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Digital Behaviours and Cognitions of Individuals Convicted of Online Child Pornography Offences

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Abstract

BACKGROUND

Modern Child Sexual Exploitation Material (CSEM) offences predominantly occur within a technological ecosystem. The behaviours and cognitions of CSEM offenders influence, and are influenced by, their choice of facilitative technologies that form that ecosystem.

OBJECTIVES

This thesis will review the prior research on cognitive distortions present in and technology usage by CSEM offenders, and present a new theory, Lawless Space Theory (LST), to explain those interactions. The cognitions and technical behaviours of previously convicted CSEM offenders will be examined in a psychosocial context and recommendations for deterrence, investigative, and treatment efforts made.

PARTICIPANTS AND SETTING

Data was collected using an online survey collected from two samples, one from a reference population of the general public (n=524) and one from a population of previously convicted CSEM offenders (n=78), both of which were composed of adults living in the United States.

METHODS

Two reviews were conducted using a PRISMA methodology - a systematic review of the cognitive distortions of CSEM offenders and an integrative review of their technology usage. A theoretical basis for LST was developed, and then seven investigations of the survey data were conducted evaluating the public's endorsement of lawless spaces; the public's perceptions of CSEM offenders; the self-perceptions of CSEM offenders; the suicidality of the offender sample; the use of technology and countermeasures by the offender sample; the collecting and viewing behaviours of the offender sample; and the idiographic profiles of the offender sample.

RESULTS

The reviews found that the endorsement of traditional child contact offender cognitive distortions by CSEM offenders was low, and that they continued to use technology beyond its normative lifecycle. LST was developed to explain these behaviours, and the view of the Internet as generally lawless was endorsed by the reference and offender samples. The public sample showed biased beliefs that generally overestimated the prevalence of, and risk associated with, CSEM offending when compared to the offender sample. Offenders were found to have viewed investigators as having a lack of understanding and compassion, and they exhibited very high suicidal ideation following their interaction with law enforcement. Offenders exhibited similar technical abilities and lower technophilia than the reference sample, chose technologies to both reduce psychological strain and for utility purposes, and many exhibited cyclic deletions of their collections as part of a guilt/shame cycle.

CONCLUSIONS AND IMPLICATIONS

Understanding CSEM offenders' technological behaviours and cognitions can inform more effective investigative, deterrence, and treatment efforts. Law enforcement showing compassion during investigations may generate more full disclosures while facilitating offender engagement with resources to reduce suicidality. Deterrence efforts focused on establishing capable guardianship and reducing perceived lawlessness provide the potential to reduce offending. Treatment of criminogenic needs for the majority of CSEM offenders is not supported by evidence, but non-criminogenic treatment warrants broader consideration.

Lay Summary

Individuals who view Child Sexual Exploitation Material (CSEM) in the present day do so almost exclusively using the Internet. On the Internet, those who choose to view CSEM have a choice of technologies that they can employ, and these technologies when grouped together make up various virtual spaces. Certain virtual spaces are more likely to provide the perception of anonymity and security, and if those same spaces contain a critical mass of illegal content, they may be perceived as lawless. Under Lawless Space Theory (LST), individuals looking for novel sexually explicit content, which may or may not initially be CSEM, gravitate toward virtual environments that they perceive to be lawless. They may begin using technologies such as peer-to-peer software that make them feel secure and anonymous while providing easy access to explicit content, including CSEM images and videos. As they continue to engage in a virtual lawless space, they see others sharing similar content, and are able to download content themselves without being caught. This reinforces their perceptions that the environment is lawless and relaxes their inhibitions and reduces their anxiety about continuing their behaviour. That particular lawless space becomes comfortable to them, and they will continue to use it, even if more secure options are available, as long as it continues to easily provide content of interest and they continue to avoid getting caught.

This research reviewed the usage of technology by adults in the United States who were previously convicted of viewing CSEM and voluntarily responded to an online survey asking about both their usage of technology and their beliefs related to CSEM. Their answers were compared to a group of adults living in the United States drawn from the general public. The research found that individuals who consume CSEM did not have the same types or magnitude of distorted beliefs as individuals who committed hands-on sexual abuse of minors, and that many used technologies long after their popularity within the general public had waned. Both the general public and those who viewed CSEM perceived the Internet as generally lawless, in support of LST. The general public estimated the risk associated with individuals convicted of viewing CSEM as higher than the actual risk, overestimating the percentage of individuals who would commit another CSEM offence after being arrested as well as the number that would go on to commit a contact offence. When they were interviewed by law enforcement, the offenders viewed their interviewers as

generally lacking in compassion and understanding. Following their initial interaction with law enforcement, the offenders had, when compared to the general public in previous studies, very high degrees of suicidal thoughts and intentions. When choosing technologies, offenders looked for tools that would provide them easy access to the most content of interest, but also took into account features that would reduce their anxiety about acquiring CSEM. Many offenders did not collect CSEM in the traditional sense (e.g., targeting images of specific victims or organizing their content into categories), but did store content, which many periodically deleted when they felt guilt or shame about their actions. They also tended to be similar to the general public in terms of their technical abilities and their acquisition and usage of new technologies.

Looking at the results of these and prior investigations, there were several areas related to deterrence, investigation, and treatment that could be enhanced. First, deterrence efforts should be evidence-based, and targeted warning messages should be implemented at the appropriate times. For investigations, a more understanding-based approach to interviewing those who have committed CSEM offences should occur, and initial suicide prevention should be part of investigative planning. Finally, treatment for offending behaviour is not warranted for the majority of CSEM offenders, but a small group of the highest risk offenders may benefit from new treatment regimens.

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SECTION 1 - INTRODUCTION AND THEORIES OF OFFENDING

Chapter 1 - Introduction

1.1 Introduction

Child Sexual Exploitation Material (CSEM) is prolific across the various technologies and virtual environments that make up the Internet. No longer limited to the back rooms of adult bookstores and mail order magazines, the growth of CSEM offending has been enabled by rapid advances in connectivity and storage technologies. In 2019, the National Center for Missing and Exploited Children, the United States' clearinghouse for provider and public reports of CSEM, received reports of 69.1 million CSEM files, including 27.8 million images, and 41.3 million videos (National Center for Missing and Exploited Children, 2020). Because of the rapid growth in CSEM offending in recent decades, there is an increased need to understand CSEM offenders, and in particular CSEM consumers - the largest group of those offenders (Wolak et al., 2012) - to better target and implement deterrence, investigative, and treatment efforts.

The initial research into CSEM offending was tied to extant work and theory on child sex offenders who had committed contact offences. Sex offender theories such as Finkelhor's preconditions model (Finkelhor, 1984), Marshall and Barbaree's Integrated Theory (Marshall & Barbaree, 1990), and Hall and Hirschmann's Quadripartite Model (G. C. Hall & Hirschman, 1991) were developed prior to the Internet boom and formed a basis for later theories of offending. Ward and Siegert's Pathways model (T. Ward & Siegert, 2002) and Ward and Beech's Integrated Theory of Sex Offending (T. Ward & Beech, 2016) evolved from these theories and were the first major post-Internet sex offender theories to be directly applied to online CSEM offending (Beech & Elliott, 2012; Elliott & Beech, 2009; Middleton et al., 2006). Newer theories, looking at Internet use as an integral part of CSEM offending, were also developed. Quayle and Taylor's Problematic Internet Use (Quayle & Taylor, 2003) as well as Seto's (Seto, 2019) Motivation-Facilitation Model addressed the role

of technology in CSEM offending, but did not address offender choices between competing technologies, the lack of countermeasure usage by offenders, nor the continued use of outdated technologies in the presence of objectively more capable or secure alternatives.

In addition to the general work on theory, targeted work on cognitive distortions present in Internet CSEM offenders was initially based on research into contact offending. Ward and Keenan (1999), for example, identified five areas of problematic cognitions in child sex offenders - Children as Sexual Objects, Entitlement, Dangerous World, Uncontrollability, and Nature of Harm. Research found, however, that Internet-only CSEM offenders had different characteristics than contact or mixed offenders (Babchishin et al., 2015). Later models took this into account. Bartels and Merdian (2016), for example, adapted the Ward and Keenan model to CSEM offenders with five modified cognitive categories - Unhappy World/Dangerous World, Children as Sex Objects, Self as Uncontrollable, Nature of Harm (CSEM-specific), and Self as Collector. Instruments were also developed that incorporated technology usage directly with cognitions. The Internet Behaviours and Attitudes Questionnaire (IBAQ) was developed and consisted of 42 behavioural and 34 attitudinal items, but many of the behavioural items are now dated (e.g., questions on bulletin boards) and subsequent research has refined the understanding of the endorsement of cognitive distortions by CSEM offenders (M. D. O'Brien & Webster, 2007). The Children and Sexual Activities (C&SA) questionnaire further identified specific beliefs of contact offenders when compared to Internet-only offenders (Howitt & Sheldon, 2007a). The Children, Internet, and Sex Cognitions (CISC) questionnaire, currently in development, shows promise as a behaviorally driven questionnaire to identity agreement in CSEM offenders with various distortion groups (Kettleborough & Merdian, 2013). Most recently, Paquette and Cortoni developed the Cognitions of Internet Sexual Offending (C-ISO) Scale, which showed strong psychometric value in discriminating between contact and Internet-only offenders (Paquette & Cortoni, 2019). While extensive work has been done on the cognitive distortions present in CSEM offenders, the overall strength of their cognitive distortions across the studies has not been assessed, and minimal work measuring technology usage in conjunction with cognitions has been performed.

Several virtual environments used by CSEM offenders have been extensively studied. Peer-to-peer networks, one of the largest ecosystems for CSEM, have been shown to have significant amounts of CSEM content being transacted (Fournier et al., 2014; Koontz, 2003; Steel, 2009a; Wolak et al., 2014). Additionally, the use of CSEM on the open web (Kusz & Bouchard, 2019; Steel, 2009b, 2015; Westlake & Bouchard, 2016) and the dark web (Dalins et al., 2018; Faizan & Khan, 2019; Guitton, 2013) have been studied, and the use of enabling technologies collected in several longitudinal studies from law enforcement records related to CSEM offenders (Wolak et al., 2005, 2012; Wolak, Finkelhor, Mitchell, et al., 2011). Little research has been done, however, on the psychological and utility-based reasons for why offenders choose a particular technological ecosystem. Additionally, there has been limited work done on the progression of CSEM offenders over time, though preliminary research suggests that there are both desistance and escalation patterns present in different offenders (Fortin & Proulx, 2018). The overall presence and long-term applicability of these pathways in a technological context (e.g., is desistance cyclical or permanent) is still an open question.

Coupled with the usage of technology, the motivations of offenders for accessing CSEM and what types of CSEM they choose to target is an area of research interest. The prior evidence indicates that there is no single motivation present, and that CSEM offenders are a heterogenous group (Taylor & Quayle, 2003). Individuals may have an interest in CSEM, but they may have other SEM viewing preferences that interact with that interest, and for some their interest in CSEM may not be the predominant interest (Seigfried-Spellar & Rogers, 2014). Other paraphilias as well as subclinical preferences for different categories of SEM may be of higher levels of interest to the individual and may serve as “healthy” alternatives to CSEM viewing, or they may serve as pathways to CSEM viewing if the content is likely to be co-located with CSEM (e.g., bestiality content) (Seigfried-Spellar & Rogers, 2013). Additionally, some CSEM activity may be state-dependent - prior research has found a general lowering of inhibitions when in an aroused state, and there may be perseverance effects present in movement between genres (Ariely & Loewenstein, 2006). The depth and breadth of viewing behaviours, and the influence of novelty-seeking as opposed to preferential viewing, is likewise an area requiring additional study.

Finally, the application of research into CSEM offending is important in the areas of deterrence, investigation, and treatment. For deterrence, evidence-based approaches that incorporate the appropriate messaging at the most effective time for intervention are needed (Quayle, 2020). For investigative purposes, many investigators utilize confrontational interview techniques that may be less effective instead of focusing on building trust (Brimbal et al., 2019), and investigative planning does not generally incorporate the high suicide risk of offenders (Hoffer & Shelton, 2013; Walter & Pridmore, 2012). Finally, the efficacy of traditional sex offender treatments for CSEM offenders has been questioned (Mews et al., 2017; Mokros & Banse, 2019), and new approaches are needed, particularly given the low recidivism rates for CSEM offenders (Seto & Eke, 2015).

To better explain CSEM offenders' choices of and interactions with technology, this work proposes Lawless Space Theory (LST), which argues that the perception of lawlessness present in the ecological niches created by specific Internet ecosystems influences CSEM offending. A lack of capable guardianship contributes to the reduction of perceived risk and habituation normalises the usage of that ecosystem. Additionally, LST argues that individuals employ specific technologies, including both the ecosystems themselves as well as tools that mitigate risk (e.g., encryption), based primarily on utility and the ability to have their psychosocial needs met. Under LST, offenders are hypothesized to make technology choices such as continuing to make use of outdated technologies that have a higher risk and lower functionality than more recent alternatives, and to fail to deploy sophisticated countermeasures to reduce actual risk.

The specific psychosocial needs of offenders are further put forth to be more diverse than what can be explained by paedophilic/hebephilic interests, and novelty seeking is hypothesized to be a critical factor for a substantial subset of offenders. Additionally, the traditional treatment focus on cognitive distortions may be hampered by both low endorsement of those cognitions and a low base recidivism rate for offenders, and a more risk-based approach, incorporating additional technology-based behavioural targets, may be warranted.

This thesis contends that, to more effectively address the deterrence, investigation, and treatment of CSEM offenders, a new approach is necessary. For deterrence to

be effective, it should include timely, targeted messaging with a sound theoretical basis. Similarly, investigative approaches need to be understanding-based, and to be better coordinated with the provision of mental health treatment. Finally, treatment needs to be evidence-based and address the shortcomings of prior approaches targeting traditional cognitions (Mews et al., 2017; Mokros & Banse, 2019), and incorporate non-criminogenic areas.

This research was designed to investigate the cognitions of Internet CSEM offenders and their interrelationship with technology usage. Within that context, goals related to their technological behaviours and beliefs were identified and addressed in discrete analyses. The overall goal of this thesis is to further the understanding of CSEM consumers and provide evidence-based recommendations to enhance deterrence, investigative, and treatment efforts. Specific sub-goals contributing to that effort are as follows:

- Review the extant research related to CSEM offenders' technology usage and endorsement of cognitive distortions.
- Develop a theoretical psychosocial model for the reciprocal interactions of CSEM users with technology and perform preliminary tests of the theory.
- Measure the public's perceptions of CSEM, CSEM offenders, and CSEM offences and quantify any differences with CSEM offenders' self-perceptions.
- Investigate CSEM offenders' suicidality and suicidal behaviour.
- Characterise the usage of enabling technology and countermeasures by CSEM offenders to facilitate their actions, including their psychological reasons for choosing specific technologies.
- Evaluate the collecting and viewing behaviours of CSEM offenders.
- Compare the technological profiles of CSEM offenders to the general public.
- Develop recommendations for deterrence, investigation, and treatment of offenders based on the results.

1.2 Structure of the Thesis

This thesis is organized into thematic sections, with chapters within each section for individual investigations. Section 1 includes this introduction, provides a brief review of relevant theories related to online CSEM offending, and proposes a new theory on lawless spaces. Section 2 reviews the relevant prior art related to cognitive distortions and technological behaviours of CSEM offenders. Section 3 provides details on the surveys used in later chapters and the overall methodology. Section 4 investigates public perceptions as related to the perceived lawlessness of the Internet and of CSEM offenders and CSEM offending. Section 5 investigates the self-perceptions of CSEM offenders as well as their suicidality. Section 6 analyses the technical behaviours of offenders. Section 7 covers a series of smaller investigations that provide context to the other chapters, including a general demographic analysis. Section 8 provides a general discussion combining all of the investigations and provides limitations and conclusions for the research. Chapters 3, 4, and 6 through 12 have all been published or have been submitted and are awaiting publication as standalone investigations in peer-reviewed journals. The formatting of these, including reporting of results, table and figure labeling and format, headings, and layout are specific to their respective journals; however, for readability, the font size, spacing, and pagination were made uniform. The details of each section and the relevant chapters are as follows:

Section 1 - Introduction and Theories of Offending. Section 1 is composed of two chapters. Chapter 1 (this chapter) provides a short rationale for the research and introduction to the topic, a brief overview of the methodology, and details on the layout of the thesis. Chapter 2 reviews the relevant theories of offending related to online CSEM offenders, and proposes a new theory, Lawless Space Theory (LST), that is the foundation of this research.

Section 2 - Prior Art. Section 2 is composed of two chapters that review the relevant research literature. Chapter 3 looks at the cognitions of CSEM offenders and their endorsement of cognitive distortions through a systematic review. Chapter 4 contains an integrative review covering the historical and current technological behaviours of CSEM offenders. Both Chapter 3 and Chapter 4 identify gaps in prior research related to cognitions and technology usage that are explored in the later

chapters. Additionally, these reviews were used to craft the questions utilized in the surveys detailed in Chapter 5.

Section 3 - Surveys. Section 3 is composed of one chapter that provides a summary of the surveys used in the investigations in Sections 4 through 6. Chapter 5 provides an overview of the methodology used (with details provided in the individual experiment chapters), as well as information on the population and samples. The surveys collect data on the cognitions and technology usage of baseline (non-offender) and offender populations and include a proposed instrument for measuring perceived lawlessness.

Section 4 - Public Perceptions. Section 4 is composed of two chapters that evaluate the perceptions of the general public related to CSEM offending. Chapter 6 measures the public perceptions of lawlessness on the Internet to test the face validity of LST and to provide a baseline to differentiate offender perceptions in Chapter 13. In Chapter 7, the perceptions of members of the public regarding child pornography and child pornographers is assessed. These results serve as a comparison baseline for evaluating CSEM offender cognitions and behaviours in Chapter 8 and are evaluated against current legislative approaches to and sentencing guidelines for CSEM offenders.

Section 5 - Cognitions of CSEM Offenders. Section 5 is composed of two chapters that investigate the cognitions of CSEM offenders. Chapter 8 compares the beliefs and perceptions of offenders to a subset of the individuals from Chapter 7 that match their gender demographics to identify the presence of cognitive distortions and inaccurate beliefs. The viability of these distortions is evaluated for the identification of potential treatment targets. Following that, Chapter 9 investigates the specifics of suicidality and suicidal ideation present during the investigative process. The results are incorporated into proposed proximal clinical and investigative interventions.

Section 6 - Technical Behaviours of CSEM Offenders. Section 6 is composed of three chapters that look at the interaction between CSEM offenders and technology. Chapter 10 investigates CSEM offenders' overall technical behaviours and usage of countermeasures. The psychological reasons for and prevalence of countermeasure usage are evaluated in terms of LST, as are the technology choices (both initial and recurring) made by offenders. Chapter 11 examines the collecting and viewing

behaviours of offenders, primarily from a content-centric perspective. The breadth of viewing, in terms of age, gender, and content category, is evaluated with respect to novelty seeking and hebephilic/pedophilic exclusivity. In Chapter 12, the profiles of CSEM offenders related to their technical ability, sociability, and technophilia are compared to the general public. These are compared to the reference sample to better allow for targeted investigative efforts and behavioural interventions based on empirical evidence.

Section 7 - General Analyses. Section 7 is composed of a single chapter. Chapter 13 provides detailed demographic results from the other investigations and includes a series of smaller experiments that provide depth and context to the prior experiments. This includes general CSEM viewing and trading behaviours, perceptions of law enforcement, and a comparison of the perceived lawlessness of the Internet between the offender and reference groups. The demographic analyses provide an evaluation of the representativeness and a basis for the generalizability of the results. The investigations assess factors with addictive behaviours for treatments that target CSEM as an addiction, and perceived lawlessness is compared to the reference population to further test LST. Finally, the perceived fairness, compassion, and understanding shown by investigators and their impact on disclosure are assessed and utilized to propose changes in investigative approach.

Section 8 - Discussion and Conclusions. Section 8 is composed of a single chapter. Chapter 14 includes a general discussion of the findings as well as limitations of the research and recommendations for future work. The support for LST, as well as specific recommendations for deterrence, investigative/legal, and assessment/treatment efforts are detailed, and a self-assessment and structured interview questionnaire to help assess CSEM behaviours from a technological perspective is proposed.

1.3 Notes on Terminology and Spelling

This research uses the term CSEM, or Child Sexual Exploitation Material, to mean visual depictions of individuals under the age of 18 in lewd or lascivious displays of nudity and/or engaged in sexual activity, irrespective of the legality of the depiction. Where a legal context or lay terminology is referenced, the term child pornography is

used as defined by United States law (SEXUAL EXPLOITATION AND OTHER ABUSE OF CHILDREN - Definitions, n.d.) and represents a subset of CSEM. The spelling throughout is British English, except where required by a journal, where the content was part of a direct quotation or reference, or where it was part of the surveys provided to participants within the United States.

Chapter 2 – Theories of Offending

2.1 Theories of CSEM Offending

Historically, the theoretical approaches to understanding offending by Internet CSEM consumers have been conceptualized through two primary mechanisms - through the application of traditional sexual offender theory and the subsequent child sexual offender theories (Finkelhor, 1984; G. C. N. Hall & Hirschman, 1992; Marshall & Barbaree, 1990), or through traditional criminological theory as applied to the Internet (Jaishankar, 2011; Jewkes & Yar, 2013). Relevant, current theories are detailed below, but a more fulsome exploration of explanatory theories for CSEM offenders can be found in several other sources (Navathe et al., 2008; Seto, 2008, 2013; Stinson et al., 2008; T. Ward et al., 2006). Additionally, there has been recent interest in both the neuroeconomic and the biological basis for CSEM offending (and general paedophilic sexual offending). Neuroeconomics looks at the offending through a behavioural economics lens, incorporating the neuroscience of learning and addiction. The incorporation of biomarkers as a predictive or diagnostic tool are beyond the scope of this thesis, but recent scholarship has noted that "currently none of these is ready yet to serve as a clinically applicable diagnostic, response, or predictive biomarker for paedophilia and child sexual offending" (Jordan et al., 2020, p. 1).

2.1.1 Child Sex Offender Theories

Traditional child sexual offender theory builds on general sex offender theory. Two of the most prominent current theoretical models that have been applied to child sex offending are the pathways model (T. Ward & Siegert, 2002) and the integrated theory of sexual offending (ITSO) (T. Ward & Beech, 2006). The pathways model has been applied to Internet child sex offences, finding that 60% of Internet child sex offenders had dysfunctional mechanisms (Middleton et al., 2006). The ITSO offers potentially greater explanatory power by incorporating neurobiological factors and has been evaluated in the context of CSEM offences (Elliott & Beech, 2009). The ITSO was found to have viability as a model for these offences, but with significant gaps in the current research in explaining CSEM offender behaviour (Elliott, 2012).

As indicated by the title, Ward and Siegert's (2002) pathways model uses a "theory knitting" (Kalmar & Sternberg, 1988) approach to integrate earlier theories (Finkelhor, 1984; G. C. N. Hall & Hirschman, 1992; Marshall & Barbaree, 1990) into a comprehensive multi-factor explanatory model for offending that defines specific paths that lead to abusive behaviour. They identify the key factors as "developmental adversity, cultural values and belief systems, family context, biological variables, psychological deficits, and situational variables" and propose four relevant psychological phenomena - "intimacy and social skill deficits; distorted sexual scripts; emotional dysregulation; and cognitive distortions" (T. Ward & Siegert, 2002, p. 331).

Ward and Hudson (1998) developed a metatheoretical framework, conceptualizing sex offender theories into three levels. Level 1 theories are comprehensive, multifactorial models that generally incorporate both distal and proximal factors. Level 2 theories are single factor theories that explain specific phenomena associated with offending and are frequently incorporated into level 1 theories. Level 3 theories, often referred to as microtheories, generally focus on one area of the offence chain. Ward and Siegert's (2002) pathways model is a comprehensive level 1 theory, and seeks to identify all primary causal pathways for offending behaviour, both proximal and distal. The pathways model has been applied to Internet offenders (Middleton et al., 2006), and provides a macro-level view of offending behaviour.

Two specific concepts from the pathways model are particularly relevant to Internet CSEM offenders: situational variables and cognitive distortions, which are thought patterns that allow individuals to rationalize perceptions that differ from reality. The pathways model focuses primarily on state-based situational factors (such as proximal substance abuse) and cues or triggers, but to apply the concepts to Internet offending the facilitative impact of a permissive technological environment needs to be considered. This has been proposed as explanatory for other Internet-offences, for example cyberfraud by Nigerian youth (Ebenezer et al., 2016) and Sub-Saharan cyberfraud in general (Bessette et al., 2015). Cognitive distortions are also likely to be similarly important in Internet CSEM offending, as both offence supportive cognitions and ex post facto rationalizations, but are believed to be focused on different areas than contact offenders (Elliott & Beech, 2009; Khanna, 2013).

Developmentally, CSEM offending has been linked to older parents with lower education and a violent criminal history, as well as having congenital malformations and fewer older brothers (Babchishin et al., 2019). From a developmental psychopathological perspective, Srouf (1997) noted that numerous factors can either sustain or deflect an individual from their current path in a probabilistic way. This is evident in the preliminary exploration of viewing trajectories by Fortin and Proulx (2018), which showed similar point-in-time usage leading to vastly different future behaviours, ranging from a progressive decrease in age and increase in deviancy to a de-escalation of CSEM viewing.

ITSO further expands on the pathways model by incorporating developmental, neurological and ecological factors, increasing the explanatory power of offending behaviour (T. Ward & Beech, 2006). Specifically, ITSO proposes that a combination of biological and social learning factors is responsible for sexual offence behaviour.

Of particular interest is the concept introduced in ITSO of an ecological niche, which includes both proximal and distal (across the lifespan) environmental influences and is relevant to online CSEM offenders (T. Ward & Beech, 2006). Proximal environmental factors include physical environmental influences, and Ward and Beech (2006) argue that, if they are strong enough, environmental influences can lead to offending even without the presence of other psychological factors. Their work has been extended to online sexual offenders (Beech & Elliott, 2012; Elliott & Beech, 2009), with the proximal ecological niche evaluated in the context of the Internet.

Beech and Elliot (2012) present the Internet itself as the primary component of the proximal ecological niche, citing skill acquisition (Quayle & Taylor, 2003) as an integral factor in interaction in that space. Online groomers, for example, have been shown to acquire targeting and technological skills to facilitate online solicitation offending (Quayle et al., 2014). Instead of being a static entity, an Internet-based ecological niche can be altered or even dynamically created to meet specific criminogenic needs (Quayle et al., 2014).

Perception of anonymity and ease of access are noted (Elliott & Beech, 2009) as potentially causing an escalation in problematic Internet usage. The proximal ecological niche interactions also have a direct cognitive effect on offenders.

Normalization occurs through routine interactions with like-minded individuals by either direct (chatting or posting on message boards) or indirect (reading content or through general content exposure) means, and can reinforce cognitive distortions and lead to new skill development, including the learning of new countermeasures to avoid detection and the improvement of content acquisition skills (Quayle & Taylor, 2003).

The proximal ecological niche can be expanded to include the physical domain as well, as noted but not fully explored by Beech and Elliott (2012). Their work looked at the impact of the Internet, including skill acquisition, on changing the ecological niche and "changing both the person's physical environment and their ability to control that environment" (2012, p. 7). Preliminary work on content acquisition by online CSEM offenders outside of their home has shown that other locations are utilized (Wolak, Finkelhor, & Mitchell, 2011), but how and why offenders select particular locations is an unresolved question and the recent growth in mobile Internet connectivity through cell phones and other devices may further the trend of usage outside of the home (Steel, 2015). Additionally, the Internet as a whole is too broad to be viewed as a monolithic ecological niche. The overall virtual ecosystem in which a particular offender operates must be viewed contextually and may drive the types of interaction (and may be chosen to meet specific needs). In practice, an offender using exclusively peer-to-peer software from their desktop may have a qualitatively different interaction than an offender trading content through interactive group chat on a mobile device, meeting different social and utility-based needs and potentially forming a separate niche. To-date there has been no research looking explicitly at offender needs and their influence on technology usage and ecosystem choice.

2.1.2 Internet and General Criminological Theories

General criminological theories that have been broadly applied to Internet criminality (Jaishankar, 2011; Jewkes & Yar, 2013) and can specifically be applied to online CSEM activity. The activities of CSEM consumers can be conceptualized through the lens of rational choice theory in general and routine activity theory specifically. Online CSEM offending has also been conceptualized through general social learning theory (Bandura & Walters, 1977), particularly in relation to technological

environments where communications through forums are prevalent (Jung et al., 2012). As detailed below, Internet and general criminological theories provide partial explanatory power for CSEM offender actions.

Under rational choice theory, individuals act in their own self-interests, and consider risks through an analysis of the likelihood of getting caught and the impact of their actions (against victims and against personal loss), weighed against the benefits of committing an act (Becker, 1968). Rational choice theory additionally drives the selection of *how* to commit a particular act in light of selection between multiple alternatives. In CSEM offences, the positive value of their actions, i.e., the benefits, can be viewed as the use of sexual media to activate the reward mechanisms in the brain (Hilton & Watts, 2011; Pitchers et al., 2010; Pitchers et al., 2010). CSEM consumers therefore should "value" novel experiences, in particular viewing content that effectively stimulates the reward-reinforcement pathways -- whether those pathways are reinforced by the collecting activity or the actual viewing may vary (Taylor & Quayle, 2003). The impact of their actions is a combination of their evaluation of risks to themselves (both the likelihood of getting caught and the ramifications of getting caught) and the amount of cognitive dissonance (the strain caused by the difference between thoughts and actions) generated by their knowledge of the "wrongness" of their behaviour, which can be assessed through their use of cognitive distortions.

When employing rational choice theory, both the technology usage and cognitions of offenders must be considered. Different technologies used to commit cybercrimes have different perceived values to offenders (Higgins, 2011; Kao, 2014). In the case of CSEM consumption, this can include benefits such as the speed of content acquisition, the amount of content available, the ease of use, and familiarity. It can also include perceived risks that can be generalized to the likelihood of getting caught. Similarly, the cognitions of offenders can drive their behaviours by diminishing the psychological stress related to their actions through distortions and this can have a reflexive impact (e.g., through normalization). An example of a common distortion amongst CSEM offenders, Virtual is not Real, allows an individual to view their actions as less impactful by divorcing digital activity from the underlying abuse (Paquette et al., 2019).

As an illustration, the choice between using peer-to-peer software and using a Tor-based private forum to acquire CSEM content can be considered. Peer-to-peer software is inherently riskier, with tools such as CPS and RoundUp (Liberatore et al., 2010) actively used by law enforcement to monitor activity. Additionally, peer-to-peer arrests are frequently featured in the media, making the risks more salient. Content, however, is abundant and diverse on peer-to-peer networks, and peer-to-peer software is relatively easy to use and requires minimal setup (Hughes et al., 2006; Hurley et al., 2013; SourceForge Staff, 2019; Steel, 2009a; Wolak et al., 2014; Wolak, Finkelhor, & Mitchell, 2011). Tor-based forums, alternatively, are objectively lower risk. The Tor network is anonymizing, encrypting traffic and hiding the source (consumer) IP address as well as the target (forum) IP address (The Tor Project, Inc, n.d.). Additionally, forums often have controls in place to prevent law enforcement from gaining easy access, including referral requirements or upload requirements (sending CSEM content) before being allowed to join (Faizan & Khan, 2019; Holt et al., 2010). While Tor forums are lower risk, there is no cross-forum search and indexing and forum content can be transient, so targeted content may be more difficult to obtain, and Tor has bandwidth constraints (Bissias et al., 2016; Dingledine & Murdoch, 2009; *Performance – Tor Metrics*, 2019; Westlake & Bouchard, 2016). While individuals may not consciously weigh all of the technological factors, they cannot ignore their impact on their subjective experience when using the tools. On the psychological factors, perceived anonymity is important in reducing stress (Eneman, 2009), and frequency of exposure leads to normalization (Popham, 2018). There has been minimal work looking at how CSEM offenders view the perceived anonymity between preference choices, and the differential impact between normalization through ready availability and quantity (the peer-to-peer model) and more in-depth interaction with like-minded individuals (the Tor forum model).

Routine activity theory builds on rational choice theory by including the concepts of time and space as well as offender and victim interaction. Rational actors (offenders) choose to be in a particular place and time (e.g., outside of a bar at closing time) where targets are likely to be present, selecting target rich environments with a low presence of capable guardianship. Specifically, Cohen and Felson (1979) proposed that, for a crime to occur, three things have to happen. First, you need an available and suitable potential victim. In the case of CSEM

offenders, the victimization is secondary and is reflected in the availability of content of interest to the offender. Second, you need a motivated offender - i.e., a potential CSEM consumer. Third, you need the lack of an authority figure which would prevent the crime from occurring. In the CSEM offence realm, with few exceptions, offences are rarely actively deterred at the time of the action (Steel, 2015), but the more important characteristic is the *perceived* presence of authority (i.e., capable guardianship). With a lack of perceived authority, the Internet becomes a virtual "lawless space", providing the third element necessary for criminality under routine activity theory. Research and disruption efforts have largely focused on the first element, the availability of CSEM material (e.g., (Kloess et al., 2014; Seto et al., 2015), with treatment efforts focused on the second element (the offender and their motivations). The interplay of offender motivation and their perceptions, as well as their choice of technologies, impact the third element, and provide a new area of intersectional research into the impact of virtual spaces on CSEM offending.

Prior research looking at routine activity theory as predictive of cybercrime has mostly focused on victimization (Bossler & Holt, 2007; Choi, 2008; Holt & Bossler, 2008; Hutchings & Hayes, 2009), and the applicability of terrestrial spaces to virtual spaces has been questioned (Yar, 2005). The prior work predates the eminence of the dark web and fails to take into account the segmentation of networks by technology (e.g., peer-to-peer) that are the virtual equivalent of physical spatiality, and the amount of effort needed to obtain access to a particular virtual space is akin to distance. The concept of temporality being a factor can likewise be incorporated, though the timescale looked at by Yar (2005) is inadequate (i.e., hour of the day). Prior work fails to take into account the obvious nature of online solicitation offences of minors (which are more likely to occur when the minor is online and not in school, for example, if desktop chat programs are used), but has primarily applied the concept to victimization related to non-child exploitation crimes (Leukfeldt & Yar, 2016). Additionally, the timing aspect becomes relevant on a scale of months or years as opposed to hours and days as technologies ebb and flow in usage and enforcement. An individual using Internet Relay Chat (IRC) to obtain CSEM in 2019 is likely to have a higher level of capable guardianship present but also a lesser amount of potential content than in 2009, impacting the use of that particular pathway for criminality.

Wortley and Smallbone (2006) applied situational crime prevention theory to all crimes against children. Situational crime prevention, unlike other theories, focuses on reducing the opportunities for crime as opposed to dealing directly with the offender (R. V. G. Clarke, 1997). Wortley and Smallbone (2006) identified four environmental factors that can facilitate offending:

1. Situations can present cues that prompt an individual to perform criminal behaviour;
2. They can exert social pressure on an individual to offend;
3. They can weaken moral constraints and so permit potential offenders to commit illegal acts; and
4. They can produce emotional arousal that provokes a criminal response (Wortley & Smallbone, 2006, p. 10)

Situational crime prevention theory has also been applied to deterrence efforts, specifically the concept of an opportunistic offender. Looking at gateway offences, Hunn et al. (2020) found that a substantial minority of the public did not understand that CSEM viewing was criminal or comprehend the victimization associated with it, providing a potential intervention target to reduce the number of future offenders.

Taylor and Quayle (2006) further expanded upon the applicability of situational crime theory to existing online CSEM offenders. They included risk-based decision making in that offenders evaluate the expected payoff of an action (e.g., clicking on a link) against the potential risk of adverse consequences, creating a “precriminal opportunity” for intervention. Quayle and Taylor (2006) identified that the virtual environments facilitated by the Internet “constrained the behavioural repertoire”, which influenced further criminal behaviour. In particular, looking at the socialization aspects of online CSEM offending, normalization through those interactions makes future criminal behaviour more likely, but technological constraints may limit the offending. This built on their earlier model of problematic Internet use (Quayle & Taylor, 2003), which incorporated problematic cognitions as well as Internet-specific enablers of perceived anonymity, reduced inhibitions, and ready availability of specialized fantasy content.

Given the proliferation of online CSEM ecosystems, both social and non-social, the limitations have been largely removed and the offenders now have a choice of virtual environments in which to operate. In non-social environments, indirect normalization (acceptance of abnormal behaviour through vicarious exposure and selective environmental reinforcement) occurs, and the rate limiting factor in finding additional content becomes the expertise in navigating a particular environment.

2.1.3 Neuroeconomic and Behavioural Theories

Love et al. (2015) reviewed the neuroscience of general Internet pornography usage and found that it maps to traditional addiction models and activates the same mechanisms as substance addiction. In another review, Chamberlain et al. (2016) looked at behavioural addiction in general, as well as hypersexual behaviour and Internet addiction in particular. They concluded that there are issues in making a direct comparison to substance-based addictions, in particular with the concepts of withdrawal and tolerance. They noted, however, that gambling disorder, another behavioural addiction, has been found to have features consistent with substance-based addictions, and to have comorbidity with Internet addiction. Perry et al. (2014) identified that reward seeking behaviour, including that in hypersexual behaviour related to SEM, is associated with a decrease in volume in areas of the right basal ganglia in behavioural variant frontotemporal dementia patients. Due to the complex nature of the reward circuitry, they postulated that the actions could be related to either increased reward sensitivity or to a decrease in the sensitivity to the consequences of their actions. Also related to the reward system, Oei et al. (2012) identified dopamine as a primary modulator in the reward process, particularly related to the nucleus accumbens, when presented with subliminal sexual stimuli, though the interaction may be part of a more complex neurochemistry (Krüger et al., 2005).

The reward system activation is relevant for searching behaviour as well as any release related to orgasm, which has been shown to activate reward seeking areas including but not limited to the amygdala, cortex, nucleus accumbens, thalamus, and ventral tegmental area (Marson, 2008). Of particular interest to searching behaviour, the *anticipation* of gain (such as an orgasm) may activate the neural reward circuitry (Cho et al., 2013; Hommer et al., 2003; Katner et al., 1996; Knutson et al., 2001) as

opposed to the receipt of the reward, with the level of activation related to the potential value placed on the reward (Kirsch et al., 2003). According to the prediction error hypothesis, dopaminergic reinforcement only codes for the difference between the expected reward and the actual reward (Caplin & Dean, 2008), supporting greater reinforcement when novel content is acquired (Krebs et al., 2011).

With CSEM offenders, the visitation to, and interaction with, the technical environment therefore may in and of itself provide a dopaminergic reward activation (and reinforce the usage of that environment). This provides two potential treatment targets - the usage of particular technologies (and engagement in the associated lawless space), as well as the cues that start the subsequent neurological reward circuitry engagement (e.g., non-offending images that cause an individual to start a session of seeking offending images). Additionally, because of the bidirectional relationship between emotion and sexual regulation, the emotions and their underlying biological regulation become targets for treatment (Quayle et al., 2006; Smid & Wever, 2019).

As a blended theory, building on Finkelhor (1984), Seto (2019) proposed the motivation-facilitation model (MFM) of offending for general sexual misconduct but with specific applicability to CSEM offences. MFM highlights three key motivations - the presence of paraphilias, a high sex drive, and an intense mating effort. For CSEM offenders, chronophilias (paraphilias characterized by a sexual attraction to individuals within a limited age range) are the most prevalent (Seto, 2017), with paedophilia and hebephilia as the primary paraphilias, though comorbid paraphilias such as voyeurism and sadism may play a role in content selection. Hypersexuality, whether clinically defined based on sexual activity or by a cutoff on a continuum (e.g., above the 95% percentile) (Kafka, 1997), has been correlated with CSEM usage (Seto et al., 2010). A high mating effort may be relevant to CSEM offences in terms of novelty-seeking behaviour and would potentially explain the breadth of CSEM-related content present with some offenders beyond what is explained through hypersexuality.

The second portion of the MFM model, facilitation, incorporates lack of self-control to explain why some motivated individuals become offenders (Gottfredson & Hirschi, 1990). Misogynistic attitudes, negative affect (Cortoni & Marshall, 2001), and state-

based factors are also facilitators. Seto (2019) further incorporates time and place as factors, as well as the lack of capable guardianship, consistent with routine activity theory. MFM does not address the method of offending specifically (e.g., choice of a technological environment) or the trajectories of offending, but offers a strong basis for a motivation-based treatment approach.

The behavioural economics of choice provide a basis for CSEM technical activities as well. When provided with a default (the current ecosystem used), individuals will tend to stay with that default. Thaler et al. found that "behavioral tendencies toward doing nothing will be reinforced if the default option comes with some implicit or explicit suggestion that it represents the normal or even the recommended course of action" (Thaler et al., 2013, p. 430). Within the CSEM environment, finding content that drives the reward system and encourages normalization contributes toward reinforcing the status quo, even in the face of objectively more viable options. Additionally, the economic concept of friction costs has been applied to other domains with behavioural reinforcers. Carr and Epstein noted that "If the value of Reinforcers A and B are equal, but Reinforcer A is more easily accessible, then people will generally choose Reinforcer A" (K. A. Carr & Epstein, 2020, p. 142). Thus, the presence of similar rewards (CSEM content) on an unfamiliar ecosystem is generally less accessible, and the reinforcer needs to be substantially stronger (e.g., significantly more content or more desirable content) to overcome the friction costs of switching.

2.2. Lawless Space Theory

Taylor and Quayle's (2006) situational offender theory can be combined with the concept of the proximal ecological niche (2012) and applied to current CSEM offenders through the concept of a "lawless space". A lawless space, in this context, is a technology ecosystem where there is a *perceived* lack of capable guardianship that facilitates Internet-based criminal activity. This research looks specifically at the intersection between the virtual environment created by the use of technologies (and the physical space where they occur) and the motivated cognitions that reflexively interact to facilitate online CSEM offending. Lawless space theory posits that:

1. Offenders will primarily choose and utilize a perceived lawless space that best meets their psychosexual needs in the most frictionless way.

2. Habituation and differential association in the lawless space will reduce the perceived risk.

3. Normalization will increase comfort in a particular lawless space, increasing friction costs that must be overcome to switch technologies.

4. Additional countermeasures will only be implemented by offenders to reduce perceived risk and lower cognitive dissonance, but not at the expense of utility.

The American Wild West is often held up as the canonical example of a lawless space (O'Roeardon, 2004), presented through movies and literature as having bank robberies and shootouts occurring on a regular basis. Though there were specific areas with high crime, the American Wild West is more accurately a representation of a *perceived* lawless space (Agnew, 2017). Similar to the American Wild West, the Internet has also been labelled a lawless space, and may be so in both perception and reality[1].

There are areas of the Internet that are *in effect* lawless. On the dark web, for example, most criminality goes unreported and unpunished. In 2017, only 1 out of every 300 Internet crimes was estimated as having been reported to law enforcement (Bayerl & Rüdiger, 2018). The impact of this situation and the perceptions of it can be seen in a corollary illegal content issue - music piracy. Looking at music piracy on the Internet, Chiang and Assane found that "piracy occurs when an individual is unwilling to pay for a good but is willing to acquire a pirated version of it" (Chiang & Assane, 2009, p. 514), noting that increasing the perceived risk of piracy can reduce demand. Similarly, perceived lawless spaces facilitate differential association, and normalize the piracy (Cheung, 2013). Differential association includes learning motives, drives, rationalizations, and attitudes (Sutherland et al., 1992), but also techniques and countermeasures. Similar effects would apply equally to online CSEM consumers in virtual

[1] The National Society for the Prevention of Cruelty to Children even named its 2019 campaign against Facebook implementing encryption the "Wild West Web".

environments, and there is significant overlap between the piracy community and the CSEM offender community, with pirate sites providing another mechanism for CSEM acquisition (Watters, 2018).

Increased lawlessness can change perceptions as well, particularly with regard to capable guardianship. While there are no physical agents present in cyberspace, there are visible deterrents, ranging from warnings on search engines (Steel, 2015) to discussions of arrests on message boards (Jenkins, 2001), whose presence qualifies as what Felson notes as informal guardianship "whose mere presence serves as a gentle reminder that someone is looking" (Felson, 1998, p. 28). Whether or not the specific ecosystem is *in effect* lawless is irrelevant, however, under LST; it is the *perception* of lawlessness that is essential.

Different lawless spaces have different barriers to entry, both technological and social. At the simple end, searching Google for CSEM using lay terms (e.g., "young boy sex") using a web browser is easily performed and requires no specific skills or associations. At the other extreme, closed dark web forums may require the installation of specific technologies (e.g., Tor and Bitcoin), and may require the submission of illegal content obtained a priori similar to prior closed-membership groups (Jenkins, 2001), requiring prior sophistication. As such, certain spaces may be considered likely "gateways" to other spaces. Each space may have a different lingua franca, and create a subculture adapted to meet the needs of its members (Jenkins, 2001; Steel, 2009b).

LST is proposed to have explanatory power for the actions of CSEM offenders. It differs from other environmental crime theories, however, in that it does not predict that the presence of a perceived lawless space or interaction in that space causes CSEM behaviour. Building on Routine Activity Theory concepts, LST assumes the a priori presence of a motivated offender, and only predicts their choice of and continued usage of a particular environment. Unlike the largely discredited (Harcourt & Ludwig, 2006) Broken Windows model of environmental criminality (Wilson & Kelling, 1982), the mere presence of other illegal or illicit content in and environment does not create an environment that is causative of CSEM offending under LST. Rather, a motivated offender, who is already looking for CSEM, will choose a specific ecosystem that creates a perception of lawlessness through the presence of that

content. The factors that are involved in the choice of and usage of lawless spaces are detailed below.

2.2.1 Technology Choice and Psychosexual Needs

Evaluating the psychosexual needs of offenders in the context of a lawless space is as critical as viewing other criminological activity within a physical environment. The psychosexual needs that drive offenders to a particular lawless space need to be understood to focus deterrence efforts on both gateway activities and on controls that actually mitigate risk and do not simply facilitate risk transfer. Investigatively, the choice of a lawless space may provide profiling information on a particular offender and their likelihood of using other, complementary lawless spaces and ultimately enhance an understanding-based approach to CSEM casework. The application of traditional profiling to CSEM offending is in its infancy, but shows promise for investigative prioritization (McManus et al., 2011) and assessing the move from Internet to contact offending (Elliott et al., 2013). Finally, the cognitive distortions present in a particular individual may drive their selection of a specific lawless space and interacting in that space may enhance future offence supportive cognitions. Disrupting that cycle can be used to enhance behaviourally based treatment interventions.

There are multiple virtual ecosystems that comprise the lawless spaces on the Internet relevant to CSEM offenders. For example, peer-to-peer networks provide rapid, large scale content acquisition, but content persistence is highly variable (Bissias et al., 2016) and there is generally no direct interaction between offenders. The dark web, in contrast, has highly targeted content available freely and for purchase, and includes forums for interaction (Guitton, 2013), but has sites that are highly variable in availability despite CSEM having a large presence on the dark web overall (Dalins et al., 2018; Owen & Savage, 2015) and has historically had slow access to content (Dingledine & Murdoch, 2009). This requires an offender to make trade-offs when determining which technology to use. Proposed factors taken into account when offenders choose an ecosystem may include:

1. Diversity and quantity of content available.
2. Persistence of content availability.

3. Perceived lack of law enforcement presence.
4. Ease of use.
5. Speed of content acquisition.
6. Socialization features.
7. Comfort level with technology.

Content availability varies greatly between platforms, both as an absolute and as a percentage of the available material. The amount of offending CSEM content present may contribute to the view of a space as lawless, and the relative percentage and persistence of non-CSEM illegal content can serve as a signaling mechanism for a lack of capable guardianship.

The availability and ease of acquisition of content relevant to a particular offender is hypothesized to be of prime importance, but social factors are also a consideration. Lawless spaces have varying degrees and types of social interactions. Not all spaces require social interaction, and a lack of interaction may be a desired feature for specific offenders. When present, social interactions can be passive (e.g., viewing the content on a forum) or active (e.g., posting to a forum), and can be synchronous (e.g., chat) or asynchronous (e.g., email) in nature. The use of these social interactions is detailed below.

Ultimately, the choice of ecosystem is driven toward lower friction costs for the offender. The friction cost encompasses the direct transactional costs (in effort and money) as well as the indirect costs (e.g., the potential change in cognitive dissonance). Examples of direct and indirect costs are shown in Table 2.1 below.

Financial Costs	
Direct	*Indirect*
Cost of the content	Purchase cost of the laptop/desktop/cell phone
	Purchase cost of Internet service
	Purchase cost of countermeasure software/hardware (e.g., a second device)

Time Costs	
Direct	*Indirect*
Proximal time to find content	Time spent to join and maintain the ecosystem (e.g., software acquisition, installation, and maintenance)
Proximal time to download and view the content	Time learning the ecosystem
	Delays caused by countermeasure usage
	Time learning the specific patois
	Time spent gaining access to a particular group or forum
	Time lost viewing or acquiring unwanted content
Psychological Costs	
Direct	*Indirect*
Habituation to viewed content	Discrepancies between self identity and conduct
	Discrepancies between societal expectations and conduct
	Anxiety over detection

Table 2.1. Example friction costs of CSEM transactions

When choosing an ecosystem, offenders will seek to minimize friction costs, and the friction costs are not necessarily the same for all offenders. This can be done by utilizing easier-to-use software with a rapid learning curve (e.g., most peer-to-peer clients), by reducing cognitive dissonance (e.g., joining a forum to normalize behaviour), by employing countermeasures to reduce anxiety (e.g., using Tor-based services), or by the purchase of new technologies (e.g., acquiring a faster Internet connection). Understanding the friction costs are important for deterrence in that they provide both a mechanism and a framework for interventions.

2.2.2 Habituation and Differential Association

Habituation, the decrease in stimulation through repeated usage, is frequently discussed in the context of CSEM as part of novelty seeking. Quayle et. al (2006) put forth arousal as the "benefit" in the cost benefit calculation, such that any reduction in arousal would reduce the value of a particular transaction, driving searches toward content that increases the arousal of the offender. Zillman and Bryant (1986) found that users of pornography drifted toward more extreme pornography over time as arousal became more subdued with increased exposure, though habituation in general sex offenders has been questioned and conflicting research has shown a lack of change in arousal due to novel stimuli in other studies (Palk & O'Gorman, 2004). Previous work has found that habituation to adult pornography may explain one pathway into CSEM, specifically that "some individuals habituate to pornography and that high levels of sensation seeking and extensive online pornography use may be important risk factors for CP consumption" (Ray et al., 2014, p. 537). Additionally, CSEM offenders with longer periods of activity have been found to have higher amounts of more severe content (Quayle & Taylor, 2002), and view more deviant content such as bestiality material (Seigfried-Spellar & Rogers, 2013).

What has not previously been examined is the impact of habituation on negative arousal within CSEM offenders. Negative arousal occurs through fear or anxiety related to the risks associated with an activity. Specifically, the perceived risk of an action can be attenuated through habituation, reducing negative arousal, even when the actual risk remains unchanged (Slovic et al., 1986). This effect had been shown in animal studies (Nowak et al., 2014; Wheat & Wilmers, 2016), and in humans in other domains such as tobacco use (Leavens et al., 2019). This impacts the continuous risk/benefit analysis associated with offending CSEM activity in the use of a lawless space, making continued usage more attractive, and increases the required benefit costs needed to switch lawless spaces. The longer an individual uses a particular lawless space and does not get caught or encounter any stimuli that increase the perceived risk (e.g., reading an article about law enforcement activity), the more valuable that space becomes. This also potentially influences the timing of deterrence efforts - it is easier to increase the perceived risk beyond the threshold during the first interaction than during the n-th interaction.

Along with habituation, differential association specific to a lawless space influences its usage. Differential association primarily normalizes behaviour through the interaction with like-minded individuals who provide CSEM offenders mutual support as opposed to social guardianship. This can occur directly through the use of forums where individuals can openly discuss their behaviours, creating a social in-group (Quayle & Taylor, 2003). Additionally, through chat or message boards, offenders can trade accounts with others and post their own thoughts and actions for feedback, not realizing their choice of a forum may have created an echo chamber. Social media echo chambers lead to in-group thinking, reinforcement of pre-existing ideas, and default differential association, which impacts cognitions and emotions (Del Vicario et al., 2016).

Indirectly, everything from file names and descriptions to the amount of content available within a particular lawless space are amplifying, and open sharing of content can support motivated reasoning behind cognitive distortions. Offenders are able to observe others who are "worse" than they are, either through their comments in postings or through the types of content they make available - particularly if the content relates to younger children or more egregious activities - leading to minimization-based cognitive distortions (Abel et al., 1984; Paquette & Cortoni, 2020). Continued browsing is further reinforcing of minimization-based distortions, and each encounter with material not of interest to the offender potentially impacts not only Mechanism II distortions (proximal thoughts that allow justification immediately prior to an offence) for the current browsing session but also reinforces Mechanism III distortions (post-hoc thoughts that justify past behaviours) from prior offences (Szumski et al., 2018).

CSEM offenders also enhance their techniques, including the use of countermeasures (Quayle & Taylor, 2003), through differential association that is both specific to a lawless space and transferrable to other lawless spaces. Through direct interaction, offenders can engage in chat and in forums where they can elicit information on how to better utilize a lawless space or learn about other lawless spaces. From a countermeasures perspective, guides on everything from the discrete use of VPNs and cryptocurrency to how-to-avoid-law-enforcement can be obtained. Outside of direct learning, vicarious learning through observing others can occur. Learning the terminology associated with content of interest can occur

through trial and error and observations of things like postings and filenames from other parties, rather than through the use of primers or similar materials. Because of this, the more time spent on-target, the more effective future time can be spent in a particular lawless space, making later transactions more frictionless and thus having a greater benefit to the offender at a lower cost.

2.2.3 Frictions Costs and Switching

Individuals have been shown to choose default (status quo) options, even when presented with superior alternatives (Johnson et al., 2012; Johnson & Goldstein, 2003; Thaler & Sunstein, 2009). In the technology realm, CSEM users are likely to stay within their chosen lawless space as long as their psychosocial needs are met and will only switch spaces if forced to (e.g., the lawless space becomes unavailable) or if the friction costs become less than the gain in psychosocial benefit of switching.

Based on rational choice theory, there are two distinct decision activities - the decision of involvement (the process of engaging in a particular form of crime) and the event decision (deciding to commit a specific crime). Involvement decisions are long term and multi-stage, while event decisions are short term and proximal activities (R. V. Clarke & Felson, 2017; Cornish & Clarke, 2014). The choice of constructing (e.g., installing software) and learning an ecosystem is one of involvement, however the selected ecosystem will facilitate increasingly easier event decisions (R. V. Clarke & Felson, 2017). The cost of switching ecosystems becomes a new involvement decision, re-engaging the longer-term planning required to re-start the criminal behaviour. Offender technical capabilities may alter the potential costs of switching as well, with more technical users being more likely to use complex (utilizing encryption and secure browsing) spaces (Griemink, 2019). Obtaining the skills necessary to switch to a more complex (and secure) space may require technical knowledge acquisition, which requires longer term planning unless the acquisition is incidental to the browsing of the current lawless space, such as skill learning through browsing of forums (Quayle & Taylor, 2003).

Using the Theory of Reasoned Action (Fishbein & Ajzen, 1977), user adoption of new lawless spaces can be viewed through the Technology Acceptance Model (TAM) (Davis, 1989). Under TAM, users will adopt new technologies based on their

perceived usefulness and the perceived ease of use, which form a behavioural intention. TAM has been shown to be robust across multiple technology domains (King & He, 2006), and drives the transition to switch to a new lawless space. The perceived usefulness of a new space is the difference between the content available combined with the lack of perceived law enforcement oversight. The friction costs to switch are perceived ease of use. As users become more familiar with their current lawless space, the differential in perceived ease of use grows. Additionally, users will form a behavioural intention to switch only when the presence of sufficient novel content in the current space is not enough to stimulate arousal given habituation as noted above, and the perceived risk between the current space and the new space coupled with the ease of use difference is low enough (friction costs).

Given Cooper's Triple-A engine model, with the Internet offering accessibility, affordability, and anonymity (Cooper, 2013), normalization within a lawless space contributes to the enhancement of all three. Accessibility becomes easier as skills are developed to acquire content in a lawless space, making searching and reviewing more rapid. This reduces the time cost (affordability), as does the acquisition and installation of software that facilitates access. Anonymity, which is a key concern of CSEM offenders (Eneman, 2009), is a constant fear, though one which is likely to be reduced every time an individual engages in CSEM activities and does not get caught or encounter capable guardianship. Each of these serve to reduce the cost of using the current lawless space, and proportionately increase the switching cost to other spaces.

The friction costs of switching lawless spaces help explain the reluctance of some offenders to switch technologies, even when more viable lawless spaces exist. As an example, Usenet, a distributed set of limited functionality newgroups based on largely obsolete technology, was the first major Internet-based CSEM lawless space (Mehta, 2001). Other technologies, such as dark web forums and message groups in encrypted mobile applications such as WhatsApp provide more modern interfaces and advanced functionality, including better anonymity controls, yet Usenet persists as a CSEM distribution mechanism (A. Carr, 2004; IWF, 2018a). Longitudinal studies have not been performed tracking individual CSEM offender technology usage (only aggregate usage), but lawless space theory would predict that older technologies largely represent a user base of longer term CSEM offending, and that

newer offenders would navigate toward more current technologies that they would already be familiar with through other usage.

2.2.4 Usage of Countermeasures

Countermeasures (known as precautionary acts in behavioural analysis) are acts taken by offenders before an offence to reduce the likelihood of detection (e.g., creating a throw-away email address to register for a service), during an offence to prevent it from being detected or hide the offender's role in it (e.g., using encrypted communications on the dark web), or after an offence to frustrate attempts by law enforcement to prove the offence afterward (e.g., using encrypted storage) (Turvey, 2014). Many countermeasures can be implemented at zero financial cost - GPG, for example, provides excellent encryption and is open source software (The People of the GnuPG Project, 2019), and the Tor browser, which uses onion routing to obfuscate the source of web requests is also free and easy to use (The Tor Project, Inc, n.d.).

Using a traditional economic analysis where all offenders are rational actors, countermeasure usage should be ubiquitous. In practice, the use of countermeasures has been consistently low. In the earliest comprehensive study (using 2001 data) that looked at countermeasures, only 20% of offenders hid their collections using sophisticated technology (Wolak et al., 2005), and that number remained low in 2006 at 19% (Wolak, Finkelhor, Mitchell, et al., 2011). Additionally, a large percentage of CSEM offenders have been found to have medium to high technology skills (A. Carr, 2004; Wolak et al., 2005), making the installation and usage challenges an unlikely barrier.

Since financial cost and installation/usage effort do not explain the limited usage in light of the high consequences of detection, there are other factors that must be present. In particular, the absolute risk is not the basis of evaluation but the *perceived* risk. Additionally, the value of implementing the countermeasure will be based on the reduction of perceived risk against the impact to utility (slowing down the acquisition or viewing of content) and will paradoxically decrease over time instead of increasing (as offenders become more knowledgeable). This can be explained in part through the self-management of cognitive dissonance.

Cognitive dissonance, a state of inconsistencies between thoughts and actions, causes psychological tension. According to Festinger (1962), individuals will try to reduce dissonance, and actively avoid circumstances that would increase dissonance. With online CSEM offenders, this can be achieved through cessation or de-escalation of offending, which is a viable though infrequently taken pathway (Fortin & Proulx, 2018). Alternatively, it can occur through normalization of activities (as noted above) or through the use of countermeasures. The theory of lawless spaces posits that these will be reciprocal in nature, which helps explain why a majority of offenders do not regularly use countermeasures (Wolak et al., 2005; Wolak, Finkelhor, & Mitchell, 2011; Wolak, Finkelhor, Mitchell, et al., 2011) and that usage does not increase (and may decrease, with the exception of integrated countermeasures that are present by default) over time (Lukas, 2013).

The use of countermeasures that lower the risk of getting caught potentially decreases the cognitive dissonance in offenders, and the ubiquity of criminal activity normalizes their deviant behaviour (Popham, 2018). Thus, individuals are likely to rationalize their safety within a lawless space rather than leaving that space to reduce dissonance, even if that space has increased risk. McMaster and Lee (1991) identified that tobacco smokers recognized the health risks of smoking, but compared to non-smokers rated their individual health risk as lower than other smokers. The knowledge of increased risk caused cognitive dissonance, but smokers reduced that not through abstention but through the application of cognitive distortions to their behaviour. Prior work has identified the use of security technologies not only to reduce the absolute risk, but to reduce the perceived risk (reducing dissonance) by CSEM offenders (Eneman, 2009).

When CSEM offenders are arrested, they are forced to confront the consequences of their actions (at least the personal consequences) directly. In theory, this can lead to a rapid and catastrophic collapse of the protective cognitions they previously used to manage dissonance. As a result, they experience increased strain and may be at increased proximal risk for suicide (Zhang & Lester, 2008).

2.3. Primary Lawless Spaces

Lawless spaces can be broken up into several types of environments based on technical and social characteristics as well as the content availability within those spaces. Additionally, content availability can be broken up by volume and specificity (a proxy for desirability). Volume represents the ability of a lawless space to be resilient to traditional habituation for individuals seeking novel material. Specificity represents the ability for an individual to rapidly find and acquire at minimal cost (financial and non-financial, as noted above) content particular to their individual interests, making the space more desirable to them. The primary ecosystem types of interest to CSEM offenders are detailed below, with each instance of an ecosystem considered a separate lawless space (e.g., a group of websites on the open Internet is a separate space from a dark web hidden service, even though they use the same general delivery mechanism).

2.3.1 Social Lawless Spaces

Social ecosystems are CSEM environments that rely on direct or indirect interaction with other offenders as a main part of the acquisition experience. In social ecosystems, the interaction with other participants through group chats, forums, or other forms of collective engagement are a critical feature for offenders. The interactive nature of these ecosystems provides offenders strong primary normalization through the interaction of supportive writing or speech, and through collective support for their personal cognitive distortions through direct feedback (Durkin & Bryant, 1999; O'Halloran & Quayle, 2010). In many cases the transfer of actual CSEM material is secondary (and can even take place in another ecosystem), with both producers and secondary distributors (non-producers) posting content (Corriveau, 2010). These virtual environments support social learning, which can become a pathway facilitator toward distribution and contact offences (Fortin et al., 2018), and have multiple features that support rationalizations of behaviour and other criminogenic characteristics (D'Ovidio et al., 2009).

In addition to social value and normalization, these ecosystems can also provide highly specific content, often on a feedback-based model. Individuals can offer feedback on posted content (encouraging the future creation and posting of similar content), and can exhibit collecting behaviour in following particular victims or series

(Quayle & Taylor, 2002; Taylor & Quayle, 2003), but can also engage in one-on-one interactions and postings that allow for direct requests of highly individualized material. Aside from the content itself, social ecosystem users are hypothesized to be more aware of countermeasures as they can serve as mechanisms to transfer information on “best practices” for avoiding detection (Balfe et al., 2015), though whether that translates to implementation is an unanswered question.

Social ecosystems can be either synchronous or asynchronous, with participation being mandatory and highly interactive in certain circumstances (e.g., one-on-one chat), or passive and non-interactive in others (e.g., reading message boards without posting). Active participation can include social rewards for being a power user or part of a respected hierarchy (Corriveau, 2010), but requires sacrificing a degree of anonymity and engagement greater than that of passive participation.

Social ecosystems can facilitate sharing content directly, such as the attachment of binaries in a Usenet group (Mehta, 2001), or indirectly, through proxy links or pointers to other distribution mechanisms (Balfe et al., 2015). This work focuses only on those social environments that facilitate CSEM consumption, as opposed to more general forums advocating for paedophilic behaviour such as NAMBLA (DeYoung, 1989).

2.3.1.1 Many-to-Many

Many-to-many interactions are those in which multiple offenders distribute content that is then downloaded by numerous other offenders. The distributions are not targeted at an individual, but they may be made broadly in response to individual or aggregate requests. Many-to-many lawless spaces can be open with no barriers to entry (e.g., Usenet forums) or closed with extensive vetting required to participate (e.g., invitation-only WhatsApp groups).

The two primary many-to-many social ecosystems are message boards (or forums) and chat groups. Open message boards can take the form of everything from Usenet’s replicated content to websites with dedicated forums setup for the purposes of sharing content, such as 4chan. Closed message boards can be on the traditional web, the hidden web (boards hosted in plain sight but not indexed or advertised), or the dark web. Chat functions are distinguished from message boards in that they

are synchronous communication mechanisms. Internet Relay Chat (IRC), WhatsApp groups, and dark net channels are variants of many-to-many chat interactions.

Many-to-many social spaces generally have lower content availability than distribution spaces. If they are open spaces, such as semi-public message boards, posts of illicit content or torrents are subject to a limited lifespan that is inversely proportional to their popularity. Closed spaces are content-limited by the number of users and have a similar inverse risk relationship to size - the more members, the higher the likelihood of detection and law enforcement interest.

The potential for normalization within many-to-many social spaces is higher due to the large number of forced interactions, and friction costs for switching are frequently high and may require making friends with a new group to obtain an invitation or taking additional risky behaviours such as openly submitting to a new verification routine.

The use of many-to-many social lawless spaces requires a higher degree of CSEM domain knowledge than simply placing a term into a peer-to-peer client, and additional virtual exposure. Common countermeasures include the use of aliases and throwaway email addresses (for venues that require registration), requiring at least a minimal amount of technical savvy. Most of the more current mechanisms for interaction, however, do not require the installation of custom software to facilitate their usage. They may require domain skills to find and join (e.g., having the social skills to obtain an invite or uploading content they already possess), but these are not explicit technical barriers.

2.3.1.2 One-to-One

Social ecosystems built on one-to-one interactions require the most socialization, involve active and not passive engagement, and have very targeted uses. The primary technologies behind one-to-one social interactions are email, private chat (as a subset of a many-to-many ecosystem), and messaging applications. This includes technologies as varied as legacy ICQ communications and messaging apps such as Kik, Whatsapp, or Facebook Messenger on mobile phones. The communications can be synchronous (real time chat) or asynchronous (email).

Unlike many-to-many social ecosystems, one-to-one social ecosystems are not gateway technologies. Individuals need to find other like-minded individuals to engage in one-to-one interactions, which necessitates the use of other Internet technologies first (with the exception of cases where hands-on or grooming offences predate Internet offences or involve individuals already known to the participant). As such, they cannot be considered in isolation for deterrence or treatment efforts, both of which need to consider how the offender identified targets for one-to-one interactions.

Social ecosystems require the highest degree of risk tolerance. They involve the use of persistent identifiers such as email addresses or ICQ numbers, and repeated interactions with the same individual or individuals. The use of pseudonymous identifiers is common (Balfe et al., 2015), but effective protection requires the use of more complex technologies, such as tunnelling requests through an onion router, using extraterritorial anonymous proxies, or the utilization of burner devices (for mobile transmission).

The domain expertise required to identify and communicate with other like-minded individuals is high, but the non-public nature of the activity may lower the perceived risk. These ecosystems require explicit requests for content instead of anonymous searching for existing content. The direct interaction allows for normalization of activity not through volume but through specific reassurances and reinforcement from a limited number of parties. Content availability and consumption by the nature of the communications is highly rate limited, but it allows for extremely targeted requests to be made, including abuse-on-demand requests.

The friction costs to switch from a one-to-one ecosystem, where each interaction pairing is its own lawless space, are very high. Offenders must identify other like-minded offenders, engage in a gradual building of trust, and then hope that the content provided meets their psychosexual needs. The technology costs of switching are minimal (they may utilize the same underlying tools), but they are overshadowed by the social and time costs.

2.3.2 Non-social Lawless Spaces

Non-social spaces feature vicarious learning of search techniques and domain-specific terminology, which can be iterative (Steel, 2009a), through usage. Indirect normalization of behaviours occurs as well through the visibility of the volume of material available, in addition to direct normalization through the exposure to the content itself (Savage, 2009).

Non-social lawless spaces are more likely to serve as gateways through the presence of limited barriers to access CSEM and limited capable guardianship. Early web-based access was facilitated by search engines that had limited controls to detect and deter “easy” access to CSEM material (Steel, 2009b). Similarly, peer-to-peer networks, popularized by Napster and others for illegal acquisition of music and movies, facilitated deviant behaviour (Hughes et al., 2006) and allowed for searchers for pornography to easily cross boundaries between legal and illegal.

The core feature of non-social lawless spaces is the direct acquisition of CSEM material, though incidental social features may be present (e.g., comments on a video hosting site). Additionally, non-social lawless spaces may be either free or commercial, and can exist in the open (as indexed websites), or under the protection of the dark web. While basic controls have made open provision of services more difficult (Steel, 2015), avenues still exist for obtaining content using both web (Morris, 2020) and peer-to-peer (Bissias et al., 2016) ecosystems. Additionally, the growth of Tor and the dark web have provided a new path for direct, anonymous distribution of commercial CSEM, facilitated by the growth of cryptocurrencies (Olson & Tomek, 2017).

Almost all content systems are many-to-many. While the possibility exists for transaction-based content on a one-to-one basis, the transactions are generally part of another primary lawless space (e.g., transmission via email of CSEM purchased from a commercial dark web location).

2.3.2.1 Many-to-Many

The two most common lawless spaces for many-to-many distribution of CSEM are websites (open web, deep web, and dark web), and peer-to-peer networks. The open distribution technologies generally require minimal additional technology

usage, and minimal skill to navigate. Additionally, they can provide pointers to other lawless spaces, including dark web locations, that are more difficult to use but have lower associated risks.

Websites are client-server distributed computing environments, where a host (server) provides content to a large number of users using open protocols (e.g., HTTP) through common applications such as Microsoft Edge and Google Chrome (clients). Users are able to find websites related to CSEM multiple ways. First, for open web content, search engines such as Google and Bing index the content of websites, providing offenders a way to discover new sites. Second, directory services that list specific websites based on their content categories are used on the dark web to provide pointers. Finally, deep web content, which is not indexed, is generally accessed through a link provided on other websites with related content. Web servers can utilize a variety of technologies that are of interest to CSEM offenders. These can range from Thumbnail Gallery Post (TGP) and Movie Gallery Post (MGP) websites (Wondracek et al., 2010) to live-steamed abuse-on-demand systems (Dushi, 2019; IWF, 2018b), and may involve both traditional and mobile device consumption (Horsman, 2018; Steel, 2015).

Website-based non-social lawless spaces have the lowest barriers to entry, requiring only a web browser and the ability to use a search engine. They are also the most loosely coupled - there is little homogeneity between websites, they are linked technologically but not necessarily functionally, and each individual's access pattern represents a discrete lawless space that only partially overlaps with those of other individuals. The commonality within a lawless space (a particular website or set of websites) may have a distinct set of distribution features of interest to a particular offender. Because early web distribution was facilitated by search engines, switching between sites was easy, and the same search engines lowered the barriers to switching to other lawless spaces by providing access to tutorials and to downloads of enabling software.

Overall, the diversity of content available on websites is extremely high, with specialized sites available for particular interests. The availability of content is not necessarily limited by bandwidth or by overall quantity, but by the ability to find that content. While indexing of known CSEM content by mainstream search providers is

blocked using tools such as the Internet Watch Foundation's hash list (*Hash List*, 2020), Yandex and other search engines have not fully implemented similar controls, allowing for continued discovery of CSEM (Morris, 2020).

Websites began evincing capable guardianship by returning warning banners when CSEM-related search terms were used (M. Ward, 2013; Watt & Garside, 2013), resulting in a decline of web-based CSEM searching on the major English language search engines (Steel, 2015). During the same period, a rise in Tor-based CSEM content occurred, providing a similar experience (through the Tor Browser), but with a more limited selection of content and slower access speeds (Dingledine & Murdoch, 2009; Faizan & Khan, 2019; *Performance – Tor Metrics*, 2019). One of the most prevalent methods of many-to-many access to CSEM is through peer-to-peer networks. Peer-to-peer software allows all connected computers to be both clients and servers. Users automatically share content from their local drives and can search for CSEM using keywords on networks such as Gnutella and eDonkey or using common protocols like BitTorrent (Bissias et al., 2016; Hughes et al., 2006; Liberatore et al., 2010; Makosiej et al., 2004; SourceForge Staff, 2019; Wolak et al., 2014).

Peer-to-peer software is easy to install, generally requiring only the download of a single piece of software. There is a high perceived anonymity as connecting does not require the entry of an email address or other personally identifiable information (though some clients require the use of a user-selected handle). There is generally no inherent security in peer-to-peer networks, and despite the availability of anonymizing clients like Tribler (*Tribler*, 2020), there is no evidence of their widespread usage, likely due to decreased content availability and speed limitations.

Searching and downloading content on peer-to-peer networks involves typing in a search term and downloading relevant content from a list of files returned. Differential association permits vicarious learning through the observation of how shared CSEM content is labelled and advertised. Rapid acquisition of terminology is facilitated by long file names that contain related terms, and transfer of those terms to other lawless spaces is possible (Steel, 2009a). Unlike most web-based acquisition, peer-to-peer acquisition generally precludes simple viewing of content and requires it to be downloaded. This alters the usage model in that batch

downloads of large amounts of content need to be performed and then viewed offline to identify CSEM of interest. Web-based acquisition supports the opposite approach - extensive viewing to preview content and then selective (if at all) downloading of CSEM of interest.

While perceived anonymity is present, both actual and perceived capable guardianship are also present. Law enforcement routinely monitors peer-to-peer transactions (Liberatore et al., 2010; Wolak et al., 2014), and arrests related to peer-to-peer CSEM consumption are high (Wolak et al., 2012) and receive frequent press attention - a brief search on Google News identified stories covering over 100 arrests in the United States within the past 12 months.

Switching between peer-to-peer networks has low friction costs, as the terminology and interfaces are similar and the underlying network is largely abstracted from the user. In some cases, the software clients bridge multiple networks in a way that is transparent to the user, interconnecting lawless spaces seamlessly. Shareaza, for example, automatically searches BitTorrent, eDonkey, Gnutella, and Gnutella2 networks (Shareaza Development Team, 2020).

Although not a lawless space in itself[2], the dark web facilitates the creation of other lawless spaces, using technologies like Tor (The Tor Project, Inc, n.d.). There are higher barriers to entry for the dark web in that an appropriate client must be installed, and new methods of traversal must be learned, as there is no central indexing of dark web content akin to Google. The dark web layers protections on traditional web based acquisition, but at the cost of usability, speed, and content availability. The use of supplementary technologies on the dark web has created avenues for anonymized commercial CSEM distribution as well. Acquisition of commercial CSEM requires additional technical skill and effort, primarily in procuring (or producing) BitCoin, Ethereum, Monero or other cryptocurrencies (Mabunda, 2018). This requires the acquisition of wallet software, the conversion of physical currency (or credit) to the cryptocurrency of choice, and the use of specific payment systems. These have allowed commercial sales of CSEM to be reinvigorated for a

[2] While it is noted as an enabler of non-social spaces, the dark web can also be utilized to facilitate social lawless spaces.

subset of CSEM consumers, including live streaming and abuse on demand activities (Olson & Tomek, 2017).

A final area of interest is on a technology that bridges the gap between social and non-social lawless spaces - the use of deep web technologies. These are non-social, non-indexed file sharing locations (or Torrent sharing locations) that host CSEM but require the users to have prior access to a social platform to acquire the links to the content. These frequently use transient hosting, and may even require the user click on a specific link directly from a forum to access them (M. O'Brien, 2014; Rodriguez-Gomez et al., 2017). Usage of deep links is generally incidental and does not represent another space as much as a virtual extension of previously highlighted spaces.

Tor-based dark web content is available in an environment with more limited social control. Because dark web content is specialized and segmented, informal control within the ecosystem is missing, and differential association provides behavioural reinforcement. Formal social control, including evidence of capable guardianship, is similarly lax, with some areas having negligible amounts of law enforcement presence (Dalins et al., 2018; Delong et al., 2019; Faizan & Khan, 2019; IWF, 2019, Bayerl & Rüdiger, 2018). Open web content, while initially more readily accessible and with reduced costs to engage, provides an environment with higher degrees of social control and higher perceived capable guardianship. As such, rational choice theory may be applied by users unconsciously comparing both the utility and psychosocial benefits against the perceived risk and costs as defined by LST in selecting between these environments.

2.4 Applications of Lawless Space Theory

The prior sections provide the basis for LST and address the foundation for its face validity, but to be of value it must have utility in practice. The theory was designed to address three areas - deterrence of future CSEM offences, targeted treatment of existing offender behaviour, and more effective legal response to offenders, including the investigation of CSEM offences and better sentencing and probation controls. Potential applicability of LST to these areas is detailed below, and specific evidence-based recommendations are made in Chapter 14.

2.4.1 Deterrence

Targeting the supply side for CSEM makes any given lawless space less attractive by reducing the amount of content available, which lowers the psychosocial value of that space. An example effort in this space was the blocking of known-CSEM images by Google from appearing in their search results (Jutte, 2016). This reduced access to the content available, making web-based searching less valuable. Similar efforts at targeting the highest volume offenders on peer-to-peer networks have been partially successful in limiting the likelihood of a particular image being available at any point in time (Hurley et al., 2013), but the distributed nature of peer-to-peer networks means that the overall impact on supply has been one of rate limitation more so than one of availability.

As with drug interdictions, demand side interdictions are principally focused on arrests of offenders. By removing offenders from access the absolute number of offenders is decreased (however marginally and temporarily), but this has been criticized as a sub-optimal approach (Jutte, 2016). Under LST, the greater benefit is made through awareness of the arrests, providing a more salient reminder of capable guardianship. Hunn et al. (2020) found that a substantial minority of individuals surveyed were unaware of the illegality of viewing CSEM, showing that there is a need for additional public education surrounding CSEM offending. In particular, raising awareness at the time where an individual first searches for CSEM content through a gateway lawless space is likely to be the most effective.

Newman's defensible space theory (Newman, 1972; Reynald & Elffers, 2009), although criticized when applied to physical space design (Hillier & Shu, 2000), has applicability in the virtual realm in terms of both supply and demand. In particular, the concept of natural surveillance by both the technology itself and by participants in the lawless space are helpful. An example of technology-driven surveillance is referenced above - web search companies began visibly demonstrating capable guardianship when individuals searched for CSEM-related content by providing immediate warnings highlighting the illegality (and risk) to searchers (M. Ward, 2013; Watt & Garside, 2013). This was correlated with a decline in CSEM searches on those platforms implementing the warnings, but not others without warnings, though direct causation could not be shown (Steel, 2015). Police2peer performs a similar

role on peer-to-peer systems but its efficacy has not been evaluated (Europol, 2020), and despite a large number of related arrests consumption remains high (Wolak et al., 2012). For participant-centric natural surveillance the ease, frequency, and impact of reporting of offenders in the lawless space has a potential to reduce criminal behaviour in that space. The Internet Watch Foundation (IWF) has seen an increase in individual reporting of web-based uniform resource locators (URLs) occurring (IWF, 2018a) commensurate with the drop in web search activity noted above (Steel, 2015).

2.4.2 Treatment

With CSEM offenders, the visitation to and interaction with the technical environment may in and of itself provide dopaminergic reward activation (and reinforce the usage of that environment). This provides two potential treatment targets - the usage of particular technologies (and engagement in the associated lawless space), as well as the cues that start the subsequent neurological reward circuitry engagement (e.g., non-offending images that cause an individual to start a session of seeking offending images). Additionally, because of the bidirectional relationship between emotion and sexual regulation, the emotions and their underlying biological regulation become targets for treatment (Quayle et al., 2006; Smid & Wever, 2019).

Treatment of CSEM offenders can be broken up into two phases - pre-arrest and post-arrest. In general, pre-arrest treatments are believed to be more effective for reasons of motivation. Individuals that self-identify for treatment are likely to both see their behaviour as problematic and to want to change that behaviour. Post-arrest (or police interaction) treatment is likely to be mandated or have other motivating factors (e.g., showing positive behaviour for sentencing purposes), and there may not be the same level of commitment present.

Post-conviction, the recidivism rates are generally low for CSEM offenders - Eke et al. (2011) found that 6% were charged with contact offences (new and historical) and 7% were charged with new CSEM offences. This rate includes both treated and untreated offenders, however there is limited evidence that current sex offender treatment programs reduce that rate further. Because of the low base rate for recidivism, which is predicted by LST for reasons unrelated to treatment (see Legal Response below), the number of post-conviction individuals that will benefit from

treatment as a method of reducing re-offending risk is likely small to begin with. In addition to identifying individuals who have the highest risk of re-offending for a treatment intervention, the treatments themselves can be better targeted. For traditional interventions, for example using Cognitive Behavioural Therapy, there is little evidence that faulty cognitions present in traditional sex offenders are strongly endorsed by CSEM offenders as shown in Chapter 3. In a large group of CSEM individuals treated using traditional sex offender treatment, for example, the treatment group re-offended at a higher rate than a non-treatment group (Mews et al., 2017).

In contrast to traditional treatment programs, there are targeted programs for online CSEM offenders such as the i-SOTP, which showed promising early results (Middleton et al., 2009), but was discontinued due to programme costs and the low baseline recidivism risk of participants. These focus on areas beyond just faulty cognitions, including coping skills and intimacy deficiencies, but could benefit from a greater understanding of technological behaviours from a lawless space perspective. For example, differentiating between social and non-social lawless space users can better identify the specific psychosocial needs of an individual offender to enhance treatment. Additionally, putting up additional cost barriers to usage through behavioural interventions may be helpful. These can include technological barriers (removing all enabling software and avoiding its future use) or psychological barriers (de-normalizing CSEM usage or social commitments). They can also include other initiatives that increase the awareness of capable guardianship, particularly for pre-conviction offenders, or make the risks more apparent, but this requires an understanding of what particular risks are most meaningful to an individual offender (e.g., social shaming v. prison).

2.4.3 Legal Response

Investigations into CSEM offences are believed to have a deterrence effect as noted above and sentencing (and subsequent probation) is intended to be both punitive and rehabilitative. For CSEM offences, sentencing in the United States generally includes having to register as a sex offender as part of the National Sex Offender Registry (NSOR), and may result in restrictions being placed on digital activities. The registration requirement is generally coupled with probation requirements

banning the use of particular technologies, as well as restrictions on criminal association and even restrictions on social media usage.

CSEM offenders, as noted above, have a generally low recidivism rate, which is consistent with what LST predicts. Arrest and conviction raise the awareness of capable guardianship within a given space to the highest levels, particularly if they were detected by or reported to law enforcement due to their engagement in that space, greatly influencing the risk/reward calculation for the individual arrested. This is enhanced by the use of monitoring software in probation situations, though if there is a lack of understanding of the offender's lawless space choices it can be ineffective (i.e., installing software on the offender's laptop may just drive them to use their mobile phone).

The removal of the offender's CSEM content, as well as disrupting their electronic ecosystem, may reduce the risk of re-offending. The requirement that the offender acquire new equipment, reinstall the relevant software for their lawless space of choice, and then re-engage in that lawless space increases the costs by making it again a choice of involvement as opposed to an event choice. If the offender is engaged primarily with social lawless spaces, the differential association that was occurring is attenuated by the time away from those networks, and there may be additional barriers to re-engagement with the disruption of a criminal social network. Any normalization that occurred due to the constant interaction is likely to be attenuated over time as well, further increasing the barrier to re-entry.

Based on LST, the permanent seizure of any technologies used to consume CSEM is supported. Allowing an offender to keep their ecosystem, or to retain even a single image (through the non-comprehensive execution of a warrant, for example), can make future offending an event-based decision. Similarly, understanding what ecosystem an offender utilizes allows for targeted probation restrictions on the use of enabling technologies. Selectively banning an offender from using peer-to-peer software or from engaging on particular message boards creates higher technological and psychological re-entry costs for new offending behaviour.

When CSEM offenders are arrested, they are forced to confront the consequences of their actions (or at least the personal consequences) directly. In theory, this can lead to a rapid and catastrophic collapse of the protective cognitions they previously

used to manage dissonance. As a result, they experience increased strain and may be at increased proximal risk for suicide (Zhang & Lester, 2008). As such, investigative protocols should include activities to reduce the proximal suicide risk in offenders.

2.5 Testing Lawless Space Theory

While utility, as noted above, is important for a theory of offending, validity is equally important. The theoretical basis for LST was previously provided, but to be valid the theory must also be testable and falsifiable. A testing methodology for LST has two components - showing that CSEM offenders (or non-offenders) view the Internet or spaces within the Internet as lawless, and showing that the components of the theory can be empirically tested and validated. A proposed methodology for doing so is presented briefly below, and then tested in the following chapters.

First, to test that the Internet is perceived as lawless, a validated scale must be developed. The scale should evaluate the views of the Internet as being a separate and distinct ecological niche from the physical world, having lower capable guardianship, and being a location where criminality occurs and is tolerated. The following scale, using a seven-point Likert measurement of agreement, is proposed to measure that perception:

1. The rules of behaviour on the Internet are different from the physical world;

2. There is more criminal behaviour on the Internet than in the physical world;

3. You can get away with behaviour on the Internet that would be unacceptable in the physical world;
4. It is easier to find illegal goods and services on the Internet than in the physical world;
5. Most activity on the Internet is not monitored by law enforcement;
6. Law enforcement cares less about Internet crimes than crimes in the physical world;

If spaces on the Internet are viewed as lawless, the other components of the theory can be tested individually. First, the choice of spaces by offenders to meet their psychosocial needs in a frictionless way can be evaluated through application usage paradigms. CSEM offenders can be asked how they chose a particular lawless space, and what features were important to them. These features should include both psychosocial features (e.g., the availability of content of interest) as well as both time-based friction costs (e.g., the ability to use the space) and psychological friction costs (e.g., perceived anonymity). Features from both categories should occur and have roughly equal weighting. Second, time-based changes to perceived risk needs to be measured. This is difficult to measure directly as it would require a longitudinal study of individuals who were currently offending and had not been caught, and any observations indicating to them that they were being watched, even for research, would alter the results. Instead, a proxy measure can be used - an escalation of offending behaviour over time. Preliminary work by Fortin and Proulx (2018) supports this aspect, showing that, when looking at image collections for 40 individuals over time, the most common trend was an escalation of problematic usage evidenced by viewing of younger individuals involved in more severe sexual activities.

The third aspect of usage, that normalization occurs and friction costs must be overcome to change lawless spaces, can be evaluated by looking at the entry-level lawless spaces, as well as the switching rates between spaces. Under LST, most individuals should first make use of spaces that are lower risk and have lower costs of entry (e.g., peer-to-peer and web-based spaces). The historical usage of lawless spaces by long-term offenders can be asked, and their preferred space compared to their initial space. LST predicts that most individuals will stay with their first space and will continue to use that space as their primary space even if they branch out to other spaces to meet additional psychosocial needs. Because no one space is likely to meet all of the varying psychosocial needs of all users, a substantial minority of users are predicted to evince multi-space usage. The final aspect, the use of countermeasures, can be evaluated by measuring the overall countermeasure usage, particularly that of low-cost but effective countermeasures such as encryption in an offending population. Prior work has already supported this through the low overall adoption rate of encryption by offenders over multiple time periods as

highlighted in Chapter 4, and further work can be done to confirm that the majority of offenders do not use encryption, and that adoption of more complex lawless spaces with built-in countermeasures (e.g., Tor) but lower variety of content and ability to rapidly obtain content will be less frequently used than simpler spaces with more content but fewer protections (e.g., peer-to-peer spaces). The reasons for countermeasure usage can also be measured - offenders can be asked why they implemented particular countermeasures, and LST predicts the reasons would be for both reducing anxiety and frustrating efforts at detection.

2.6 Summary

Current theories of online CSEM offending are a subset of existing sex offender, criminological, neuroeconomic, and behavioural theories. These include the pathways and ITSO theories of sex offending and the rational choice, routine activity, and social learning criminological theories. Additionally, theories such as MFM and PIU as well as reward, rational choice and addiction research inform CSEM.

This work introduced the theory of lawless spaces, which is consistent with earlier macro theories but provides a focused lens on the technical choices and behaviours of online CSEM offenders. Specifically, the theory of lawless spaces states that psychosexual needs are the primary driver behind the choice of a technological ecosystem, and that habituation and differential association reinforce that choice. This leads to normalization, which increases the psychological costs of switching ecosystems. Although it would make economic sense to broadly employ countermeasures such as encryption, CSEM offenders do so only when it serves a psychological, as opposed to a purely criminological precautionary, need.

Lawless spaces can be considered as primarily social or non-social. Social spaces encourage normalization directly, while non-social spaces encourage it indirectly. Social spaces tend to have a higher specificity of CSEM available, while non-social spaces provide a higher volume. Social spaces have a higher risk and higher barriers to entry and switching but serve different needs. Certain spaces are more likely to serve as gateway spaces - either web-based searching or through crossover while searching for other illicit content using peer-to-peer or similar technologies. Finally, a subset of offenders will make use of multiple lawless spaces that serve

differing psychosocial needs, and multiple offenders may use the same lawless space differently.

SECTION 2 - PRIOR ART

Chapter 3 - A Systematic Review of Cognitive Distortions in Online Child Sexual Exploitation Material Offenders

3.1 Overview

Cognitive distortions have historically been a treatment target for sex offenders, and similar distortions have been presumed to be present in online CSEM offenders. To measure the presence of distortions in the CSEM offender population, instruments used to evaluate cognitive distortions in contact sex offenders were traditionally employed. In the previous chapter, it was noted that recent scholarship has questioned that approach and devised new instruments developed specifically for the CSEM offender population, including the Internet Behaviours and Attitudes Questionnaire (IBAQ) (M. D. O'Brien & Webster, 2007) and the Cognitions on Internet Sexual Offending scale (CISO) (Paquette, 2018). The systematic review that follows is the first to comprehensively analyse the prior research on the endorsement of cognitive distortions within the CSEM consumer population.

The systematic review consisted of a search of the Pubmed and Psycinfo databases as well as Google Scholar for relevant, peer-reviewed and grey literature papers with terms related to both CSEM and cognitive distortions published in the prior 10 years. Additionally, papers from the references in the initial corpus identified through the database searches were added and assessed for inclusion. The search was conducted using the SPIDER (Sample, Phenomenon of Interest, Design, Evaluation, Research type) (Cooke et al., 2012) methodology, and a quality review of the results performed using the Mixed-Methods Appraisal Tool (MMAT) (Hong et al., 2018). A total of 270 papers were reviewed by title and abstract, and 20 papers identified for inclusion in the analysis.

The systematic review was conducted to evaluate the endorsement of cognitive distortions by CSEM offenders. For the many of the cognition-oriented components

of therapy to be viable, the overall endorsement of distortions needs to be sufficiently strong to warrant targeting. Additionally, for the purposes of treatment as well as for investigative interviewing, the distortions specific to CSEM offenders (as opposed to contact offenders) need to be differentiated. This review confirmed that low overall endorsement of traditional cognitive distortions by CSEM offenders provided a driver to revise current cognitive-behavioural therapy approaches, either through the identification of distortions specific to this community or through more behavioural-based targeting.

3.2 Summary of Findings

The major findings of the systematic review were as follows:

- The overall endorsement by CSEM offenders of distortions commonly associated with contact sex offenders was low.
- Traditional sex offender assessment instruments are largely ineffective for use with CSEM offenders.
- Newer instruments targeted specifically at CSEM offenders such as the CISO (Paquette, 2018) show promise and warrant further investigation.

The validity of targeting cognitions in CSEM offender treatment is still unresolved, and behavioural targets may be more viable.

A Systematic Review of Cognitive Distortions in Online Child Sexual Exploitation Material Offenders

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Abstract

The aim of this review was to analyse and synthesize the results of prior research into the cognitive distortions present in online child sexual exploitation material (CSEM) consumers. A systematic search of databases containing peer reviewed articles as well as grey literature was conducted for prior studies involving the cognitions of CSEM offenders using the SPIDER methodology. Twenty articles were identified for inclusion following a full text review and a Mixed-Methods Appraisal Tool (MMAT) quality analysis. The instruments used were reviewed and summarized, and the level of endorsement present in the measured characteristics was analysed. The study's findings show that overall endorsement of cognitive distortions traditionally associated with contact sex offenders by CSEM offenders was low, and that existing sex offender instruments are ineffective tools for use with CSEM offenders. Newer assessment instruments built specifically for online offenders show promise, with overall moderate endorsements present in tools such as the Cognitions on Internet Sexual Offending scale (CISO), but additional research is needed to validate this approach.

Keywords: Child pornography, online offender, child sexual exploitation material, cognitive distortion

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A Systematic Review of Cognitive Distortions in Online Child Sexual Exploitation Material Consumers

1. Introduction

Cognitive distortions are thoughts and beliefs that result in an inaccurate view of reality (Beck, 1963). The concept of cognitive distortions is not new and, although originally used within a cognitive therapeutic framework, it has since been applied to many forms of criminal behaviour, ranging from general antisocial behaviour (Wallinius et al., 2011) to drug use (Kirisci et al., 2004) and to sexual offenses (Pornari et al., 2018). Researchers originally studied the cognitive distortions present in offenders who committed sexual offenses against adults as a method of risk assessment and treatment (Abel et al., 1984), and eventually applied modified versions of those techniques to child molesters (hereafter referred to as contact offenders) (Abel et al., 1989).

Those who commit online offenses against children, specifically consumers of child sexual exploitation material (CSEM), have been hypothesized as endorsing cognitive distortions to rationalize their actions. Distortions of CSEM offenders can include those that minimize the subject's behaviour, for example differentiating themselves from contact offenders with rationalizations such as, "Paedophiles are innocent if they have not used force, deception, intimidation, drugs, and if their acts have been consentual[sic]" (O'Halloran & Quayle, 2010, p. 77), or those that blame the victim, providing explanations such as "It was almost like the children in the photos were, were very often ... smiling as well so again from that point of view I didn't think that I physically was doing anything wrong" (Winder & Gough, 2010, p. 130). Understanding these cognitive distortions can be helpful in developing early interventions (Houtepen et al., 2014), in investigative efforts (Steel, 2014), in risk assessments (Garrington et al., 2018; Seto & Eke, 2015), and in treatment (Quayle & Taylor, 2003), and as such there is extensive interest in understanding what cognitions are present in CSEM offenders and how they differ from the cognitions present in both contact offenders and non-offenders.

For the purposes of this review, CSEM offenders are considered to be adults who intentionally viewed CSEM images of individuals under the age of 18. CSEM includes still images and videos of minors engaged in sexual activity or containing nudity for the purposes of sexualization, irrespective of the local legal status of the

images. Offenders are those who consume CSEM using the Internet, either through viewing or through downloading, and they include both detected and undetected individuals.

Cognitive distortions are employed by individuals to rationalize their behaviour before, during, and after committing an offense (Szumski et al., 2018). In the case of CSEM offenders, this includes beliefs that facilitate ongoing viewing activity as well as post-hoc rationalizations that reduce guilt or fear associated with their actions. In investigations, cognitive distortions may be referred to as "themes" or simply "explanations" for offending behaviour (Inbau et al., 2011). Clinically, the concept of cognitive distortions in offenders has been expanded and subcategorized based on timing and usage. Concepts such as supportive distortions (Malesky & Ennis, 2004), offense supportive beliefs (Mann et al., 2007) and attitudes (Helmus et al., 2013), implicit theories (Bartels & Merdian, 2016; Bartels et al., 2016; Howell, 2018; Ward & Keenan, 1999), and faulty schemas (Mann & Beech, 2003) are all covered under the umbrella of cognitive distortions for the purposes of this review. Szumski, Bartels, Beech, and Fisher (2018) provide a more thorough examination of the differences between the concepts above in sexual offenses against children.

1.1 Child Sex Offender Cognitive Distortions

Cognitive distortions in child sex offenders grew out of prior work on individuals who committed sexual offenses against adults. For a discussion of the theories of offender cognitions for general sex offenders, see Ó Ciardha & Ward (2013) as well as the work of Abel et al. (1984). Abel's seminal work on the cognitive distortions of child sex offenders highlighted seven representative distortions (1984):

- "A child who does not physically resist my sexual advances really wants to have sex with me."
- "Having sex with a child is a good way for an adult to teach the child about sex."
- "Children do not tell others about having sex with a parent because they really enjoy the sexual activity and want it to continue."
- "Sometime in the future our society will realize that sex between a child and an adult is alright (a corollary is that, in the past, previous cultures have found sex between children and adults acceptable)."

- "An adult who only feels a child's body or feels the child's genitals is not really being sexual with the child so no harm is being done."
- "When a child asks an adult a question about sex it means that the child wants to see the adult's sex organs or have sex with the adult (a similar distortion is that children are sexual beings, and therefore they should have sex with adults)."
- "My relationship with my daughter or son or other child is enhanced by my having sex with them." (Abel et al., 1984, pp. 98–101)

These distortions served as the baseline research for the creation of early instruments to measure cognitive distortions (Abel et al., 1989; Beckett, 1987; Bumby, 1996), and for later research into the topic.

The implicit theories of child sex offenders grew out of general sex offender cognitive groupings. Ward and Keenan (1999) looked at the implicit theories of child sex offenders and identified examples of those theories based on flawed cognitions in five areas:

- *Children as Sexual Objects.* Cognitive distortions in this category include those that blame the victim for initiating sex as well as those that involve warped perceptions of the victim's participation in an act (i.e. that the victims are enjoying themselves).
- *Entitlement.* Offenders with distortions of entitlement rely on special pleadings for their particular offenses. They believe that their actions are justifiable due to something intrinsic, and because of their inherent superiority, their targets are not truly victims.
- *Dangerous World*. Distortions related to the nature of the world are used in two ways to justify offender actions. First, because the world itself is full of risks and bad actors, individuals need to look out for their own interests. Second, children are more trustworthy than adults, therefore sexual relationships with children are more loving and natural.
- *Uncontrollability*. Blame is placed on the actions of others or on external influences. Stress and substance abuse are proposed as excuses for behaviour, and prior life experiences (e.g., being abused as children themselves) are provided by offenders in an attempt to deflect responsibility for their actions.

- *Nature of Harm*. The specific actions taken by the offender are minimized with this distortion. The impact on the child in downplayed, or the comparison of the offender's actions to those of a more severe offense are made as part of their rationalizations.

Ward and Keenan's (1999) paper put forth the above categories as exemplars and not a strict taxonomy, but others have used their categories and revised them as key groupings for child sex offender cognitions. The five theories were empirically tested (with Children as Sexual Objects reworked as Child as a Sexual Being) with contact child offenders, and found to have endorsements at the following levels:

- Child as a Sexual Being (28%)
- Uncontrollability (26%)
- Dangerous world (22%)
- Nature of harm (14%)
- Entitlement (10%). (Marziano et al., 2006)

How to specifically categorize cognitive distortions is a topic of ongoing research. Mann et al (2007) reduced Ward and Keenan's (1999) categories to two factors in their Sex With Children (SWCH) instrument, with the first factor encompassing the fact that having sexual contact with children is harmless, and the second factor encompassing victim-blaming distortions where the offender rationalizes that the child initiated or was responsible for the contact. While SWCH reduced the factors to two, Nunes and Jung (2013) proposed additional breakdowns in child contact offenders, hypothesizing that denial and minimization were separate from but correlated with traditional cognitive distortions associated with child molesters. They found that endorsement of the distortions present in scales including the Bumby MOLEST scale (Bumby, 1996) were associated with higher degrees of minimization and denial, in particular denial of the need for treatment.

1.2 CSEM Offender Cognitive Distortion Models

Bartels and Merdian (2016) proposed and developed from a qualitative review of identified studies a model of implicit theories specific to CSEM offenders based on the work of Ward and Keenan (1999), with five groupings specific to CSEM offences. Their proposed conceptualization included:

- *Unhappy World*. Unhappy world cognitions are related to the physical world and are similar to Dangerous World *c*ognitions, but instead of viewing the world as threatening it is viewed as "limiting and unsatisfying" (Bartels & Merdian, 2016, p. 11). The Internet, in contrast, is viewed as a location where socialization is easier and as such viewing CSEM becomes a coping mechanism.
- *Children as Sex Objects*. As a variant on the Children as Sexualized Beings theme, Children as Sex Objects encompasses distortions that focus on the depersonalization of children to facilitate their sexualization. Particularly salient for CSEM viewers, cognitions in this area allow the offender to view the images as separate from the actual abuse being portrayed. This provides explanatory power for prior studies showing that online-only offenders may empathize with child victims of contact offenses more than contact offenders (Merdian et al., 2014), while compartmentalizing their viewing as separate from that harm.
- *Self as Uncontrollable.* Uncontrollability is the distorted belief that an offender's actions are not under their own control. With CSEM offenders, this can be blamed on compulsion or obsession with CSEM (Winder et al., 2015) or addiction to pornography (Paquette, 2018), or on the Internet causing an individual to "act outside themselves" (Elliott, 2012). One contact offender variant, that substance abuse is a precipitating factor for offending, is not predicted to be as prevalent in CSEM offenders (Webb et al., 2007), though recent studies have not supported a difference in prevalence (Khanna, 2013).
- *Nature of Harm (CSEM variant)*. There are two components to the CSEM variant of the Nature of Harm distortion. The primary distortion is a minimization of the activities of CSEM offenders by comparing themselves to contact sex offenders. This is embodied by the "they are only images" conceptualization. The second is related to the impact of the actions depicted in the images. Similar to the contact offender variant, the child victims are perceived as enjoying the activities or at least not being harmed by them, which allows the CSEM viewer to maintain their fantasy.
- *Self as Collector*. Based on the work of Quayle and Taylor (Taylor & Quayle, 2003), some CSEM offenders assert that they are not sexually attracted to children and that the collection itself is the end goal. Therefore, downloading

all of the images in a series or obtaining certain categories of images provide the satisfaction, and the fact that the sexual abuse of children is depicted in incidental (Quayle & Taylor, 2002). Lanning (1987) related the activity to collecting baseball cards, but has also noted that individuals who are not interested in baseball generally do not collect baseball cards.

The Bartels and Merdian model (2016) represents a step forward, but may not address current technological changes. For example, the increase in the availability of high speed Internet access and the shift to mobile devices (Steel, 2015) may impact the Self as Collector category by limiting the need to download content (which carries additional risk) and increasing the amount of viewing. Technologies such as peer-to-peer software that rely on mass downloads will also allow for the more rapid acquisition of content, increasing collection sizes but also potentially increasing the amount of unviewed content downloaded, essentially transferring the viewing paradigm from external content to internally stored content.

Paquette (2018) grouped the distortions present in prior models into four themes as part of the development of the Cognitions on Internet Sexual Offending (CISO) measure, which was developed specifically for online offenders:

- *Interpersonal Relationships.* The Interpersonal Relationships theme incorporates elements from the Dangerous World, Child as Partner, and Entitlement distortions. Cognitive distortions include identifying children as willing participants in CSEM, claiming CSEM behaviour is about collecting and not sexualization, and minimizing the volume of their own collections in comparison to that of other offenders'.
- *Sexualization of Children.* Combining the categories of Child as Sexual Being and Nature of Harm, Sexualization of Children involves distortions related to victim blaming and minimization of the offender's actions (as compared to contact offenders in particular, but also to other online offenders).
- *Self*. Offending behaviour is the result of internal or external factors outside of the offender's control. This relates to the prior category of Uncontrollability and encompasses substance abuse and stress-related rationalizations.
- *Internet*. The general Internet category includes distortions that differentiate between the Internet and real life (Virtual is not Real), including differentiation from contact offenses and distancing from the acts present in images. Additionally, Internet is Uncontrollable is incorporated, covering distortions

that blame the Internet (unwanted images) as well as the facilitative processes of the Internet (perceived anonymity) (Paquette, 2018).

1.3 Current Study

Despite the applicability of contact offender instruments and groupings being questioned for decades (Quayle et al., 2000) and the recent introduction of online specific models (Bartels & Merdian, 2016; Paquette, 2018), there has been no work that has systematically reviewed the level of endorsement of cognitive distortions present in CSEM offenders and what specific distortions are endorsed. This study seeks to review the extant research on cognitive distortions present in CSEM offenders and assess the overall levels of endorsement of those distortions. For a working definition of cognitive distortions, this work uses the proposed language from Ó Ciardha and Ward of "specific or general beliefs/attitudes that violate commonly accepted norms of rationality, and which have been shown to be associated with the onset and maintenance of sexual offending" (Ó Ciardha & Ward, 2013, p. 6).

This study includes prior work on related concepts such as implicit theories, which are aggregates of distortions with explanatory power (Ward & Keenan, 1999), as well as areas that are indirectly related but representative of distortions, such as victim empathy (Beckett & Fisher, 1994).

This review includes both short-and-long-term cognitive distortions related to CSEM offenders. The initial work in the field was centred on longer term distortions (Ward & Keenan, 1999) that are more pervasive and endure beyond a specific offense and which may differ from offense-specific cognitions (Blumenthal et al., 1999). Szumski et al (2018) proposed a three mechanism model of distortions, all of which are included in this review:

- Mechanism I: Long-term distortions that precede but facilitate offending by guiding an individual down a long-term path. These are distal influences that can be impacted by the early childhood environment and experiences far removed in time from the current offense. Wood and Riggs (2009), for example, identified early attachment issues as associated with offense supportive cognitions related to adult/child sexual activity.
- Mechanism II: Short term pre-offense distortions that serve to enable proximal justification of offender activity. This can include decisions made in an

aroused state that show distorted thinking in the form of lowered inhibitions, such as Ariely and Lowenstein's (2006) finding that showed greater acceptance of potential attraction to a 12 year old when aroused than when in an unaroused state.

- Mechanism III: Post-hoc cognitions that allow an individual to rationalize their behaviour and cope with the impact of their actions. Szumski et al. (2018) note the minimization that occurs to reduce cognitive dissonance after a crime has been committed, as presented by Abel et al., (1989) as an example.

Most prior studies do not distinguish between mechanisms, and included cognitions that spanned multiple mechanisms, so distinctions are not made in this review between them, though it remains an important consideration for future work, especially when considered alongside behaviours that may be reflective of an individual mechanism (e.g. visiting the Dark Web may invoke Mechanism II distortions, which facilitate offending). Distinguishing mechanisms may also provide a useful framework when considering which beliefs should form the targets of treatment, with Maruna and Mann putting forth that treating offense-enabling cognitions is more critical than looking at post-hoc rationalizations (2006), and this work serves as a baseline in identifying the highly endorsed distortions for doing so.

2.0 Method

The present review is based on quantitative and qualitative studies (as well as mixed-method) that employed both validated and non-validated instruments to assess cognitive distortions in online CSEM offenders. The studies included peer-reviewed journal publications as well as work from published graduate theses. Studies that only contained reviews of other studies or proposed taxonomies based on prior work were not included.

Studies were identified using iterative searches of Pubmed, PsycInfo, and Google Scholar as shown in Figure 1 utilizing the SPIDER methodology (Cooke et al., 2012). The initial Boolean search query used (with implementation based on the individual database search form requirements) was:

("Child Pornography" OR "Child Sexual Material" OR "Child Sexual Exploitation Material") AND ("Cognitive Distortion")

with all terms searched in the full text and a date limitation of ">=2009" included to ensure maximum relevancy. After the full text review of the responsive papers, the query was revised and re-run. The final expansive query used to generate the results was as follows:

> ("Child Pornography" OR "Child Sexual Material" OR "Child Sexual Exploitation Material" OR "Child Sexual Abuse Material" OR "CSEM" or "SEM-C" OR "CSAI" OR "Indecent Images" OR "Innocent Images") AND ("Cognitive Distortion" OR "Offense Supportive Cognition" OR "Implicit Theory" OR "Flawed Cognition" OR "Sense Making" OR "Permission Giving") AND Date>=2009.

The traditional PICO methodology was not utilized, given the differences in control groups (Comparison) and the lack of specific outcomes (Outcome). Under SPIDER, the parameters of the search were defined as follows:

- *Sample*. The study sample was limited to adult male offenders who possessed or viewed CSEM. Studies involving the consumption of CSEM by adolescents (e.g., sexting) and those *exclusively* involving production (which necessitates a contact offense) and not consumption were excluded. Because the vast majority of the studies reviewed met the Sample criteria, limiting search terms were not necessary (the few papers not meeting the Sample criteria were removed in abstract and full text review).
- *Phenomenon of Interest* (PI). The PI was the consumption (viewing or possession) of CSEM. The initial query terms included "Child Pornography", "Child Sexual Material", and "Child Sexual Exploitation Material". Following the initial full text review, the terms "Child Sexual Abuse Material", "CSEM", "SEM-C", "CSAI", "Indecent Images", and "Innocent Images" were added.
- *Design.* There were no limitations placed on study design for this review, however the search was limited to publications within the past ten years. Because of the changing nature of Internet consumption of child pornography (Steel, 2014) and the delay in information collected (all of the studies were post-offense, some by several years), studies were limited to those published in the last ten years (since 2009). Additionally, focusing on more recent

studies reduces any potential bias due to the changing demographics of online offenders as well as any bias related to the populations sampled as a result of the changing law enforcement response to CSEM offenses (Wolak et al., 2011). As such, a time limit of “Year>=2009” was added to the query. Study designs in the final paper selection included surveys, coded interviews, in-person instrument testing, and ethnographies. Studies using implicit association tests were manually excluded as they did not directly address cognitions and focused primarily on discriminating sexual interest in children (Babchishin et al., 2014).

- *Evaluation.* The Evaluation criteria was the presence, endorsement level, and makeup of cognitive distortions in the Sample. The initial query used the term “Cognitive Distortion”, with the phrases “Offense Supportive Cognition”, “Implicit Theory”, “Flawed Cognition”, “Sense Making” and “Permission Giving” added following the preliminary paper review.
- *Research Type.* The study included both quantitative and qualitative studies, as well as mixed-method studies. There were no Randomized Controlled Trial (RCT) studies present as the topic area did not lend itself to such experiments. Because there were no limitations on research type, additional limiting query terms were not included.

A combined title and abstract screening was conducted for all initially identified studies (n=251) to determine suitability based on the inclusion criteria. Following the initial screening, the full text of the remaining studies was reviewed. Any papers meeting the inclusion criteria from the references used in the remaining studies were identified (n=11), and additional search terms were added to the initial query to ensure adequate coverage as noted above. Grey literature was searched using Google as well as Proquest (for dissertations and theses) to identify unpublished studies that were not indexed in the traditional databases and several theses were included (n=8). The overall methodology is shown as a PRISMA flowchart (Moher et al., 2010) in Figure 1 below. Exclusions included studies that had populations that were not of interest to this review (e.g., offenders who were exclusively commercial producers of CSEM), were aggregates of other studies (e.g., literature reviews), or contained no qualitative or quantitative measures of distortion.

The selected studies (n=20) were evaluated for content and quality (Table 1), and the instruments relevant to cognitive distortion measurement were noted.

Studies that included additional instruments unrelated to cognition distortions or related to general cognitive functioning (e.g., general impulsivity) only had the instruments relevant to cognitive distortions noted. Studies involving direct measure of cognitions (e.g. Paquette, 2018) as well as clinical provider evaluations, both direct and case-based (e.g. Seto et al., 2010) as well as indirect (based on professional judgement) and aggregated (Kettleborough & Merdian, 2017) were identified and included. Each of the studies was evaluated for overall endorsement of cognitive distortions, with low distortions having an endorsement rate below .25, moderate distortions having a rate between .25 and .5, and strong endorsements having a rate above .5 where quantitative rates were provided. Other studies where aggregate rates were not provided directly or where inadequate statistical analyses were included to generate aggregate rates were evaluated qualitatively based on the study findings. Where relevant endorsement measurements were present at the item level, these were explored and noted in the findings.

A quality review was performed on all of the studies. For this study, the Mixed Method Appraisal Tool (MMAT) (Hong et al., 2018) was used to evaluate study quality. The MMAT was chosen because of the nature of this mixed studies review and its incorporation of qualitative, quantitative and mixed methods studies. All studies were confirmed to have positive answers to the two MMAT qualifying criteria and fully assessed against the appropriate study type question categories. Per MMAT guidance, quantitative rankings for between-study comparison are not relevant and not noted.

The findings were summarized and a confidence level assigned to the aggregate results. For those findings where there was support based on the results from the majority of the prior studies, taking study quality into consideration, a high confidence was assigned. For those findings where there was support based on a few well controlled studies but there was insufficient replication or consensus a medium confidence was assigned. Low confidence findings were not reported.

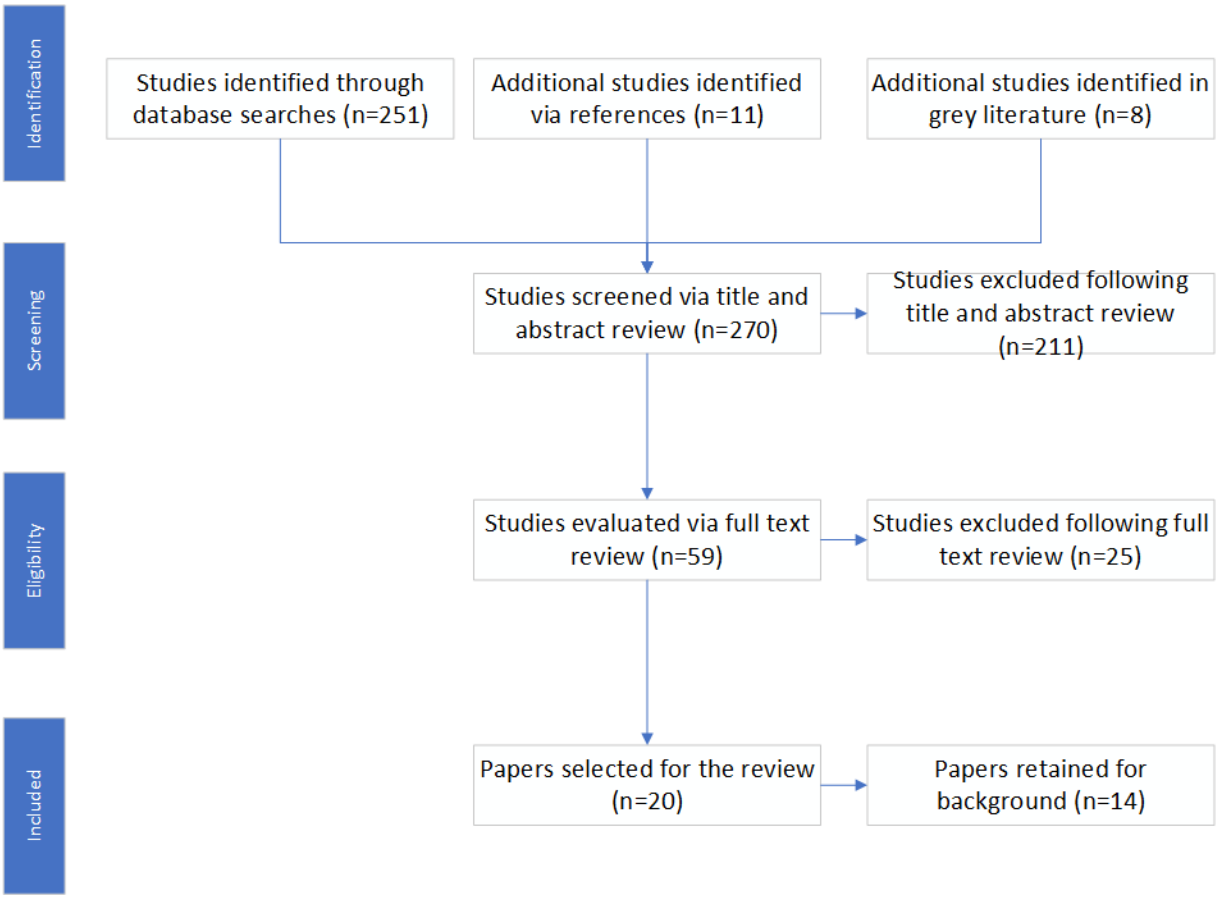

Figure 1 - Review methodology and selection summary

2.1 Instruments

The studies included in the review used ten previously published instruments as well as several custom surveys. The published instruments fell into two categories - those specific to traditional contact offenders (or potential contact offenders), and those specific to Internet-based crimes against children offenders. Because the studies involved were related specifically to cognitive distortions, risk-tools that addressed behavioural factors related to recidivism, such as the Child Pornography Offender Risk Tool (CPORT) (Seto & Eke, 2015), were not included in any of the referenced studies. Additionally, promising tools that are in active development but without available population studies such as the Children, Internet, and Sex Cognitions scale (CISC) (Kettleborough & Merdian, 2013) were not included.

2.1.1 Contact Offender Instruments

Victim Empathy Distortion Scale (VEDS). VEDS (Beckett & Fisher, 1994) was developed to measure victim empathy, both direct empathy for an actual victim and theorized empathy based on a general scenario. Originally designed for general sex offenders, it was found to have an internal consistency of .89 and test-retest reliability of .95 when evaluated with child contact sex offenders (Beech, 1998). Lower scores equate to higher levels of victim empathy. The score effectively measures victim blame-related cognitions, including the impact on the victim emotionally, the victim's role in encouraging the behaviour, and the victim's relative enjoyment of the behaviour.

Children and Sex Cognitions Questionnaire (CSCQ). CSCQ (Beckett, 1987) was developed to measure the cognitions of child sex offenders. CSCQ has two scales, one related to cognitive distortions and one for emotional congruence - this study was primarily concerned with the first scale. The cognitive distortion scale evaluates distortions related to the motivation and to the sexual sophistication of the child. Higher scoring is indicative of more cognitive distortions being present. The cognitions scale was evaluated as having an alpha of .90 and a test-retest reliability of .77 when evaluated against a group of child contact sex offenders (Beech, 1998).

Bumby Cognitive Distortion Scale (MOLEST and RAPE) (BCDS). BCDS (Bumby, 1996) was designed to measure the cognitive distortions of child molesters (MOLEST) and rapists (RAPE) using two separate scales. Both scales are used in this study and have been found to have moderate correlations with the number of victims and the length of offending. With both scales, higher scores correspond to more cognitive distortions. The MOLEST scale had an alpha of .97 and a test-rest reliability of .84, and the RAPE scale had an alpha of .96 and a test-retest reliability of .86 (Bumby, 1996).

Abel and Becker Cognition Scale (ABCS). ABCS (Abel et al., 1989) was one of the first instruments to specifically examine the cognitive distortions of child molesters based on a factor analysis that identified key areas of difference between child sex offenders and both non-child sex offenders and non-sex offenders. The ABCS focused on child sexualization distortions as well as distortions based on offender self-assessment of harm, with lower scores indicating higher levels of cognitive distortion. Of the six factors in ABCS, all but one had alphas above .7 and the overall test-retest reliability was measured as .76.

Coping Using Sex Inventory (CUSI). CUSI (Cortoni & Marshall, 2001) was developed based on the concept that stress and sexual preoccupation are coping strategies employed by sex offenders. While not specifically designed to measure cognitions, many of the themes presented overlap with the Unhappy World distortion category, and pornography usage was one of the strategies measured. CUSI is scored with higher values indicating more coping mechanisms employed. The overall alpha for CUSI was found to be high (.88) with all subscales above .80.

Empathy for Children Scale (ECS). ECS (Schaefer & Feelgood, 2011) was designed to measure victim empathy using generic scenarios involving sex offenses with children. Higher scores equate to higher empathy. Similar to VEDS (Beckett & Fisher, 1994), ECS measures cognitive distortions related to victim impact. ECS was developed specifically for non-offending paedophiles, making CSEM offenders potential matches for the intended use. The overall alpha for ECS was found to be high (.96).

2.1.2 Internet Child Sex Offender Instruments.

Implicit Theory Coding Template (ITCT). ITCT (Howell, 2018) was developed to assist in differentiating Internet-only sex offenders from crossover contact offenders. ITCT was based on the taxonomies of distortion proposed by Ward and Keenan (1999) as well as Bartels and Merdian (2016). Higher ICIT scoring is indicative of higher endorsement of cognitive distortions. Comprehensive validity testing of the instrument was not performed, but initial inter-rater reliability was found to be high.

Internet Behaviours and Attitudes Questionnaire (IBAQ). Hammond (2004) provided four reasons for the assessment of sex offenders - for treatment purposes, for research purposes, to evaluate the efficacy of interventions, and for risk management. IBAQ (O'Brien & Webster, 2007) was developed to address all of Hammond's (2004) reasons for assessment and was designed specifically for CSEM offenders. The IBAQ included both behavioural and attitudinal scales, including scales related to distorted thinking, with higher scores indicating higher levels of distortion on the attitudinal scale. The IBAQ was found to have a high alpha value (.93) (O'Brien & Webster, 2007).

Children and Sexual Activities Inventory (C&SA). C&SA (Howitt & Sheldon, 2007) was based on the Ward and Keenan (1999) typology and meant to apply to both contact and Internet-only offenders. Higher agreements were indicative of higher degrees of cognitive distortion, and the C&SA eliminated the "Neither Agree nor Disagree" Likert category to avoid bias toward ambiguous responses. Validation data was not available on the C&SA (Howitt & Sheldon, 2007), but it was used to create later scales that were validated (Paquette, 2018).

Cognitions on Internet Sexual Offending scale (CISO). CISO (Paquette, 2018) was developed to address some of the limitations present in contact offender scales applied to online offenders and built on the work of tools such as the IBAQ (O'Brien & Webster, 2007) and C&SA (Howitt & Sheldon, 2007). Although not specific to CSEM offenders (online solicitation offenders were included), CISO showed that traditional cognition questions for contact offenders did not map well to online-only offenders. CISO is scored on a basis where higher values correspond to higher levels of cognitive distortion. The overall alpha for the CISO was high (.90) (Paquette, 2018).

Studies that included additional instruments unrelated to cognition distortions or only related to general cognitive functioning (e.g., general impulsivity) only had the relevant instruments noted. Of note, several studies included deception checks based on social desirability, notably the Marlowe-Crowne Social Desirability Scale (MC-SDS) (Crowne & Marlowe, 1960) and Paulhus Deception Scales: The Balanced Inventory of Desirable Responding (BIDR) (Paulhus, 1998). Some prior work with child molesters in general has shown mixed endorsement of cognitive distortions, with "faking good" being a potential reason for the overall low endorsement in surveys, so social desirability instruments serve as a potential control for these situations (Gannon & Polaschek, 2005; Hammond, 2004).

3. Findings

Twenty studies were identified, utilizing quantitative and qualitative methods and mixed-method approaches with a variety of instruments as noted in Table 1. The majority of the studies relied on self-reporting, and the overall endorsement of cognitive distortions by CSEM offenders was found to be low across the studies assessed. Not all of the studies utilized a control group but for those that did the

control group was noted (the comparison group was always online CSEM offenders). Mixed offenders had higher overall distortion numbers than either contact or CSEM offenders (Merdian et al., 2014; Neutze et al., 2012), potentially due to their endorsement of both contact and Internet-only endorsements. Additionally, while some studies used the same instruments, differences in the control group composition and the lack of non-aggregated endorsement data made individual comparisons between studies difficult, supporting the selection of the MMAT for the review.

Study	n	Population	Internet/ Contact/ Mixed	Type of Study	Instruments	Type of Reporting	Control Group	Key Findings
(Bailey et al., 2016)	1,102	Adult males sexually attracted to children recruited from websites	Internet/ Contact/ Mixed	Internet Survey	Custom	Self	N/A	Moderate endorsement. Distortions that child-adult sex is not immoral or harmful (age controlled) and that there is minimal impact to the child showed high correlation with each other but did not correlate with offense categories in a predictive manner.
(Elliott et al., 2009)	1,031	Adult male Internet and contact sex offenders	Internet/ Contact	Survey	VEDS, CSCQ	Self w/Deception Check	Contact	Low endorsement. Internet offenders have significantly fewer general cognitive distortions and victim empathy-related distortions compared to

Study	n	Population	Internet/ Contact/ Mixed	Type of Study	Instruments	Type of Reporting	Control Group	Key Findings
								contact offenders.
(Elliott, 2012)	177	Adult male Internet offenders (pre-conviction at the start of therapy)	Internet	Survey	IBAQ (modified)	Self	N/A	Low endorsement. Moderate endorsement for six IBAQ items, primarily related to uncontrollability.
(Elliott et al., 2013)	1,128	Adult male offenders post-conviction	Internet/ Contact/ Mixed	Survey	VEDS, CSCQ	Self w/Deception Check	Mixed/ Contact	Low endorsement. Internet offenders had higher victim empathy and lower cognitive distortions than mixed or contact offenders.
(Henry et al., 2010)	422	Adult male offenders post-conviction	Internet	Survey	VEDS, CSCQ (modified)	Self w/Deception Check	Internal Clusters	Moderate endorsement (subgroup). Three clusters of offenders were identified. The “deviant”

Study	n	Population	Internet/ Contact/ Mixed	Type of Study	Instruments	Type of Reporting	Control Group	Key Findings
		pre-treatment						cluster (n=145) showed significant differences in overall pro-offending cognitive distortions.
(Howell, 2018)	59	Adult male offenders post-conviction pre-treatment	Internet/ Mixed	Survey	ITCT	Coded psychological report	Mixed	Low endorsement. Moderate endorsements were only found in the CSEM group for Unhappy World and Nature of Harm.
(Kettleborough & Merdian, 2017)	16	Treatment professionals	Internet/ Contact	Survey	Custom	Professional Estimate (Inductive Theme Analysis)	Contact	High endorsement (perceived). Treatment professionals believed in significantly higher levels of ITs in CSEM offenders; Children as Sexual Objects and Entitlement were the highest

Study	n	Population	Internet/ Contact/ Mixed	Type of Study	Instruments	Type of Reporting	Control Group	Key Findings
								perceived endorsements.
(McCarthy, 2010)	247	Adult male offenders pre-and-post conviction pre-treatment	Internet/ Mixed	Survey (Archival)	Custom	Self	Mixed	Low endorsement. Both Internet-only and Contact CSEM offenders showed low endorsement of cognitive distortions related to child sexual abuse.
(McWhaw, 2011)	37	Adult male offenders in treatment	Internet/ Contact/ Mixed	Survey (Archival)	Bumby	Self w/Deception Check	Contact	Low endorsement. Both Internet-only and Contact CSEM offenders showed low endorsement of cognitive distortions on MOLEST and RAPE scales with no statistically significant difference between groups.
(Merdian,	68	Adult male	Internet/	Survey	C&SA	Self	Contact/	Low endorsement. No

Study	n	Population	Internet/ Contact/ Mixed	Type of Study	Instruments	Type of Reporting	Control Group	Key Findings
2012)		offenders from both treatment centres and prisons	Contact/ Mixed				Mixed	statistically significant difference between the groups. Moderate endorsement on four items, two related to victim empathy, one to stress, and one to nature of harm.
(Merdian et al., 2013)	39	Adult male offenders from prisons and treatment centres	Internet/ Mixed	Survey	ABCS	Thematically coded qualitative responses, Self	Mixed	Low endorsement. Mixed offenders had higher distortions than Internet-only.
(Merdian et al., 2014)	68	Adult male offenders from both treatment	Internet/ Contact/ Mixed	Survey	ABCS, C&SA (modified)	Self	Contact/ Mixed	Low endorsement. One offense-specific distortion on the nature of harm had moderate endorsement.

Study	n	Population	Internet/ Contact/ Mixed	Type of Study	Instruments	Type of Reporting	Control Group	Key Findings
		centres and prisons						
(Merdian et al., 2018)	68	Adult male offenders from both treatment centres and prisons	Internet/ Contact/ Mixed	Survey	ABCS, C&SA (modified)	Self	Contact-driven*	Low endorsement. Significantly lower justification-related distortions compared to contact-driven offenders. Internet-only offenders had moderate endorsement of not being sex offenders.
(Neutze et al., 2012)	345	Adult male offenders in voluntary treatment	Internet/ Contact/ Mixed	Survey	BCDS-MOLEST, ECS	Self	Contact/ Mixed	Low endorsement. The highest endorsements occurred amongst mixed offenders.
(Nilsson, 2009)	3	Adult male offenders in non-	Internet	Interviews	Custom	Thematically coded qualitative	N/A	High endorsement. Cognitive distortions on nature of harm were

Study	n	Population	Internet/ Contact/ Mixed	Type of Study	Instruments	Type of Reporting	Control Group	Key Findings
		voluntary treatment				responses		endorsed, as were stress and life trauma-based distortions.
(Paquette, 2018)	241	Adult male offenders in community supervision	Internet/ Contact/ Mixed	Survey	CISO, CUSI-Child, BCDS-MOLEST	Self w/Decepti on Check	Contact/ Mixed/ Non-Sexual	Moderate endorsement. Overall moderate endorsement of cognitions by online offenders on CISO and CUSI-Child but low endorsement on other scales.**
(Rimer, 2017)✢	81	Adult male offenders in group and individual sessions as part of a treatment	Internet	Interviews and Observatio ns	N/A	Thematical ly coded qualitative responses	N/A	Moderate endorsement. Participant endorsement of online offenses being different from offline (compartmentalization); Most justification was related to environment

Study	n	Population	Internet/ Contact/ Mixed	Type of Study	Instruments	Type of Reporting	Control Group	Key Findings
		programme						and lack of boundaries online as opposed to direct distortion.
(Seto et al., 2010)	50/34***	Adult male offenders in police interviews and adult male offenders in post-arrest treatment	Internet	Interviews and Observations	N/A	Thematically coded qualitative responses	Police/ Clinical Interviews	Low endorsement. Low endorsement of Internet addiction but moderate endorsement of pornography addiction and accidental or curiosity-based access; Explanations changed based on the environment.
(Winder & Gough, 2010)	7	Adult male offenders in treatment-based prison	Internet	Interviews	N/A	Interpretative Phenomenological Analysis	N/A	High endorsement. Overall strong endorsement for uncontrollability, nature of harm, direct victimization

Study	n	Population	Internet/ Contact/ Mixed	Type of Study	Instruments	Type of Reporting	Control Group	Key Findings
								and sex offender status distortions.
(Winder et al., 2015)	7	Adult male offenders in treatment-based prison	Internet	Interviews	N/A	Coded discourse analysis	N/A	High endorsement. Overall strong endorsement for uncontrollability was identified amongst offenders.****

Table 1 - Study Composition and Endorsement Levels

* (Merdian et al., 2014, 2018) included different analysis of the same study content for cognitive distortion purposes. Their 2018 study used “fantasy-driven” v. “contact-driven” as comparators as opposed to “CSEM” v. “contact”. **(Paquette, 2018) included both CSEM offenders and child luring offenders in their analysis, but noted future work would be needed to compare the CISO scale in an intragroup analysis. *** (Seto et al., 2010) included two samples - the first were police interviews and the second clinical interviews.**** (Winder & Gough, 2010; Winder et al., 2015) both used the same dataset, but a different analysis, and are included for comparison purposes.✢(Rimer, 2019) is part of the same study and contains additional details of relevance, but was not counted separately.

While overall endorsement was low, several studies did identify specific distortions that were endorsed at a moderate or higher level by CSEM offenders. Six distortions in the IBAQ were identified as having moderate or higher endorsement:

- "I have found myself aroused at the illegality of the child pornography"
- "I do not use the Internet to escape from my problems" (Reverse coded)
- "I am not addicted to Internet child pornography" (Reverse coded)
- "I like to look at child pornography pictures when I masturbate"
- "I feel that my use of Internet child pornography encourages me to act in ways that I would not normally act"
- "I feel more confident on the Internet than I do talking to people in real life" (Elliott et al., 2013)

Similarly, the ICIT identified endorsement of the Nature of Harm and Unhappy World implicit theories by CSEM offenders (Howell, 2018). With the CS&A, two studies identified moderate endorsements of cognitions as follows:

- "An adult can tell if having sex with a young child will emotionally damage the child in the future"
- "My daughter (son) or other young child knows that I will still love her (him) even if she (he) refuses to be sexual with me"
- "Just looking at a naked child is not as bad as touching and will probably not affect the child as much"

"For many men, sex offences against children are the result of stress and the offence helped to relieve the stress"(Merdian, 2012; Merdian et al., 2014)

In their 2014 study, Merdian et al. additionally found support for the denial of sex offender status by CSEM offenders (2014). Finally, Seto et al. (2010) found endorsement for the Accidental Access, Pornography Addiction (but not Internet Addiction), and Curiosity themes.

In addition to the specific cognitive distortions identified above as being endorsed, there are several aggregate findings from the overall review:

- *Endorsement of cognitive distortions associated with contact offenders by CSEM offenders is low.* Confidence: *High*. The traditional contact offender scales, even those associated with children (e.g. VEDS, CSCQ, BCDS-

MOLEST) showed low overall endorsement by CSEM offenders. The traditional scales generally measure categories similar to those identified by Ward and Keegan (1999), which have an aggregate low endorsement when applied to online-only offenders.

- *Traditional instruments that measure cognitive distortions of child molesters have limited utility for CSEM-only offenders.* Confidence: *High*. CSEM-specific tools have been developed to address the differences in cognitive distortions between contact and non-contact offenders. It had been previously hypothesized that "CPOs [Child Pornography Offenders] may endorse qualitatively different cognitive distortions from offenders with contact victims, and may thus appear as less distorted on conventional measures that are not validated on non-contact sex offenders" (Merdian et al., 2013, p. 15), and this review supports that hypothesis.
- *Online-specific cognitive distortions have higher degrees of endorsement.* Confidence: *Medium*. Customized instruments such as the IBAQ (O'Brien & Webster, 2007) and the more recent CISO (Paquette, 2018) show statistically significant higher levels of endorsement than prior instruments. While it is not validated specifically on CSEM offenders and includes a substantial number of questions related to online solicitation, the work on CISO is rigorous and promising and demonstrates the opportunity for a CSEM-specific instrument. This is consistent with a prior meta-analysis showing that the populations differ on several dimensions (Babchishin et al., 2015).
- *Environment and social desirability impact reporting.* Confidence: *Medium*. Clinicians reported perceiving moderate to high levels of cognitive distortions amongst CSEM offenders (Kettleborough & Merdian, 2017), and offenders asked to explain their actions provided answers consistent with moderate to high levels of cognitive distortions (Nilsson, 2009; Rimer, 2017; Winder & Gough, 2010; Winder et al., 2015). This is in contrast to the lower endorsements in survey-based self-reports, and consistent with the inclusion of social desirability checks (Crowne & Marlowe, 1960; Paulhus, 1998) in these tools. Additionally, environmental changes among the same offenders showed

different distortions in different settings (Seto et al., 2010). Finally, many of the studies involved individuals in treatment, and participation in a sex offender treatment program would potentially impact the underlying biases as well as their reporting.

4. Discussion

Low levels of overall endorsement of traditional child molester-oriented cognitive distortions were consistently found in surveys of CSEM offenders. Low endorsement of cognitive distortions has been found in child molesters as well (Gannon et al., 2007), with some authors questioning the validity of those endorsements and their value in understanding criminogenic behaviour (Gannon & Polaschek, 2006) and potentially even the value in treating those cognitions (Marshall et al., 2011). Others have noted that understanding cognitive distortions is essential for treatment (Ward et al., 1997), and they are addressed specifically in cognitive behavioural therapy with success in treating CSEM offenders as well as other therapeutic areas (Beier et al., 2015; Young, 2007; Yurica & DiTomasso, 2005). The majority of the studies to-date, however, have focused on risk assessments (Seto & Eke, 2015) and differentiation between Internet-only and contact offenders (Babchishin et al., 2015). There is currently limited research looking specifically at the application of CSEM offenders' cognitive distortions to the treatment, investigation and intervention domains.

Cognitions are believed to change over time, potentially due to factors including normalization (Carr, 2006; Quayle & Taylor, 2003) and habituation (Taylor, 1999), with the potential changes in cognitions being indicators of a migration from CSEM to contact offending (Quayle & Taylor, 2001). Because of this, the results from some of the reviewed studies may be representative of the current state of an offender, not of the trajectory of their offending or of potential end-states. The value of locating the individual on the spectrum for appropriately timed intervention and treatment does not appear to have been a general consideration in most of the prior work.

Overall, there are several recommendations for future research based on this review:

1. There is a need for CSEM-specific cognitive distortion instruments (Merdian et al., 2014, 2018). The majority of the prior research has used instruments either directly from, or adapted from, those used for contact sex offenders, with the customized instruments showing the most promise (O'Brien & Webster, 2007; Paquette, 2018). Kettleborough (2017) used the existing framework from Ward and Keegan (1999) and the categories identified by treatment professionals as having the most perceived endorsement by CSEM offenders (Children as Sexual Objects, Entitlement) had some of the lowest actual endorsements in offender responses (Elliott, 2012; Howell, 2018). Kettleborough (2017) noted, however, that the professional opinion was mixed about the validity of using contact offender instruments. There is little utility in further research into the use of traditional sex offender instruments to assess online-only CSEM offenders.
2. Better scales could be used to measure self-endorsement. Based on the coding of statements and interviews with CSEM offenders (Nilsson, 2009; Rimer, 2017; Seto et al., 2010; Winder & Gough, 2010; Winder et al., 2015), offenders make assertions that are representative of cognitive distortions, but when asked their level of agreement with the distortions on a traditional Likert scale, they show low endorsement. Using questions more reflective of the actual statements of offenders may provide greater insight into actual endorsement. For example, one interviewee noted "I couldn't stop looking at these pictures" (Quayle & Taylor, 2004, p. 352), which differs from the corresponding question of "I am not addicted to Internet child pornography" (O'Brien & Webster, 2007). Additionally, when coupled with social desirability effects, a four-to-five point Likert scale only has individuals generally selecting the lowest two scores of Disagree and Strongly Disagree, making it a de-facto two point scale. This results in signal compression, making it difficult to differentiate between offenders and non-offenders. Many of these questions could also be asked as a frequency of occurrence question as opposed to a point-in-time agreement with that question.
3. The scales could include better discrimination in their questions. The phrasing and context of how questions are asked may identify more nuance in cognitive

distortions than is readily apparent from a single question. For example, instead of asking about the level of agreement with a statement about child pornography creating victims, a question group may instead be asked as follows:

> Which of the following do you most agree with about viewing child pornography and child victims:
>
> - Viewing child pornography is directly responsible for creating child victims.
> - Viewing child pornography is indirectly responsible for creating child victims.
> - Viewing child pornography does not contribute to child victimization.

Additionally, the use of proxy questions can be employed. For example, taking countermeasures to hide CSEM material but not adult pornography would be representative of the individual cognitively viewing the two as different. While the use of Implicit Association Tests (IATs) has been proposed as a proxy for distortions (Merdian et al., 2014), none of the reviewed studies utilized other forms of proxy questions and none fully utilized non-Likert question groups. One study which asked a question about opinions on child-adult sex permissibility using a non-Likert question showed a promising broader spread of answers and supporting the use of non-Likert question construction, finding that "17.2% of the sample said it was 'very immoral,' 18.4% said it was 'immoral, but not the worst thing an adult could do,' 24.4% said 'it depends on the circumstances,' 35.4% said it was 'not immoral if the act is consensual,' and 4.7% said it was 'no more immoral than sex between adults'" (Bailey et al., 2016, p. 995).

4. The current studies are not baselined against a true control group. Paquette utilized non-sex offenders as a comparator group (2018), but the remainder of the studies only performed intra-group comparisons with other child sex offenders. Paquette's comparison group consisted of individuals who were convicted of non-sexual offenses, and that group in addition to both online and contact offenders were given a 116 item questionnaire that measured their related cognitive distortions. In Paquette's work, the comparison of online offenders to non-sex offenders on CISO showed significant group differences,

which would potentially be larger when compared to the general public. Even a small change in endorsement from “Strongly Disagree” to “Disagree” could be statistically significant, allowing for more discriminative power in instruments designed to assist in treatment.

5. There is a need for an instrument for identifying distortions for treatment and intervention purposes. The current instruments are designed to differentiate between contact offenders and Internet-only offenders, not identify faulty cognitions (or behaviours) for treatment and intervention purposes. If intervention is viewed as being most effective when timed appropriately, the instruments must take into account the temporal nature of cognitive distortions to target the right distortion at the right time. The need for a different approach to intervention is highlighted by the lack of reduction in recidivism seen by traditional sex offender treatment programs (SOTPs). In the CORE SOTP, child image offenders who went through treatment showed a small but higher rate of re-offending than a control group without treatment (Mews et al., 2017). In contrast, the i-SOTP, an Internet offense specific treatment programme, showed early promise with improved socio-affective functioning as well as a reduction in pro-offending attitudes (Middleton et al., 2009).
6. Additional research incorporating behavioural and environmental factors with cognitions is still needed. Paquette (2018, p. 180), quoting Mann and Beech (Mann & Beech, 2003), noted that “offense-supportive cognitions would interact with other risk factors such as problems with self-regulation or deviant sexual interests to increase the likelihood of sexual offending behavior.” The expansion of instruments to include behavioural factors and deviance factors, as was piloted by the IBAQ (O’Brien & Webster, 2007), would be consistent with current criminological theories and potentially provide more explanatory power for offense-related activities. When considering Internet affordances, the specific usage patterns of CSEM offenders must be contextually considered - the technology alone may be benign, but may be utilized in unforeseen ways specifically by offenders (Jerde, 2017).

5. Limitations

The studies analysed varied greatly in size, from n=3 (Nilsson, 2009) to n=1,128 (Elliott et al., 2013). The smaller studies tended to have higher degrees of endorsement but had insufficient power to draw any substantive conclusions and lacked generalizability. The larger studies contained sufficient individuals based on power analysis, but it was unclear whether they had representative samples or whether there was a sampling bias (many were samples of convenience based on the population available).

There is a general difficulty in all studies comparing CSEM-only offenders to mixed and contact offenders in that CSEM offenders may be unidentified contact offenders (Bourke & Hernandez, 2009; Long et al., 2013; Seto et al., 2011). Given the prior studies, the number of unidentified contact offenders may be statistically significant, and few studies control for this factor. Additionally, the dichotomy of contact offenders and non-contact offenders may be more of a continuum, with acts such as voyeurism and frotteurism potentially confounding any analysis based on discrete groups.

A key limitation in the study of the cognitive distortions of CSEM offenders is that most research has been performed ex post facto. If distortions are primarily trait-based, this is valid, however state may be an equally critical factor. Ariely and Lowenstein (2006) showed that arousal increased the hypothetical attractiveness of a 12 year old girl (as well as the general appeal of other atypical stimuli). Their research supported the presence of a “hot state” (Van Boven & Loewenstein, 2003), in which cognitive distortions may be amplified and traditional prefrontal cortex inhibitory mechanisms diminished. While hot states have been shown to impact judgement in the moment (state-based), self assessments of their impact in other domains have shown limited correlation with actual impact (Evers et al., 2009, 2011), potentially moderating self reporting validity for state as opposed to trait based cognitions. There is the potential for individuals to reflect on and assess their own hot states ex post facto, however, as evidenced in an offender interview response:

> Actually, once I'd come I'd then almost be ... I'd I'd I'd be ... I'd find it distasteful. That what had been ... that what had been acceptable during a state of sexual arousal ... afterwards wasn't acceptable. (Quayle et al., 2000, p. 91)

The wording of questions to take the individual back to the time of their offending, as opposed to their endorsement at the time of the study, may yield different results.

The systematic review utilized the MMAT tool for quality review, but direct quality comparisons between studies are not meaningful given the variety of study types present (Hong et al., 2018). Additionally, the various studies utilized different instruments (and modifications of those instruments) as well as different comparison groups, making a meta-analysis infeasible.

6. Conclusions

Our systematic review showed that the body of research has failed to establish that there are strong endorsements by CSEM offenders of the cognitive distortions traditionally associated with contact offenders. Additionally, the current instruments available are not well suited for CSEM offenders for assessment, investigative, treatment, or deterrence purposes. One of the newest instruments, the CISO (Paquette, 2018), shows promise for a CSEM-specific set of distortions, but was developed using other online offenders and needs to be shown as effective specifically for CSEM-only offenders.

The majority of the studies in this review looked at cognitive distortions in isolation. There is a research need for additional work incorporating the cognitions and the technical behaviours of CSEM offenders into an integrated model (O'Brien & Webster, 2007; Paquette, 2018). Past scholarship has questioned targeting contact offender cognitive distortions alone (Gannon & Ward, 2009; Marshall et al., 2011; Maruna & Mann, 2006), and with the underwhelming results using a traditional treatment approach with online sex offenders (Mews et al., 2017), a paradigm shift is warranted. Better understanding of the thought process of offenders as they interact with technology to view CSEM, and planning both treatment and interventions around their intersection, is an area of current need for improving treatment outcomes.

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Chapter 4 - An Integrative Review of Historical Technology and Countermeasure Usage Trends in Online Child Sexual Exploitation Material Offenders

4.1 Overview

Lawless space theory (LST), introduced in Chapter 2, proposes the integral nature of technology in CSEM offending. Understanding the usage of technology by CSEM offenders is also a key factor for investigation, interdiction, and treatment purposes. Starting with electronic Bulletin Board Systems (BBSs) and continuing through the use of the dark web and mobile devices, specific technologies have both enabled and constrained the acquisition of content by CSEM offenders. In addition to facilitating access to CSEM, technology has also been used as a countermeasure to hide activities, ensure anonymity, and secure collections from discovery and access. This work looks at the evolution of technology usage by CSEM offenders separated into five overlapping eras - the early networking era, which was made of primarily of BBS, Usenet, and email activity; the early Internet and World Wide Web (WWW) era, which included Internet Relay Chat (IRC) and early instant messaging; the peer-to-peer era; the dark web era; and the current, mobile era.

An integrative review was conducted using relevant search terms on the PsycInfo, Web of Science, EBSCOHost Academic Search Complete, and Proquest databases for journal articles, conference proceedings, and grey literature. The SPIDER methodology (Cooke et al., 2012) was used to conduct the search, and a quality review was performed using the Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies (*Study Quality Assessment Tools | National Heart, Lung, and Blood Institute (NHLBI)*, n.d.). An initial 1,093 technology papers and 3,190 countermeasures

papers were identified. Following a title and abstract triage and subsequent full text review, 33 papers were identified as meeting relevancy and quality standards and included in the analysis.

Under LST, individuals were proposed to utilize technologies beyond their normative lifecycles due to habituation of risk and normalization of their actions. Additionally, LST proposed that individuals would use countermeasures only if they could be employed without sacrificing utility. This review formed the basis for these components of LST by showing the continued usage of sub-optimal technologies by offenders when lower risk and more capable options were available, as well as the overall low employment of sophisticated countermeasures by CSEM offenders.

4.2 Summary of Findings

The major findings of the review were as follows:

- The size of CSEM collections has grown progressively, but at a slower rate than the growth of low-cost digital storage.
- The composition by percentage of CSEM collections that is video as opposed to static images has grown, but at a slower rate than the overall adoption of video content in other areas (e.g., adult pornography).
- CSEM offenders continue to use technologies beyond their normative usage periods and only adopt new technologies when features that meet offense-specific needs are incorporated into those technologies.
- The employment of countermeasures, and technologically sophisticated countermeasures in particular, by CSEM offenders has been historically low, but prior research does not consider the incorporation of integrated countermeasures that are incorporated by default (e.g., encrypted storage on an iPhone) (*iPhone 6 Plus - Technical Specifications*, 2019).

- More investigation into “gateway” technologies that facilitate initial usage, as well as how different technologies are used to fulfil different needs, is needed to better inform behavioural treatments, deterrence efforts, and investigations.

An Integrative Review of Historical Technology and Countermeasure Usage Trends in Online Child Sexual Exploitation Material Offenders

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Abstract

Starting with electronic Bulletin Board Systems (BBSs), Usenet and email, the adoption and continued use of technology to facilitate the viewing and possession of child sexual exploitation material (CSEM) has been of research interest for investigation, treatment, intervention, and interdiction purposes, and has been used in developing risk assessment tools. In this review, a systematic search of databases containing peer reviewed journal and conference papers as well as grey literature was conducted to identify prior quantitative research using the SPIDER methodology. The search was broken into a search for general technology usage, which identified 1,093 papers, and a search for countermeasure usage, which identified 3,190 papers. Following a title and abstract triage, then a subsequent full text review of the remaining papers, 33 papers were identified for inclusion as meeting relevancy and quality standards as measured by a modified Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies analysis. The review found long term trends indicative of a slow growth in collection sizes with growing percentages of video content. Additionally, offenders continued to use technologies beyond their normative usage periods and only adopted new technologies once capabilities specific to offender needs were incorporated into those technologies. Finally, the review noted issues with current countermeasures research in not adequately addressing integrated countermeasures that are enabled by default in newer technologies, and with general technology research in using older data and not including mixed-method technologies.

Keywords: Child pornography, online offender, child sexual exploitation material, technological behaviours, countermeasure usage

Introduction

Understanding the technological behaviours of online child sexual exploitation material (CSEM) offenders is useful in assessing and developing effective treatments (Ethel Quayle and Taylor, 2002), in deterrence efforts (Quayle and Koukopoulos, 2019; Steel, 2015), for investigative purposes (Jewkes and Andrews, 2005; Steel, 2014a; Wells et al., 2007), and for sentencing and probation purposes (Hamilton, 2011). This includes technologies used by individuals to acquire and view CSEM from others, for example peer-to-peer technologies permit perceived anonymity when downloading with no social interaction, while email acquisition requires direct contact and communication with other offenders. It also includes countermeasures used by offenders to both hide their actions and potentially decrease their psychological distress. As with the reduction in distress experienced with the installation of door locks (Norris and Kaniasty, 1992), the employment of controls such as content encryption at rest may serve a similar purpose.

With online CSEM offenders, the use of technology cannot be decoupled from their actions or associated cognitions, with the criminogenic nature of the Internet influencing behaviour (Jerde, 2017; Paquette et al., 2019; Taylor and Quayle, 2008). Despite this, the research into the technological behaviours of CSEM offenders has largely focused on content (Kusz and Bouchard, 2019; Seto et al., 2006; Seto and Eke, 2015), with few research studies looking at the underlying technological methods.

Additionally, given the rapid changes in Internet-based technology, even fewer studies have looked at the changing behaviours of offenders, with the longitudinal studies conducted by Wolak et al. as part of the National Juvenile Online Victimization studies (N-JOV1 and N-JOV2) being the most comprehensive (Wolak et al., 2012, 2011b, 2005). Wolak et al. measured CSEM offender behavior over time, finding that the one way interactions for technology usage, storage, collection sizes, and countermeasures had no statistically significant changes between 2000 and 2006. In contrast, however, multiple two-way interactions showed increases in the use of specific technologies (e.g., peer-to-peer) for specific collection content (e.g. images) over that period (Lukas, 2013), indicating that behaviours were evolving. The National Center for

Missing and Exploited Children (NCMEC), which receives reports in the United States primarily from electronic service providers (ESPs) such as Facebook and Twitter, looked specifically at data for the last 20 years. They showed peak periods for several technologies that are noted below, but due to limitations in their dataset overall trends between technologies cannot be easily extrapolated from their numbers (Bursztein et al., 2019).

Technology has also potentially added new modalities to CSEM offending. Prior to the introduction of websites, individuals needed to physically acquire and retain (at least temporarily) content locally, facilitating collecting behaviour. After the introduction of web technologies, including dark net-based websites, CSEM became readily available for on-demand viewing and reduced the need for collecting, allowing for better differentiation of storage out of necessity v. storage by preference.

Of the research available, it appears the pervasiveness of technology usage over time by CSEM consumers is extensive. As an example, Durkin and Bryant (1999) analysed a boy love support group, identifying thematic postings related to paedophilic discussion topics. An analysis a decade later (O'Halloran and Quayle, 2010) found that not only was the newsgroup still active, but had approximately ten times the volume as in the prior study. This persistence may mean that at least some groups of CSEM consumers become comfortable with specific technologies and potentially fail to completely adopt newer technologies when they become available, or may revert to older technologies as a risk avoidance strategy.

Technology is influencing the nature of the contact offenses committed as well, with the lines between production and consumption being blurred. Live streaming of child molestation on-demand means that production and consumption occur simultaneously, and consumption can directly (as opposed to indirectly) influence contact offense commission (Internet Watch Foundation, 2018a). Additionally, the use of mobile technology to view pornography in general has increased dramatically. Between 2010 and 2016, Pornhub, one of the top sites for adult pornography, had a 1400% increase in activity ("Porn on the Go: Mobile Traffic Takeover – Pornhub Insights," 2016), and in 2018 80% of their traffic was from a smartphone or tablet ("2018 Year in Review – Pornhub Insights," 2018).

In addition to the use of technology to acquire and consume CSEM, offenders also utilize countermeasures. Countermeasures are any action taken before, during, or after the viewing of CSEM to reduce the risk of detection. They can take the form of either basic behavioural modifications or technical controls. The most basic behavioural countermeasure is only viewing content where there is a low likelihood of being physically observed. Technical countermeasures include the use of technologies to hide offender activities, including the use of encryption and wiping tools, as well as technologies that hide the identity or location of offenders such as The Onion Router (commonly known as Tor) - the primary technology behind the dark web - or anonymous remailers.

The use of countermeasures by CSEM offenders is potentially helpful in understanding their cognitions (using a countermeasure is an indicator of an awareness of social undesirability of an action), and for law enforcement purposes. As an example, for investigative purposes, file, partition, or full disk encryption can be used to hide CSEM material from other users of a device, and make recovery of evidence for prosecutorial purposes difficult or impossible (Casey et al., 2011). CSEM offenders often discuss the use of countermeasures to avoid detection in online forums (Holt et al., 2010), but the actual prevalence of intentional usage in practice is not necessarily high.

Understanding and quantifying the usage of countermeasures has a legal context as well. Statutes such as the United Kingdom's Regulation of Investigative Powers Act of 2000 as revised by the Revisions by the Policing and Crime Act 2009, which allows for court orders requiring decryption, have been primarily used in cases of child pornography offences (Chatterjee, 2011). Tools such as Tor can not only be used to hide the identities of CSEM offenders and distributors, they can also create legal issues over jurisdiction and venue for the purposes of search warrants and enforcement actions by routing activity through multiple countries (Ghappour, 2017). Additionally, individuals can be improperly identified if they run a Tor exit node (the final Tor relay whose Internet Protocol (IP) address appears to be originating any traffic passing through it), which has resulted in the creation of services such as Exonera Tor to

differentiate between likely child pornography offenders and likely Tor relays (Tashea, 2017).

Countermeasure usage by CSEM offenders has been put forth as a driver for both the technology used to acquire the CSEM and for ensuring anonymity. Forde and Patterson, in one of the early reviews of paedophile activity on the Internet, noted "Internet components providing the strongest anonymity hosted the most extreme paedophile behaviour" (1998, p. 3). The use of countermeasures is so intertwined with activity that Krone (2004) proposed a typology based on the use of countermeasures and the method of access. Krone's typology differentiated browsers who stumble upon CSEM and trawlers who actively search for it using web browsers, from non-secure and secure collectors who utilize peer-to-peer technology to acquire CSEM.

This paper represents an integrative review of the quantitative studies that empirically measure the technology usage by CSEM offenders. The methods used to search for, acquire, and store CSEM are enumerated and any trends over time identified. The review evaluates the evolution of CSEM consumption behaviour in a technological context. Specifically, it seeks to answer the questions about the growth and persistence of particular technologies and how they have changed the behaviours of offenders, and to identify gaps in the current research into both technology usage and countermeasure usage by offenders. Based on the work reviewed, consensus behavioural trends are presented, and recommendations are made for additional research.

For the purposes of this review, CSEM offenders are considered to be any persons who intentionally viewed CSEM images. CSEM includes still images and videos of individuals under the age of 18 engaged in sexual activity or containing nudity for the purposes of sexualization, irrespective of the local legal status of the images. While possession cases do not traditionally include live streaming, consumption of live streaming (though not creation) has been included as part of the review. Adolescent-to-adolescent viewing of CSEM through sexting, and the use of technologies to facilitate grooming, are not included.

1. Method

The current study utilized previously published quantitative studies of the technological behaviours of online CSEM offenders. The review included peer-reviewed journal articles and conference proceedings as well as grey literature, including graduate theses and both government and industrial reports. Studies without substantial quantitative data that contained relevant theoretical or summary information were retained as background references and cited in the appropriate sections, but were not used directly in the trend analysis and timeline breakdowns. In addition to the studies, exemplar court cases from each of the eras were identified. The cases were selected as representative examples of the new behaviours for CSEM offending that were enabled by the changes in technology present in those eras.

Studies were identified using iterative searches of PsycInfo, Web of Science, EBSCOHost Academic Search Complete, and Proquest. The breadth of databases was selected to ensure inclusion of both academic and non-academic sources from both the social sciences and computer science. The search, shown in Figure 1, was conducted utilizing the SPIDER (Sample, Phenomenon of Interest, Design, Evaluation, Research type) methodology (Cooke et al., 2012). There were two separate Boolean queries used, one for general technology usage and one for countermeasure usage. Both were modified as necessary for each particular database, and were searched against the full text. The general technology search was as follows:

("Child Pornography" OR "Child Sexual Material" OR "Child Sexual Exploitation Material" OR "Child Sexual Abuse Material" OR "CSEM" OR "SEM-C" OR "CSAI" OR "Indecent Images" OR "Innocent Images")
AND
(“Peer-To-Peer” OR “P2P” OR “BitTorrent” OR “Website” OR “Dark Web” OR “Dark Net” OR “Usenet” OR “Newsgroup” OR “Forum” OR “Chat” OR “Messaging” OR “IRC” OR “Bitcoin” OR “Mobile” OR “Cell Phone” OR “Live Stream”)
The countermeasure search was conducted on the same databases as follows:

("Child Pornography" OR "Child Sexual Material" OR "Child Sexual Exploitation Material" OR "Child Sexual Abuse Material" OR "CSEM" OR "SEM-C" OR "CSAI" OR "Indecent Images" OR "Innocent Images")
AND
(“Countermeasure” OR "Encryption" OR "Wiping" OR "Wipe" OR "Partition" OR "Remailer" OR "Steganography" OR "Anonymizer" OR "VPN" OR "In-Private" OR "Incognito" OR "TOR" OR "Onion Router" OR "Format" OR "Mislabel")

The SPIDER parameters were utilized as follows:

- *Sample*. The study sample was limited to offenders who possessed or viewed CSEM. Data on convicted offenders (from forensic analysis as well as self-reporting), self-reported CSEM consumers, industry reports of CSEM activity, and network traffic including CSEM activity were included. There were no limiting search terms used, and any papers not meeting the criteria were removed as part of the title, abstract, and full text reviews.
- *Phenomenon of Interest* (PI). The main PI area was the technological behaviours related to the consumption of child pornography. This included viewing of CSEM material as well as the acquisition and collection of CSEM material, which was limited to images and videos (as opposed to text material). The terms used were comprehensive based on prior work and readings in the field and consisted of the following - "Child Pornography", "Child Sexual Material", "Child Sexual Exploitation Material”, "Child Sexual Abuse Material", "CSEM", "SEM-C", "CSAI", "Indecent Images", and "Innocent Images"
- *Design.* There were no limitations placed on study design for this review. The designs included were primarily descriptive statistical analyses based on network data, forensic reviews, industry reports, and self-reports through surveys.
- *Evaluation.* The criteria for Evaluation was the inclusion of relevant technical behaviours. This included both technologies that facilitated the acquisition, viewing, and storage of CSEM as well as those that facilitated the hiding or obfuscation of the activities (countermeasures). Separate queries were utilized for each of the two areas, but several papers were responsive to both and a

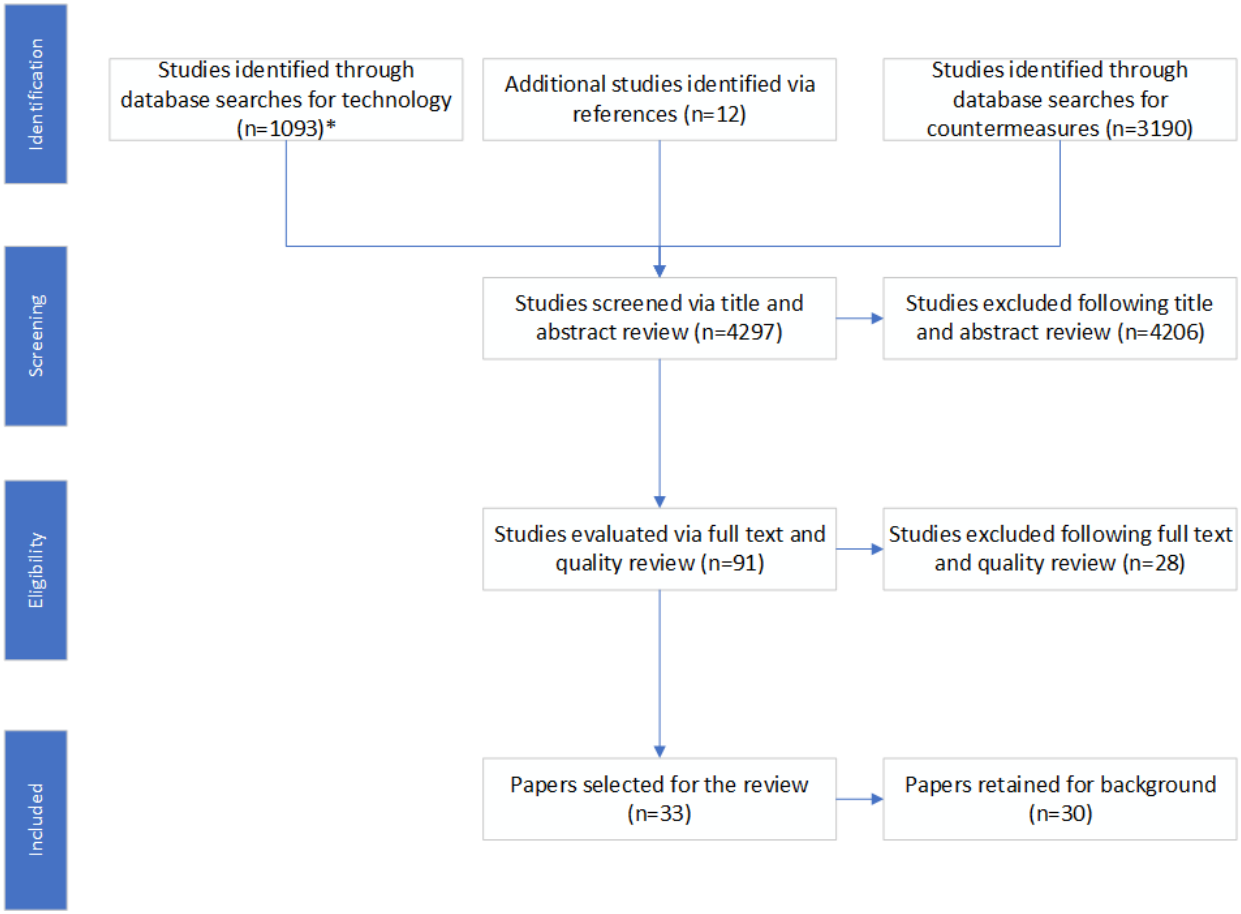
single review was performed following the searches. The most common technologies of interest based on prior art and current casework were included in the search. The terms used for technologies were “Peer-To-Peer”, “P2P”, “BitTorrent”, “Website”, “Dark Web”, “Dark Net”, “Usenet”, “Newsgroup”, “Forum”, “Chat”, “Messaging”, “IRC”, “Bitcoin”, “Mobile”, “Cell Phone”, and “Live Stream”. For countermeasures the terms were “Countermeasure”, "Encryption", "Wiping", "Wipe", "Partition", "Remailer", "Steganography", "Anonymizer", "VPN", "In-Private", "Incognito", "TOR", "Onion Router", "Format", and "Mislabel". Where possible, categories were used as opposed to specific products.

- *Research Type.* The study included quantitative studies (several mixed-method studies were present, but only the quantitative data were utilized). Because there were no limitations on research type, additional limiting query terms were not included.

The results of the two initial searches for countermeasures (n=1,093) and technology (n=3,190) were first reviewed for suitability based on title and abstract. The resultant data consisted of a total of 77 papers for initial full text review. Based on the references in those papers, an additional 12 papers were included, and two more papers were added that were published during the revision process for full text review (n=91). 33 papers were selected for inclusion based on the criteria noted above. Two papers from a primarily qualitative study using coded interviews (Eneman, 2010, 2009) were included due to specifically quantified results for countermeasures of interest. A Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) (Moher et al., 2010) chart showing the full methodology, including the results broken down by database, is shown in Figure 1 below.

Studies were excluded from consideration for multiple reasons. Review papers or those without quantitative results were excluded. Additionally, any papers involving non-CSEM consumption offenses (such as online child grooming) were excluded, as were sexting cases where the sexting offense was the primary focus (secondary transmission of sexting images may have been included as part of the material reviewed by offenders). Additionally, individual case studies and pre-network

transmission research (involving manual trading of floppy disks or magazines) were excluded. Finally, studies or portions of studies looking at the *content* of the material viewed as opposed to the technological mechanisms were excluded (e.g., studies looking at the male/female ratio of images).



* Two additional, recent papers were indexed and identified while in the revision process and added.

Figure 1. PRISMA flowchart summarizing review methodology

Of the material reviewed, multiple studies had other data outside the scope of this review. The in-scope statistics were included and the other portions of those studies excluded. The results were broken up by content area, and studies listed in the appropriate section below. Several studies included statistics from various topic areas - in these cases the results were included in multiple areas. Where possible, trends were identified within the studies (when mathematical comparisons could be made), however

methodological differences made this difficult in many situations which are noted individually.

A quality review was performed using a modified version of the Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies ("Study Quality Assessment Tools | National Heart, Lung, and Blood Institute (NHLBI)," n.d.). The tool was modified to include devices as subjects where the sample was technical in nature, and to only include those questions related to exploratory and observational studies, as the papers reviewed were not experimental in nature.

The major technologies used by CSEM offenders were grouped into time periods marked by specific technological changes that drove major behavioural changes. The eras were selected based on the confluence of technologies causing substantial uptake by CSEM offenders, focusing specifically on technological changes that altered the overall behaviours of offenders (e.g., moving from offline downloading and review to online viewing). The dates were based on the dates of the activity from the studies reviewed and not the study dates as there was a substantial delay between data collection and publication in many studies as noted in Table 1. For each of the major technology areas of interest, including countermeasures, data was extracted from the identified papers. The primary technologies where statistics of interest were extracted from each paper are shown in Table 1 below.

Study	*Date of Sample*	*Newsgroups*	*IRC*	*Peer-to-Peer*	*Web*	*Email*	*Instant Messaging*	*Dark net*	*Live Exploitation*	*Mobile*	*Collection Size*	*Video %*	*General*	*Encryption*	*Wiping*
(Rimm, 1994)	1994	X													
(Mehta and Plaza, 1997)	1996	X													
(Mehta, 2001)	1996	X													

Study	*Date of Sample*	*Newsgroups*	*IRC*	*Peer-to-Peer*	*Web*	*Email*	*Instant Messaging*	*Dark net*	*Live Exploitation*	*Mobile*	*Collection Size*	*Video %*	*General*	*Encryption*	*Wiping*
(Carr, 2004)	2000			X						X	X	X	X	X	
(Wolak et al., 2005)	2001			X							X	X	X	X	X
(Koontz, 2003)	2002	X	X	X	X	X	X								
(Hughes et al., 2006)	2006			X											
(Wolak et al., 2011a)	2006			X					X		X	X	X	X	X
(Steel, 2009a)	2008			X											
(Steel, 2009b)	2008				X										
(Seto et al., 2010)	2008										X		X	X	X
(Eneman, 2009)	2009														
(Eneman, 2010)	2009												X		
(Latapy et al., 2013)	2009			X											
(Wolak et al., 2012)	2009			X											
(Liberatore et al., 2010)	2010			X											
(Prichard et al., 2011)	2010			X											
(McCarthy, 2010)	2010	X				X							X		
(Krone et al., 2017)	2011										X	X		X	
(Hurley et al., 2013)	2011		X	X									X		
(Wolak et al., 2014)	2011			X											
(Guitton, 2013)	2012				X								X		

Study	*Date of Sample*	*Newsgroups*	*IRC*	*Peer-to-Peer*	*Web*	*Email*	*Instant Messaging*	*Dark net*	*Live Exploitation*	*Mobile*	*Collection Size*	*Video %*	*General*	*Encryption*	*Wiping*
(Steel, 2015)	2014				X					X					
(Bissias et al., 2016)	2014			X											
(Fournier et al., 2014)	2014			X											
(Romero Hernández, 2017)	2015									X					
(Mutawa et al., 2015)	2015			X										X	X
(Westlake et al., 2017)	2015				X							X			
(Kolenbrander et al., 2016)	2015			X											
(Dalins et al., 2018)	2016							X							
(Internet Watch Foundation, 2018b)	2017	X			X			X					X		
(Internet Watch Foundation, 2018a)	2018								X						
(Internet Watch Foundation, 2019)	2018				X										
(Bursztein et al., 2019)	2019		X	X	X	X	X	X		X		X			

Table 1: Primary technologies covered by prior studies

2. Findings

The behaviours of CSEM offenders have adapted over time to technological changes. For analysis purposes, the evolution of that technological behaviour can be grouped into five eras. The first era was the early networking era, marked by the use of electronic Bulletin Board Systems (BBSs), Usenet, and email. The second era, marked by the early adoption of widespread Internet use, was dominated by the World Wide Web (WWW), as well as Internet Relay Chat (IRC) and early instant messaging applications like ICQ ("I Seek You"). The third era was primarily driven by peer-to-peer software. The fourth era was marked by the adoption of dark web technologies. Finally, the fifth and current era, was marked by the shift toward mobile consumption. There are substantial overlaps between the eras, and the years provided are those where the technology noted first attained a degree of dominance with a substantial segment of CSEM offenders. A summary of the major technologies analysed and their *primary* associated eras are noted in Table 2 below.

Technology	*Primary Eras*	*Anonymity*	*Socialization*	*Dynamics*	*On Demand*	*Quantity Available*	*Current Trend*
BBS	1,2	Low	Moderate	One-to-Many	Yes	Low	N/A
Usenet	1,2,3,4,5	Moderate	Moderate	Many-to-Many	Yes	Moderate	Unknown
Email	1,2,3,4,5	Low	High	One-to-One	No	Low	Unknown
IRC	2,3	Moderate	High	One-to-Many	Yes	Low	Declining
Instant Messengers	2,3,4,5	Low	High	One-to-One	No	Low	Unknown

Technology	*Primary Eras*	*Anonymity*	*Socialization*	*Dynamics*	*On Demand*	*Quantity Available*	*Current Trend*
WWW	2,3,4,5	Low	Moderate	One-to-Many	Yes	Moderate	Declining
Streaming	2,3,4,5	Moderate	Moderate	One-to-Many	No	Low	Unknown
P2P	3,4,5	Moderate	Low	Many-to-Many	Yes	High	Declining
Darknet Services	4,5	High	Moderate	One-to-Many	Yes	Moderate	Increasing
MMS/ Mobile Messengers	5	Low	High	One-to-One	No	Low	Increasing

Table 2: Primary technologies used to obtain CSEM

3.1 Early Network Era (1987 - 1996)

Key Technologies - Floppy Disks, BBSs, Modems, VGA Monitors, Scanners, Email, Usenet, GIF images. Mixed-mode (videos/magazines and electronic)

Behavioural Characteristics - Small, image-only collections, concept of an image "series", limited diversity in images, limited acquisition avenues that were difficult to find, limited socialization and normalization, and minimal anonymity.

There is no record of the first use of a computer to view CSEM, but it began with digitized images from child pornography magazines that were popularized in the 1970's and shared using static image files (Ferraro and Casey, 2004). The images were digitized as opposed to being generated in a digital format because digital cameras

were not readily commercially available, and static image files were used, primarily in the form of low resolution Graphics Interchange Format (GIF) images. Video Graphics Array (VGA), the standard which allowed 640x480 resolution in 256 colours was released in 1987 and was the first consumer technology to support semi-photorealistic images (Scheller, 1993; Thompson, 1988). Digital video was not available at a consumer level due to graphics processing, storage, and transmission speed limitations and the Internet was primarily restricted to non-commercial government and research institution usage. Additionally, storage space was limited, resulting in practical limitations to collection sizes.

With the baseline technologies available to make CSEM viewing practical, there was still the need for a transmission mechanism for CSEM to move from the back rooms of bookstores to something that could be obtained remotely by offenders from their homes[3]. Early transmission relied on three primary technologies - BBSs, email, and Usenet newsgroups, all facilitated by low speed modem connections using the public telephone network.

BBSs were the first major online social meeting place for CSEM consumption. Accessed by dial-up modem, they were run by individuals and often catered to specific interest groups, providing a location where offenders could upload and download CSEM images, discuss CSEM, and indirectly access early Internet services such as email and Usenet (Jenkins, 2001). The first mention of using BBSs to transmit images of child pornography dates back to at least 1985, when BBSs where contact offenders could share information were referenced and one board was sophisticated enough to "transmit a photographic image of the child" (Staihar, 1985).

A representative example of an early BBS dedicated to CSEM was BAMSE, a Dutch hosted BBS that led to multiple international arrests and was identified by law enforcement in 1992 as part of the international Operation Long Arm. Long Arm identified the BAMSE organization as having approximately 900 targeted offenders across the world (Krone, 2005). One of the defendants, Terry Kimbrough, was arrested

[3] Trading of floppy disks containing CSEM was a viable transmission mechanism, but because it required the physical transfer or mailing of the content, it was behaviourally closer to the trading of magazines and not covered herein.

in the United States for downloading CSEM images from the Netherlands and storing them on his computer. Kimbrough's image quantities were minimal, with only two images accessed, but the warrant executed on his house found mixed-mode content, including computerized images as well as video tapes and magazines (*United States v. Kimbrough [69 F.3d 723]*, 1995).

BBSs allowed offenders to access content remotely and from their own homes, but finding offending BBSs was difficult. Some BBSs. such as the Amateur Action BBS, blended adult and child pornography on the same service (*United States v. Thomas [74 F.3d 701]*, 1996). Other BBSs cross-posted advertisements to other boards and to Usenet groups through both messages and by embedding their information on the images, marking an initial mixed-mode sharing of CSEM. In the first major study involving both BBSs and Usenet newsgroups, Rimm (1994) surveyed approximately 500 commercial BBSs. The study found that approximately 6.9% of all files present were CSEM material, and represented approximately 15.6% of downloads. Of particular interest for mixed-mode distribution, Rimm (1994) noted that there was a feedback cycle between Usenet message boards and private BBSs in which files were reflexively distributed. Mehta (2001) confirmed this, identifying that approximately 24% of the images containing advertisements for commercial services embedded as overlay text or watermarks were CSEM that was primarily hebephilic in nature.

The second major distribution mechanism in use during the early era of computerized CSEM distribution was Usenet. Created in 1979, Usenet provided a way for individuals to post messages to a persistent forum that was shared over the Internet between providers. Initially, Usenet contained non-commercial text content, but two technologies facilitated Usenet as a home for CSEM. First, in 1980, Mary Ann Horton wrote UUEncode, which allowed the inclusion of binary files (in this case images) in newsgroups, permitting their transmission as ASCII text. UUEncode was also the driver behind the sharing of CSEM over email, particularly when it became a feature of cc:Mail, one of the early email graphical clients in 1985 (Horton, n.d.). Second, in 1987, the alt.* hierarchy of newsgroups was added to Usenet, facilitating alternative topics ("Usenet Newsgroups History | Giganews," n.d.), in particular the alt.binaries.* hierarchy, where files could be requested and shared, and the alt.sex.* hierarchy,

creating the first widespread social media platform. Usenet could be used to share CSEM images (as ASCII encoded binary files), to normalize behaviour and discuss countermeasures (as a forum), and to facilitate sharing as well as grooming behaviour (similar to IRC) (Quayle and Taylor, 2011).

Following on the work of Rimm (1994), Mehta and Plaza found that in 1994 approximately 15% of pornographic images on Usenet were CSEM material (Mehta and Plaza, 1997), and in 1996 Mehta found that approximately 20% of pornographic images on Usenet were CSEM material (Mehta, 2001).

Although it was overtaken by other mechanisms for sharing, Usenet activity still persists. Using data from 2000, Carr (2004) identified 39% of CSEM consumers used newsgroups to obtain offending material. While Usenet was not specified, other contemporaneous sources (Koontz, 2003) identified Usenet as the primary newsgroup source. In 2010, McCarthy (2010) found that 5% of offenders had posted CSEM to a bulletin board or newsgroup, but did not provide statistics on other uses of the newsgroups. The Internet Watch Foundation (IWF) reported 443 newsgroups they identified that contained CSEM material in 2018. Though numbers identified were not noted for 2017, the number of takedown notices for CSEM in newsgroups declined by approximately 53% between 2017 and 2018 (Internet Watch Foundation, 2018b).

The final technology in use during the first era was email. With the addition of UUEncoding, email could be used to transfer binary image files in the form of ASCII text. Unlike BBS and Usenet technology, email is personalized and removes the anonymity from transactions. It also requires a higher degree of socialization. Unlike the other technologies, however, email is rate limited. Early email only allowed for one or two attachments, and even later email had limited capacity to transfer high volumes of content (though links to cloud storage services largely removed that limitation). Email did, however, provide for content personalization and requests for individualized (and potentially created on-demand) content.

Because email-based CSEM is difficult to measure from a network perspective, there is minimal data on its prevalence. In one study, Carr (2004) found that 30% of offenders used email to trade child pornography. In 2010, McCarthy found that 11% of CSEM offenders communicated directly with other CSEM offenders online using

undifferentiated technological means including email (McCarthy, 2010). According to NCMEC reports, email usage peaked in 2004, with 18% of the reports they've collected in the past 20 years occurring that year, and only 2% occurring in 2017, out of a total of 86,601 reports received for the entire period (Bursztein et al., 2019). Email is still used, but its one-to-one interaction limits the overall impact on quantities of content available.

Critical in the understanding of CSEM offenders that used email were the differences in their profiles when compared to other contemporaneous CSEM offenders. According to research by Carr (2006), email offenders were more likely to have access to children, to exhibit collecting behaviour and have larger collections, and to have more criminal offenses in their past history. They were also more likely to store their content on removable devices, providing a greater degree of permanency to their collections.

Few countermeasures were employed during the first era. There is no evidence that encryption was widespread, though there was encryption software available. The most well known of the early consumer encryption software was Pretty Good Privacy (PGP), released in 1991. PGP utilized public key cryptography, and included features ranging from individual file encryption to full disk encryption as well as integration with early email clients. PGP was specifically created to address BBS and Usenet weaknesses (Zimmerman, 2001). Although PGP was available, rapid encryption was not practical either for transmission or large scale storage, and anonymizing technologies were in their infancy.

The first major anonymizing technology to be adopted by offenders was the use of anonymous remailers. Anonymous remailers allowed individuals to send a message to an anonymizing service, which would strip the email headers and forward it anonymously. Remailers were utilized to post anonymously to Usenet, and to send emails without attribution, and pioneered mixing technology that would eventually be used in Bitcoin and Tor technologies ("CMC Magazine: A Brief History of anon.penet.fi," n.d.). Remailers were associated with CSEM, however, despite the association, in 2001 less than 1% of those arrested utilized remailers (Wolak et al., 2005). Overall usage continued to be low, with only 1% of offenders found using them in 2006 (Wolak et al., 2011b).

Minimal information is available on the sizes of collections in the early era of networked CSEM distribution. Individuals were charged with possession of small numbers of images (*United States v. Kimbrough [69 F.3d 723]*, 1995), likely limited by the available storage. Floppy disks, the storage standard for much of the era, had a maximum capacity of 1.44 Megabytes, allowing the storage of 20-30 VGA still images, and hard drives were still relatively rare and expensive. In 1986, a 20MB hard drive cost $489, but by 1996 a 1.3 GB hard drive could be purchased for $250 (McCallum, n.d.).

3.2 Internet/WWW Era (1996 - 2004)

Key Technologies - Hard Drives, CD-Rs, Websites, SSL, PGP, IRC, ICQ

Behavioural Characteristics - Larger image collections, easier gateways to find images, documented use of encryption, first major appearance of videos.

Although the first website was created in 1990, the World Wide Web hit 250,000 websites in 1996 and one million websites around the start of 1997 (“Total number of Websites - Internet Live Stats,” n.d.). As one of several reviews of technology usage by child pornographers conducted by the United States Government Accountability Office (GAO), they identified 1,393 website referrals for child pornography to the NCMEC CyberTipline in 1998. GAO noted a growth in websites to 26,759 in 2002, with website-based CSEM representing 75% of all reported technologies used by offenders, providing the following results from 1998 - 2003 (Koontz, 2003) shown in Table 3.

Technology	*1998*	*1999*	*2000*	*2001*	*2002*
Web sites	1,393	3,830	10,629	18,052	26,759
E-mail	117	165	120	1,128	6,245

Technology	*1998*	*1999*	*2000*	*2001*	*2002*
Peer-to-peer	—	—	—	156	757
Usenet newsgroups & bulletin boards	531	987	731	990	993
Unknown	90	258	260	430	612
Chat rooms	155	256	176	125	234
Instant Messaging	27	47	50	80	53
File Transfer Protocol	25	26	58	64	23
Total	2,338	5,569	12,024	21,025	35,676

Table 3: GAO Report of NCMEC Complaint Origin (Koontz, 2003)

A case that was emblematic of the second era of CSEM technology was the investigation and takedown of the W0nderland group, a consortium of individuals around the world that traded CSEM over the web. In Operation Cathedral, authorities in the United Kingdom identified approximately 180 individuals, who traded approximately 750,000 images (McVeigh and Bright, 2001). This represented a couple of orders of magnitude increase over the seized content of the prior era. Additionally, W0nderland highlighted several new behaviours of interest. First, members were required to submit 10,000 new images to join, forcing either careful collection or production of content (Krone, 2005; McVeigh and Bright, 2001). Second, the club used encryption and password protection as countermeasures in their trading activity (Krone, 2005). Third, approximately 1,800 videos were seized, marking the slow shift away from images (McVeigh and Bright, 2001). Fourth, in 1996 the W0nderland club hosted the first widely known instance of abuse on demand when they live-streamed the rape of an 8 year old girl, with members directing the assault activities (O'Neill, 2001). Finally, Operation Cathedral was one of the first cases to highlight suicidality amongst CSEM

offenders - 4 of the 34 targets arrested in the United States committed suicide (Fritz and Moore, 1998).

The IWF receives reports of CSEM material from around the world and reported that it had received complaints on 105,047 unique Uniform Resource Locators (URLs) in 2018. This represented a 34% growth over the prior year and a three-fold growth for five years (Internet Watch Foundation, 2018b), but the growth is not necessarily in the number of hosts and may be in part due to increased awareness of reporting mechanisms. IWF found that the URLs reported were representative of only 3,899 discrete domains, which was only a 3% increase from the prior year and represents a substantial decline from the 2002 NCMEC statistics. Similar to IWF, NCMEC reported a growth in URLs reported, with 39% of a total of 21,431,212 URL reports from the past 20 years received in 2016, the peak year to-date. Similar to IWF, however, NCMEC's counting of what is included as a URL does not map to the number of websites and is primarily a result of ESPs reporting suspect links (Bursztein et al., 2019). Looking specifically at the types of sites reported, 82% were image hosting sites and 5% were cyberlockers (online services providing free file storage and sharing). Cyberlockers were originally released during the web era, deriving from Korean "webhard" or web-based hard drive sites that became available in the year 2000 (Lobato and Tang, 2014), and continued to be used in conjunction with dark web forums in later eras. The IWF provided data on where CSEM websites were linked from as well, showing that Bing (44%) was the most reported, followed by Twitter (40%), however these do not reflect the locations of the content itself, only the links to the content (Internet Watch Foundation, 2019).

While the IWF data shows a growth in *reported* websites, other research shows a decline in the availability of sites through traditional search engines. The use of the web, primarily search engines, is a potential entry point for individuals initially seeking CSEM (Steel, 2014a), though the empirical research on this is limited. In 2008, between .19 and .27 percent of all Google queries were CSEM related. That number represented a 59.3% decline over the prior 5 years (Steel, 2009b). The query volume was then relatively stable until 2013, when an overall decline over the next year of 67% was identified. This was potentially due to blocking and other deterrence efforts by the

major search engine providers enacted that year including efforts by Microsoft and Google to limit search results for CSEM-related terms and provide warnings when they are used (Garside and Watt, 2013; Steel, 2015). Some of the decline in web-based consumption is also potentially attributed to offender awareness of increased monitoring and reporting on the web. Project Arachnid, which proactively searches the web for known CSEM and sends takedown notices to hosting providers, represents a high profile effort that is well publicized (Canadian Centre for Child Protection, 2019). Project Arachnid may provide even more reductions in web-based CSEM consumption (in addition to limiting availability) through awareness of monitoring, which earlier studies showed as already high in the offender population. Eneman (2009, p. 9), in a study of Swedish CSEM offenders, noted that "When talking about insecure and secure technologies the respondents were unanimous in their attitude against World Wide Web." The same study found that individuals used fake identities when communicating online, and a follow-on study with the same population found that all of the offenders were able to bypass ISP (Internet Service Provider) filtering controls (Eneman, 2010).

While other CSEM distribution methods may have transient nodes (e.g. particular hosts sharing content on a Peer-to-Peer network), web-based CSEM locations were found to exist longer than comparable non-CSEM websites (Westlake and Bouchard, 2016), though the generalizability of this finding to cyberlockers and other content storage locations has not been shown to-date. Of particular note with web-based CSEM given its acquisition method and persistence, direct and repeated viewing of content not in the possession of the offenders was made possible. This allowed for on-demand viewing without the need to collect content, reducing the risk for offenders who may otherwise have possessed large quantities of CSEM for fear of losing access to it and differentiating web-based viewing from other technological accesses.

In addition to web-based content acquisition and viewing, Internet Relay Chat (IRC) became a popular mechanism for CSEM distribution (Ethel Quayle and Taylor, 2002). With IRC, individuals could identify other like-minded individuals using targeted channels, where they were able to chat and trade content. IRC provided the first major mechanism for the simultaneous real-time socialization and transmission of content, blending real time reinforcement with CSEM acquisition and viewing (E. Quayle and

Taylor, 2002). IRC provided for a degree of anonymity through the use of handles, and provided the same protections as noted with private websites through the use of private, invitation-only channels.

Carr (2004) found that 78% of offenders used IRC, making it the most frequently used method for obtaining CSEM at the time. In 2011, Hurley et al. (2013) identified 7,272,739 individual IPs in chat rooms dedicated to CSEM content, though they did not identify the trading volume present. NCMEC bundled IRC reports with Chat Room reports, and showed two peaks, one in 2007 (10% of all IRC/Chat reports) and one in 2017 (23% of all IRC/Chat reports), with a total of 36,086 reports received over 20 years (Bursztein et al., 2019). Though specific, discrete CSEM statistics on current IRC traffic are not available, IRC in general has experienced a severe decline. In 2013, IRC was estimated to have just over 400,000 total users, with peer-to-peer software (Pingdom, 2012) and discussion services like Discord taking over its user base amongst child pornographers, likely representing the majority of the second peak in NCMEC reporting (AllOnGeorgia, 2019; Bursztein et al., 2019).

One-to-one communications between child pornographers were extended beyond email in this era as well. The advent of instant messaging allowed for direct communication between offenders and synchronous file sharing, without the delays associated with email. Higher bandwidth connections made real time sharing and coordinated chatting possible as well, similar to IRC but on a more individualized level. One of the first instant messaging technologies associated with CSEM was ICQ ("I seek you"). Carr (2004) found that 21% of offenders utilized ICQ to trade CSEM content. More critically, ICQ, along with IRC, was found to be associated with more severe offending. Similar to email offenders, Carr (2006) identified these users as having more criminality in their past and more direct access to children, as well as being more likely to engage in the production of CSEM and the commercial procurement of CSEM. Carr (2004) found that many CSEM users switched between technologies as well, and that more offenders used multiple technologies (52%) than a single technology (45%).

ICQ declined in popularity with the advent of other instant messaging platforms such as Facebook Messenger, Kik and WhatsApp, but it does still exist and in 2018 had approximately 11 million users (Knight, 2018). Of particular note, ICQ provided users

with a unique numerical identifier, which allowed them to access content across devices and communicate without sharing a personal account or address. Current ICQ clients support web-based and mobile messaging (Knight, 2018).

Collection sizes grew from the first era during the early web era, as did overall content availability. The University of New Hampshire, as part of the N-JOV studies, conducted three separate reviews of arrests of CSEM offenders and the associated technologies they used in 2000, 2006, and 2009 (Wolak et al., 2012, 2011b, 2005). In 2001, for arrested individuals, 41% had 100 or fewer images, 34% had between 101 and 999 images, and 14% had more than 1000 images (Wolak et al., 2005). Lukas (2013), using the N-JOV-1 and N-JOV-2 data, found no significant changes in volumes of CSEM possession due to technology overall, but an increase when a three-way relationship with the use of peer-to-peer software, detailed in the next era, was included.

With the increase in collection sizes, persistence of collections through the use of mobile storage and hard drives increased. Lukas (2013) identified the use of hard drives and encryption as being correlated with increased collection sizes, though this may be a temporal anomaly based on the reduced usage of older technologies (e.g. floppy disks) during that period. Beyond basic technology, a New Zealand study identified 29 of 109 offenders (27%) had CSEM material on a form other than the Internet material they were identified with, ranging from portable drives to videos and slides (Carr, 2004). In 2001, 92% of offenders arrested were found to have used hard drives or removal media to store their collections. Of the offenders noted, 2% also used remote storage and 4% used file servers to hold their collections. An additional 2% partitioned their hard drive as a combination countermeasure and storage mechanism (Wolak et al., 2005). In the study by Carr (2004), hard drives were used by 86% of offenders, followed by floppy disks (29%) and CDs (14%). Of particular interest, 5% kept printed hard copies of their content. Wolak et al. (2005) also found that 18% of offenders in their analysis had non-digital CSEM content. It is not known if substantial non-digital content continues to be utilized or if these findings were a result of legacy content.

During the web era, CSEM was still primarily image-based. In 2001, only 39% of offenders arrested had videos (or videos and images). The majority, 53%, had exclusively images (Wolak et al., 2005).

The general use of countermeasures increased during this period, and new technologies provided countermeasures that were included by default in existing technologies. Secure Sockets Layer (SSL), released in 1994 and standardized as Transport Layer Security (TLS) in 1996, provided default encryption from the end user standpoint for many services using other Internet protocols, including Hypertext Transfer Protocol (HTTP) and File Transfer Protocol (FTP) ("SSL/TLS and PKI History," 2019). Despite an increase in transport layer security by default on many services, overall adoption of encryption at rest by CSEM offenders was relatively low. Wolak et al. (2005) found that, in 2001, 6% of offenders used encryption and 12% password protected their content. Looking at both encryption and passwords Carr (2004) found similar results, noting that only 6% of offenders encrypted their CSEM material and 8% password protected it. In 2001, 3% of users were identified as using wiping or evidence eliminator software (Wolak et al., 2005).

3.3 Peer-to-Peer Era (2004 - 2008)

Key Technologies - Peer-to-Peer clients, Bittorrent, Broadband, Digital cameras, Whole disk encryption

Behavioural Characteristics - Rapid acquisition of content, ease of sharing and downloading, less targeted bulk downloads, increase in video sharing.

A major explosion in the availability of CSEM occurred with the growth of peer-to-peer networks. Following the demise of Napster, a peer-to-peer network and associated software that facilitated the illegal sharing of music, a series of open source networks arose such as the Gnutella network and the eDonkey network that allowed general file sharing and were enabled by the proliferation of clients like eMule, Kazaa, and Limewire. These tools linked all other users of the software into a decentralized

network where clients downloaded shared content from other clients. By default, sharing was turned on, which meant that downloaded files were re-shared automatically, providing persistence and resiliency to CSEM content. At the same time, another peer-to-peer technology, Bittorrent, became widely available. Bittorrent utilized centralized search servers, which provided torrent files containing descriptions and locations of content residing on client systems. These two technologies contributed to the easy searching and acquisition of CSEM content without providing a central content location for law enforcement to target (Androutsellis-Theotokis and Spinellis, 2004; Cohen, 2003).

Peer-to-peer networks, while decentralizing the distribution of CSEM and having less of a hierarchical structure than web-based distribution, changed the way that law enforcement operations proceeded as well. Bolstered by new tools such as TLO's Child Protective System (CPS) and RoundUp, law enforcement were able to monitor trading activity in near realtime and view offender activity in a particular geographic area, facilitating local police engagement in enforcement operations. As an example, Operation Greenwave targeted individuals living in the United States in the State of Vermont who had downloaded or distributed large quantities of CSEM images. Law enforcement were able to identify shared images through a comparison of hash values, which are probabilistically unique signatures, of files available on the peer to peer network with the hash values of images depicting previously identified victims. This led to the arrest and conviction of multiple offenders in the target area (*United States v. Thomas [788 F. 3d 345]*, 2015).

In 2001, at the dawn of peer-to-peer software for file sharing, there were minimal numbers of CSEM offenders detected utilizing that technology, with fewer than 1% of arrestees making use of it (Wolak et al., 2005), though whether that is from a lack of early adoption or a lack of sophistication in detection and reporting is unknown. By 2006, 28% of those arrested were found to have used peer-to-peer networks to trade CSEM (Wolak et al., 2011b). This increased again to 61% in 2009 (Wolak et al., 2012). Improved detection likely played a significant role in this increase, with proactive investigations growing almost threefold and outpacing user reports in that same year (Wolak et al., 2012).

In a pilot study in 2006 of CSEM traffic on the Gnutella network, it was estimated that approximately 1.6% of queries were CSEM related, and approximately 2.4% of query responses were CSEM related (Hughes et al., 2006), though this does not necessarily translate directly into the proportion of files shared. Looking at a much larger sample of queries in 2008, approximately 1% of queries on the Gnutella network were associated with CSEM (Steel, 2009a). Using eDonkey data from 2007 and 2009, approximately .25% of queries were identified as CSEM related and .2% of users sought CSEM material (Latapy et al., 2013). This held up in further work, showing that the KAD network had 0.09% of queries being CSEM related, and .25% of the eDonkey queries being related to CSEM (Fournier et al., 2014).

Prichard et al (Prichard et al., 2011) reviewed searches on IsoHunt for CSEM-related torrents, finding that 3 of the top 162 searches in a longitudinal study that persisted for four months were CSEM related, however they included the ambiguous terms “teen” and “lolita”. Because “teen” can refer to adult pornography and “lolita” is the name of a popular movie (the major infringing type of content on IsoHunt), only one non-ambiguous term, “pthc”, was present in the top searches.

Looking at computers sharing CSEM material, Wolak et al. (2014) identified 775,941 computers sharing 139,604 unique files, though the matching was limited to known CSEM, meaning the results represent a lower bound. Of particular interest, they found that the majority of users (91%) were sharing a single file, with a Zipfian distribution (a type of exponential distribution also known as a zeta distribution) of sharing (Wolak et al., 2014). Liberatore et al. (2010), looking just at the United States, found 306,008 discrete Globally Unique Identifiers (GUIDs) cumulatively identified that had shared known CSEM. Kolenbrander et al. (2016) found 1,553,222 unique IP addresses sharing worldwide in 2015, though their analysis excluded those sharing fewer than 3 files.

In one of the few studies to show trending over time, Bissias et al. identified the likely number of devices sharing CSEM material across five peer-to-peer networks as “840,000 in December 2014, down from 1.3 million in September 2012” (Bissias et al., 2016, p. 189). They further identified Ares, Bittorrent, and eDonkey as having the most CSEM hosts, comprising approximately 95% of the files shared. Of particular interest,

their work took into account the duplication caused by multiple IP addresses with the same GUID as well as the lack of unique GUIDs in specific networks, making it a more accurate estimate than prior research. NCMEC additionally identified peer-to-peer software as peaking in 2006 and 2007, with 11% of 20 years worth of reports occurring each of those two years, though the overall number of reports (n=8,900) was extremely low compared to the amount of actual sharing (Bursztein et al., 2019).

Hurley (2013) looked primarily at peer-to-peer usage, but did find a small but substantial cross-technology usage by offenders. Notably, they identified 7.8% of eMule and 11% of Gnutella users utilized multiple peer-to-peer networks. Additionally, they found 5.3% of eMule and 4.1% of Gnutella CSEM users also utilized IRC for sharing. Peer-to-peer also became mixed-use during this period, with Gigatribe incorporating IRC-like features such as chat functionality and private groups directly into a peer-to-peer client (European Cybercrime Centre, 2012).

Collection sizes grew consistent with the growth in peer-to-peer technology, though no research work has shown causality. In 2006, using the same breakdowns that they used in 2001, Wolak et al. found that, of the offenders arrested, 34% had 100 or fewer images, 23% had between 101 and 999 images, and 20% had more than 1000 images, showing a modest growth in collection sizes (Wolak et al., 2011b, 2005). In a clinical setting in 2008, the majority of users (50%) reported having between 101 and 1000 images, while in a police setting (in 2007), the largest group (32%) had over 10,000 items (Seto et al., 2010). Collections continued to also contain large amounts of adult content. Wolak et al. found that 71% of offenders in 2001 had adult images, and 68% of offenders in 2006 had adult images present (Wolak et al., 2011b, 2005), though these likely represent lower bounds as the cataloguing of adult images may not have always been noted in CSEM investigations by law enforcement.

Commensurate with the growth in collection sizes was the increased storage on the larger hard drives available and a decline in the use of floppy disks. In 2006, 95% of offenders had their collections on hard drives or removable media, though removable media use declined from 47% in 2001 to 37% in 2006 (Wolak et al., 2011b). The number of offenders using remote storage, which includes early cloud storage locations and cyberlockers, increased to 4% in that same year. In 2006, the first empirical cell

phone data was noted, with 1% of users storing CSEM on their cell phones and an additional 2% using iPods and digital media cards to store content (Wolak et al., 2011b). With the decline in iPod usage in later periods and the inclusion of cameras and SD cards in smartphones, the combined usage of all three (3%) is more representative of the state of mobile storage at the time.

Peer-to-peer era collections slowly transitioned toward video-based content. 58% of offenders were found to possess videos as part of their collections in 2006, compared to 39% in 2001 (Wolak et al., 2011b). In 2007 and 2008, the majority of the users in both a police and clinical sample were found to have predominantly image-based content (2010), but with large numbers starting to have videos as well. In the police sample, 80% of offenders had videos and 100% had image content, and in the clinical sample 97% had videos and 44% had image content.

Overall countermeasure usage continued to be low, and may even have decreased from prior eras. Balfe et al. (2015) analysed identity protection countermeasures used by CSEM offenders as part of a review of studies between 2000 and 2011, finding that the majority of offenders did not take any steps to protect their identity. In one of the largest early studies cited, only 20% of offenders used a sophisticated method to hide their collections (Wolak et al., 2005). That number remained consistent 5 years later in 2006, with only 19% of offenders hiding their collections through technical means (Wolak et al., 2011b). The use of encryption and password protection was found to have dropped slightly in 2006 when compared to 2001, with 9% using password protection and 3% using encryption (Wolak et al., 2011b).

One conflicting study by Seto et al. (2010) found that 80% of offenders in a review of police files and 8% of offenders in a clinical setting attempted to hide their CSEM activity, however their definition of countermeasures was broader than prior studies and included technical and non-technical measures. The countermeasures employed by those reviewed in their study included encryption and evidence elimination (wiping), through both sophisticated (installation of specific software) and non-sophisticated (simple deletion of content) means.

Though it was available as a technology during earlier periods, steganography, the hiding of images within other images, became a concern during this era (Choo, 2009; Warkentin et al., 2008). The mathematical nature of steganography has been well studied, but significant use by child pornographers has not been shown to-date, with Wolak et al. finding that no offenders in 2001 and only 1% of CSEM offenders in 2006 had used the technique, though with minimal statistical significance (Wolak et al., 2011b).

3.4 Dark web Era (2008 - 2014)

Key Technologies - Tor, Bitcoin (and other cryptocurrencies), Integrated darknet functionality, cyberlockers, anonymizing VPNs

Behavioural Characteristics - Safer acquisition of commercial CSEM including marketplaces and availability of specialized dark web sites, further increases in video content, increased countermeasure usage by default.

The fourth era of CSEM was characterized by the increased usage of anonymising networks, particularly those that used onion routing, known colloquially as the dark web or dark net. The dark net, for the purposes of this review, is comprised of the services available over the Tor network as well as Freenet and similar hidden networks. This can include peer-to-peer file sharing, messaging, or traditional websites. The dark web comprises those websites hosted on the dark net, and was estimated in 2016 to consist of approximately 30,000 sites (Intelliagg, 2016).

The most popular of the technologies facilitating the dark web, Tor, drove the adoption of a series of technologies that changed CSEM distribution. Tor offered several built-in countermeasures that were of a direct benefit to CSEM consumers. First, all Tor traffic was routed through a series of relays that obfuscated both the source and destination IP addresses. This allowed both the distributors and the consumers to remain anonymous. Second, all Tor traffic was encrypted by default in multiple layers, preventing eavesdropping by law enforcement and ensuring end-to-end privacy (The

Tor Project, Inc, n.d.). The code for Tor was originally released in 2004, however widespread adoption did not occur until the release of the Tor browser in 2008 ("The Tor Project | Privacy & Freedom Online," 2019).

For Tor to become a critical technology, two prerequisites needed to be attained. First, the number of nodes hosting content had to be sufficient to become self sustaining - i.e. there needed to be enough CSEM content persistently available to attract users away from competing technologies. The first prerequisite is explored below. Second, there had to be sufficient throughput on the network to support large downloads. Initially, Tor was too slow to even facilitate sustained image downloading (Cohen-Almagor, 2013). Over the course of the era, however, Tor throughput increased five-fold, addressing the second issue (Dingledine and Murdoch, 2009; "Performance – Tor Metrics," 2019).

With the crackdown on CSEM indexing and availability by the major search providers (Steel, 2015), there was a market opportunity for Tor-based usage to grow. The growth, as noted below, was correlated with the decline in web-based CSEM, but has not been directly causally linked. Tor used a different model than web-based CSEM distribution in that websites were primarily advertised via a directory instead of using a search engine, similar to the early web directories such as Yahoo!. The primary Tor directory, known as the Hidden Wiki, directly advertised site content, including illicit content such as CSEM (Cohen-Almagor, 2013). This open advertising of CSEM content differentiated it from other technologies, where specific keywords known primarily to offenders were required to find content (Steel, 2009a, 2009b).

Simultaneous with the release of Tor, the first widespread cryptocurrency, Bitcoin, was developed. Originally released in an academic paper in 2008, it rose to prominence concurrent with the growth of Tor (Chohan, 2017). Using block chain technology, Bitcoin served as "digital cash" that could be anonymously provided to and accepted by commercial CSEM providers on dark web marketplaces.

In a representative case from the era, Richard Huckle, one of the United Kingdom's most well known paedophiles, founded the Tor site PedoFunding by combining Tor and Bitcoin to create a new method of commercializing child sexual abuse. PedoFunding sought to re-commercialize CSEM production, and solve the

economic problem for producers of having individuals pay for CSEM once and then redistribute it for free. Using the Kickstarter model, Huckle brought together producers and consumers through crowdsourcing. Producers only released content when a pre-identified aggregate amount of money was raised in cryptocurrency, ensuring a large initial payday and incentivizing direct, additional abuse (Acar, 2017). Huckle's site played on specific cognitive distortions, in particular that it was not abuse if the children were "willing", and that there were age limits (three years old) after which they could communicate "consent". The site additionally asked that producers pay children a "fair wage", putting forward the message that:

> PedoFunding has a ZERO tolerance policy for rape or even coercing an unwilling child to participate. If there is even the slightest hint that your video contains an unwilling participant, it will not be posted on the site. Light bondage is acceptable as long as it's just role playing and the child does not appear to be in distress. In addition, children younger than three years will not be allowed to appear on this site, since children younger than that do not necessarily have the ability to communicate whether they like what you are doing to them. The same goes for children who are asleep.
>
> We also require that if you are a producer, you must pay your child actors a fair wage. The purpose of this site is so that your delicious lolis can afford college, not so that you can exploit them for your own personal gain. Of course we have no way to enforce this rule, but please respect it anyway since it is the right thing to do (Deep Dot Web, 2014).

As a result of this and similar activities, Huckle was convicted of raping several children in 2016 and sentenced to 23 life sentences (McVeigh, 2016).

The viewing of CSEM on the dark web is believed to still be growing, but trends are difficult to measure due to the usage of different statistics at different points in time. As an example, the United States Federal Bureau of Investigation (FBI) identified approximate 215,000 users on a single service dedicated to child pornography in 2015 ("United States v. Ferrell - Affidavit in support of a search warrant," 2015). Around the same time, Owen and Savage, in an oft-cited study, identified that 80% of Tor hidden

service queries are for child pornography based on a six month review of requests contemporaneous with the FBI affidavit information (Owen and Savage, 2015). The study was regularly misquoted by the media, however, by citing the dark web as having 80% of its total traffic related to child pornography. According to the Tor project, hidden services represented only 1.5% of all Tor traffic, and they estimated that there were 2 Million active users at the time of the report ("Tor: 80 percent of ??? percent of 1-2 percent abusive. | Tor Blog," 2014). If hidden service requests correlated directly to hosting percentages (there are reasons to believe it doesn't - a small number of services can be more frequently queried), that would indicate that approximately 1.2% of the traffic on the dark web is related to child pornography, and if this is correlated with the number of users it would indicate approximately 24,000 users on the dark web were looking for child pornography, a number that is substantially smaller than that of the FBI's analysis of a single site. There are multiple methodological reasons for these discrepancies, for example one is a point-in-time review and the other an analysis over six months, not all child pornography providers on the dark web are hidden services, one individual may only query a service once or may query a service repeatedly, individuals may register with multiple identities on a given site, child pornography traffic volume may be higher than other uses (due to the downloading or streaming of videos and the downloading of archives containing multiple files), etc. Consistent with ongoing growth, NCMEC reported that 42% of all dark web reports received in the past 20 years (n=4,427) were received in 2016, though they showed a substantial decline to 22% of all reports in 2017 (Bursztein et al., 2019),.

Dalins et al. (2018) found that approximately 1.75% of dark websites crawled offered child pornography. Their model additionally found that the motivations present on the dark websites varied from those of traditional websites, with 28% identified as commercial (for sale) content, 26% identified as being related to forums, and 19% related to file sharing. Guitton (2013) found that, in 2012, 18% of hidden services were child pornography related, making it the largest category of services available on the dark web. Within forums, Guitton (2013) found between 13% and 50% of discussions were related to CSEM material. In 2018, the IWF identified 85 hidden services providing CSEM (Internet Watch Foundation, 2018b), compared to 44 in 2017.

The storage of content to external devices was still common during this era (McCarthy, 2010), with a 2010 study showing that 44% of offenders admitted to storing data outside of their hard drive. McCarthy also found that 11% of CSEM offenders communicated directly with other CSEM offenders online using unspecified technological means, showing that direct contact was still prevalent.

McCarthy (2010) found that images were still more prevalent and large collections were the norm (mean=782, SD=1308; n=56), but that video collections were still small (mean=43; SD=106; n=56). Using cases through 2011, Krone et al. also found that large collections were common (mean=23,034.06; SD=77,402.84; n=137) (Krone et al., 2017). In a similar study using data from 2005 through 2011, Krone et al. (2017) found that 94% of offenders had image content and 74% had video content.

Along with CSEM collection sizes, large amounts of adult pornographic activity was identified as being present with CSEM offenders. The majority of offenders also had adult pornographic images and videos, and on average the amount adult content exceeded the amount of CSEM content (ratio=0.4167, SD=0.3117) (McCarthy, 2010). This was confirmed through an in-depth forensic analysis looking at web activity on the forensic images of a CSEM offender's computer that found 38.8% of URLs visited were for adult porn sites while 10.8% of the URLs visited were classified as child pornography websites (Seigfried-Spellar and Rogers, 2014).

Local encryption continued to be used at similar rates to prior eras. Krone et al. identified 7.7% of individuals using encryption in data collected between 2005 and 2011 (Krone et al., 2017). Additionally, they found that 54% of offenders used no methods to hide their collections, while 22% deleted content, 27% renamed files or directories, 7.4% password protected content, and 25% concealed their content in unspecified ways. A 2010 study found similar figures, with 22% of offenders taking unspecified steps to conceal their activity (McCarthy, 2010).

As noted previously, newer advances have combined prior technologies, incorporating countermeasures directly into distribution methods. While Tor is the most widely known darknet technology, others are in active use by CSEM offenders. Mixer networks like the Invisible Internet Project (I2P) have been integrated into traditional peer-to-peer clients like eMule (iMule with I2P integration). These integrated tools,

which incorporate anonymization directly into the distribution mechanism, include iMule, the Gnutella client iPhex, and the Freenet client Frost and have been identified as sharing child pornography (Aked, 2011) in preliminary studies. Although other underlying software could be used with Tor, less than 1% of those sharing over peer-to-peer or IRC were found to be using Tor to mask their IP addresses (Hurley et al., 2013).

A final countermeasure, anonymizing Virtual Private Network (VPN) services, came into prominence in this era. These services allowed users to proxy all traffic through an intermediary, making their own IP address hidden from the end location. This served to protect the identities of individuals from IP address tracking efforts, and the technology was adopted by CSEM offenders. Though it has appeared in court cases and publications, there are no quantified statistics to-date on CSEM offender usage of anonymizing VPN services (Penna et al., 2005).

3.5 Mobile Era (2014 - Present)

Key Technologies - Mobile phones, LTE, tablets, streaming, mobile messaging, integrated countermeasures

Behavioural Characteristics - Increased viewing outside the home, move from storage to viewing, additional increases in video content, further increased countermeasure usage by default.

The current era is marked by the explosive growth in mobile technology, including cell phones and tablets. Mobile technology usage by CSEM offenders required several enabling technologies. First, a relatively high bandwidth to effectively transfer files was needed. Long Term Evolution (LTE) provided 300Mb/s peak download rates, and LTE-A, also known as 5G, provides up to a 1Gb/s peak download rate (Ghosh et al., 2010). In the UK, for example, over 76% of the country is covered by LTE as of 2019, with average download speeds as high as 31.5Mb/s (Iqbal et al., 2018), fast enough to stream video in 4K resolution. Second, high quality screens were

required. The iPhone 6 Plus, introduced in September 2014, included a screen with 1080p (1080x1920) resolution, allowing for the mobile viewing of high definition (HD) content. Additionally, the iPhone 6 Plus incorporated a camera that allowed for recording and streaming HD video content ("iPhone 6 Plus - Technical Specifications," 2019). Finally, the availability of inexpensive, unlimited data usage plans was required. For example, in October 2019, EE provided a 5G (LTE-A) unlimited SIM card for £44 per month ("Which networks offer unlimited data?," 2019).

An example case from the mobile era is United States v. Williams (*United States v. Williams [Case Number 18-6082]*, 2019). Williams, using the screenname "marcus williams trueone12345", uploaded CSEM images to a group chat from his mobile phone over the messaging application Kik. The IP address for the screenname was traced back to the network in a residence where Williams was staying. Federal agents seized three cell phones, all of which had CSEM content, as well as a laptop containing 3,000 CSEM videos. The Williams case is representative of the move from desktop messaging to mobile messaging, but shows that mixed method usage was still occurring through the presence of videos on his laptop.

The trend toward mobile has impacted CSEM consumption (Steel, 2015), though the overall usage has not been well studied. In late 2014, 32% of all web-based queries for CSEM were conducted using mobile devices. For technologies that require interaction between producers and consumers, Telegram, Whatsapp, and Discord have all been used to trade child pornography, with some speculation that they may replace dark web marketplaces (Constine, 2018; Restar, 2019), though the dark web may still be used to meet other offenders. In 2015, data from Colombia looking at its use from a victim's perspective identified that mobile phones were used in 82% of the exploitation cases (Romero Hernández, 2017). NCMEC reported that 27% of all CSEM cell phone activity reported occurred in 2016 and 25% in 2017 (n=38,711), though they separately collected SMS data as well as chat and instant messaging data, making it difficult to gauge reports of overall mobile growth (Bursztein et al., 2019). Additionally, the NCMEC data did not identify what percentage of URLs reported were associated with mobile viewing, further limiting its direct application.

The mobilization of consumption may drive changes to viewing location. Wolak et al. found that 7% of offenders viewed CSEM primarily at work in 2001 (and 2% at other locations), noting that the extra-home usage may have been due to a lack of access to computers in the home (2005). That number dropped to 3% in 2006, though the use of mobile viewing (primarily with a laptop) at multiple locations was found to be 18% in 2006, reflecting an increase in options for viewing location and a change in where individuals felt comfortable viewing offending content (Wolak et al., 2011a).

Other technologies have been noted as being used for child pornography viewing, such as live viewing over webcams and mobile phone cameras (Açar, 2017). Live streaming of child molestation, performed on demand, utilizes one-to-one and one-to-many chat services that may offer integrated countermeasures (encryption) and may be recorded for later distribution over peer-to-peer or other mechanisms (Dushi, 2019). As early as 2006, live viewing of child exploitation was reported with 5% of offenders noting that that had seen live exploitation (Wolak et al., 2011b), however the proliferation of inexpensive cameras, broadband, and streaming applications has affected a recent growth in its usage by offenders. In 2017, the IWF identified 2,082 instances of live streamed video and image CSEM content on various sites (primarily image hosting websites), but noted that the content generally appeared to have been replicated from their original sources, which included social media sites, chat apps, and streaming services, as identified through site branding still present on the content (Internet Watch Foundation, 2018a).

More recent data on collection sizes was not available for the mobile era, but as recently as 2015, studies have shown a continuing bias toward images instead of movies for CSEM distribution (Westlake et al., 2017) when compared to traditional pornography sites, though they have noted a continuing trend toward videos. Looking specifically at peer-to-peer offenders, Mutawa et al. (2015) conducted a forensic examination of offender's drives and identified all offenders in their sample (n=15) had both videos and images present. In 2017, the growth in video in NCMEC reports was up over 379% year-over-year, compared to an 18% increase in images, and by the trendlines may overtake images in popularity in the next couple of years (Bursztein et al., 2019).

The use of countermeasures during the mobile era may have increased through integrated encryption both at rest and during transmission. Tools like Whatsapp, which have integrated encryption, protect the data during transmission (and storage) by default (Loeb, 2017). Additionally, by the end of 2014, both Android and Apple iPhones had encryption turned on by default (Sanger and Chen, 2014). Despite the ubiquitous use of encryption on mobile devices and in applications, the use of third party tools to encryption traditional storage devices remained low. Reviewing the forensic images of offender drives, a 2015 study found 7% of offenders used encryption, with none of the offenders using commercial wiping tools, though deleted file content was present (Mutawa et al., 2015).

One of the most recent trends in countermeasures is employed by hosting providers - the use of digital pathways. Using digital pathways, CSEM hosts only show offending content to individuals that access their site through particular links - search engines and direct visitors are either blocked or provided innocuous content. In 2018, 2,581 sites using this countermeasure were identified by the IWF (Internet Watch Foundation, 2018b).

3. Discussion

While breaking the technological behaviours of CSEM offenders up into eras is useful for understanding the evolution of change, there are trends that transcend the eras and differ from general technological change. Additionally, CSEM offenders may differ in their usage of technologies from the average user, which may underlie their behavioural choices. This may range from the desire to conceal their activities, however superficially, to the retention of content due to uncertain future availability of that content. This may drive, out of necessity, increased computer expertise. Of note, CSEM offenders were found to have an above average degree of computer literacy (self reported) with 32% rating themselves as high and 30% as medium skill level in one study (Carr, 2004), though this was not compared to any baseline self-reports within the same demographic. Similarly, Wolak et al. (2005) found that 54% of individuals were rated as “very” or “extremely” knowledgeable about Internet technologies, though

neither of these studies identified causality. Technological ability does not equate to technophilia (Steel, 2014b), but it may indicate more fulsome usage of existing technology. There also may be a dichotomy of offenders, with more advanced users and those with higher sociability using dark web and combined mobile/desktop chat applications and less sophisticated users remaining on older technologies like traditional peer-to-peer networks. This has implications for law enforcement prioritization - identifying and investigating peer-to-peer offenders is easier, but they may not be the highest risk targets.

With CSEM content, there is a slow move toward videos over image content, but not as rapidly as with traditional pornography. This may in part be a forensic artifact on how video and images are counted. If icon views are turned on, for example, a modern Windows machine may have up to 8 images at different resolutions stored for each video (Quick et al., 2014). Similarly, sites advertising CSEM may have numerous images depicting the contents of videos that are viewed in an attempt to allow offenders to determine what videos to download. Additionally, new CSEM is likely created at a slower rate than adult pornography and is not as readily available, providing older photos more intrinsic value to offenders. Finally, there may be psychological reasons for the slow shift - minimal work has been done to-date to examine the differences in immersion and usage between video and image content by offenders.

Similar to the growth in video percentages, collection sizes have grown over the eras, however at a rate significantly slower than that of the underlying storage mechanisms. Of particular interest, the standard deviation for collection size appears to be several orders of magnitude beyond the mean, and additional statistical analyses of the sizes is warranted. There may be a multimodal distribution with the differentiation between those who primarily view content and those who collect (and retain) content. Additionally, the retention of content that has been downloaded but never viewed may alter the distribution. With the more ready availability of larger amounts of content and the advances in broadband that allow for fast re-acquisition, collecting now becomes more of a choice and may be indicative of more risk taking (retention of evidence) and a higher threat potential, though Fortin et al. (Fortin et al., 2019) did not find any significant sentencing enhancements with increased collection size. Despite this,

outdated sentencing guidelines still take into account collection sizes and may not be indicative of actual risk (Basbaum, 2009), and many cases involving just viewing where there is no “local” forensic evidence of stored images are not pursued due to prosecutorial discretion. As examples, the UK guidelines treat “High volume of images possessed, distributed or produced” as an aggravating factor (UK Sentencing Panel, 2014, p. 78) and the US guidelines contain enhancements based on the number of images involved with a maximum enhancement at 600 images (United States Sentencing Commission, 2018). Future sentencing needs to take into account empirical risk, incorporating work such as the efforts by Seto and Eke in the development of the CPORT instrument (Seto and Eke, 2015) and the work of Glasgow (2010) in using digital forensics to identify trajectories and intentions based on technological behaviours, as well as recommendations from prior reviews that have not been implemented (United States Sentencing Commission, 2012).

Overall, the introduction of new technologies shifts usage by CSEM offenders, but a small but sizable portion of offenders continue to use technologies that have been largely eclipsed in other areas. Although technologies like Usenet, which is now almost forty years old, continue to be used they have also evolved. Usenet now incorporates Extensible Markup Language (XML) files to allow for the automated identification and download of large multipart binary files, enabling the easy sharing of even large video and image collection content, and services like EasyNews provide web-based interfaces and VPN capabilities (Lachniet, 2008). Similarly, tools like IRC have integrated anonymizing networks like I2P directly into their infrastructure, allowing for increased identity protection for offenders (PurpleI2P Team, 2019).

The integration of new functionality into old technologies, as well as the incorporation of multiple technologies together limits the applicability of prior research questions and invalidates the same questions for future research. Web-based forums can be used to share Bittorrent links, and encrypted files can be shared from public cyberlockers. Peer-to-peer software that shares encrypted (and innocuously labelled) binaries can be run over the Tor network, and the decryption passwords and pointers to the content shared on Usenet newsgroups accessed via the web. The Ares peer-to-peer network client now includes Bittorrent link capabilities, an integrated image/movie

viewer (allowing it to be used to view and not just download content), and an integrated chat function (SourceForge Staff, 2019).

The blending of technologies limits the utility of prior research questions looking at discrete technologies used as independent options. Additionally, with the percentage of offenders using multiple methods of complex acquisition representing a large proportion of users, it is increasingly clear that categories based on the method of acquisition are not reflective of reality and the use of new quantitative and potentially more exploratory qualitative questions are warranted.

As with general technology usage, the incorporation of countermeasures directly into devices (e.g., the iPhone) and into protocols (e.g. SSL) makes questions like “Did the offender use encryption?” non-binary and confounded. An offender may have used SSL to download web-based content without being aware that their communications were encrypted, and likewise may have stored videos on an encrypted mobile phone without realizing they had used encryption. Similarly, the incorporation of features like TRIM and FORMAT in Solid State Drives (SSDs), which are projected to outsell spinning hard drives within the next 18 months (Statista, 2019), means that “wiping” occurs automatically when files are deleted (Joshi and Hubbard, 2016). These changes in technology necessitate a change in research - perhaps asking if *additional* countermeasures are used beyond those that come installed by default. More critically, the use of a countermeasure that is present by default necessitates rethinking the behavioural implications - it ceases to become a conscious precautionary act and therefore becomes less important for risk assessment measures, as well as potentially invalidating typologies that used them as differentiators (Krone, 2004).

Other countermeasures do not appear to be widespread. Steganography and similar techniques appear to have been used by a minimal number of individuals, and their routine use even by that limited number has not been shown. Despite the fact that traditional steganography is not used, embedding images and videos in Powerpoint files, Adobe PDFs, and Word documents has been used to avoid simplistic hash matching. For behaviours, there is a trend toward non-home viewing with the increased mobility available in modern viewing devices, indicating there are other locations that offenders consider secure, though what those are is still unknown. This is consistent

with other research on the Internet behaviours of sexual compulsives, where 62% of males reported outside-the-home viewing of SEM during the early days of widespread mobile computing (2003). There is likely a corollary to general CSEM offending as 52% of males in the same study admitted viewing illegal SEM content (Delmonico and Miller, 2003). Other intrinsic countermeasures may be present but unmeasured by the current studies. Inexpensive mobile phones may be used to store content separate from the user's main phone. Burner phones can be utilized so that they can be easily lost without the negative repercussions of losing a computer, providing an easy destruction mechanism as a contingency (Holt et al., 2010).

4. Limitations

Due to the different types of studies, populations, measures, and specific statistical tests there is no viable way to do a meta-analysis on the studies reviewed. There has been only one comprehensive, large scale longitudinal study conducted of CSEM offenders (Wolak et al., 2012, 2011b, 2005), and that was conducted based on law enforcement data last collected in 2009. A second longitudinal review of CSEM reported to NCMEC was conducted in 2019, but was heavily biased toward web-based reporting as NCMEC serves as the clearinghouse for all reporting by United States-based ESPs. Due mostly to dramatic increases in ESP reporting, approximately 40% of all NCMEC reports from the past 20 years were received in 2017. This is particularly critical as there are no major ESPs scanning content for most non-web and non-IM platforms (e.g. there is no centralized corporate entity running Tor, Peer-to-Peer, IRC, and similar platforms). Additionally, the NCMEC review reported results that added greatly to the information on CSEM offenders but were based on the percentage of reports received over 20 years and had non-discrete and overlapping categories, making direct comparison of volumes to other data difficult (Bursztein et al., 2019).

Almost all of the data collected from law enforcement and treatment sources has an inherent sampling bias. Certain technologies are more closely monitored (e.g., peer-to-peer) and users of those technologies have a higher likelihood of getting caught. Additionally, users that are not caught may be more careful or adopt different

countermeasures, and there are no good statistics on what proportion of potential offenders end up in either the legal system or treatment. Those studies that are performed using law enforcement data also suffer from underreporting of both quantities and behaviours. Due to limited resources and sentencing maximums, many organizations have adopted a “scorched earth” policy toward examinations and stop once sufficient evidence to prosecute has been obtained. The numbers reported can therefore, at best, be considered a lower bound.

Technologically, peer-to-peer and similar network analyses have challenges in identifying and quantifying unique users. Most research relies on GUIDs to identify individual instances. While GUIDs have traditionally been viewed as unique, Liberatore et al. (2014) found that botnets using the same GUID are prevalent. At the same time, the same GUID can use multiple IP addresses, making the IP-to-GUID mapping a many-to-many situation and preventing direct comparison between studies using IPs and studies using GUIDs.

The transient nature of CSEM material, particularly on the dark web, also provides a measurement challenge. The Deeplight project (Intelliagg, 2016) found that 54% of dark web sites were unavailable during their classification study. Additionally, much of the CSEM content is believed to be deep web content, whether on the dark web or the traditional Internet. Deep web content is by definition not indexed by crawlers and search engines, making its enumeration difficult (O’Brien, 2014). Similar to deep web content, deep torrent content is not indexed or discoverable through traditional torrent sites. While the percentage of CSEM that is present in deep torrents is unknown, there is evidence that the overall size of the deep torrent network is substantially larger than the surface network, with one study finding that 67% of torrent content is from deep torrents (Rodriguez-Gomez et al., 2017).

The inclusion criteria for what is considered CSEM also varied across the studies. As an example, Westlake et al (2017) used hashes of known child pornography and known child erotica, as well as indicative photos showing a sexualized interest in children that are *associated* with those categories, such as clothed photos from a series that included the offending material. Additionally, while Westlake et al (2017) identified fewer videos being hosted on CSEM websites, their seed criteria included historical

hash values, which are more heavily image based, though the lack of effective usage of video hashes remains an open issue in CSEM enforcement.

Measuring video as opposed to image content has inherent biases as well. Most videos will be represented forensically by a thumbnail (allowing for a double counting the same content as an image) generated by the system or on a website, while images are not represented as videos in storage. Additionally, downloading video from hosting sites may be difficult or impossible, increasing their viewing amount but limiting their download amount. Finally, any web-based acquisition is likely to involve browsing large quantities of thumbnails, which will be present on a drive as images, with only select viewing of movies, as noted above.

The most critical limitation identified in this integrative review is one of timing. The data collection tended to precede the publication by an extended period, in some cases five or more years (Krone et al., 2017; Wolak et al., 2011a). Additionally, with law enforcement data the original activity may have occurred several years before that. Given the rapid changes in technology, many of the lessons learned from the technological behaviour research are therefore historical in nature. This may require careful examination when applying those lessons to present activities and requires continuous research as behaviours evolve.

5. Conclusions

The extant body of research on the technological behaviours of CSEM offenders is limited. From the current quantitative research, there is a slow trend toward more video-based content and to larger content collections, but this may be tempered by more ready access to content to view on-demand and by a growing shift toward mobile viewing.

Overall, CSEM offenders appear to continue to use trusted technologies even after higher functioning options are introduced. This appears to be in contrast to the view that CSEM offenders may be earlier adopters of new technologies, but may be at least partially explained by the number of multitechnology offenders, who utilize different methods to view and obtain content.

The research on intentional use of countermeasures, in particular encryption, found that the uptake by offenders was fairly low, with numbers averaging around 7% until the inclusion of default encryption. With encryption built-in to technologies ranging from iPhone storage to website communications, and the ability to use tools like the Tor Browser to visit traditional (non dark web) websites, the majority of the prior research into countermeasure usage is dated and may not be indicative of current behaviours.

6. Future Work

There is a strong need for additional, timely research into more recent usage of technology by offenders. In particular, there needs to be more work done on "gateway" technologies that facilitate initial usage, as well as how different technologies are used to fulfil different needs. Bulk downloading via peer-to-peer, collecting and cataloguing images from a vintage series through dark web forum requests, immediate gratification through web browsing, or tailored abuse over live streams may satisfy different goals within the same offender or may be differentiators between offenders for future taxonomies. Coupling the underlying goals of offenders with their choices of technology will additionally help better target behavioural treatments as well as intervention and enforcement efforts.

In addition to academic research, legislation and sentencing guidelines need to be updated in response to the technological changes. Legislation authorizing warrants for law enforcement should reflect the actual usage pattern of CSEM offenders, taking into account the location-interdependence of technologies (e.g., the CSEM accessed on an iPhone may also be located in an iTunes backup on a laptop as well as on an iCloud account). With cloud storage like OneDrive becoming integrated into operating systems (Windows 10 now has it on by default), the law needs to keep up by providing location-independent search warrants for virtual locations. Similarly, sentencing guidelines must be based on risk and those taking into account technological behaviours such as the number of images present should reflect current distributions of image volumes.

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SECTION 3 - SURVEYS

Chapter 5 - Surveys

5.1 Introduction

The experimental portion of this research was conducted using an online survey tool from Qualtrics with two specific populations - one consisting of members of the general public representing non-offenders (“Reference”) and one consisting of previously convicted CSEM offenders (“Offender”). Both groups were asked similar questions related to their demographic information, their technical behaviours, and their views on CSEM. The offender group was asked additional questions about the investigation into their CSEM activities, their mindset at the time of the investigation related to suicidality, and their CSEM-specific behaviours.

The details of the survey processing, including sample characteristics, hypotheses, and analyses, are provided in Sections 4 through 6. To describe the overall approach while avoiding duplication, a general summary of the surveys and samples is provided below.

5.2 Participants

This research used two primary data sets. First, a Qualtrics panel (*Online Panels: Get Responses for Surveys & Research | Qualtrics*, n.d.) was used to identify members of the reference group. Second, individuals on both the Illinois and Texas Sex Offender Registries (SORs) previously convicted of online CSEM offences were contacted and their voluntary participation solicited for the offender group.

5.2.1 Reference Dataset

The reference data was obtained through an anonymous online survey hosted through the University of Edinburgh’s Qualtrics instance. Participants were recruited using the Qualtrics Panel service, which provides pre-identified participants from a pool of individuals recruited and compensated by Qualtrics meeting specific criteria outlined by

the researcher (*Online Panels: Get Responses for Surveys & Research | Qualtrics*, n.d.). Qualtrics panels have been shown to have appropriate representativeness on the dimensions of interest and to be of sufficient quality for research with the appropriate controls in place (Boas et al., 2020; Miller et al., 2020).

The survey population for this research was English-speaking adults (18 years of age or older) living in the United States. Prior to participation in the survey, panel members were provided with information on how the data collected would be used and both the benefits and risks associated with participation. Participants were required to affirmatively consent prior to starting the survey. Any individuals who chose not to continue with the survey were permitted to withdraw at any point prior to submission, and the results of those individuals were not retained. 624 individuals began the survey, and of those individuals 99 failed to complete the survey and their results were not recorded, resulting in 525 completed surveys.

As part of the survey execution, an initial soft launch with a small number of participants (n=31) was conducted to confirm survey structure and train automated time metrics to address insufficient effort responding (IER) concerns (Kraiger et al., 2019). Additionally, two integrity checks were built into the survey (detailed below). Responses failing the checks were automatically discarded by Qualtrics to improve response quality (Owens & Hawkins, 2019). Final completion times in seconds were recorded (m=802, sd=598), and any responses taking less than 203 seconds (one standard deviation from the mean) were discarded to eliminate individuals answering without taking adequate time to read the questions and responses (n=1). A total of 524 total surveys meeting quality standards were retained for analysis (Figure 5.1).

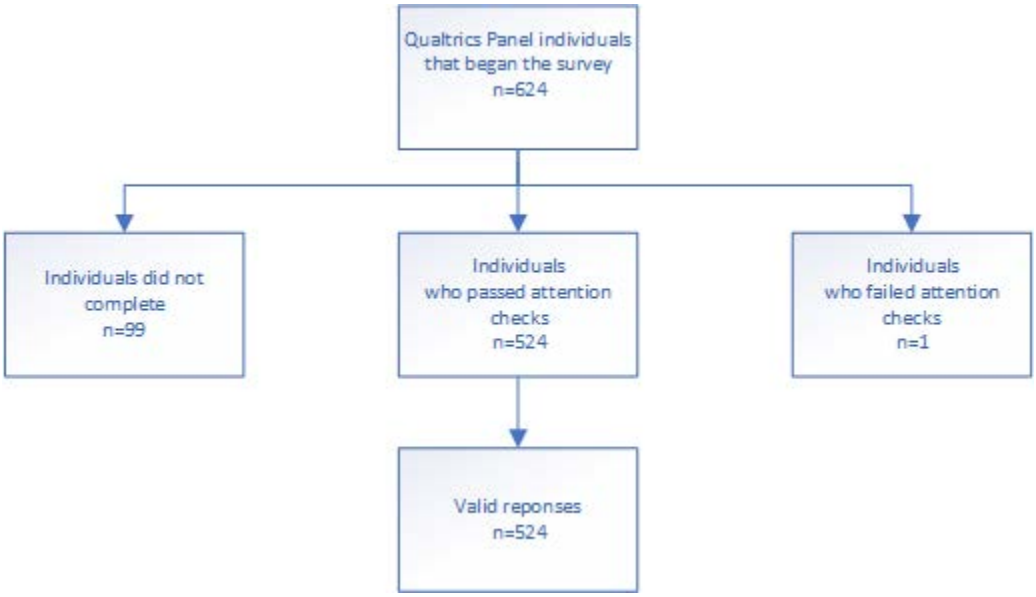

Figure 5.1. Reference group population sample

5.2.2 Offender Dataset

The previously convicted offenders were identified based on their presence on the SORs for two states. The States of Illinois and Texas were selected because of the availability of critical information (e.g., date of conviction) within their SORs and quantity of individuals available to contact.

The SOR data for both Texas and Illinois is available for public use. The Texas SOR states that "All information provided through this website is open record. It may be used by anyone for any purpose" (*Texas Public Sex Offender Registry*, n.d.) and the Illinois SOR only restricts usage for illegal purposes, stating "Information compiled on this Registry may not be used to harass or threaten sex offenders or their families. Harassment, stalking or threats may violate Illinois criminal law" (*Illinois Sex Offender Registration Information Website*, n.d.).

Both Illinois and Texas require the registration of CSEM offenders, and both had age information available to limit the solicitation to individuals over 18 as well as offence information to restrict the solicitation to individuals convicted of a CSEM offence within the past ten years. A cut-off of ten years was chosen to include a large enough sample,

while still capturing usage information on offences that were conducted in a recent technological environment.

The two sex offender registries were chosen based on their inclusion of the necessary information and their allowance for public use, however a potential sample bias was present based on the nature of the registries as well as the states chosen. First, there was a potential for bias based on the demographics of both states as well as any regional differences in law enforcement and judicial procedure. The general demographics issue is addressed in Chapter 13, and the demographic results were found to be generally consistent with the general population sample which was drawn from across the United States. The possibility of regional bias is possible, as noted, however it was mitigated by two factors. First, the Illinois and Texas are geographically separated and are associated with different regions of the United States. Second, individuals present on the registries were those residing in the particular state at the time of the sample collection, but their interactions with law enforcement and the legal system occurred in the state where they resided at the time of the offence, providing additional sample diversity for the retrospective data gathered.

In addition to the bias noted above, a survivor bias was present based on the nature of the sample. Individuals who were currently incarcerated were excluded, and individuals who failed to register as well as individuals who died prior to registration (e.g., through taking their own lives) were not part of the sample.

The data for both SORs was obtained and cleaned as follows:

1. The raw data for both SORs was downloaded and ingested into a database. The initial dataset for Illinois had 32,248 offenders and the dataset for Texas had 95,281 offenders registered.

2. Any individuals under the age of 18 at the time of the offence (or the current time) were removed from the dataset to prevent asking questions of minors. The resultant data for Illinois had 30,537 offenders and Texas had 95,253 offenders registered.

3. The offence codes from both states were manually reviewed and coded and only offenders with CSEM-specific offences with no listed, concurrent contact offences included (offenders may have committed other non-contact offences, but they were required to have at least one CSEM-specific offence to be included). Illinois had 1,982 relevant offenders and Texas had 4,330 relevant offenders.

4. Any individuals whose most recent offence was over ten years ago were removed. The resulting data contained 992 offenders for Illinois and 2,346 for Texas.

5. Final data cleansing was conducted. Any records with incomplete or inadequate information listed to solicit assistance via mail were removed. This included individuals who were incarcerated for a subsequent offence and currently in prison, individuals who had no known address or were listed as homeless, and individuals with missing or incomplete address information. The final records contained 657 offenders in Illinois and 1,851 offenders in Texas for a total of 2,508 possible participants.

Following the identification of the final record set, a disclosure analysis was performed to ensure that the questionnaire could not be used to individually identify any individual through a conjunction of answers. As a result of the disclosure analysis, a question related to the year of offence was removed and a question related to offender sex was removed. Because gender identity was not captured in the SOR data, there was no baseline for matching, therefore this question was kept in the offender survey.

The overall selection and responses to the offender survey are shown in Figure 5.2. A total of 2,508 individuals were sent a postal mail solicitation requesting their voluntary participation in the survey. A total of 128 letters were returned to the University of Edinburgh as undelivered, however this number represents a lower bound as it does not include misdelivered mail, undelivered mail that was not returned to the University of Edinburgh by local postmasters, or mail that was lost in transit. Of the 2,367 letters

believed to be received, a total of 141 individuals responded, providing a response rate of 5.9%.

Of the 141 individuals that began the survey, three individuals did not provide consent and were not shown the survey. An additional 40 individuals began the survey but did not complete it. Due to the need for informed consent, respondents were permitted to withdraw at any point prior to final submission, and partial responses were not retained. Finally, two integrity checks were built into the survey for quality control within the Qualtrics application as detailed below (Owens & Hawkins, 2019). Twenty individuals failed the checks and their responses were not included in further analysis, resulting in a total of 78 valid responses.

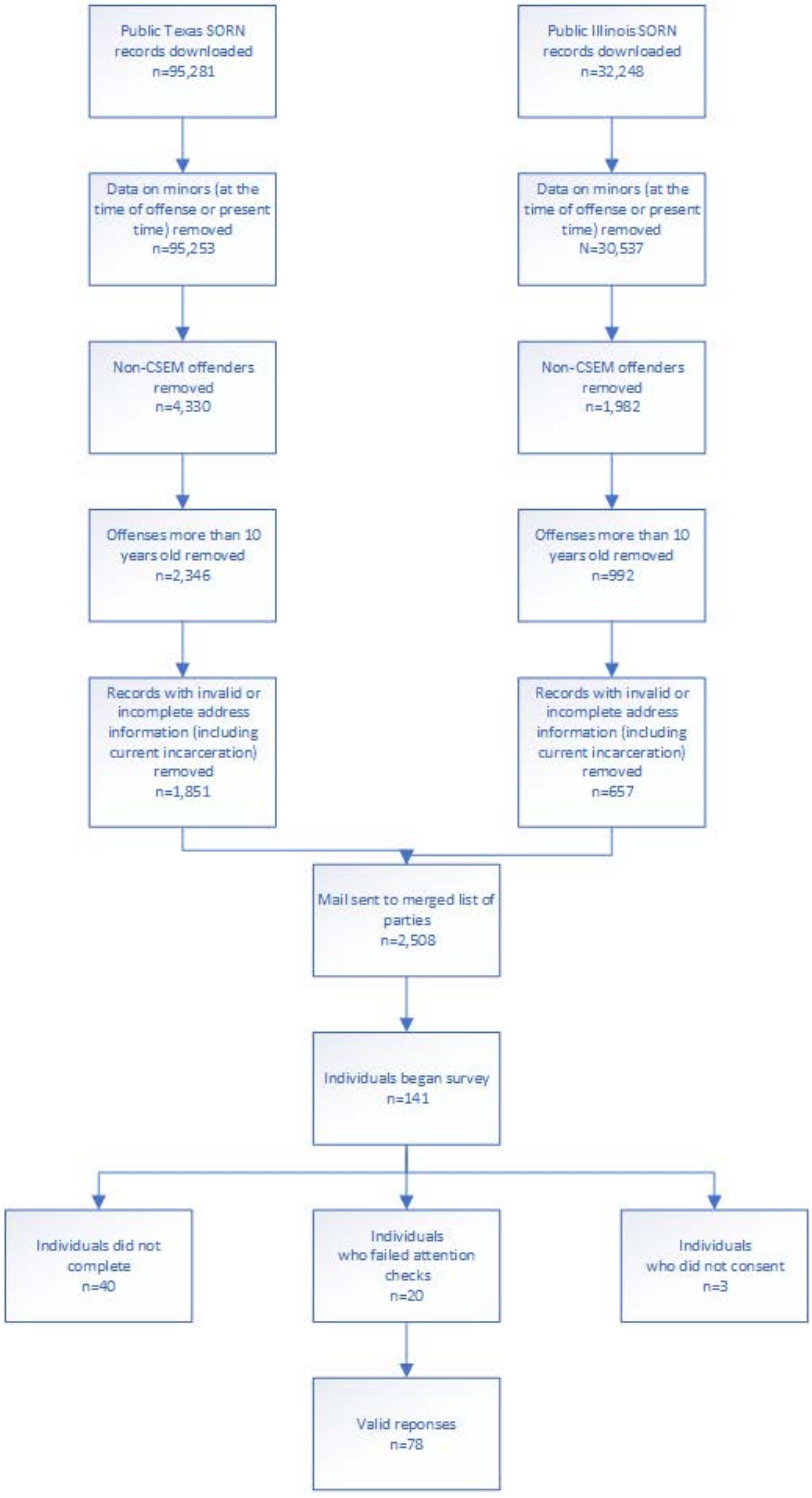

Figure 5.2. Offender group population sample

5.3 Consent

All individuals participating in the study were required to provide affirmative consent electronically before answering any survey questions. The electronic form required participants to consent to all aspects of the study, and partial consent was not possible. Once they consented, participants were able to withdraw from the study at any point until final submission. Because the study was anonymised, individualised consent forms were not collected nor maintained, and the option to withdraw participants' data following submission was not possible. The consent language is provided in Appendices A and B and was embedded into the interactive web form for each survey.

5.4 Solicitation and Compensation

The reference survey utilized the Qualtrics survey panel, as noted above. There was no direct solicitation of the panel members by researchers, but a project information sheet was embedded in the consent forms and provided to participants. Qualtrics was contracted out by the researcher to identify panel members, but no direct compensation was provided to the individuals - all compensation was provided by Qualtrics as part of their research panel compensation, the details of which are proprietary to Qualtrics.

The offender survey participants were sent a letter via postal mail (Appendix C) requesting their voluntary participation and outlining the benefits of taking part. The letter directed them online to an anonymous Qualtrics survey page that included the consent form and a detailed project information sheet. The offenders were not provided any *individual* compensation but were eligible to win one of two $150 gift cards from Amazon. Any offenders completing the survey were provided an anonymous link to a separate survey to optionally enter their email addresses. Every email address was entered into a drawing conducted by an independent party, and two participants were sent electronic gift cards from Amazon for the amount noted.

5.5 Data Collection

All of the data used in this research was collected through online surveys enabled by the University of Edinburgh's Qualtrics platform. The content of the reference survey

was a subset of the offender survey, and as such the relevant sections are only detailed once below. Printed copies of the reference and offender surveys are attached (Appendices D and E, respectively). The online versions contained additional data validation rules and flow logic, including randomization of response choices and question order where appropriate.

The reference survey consisted of four sections:

- *Demographics*. Basic information on age, gender and racial identity, employment, and education were collected. For the reference survey, the sex of the participant was collected as well, but was excluded from the offender survey following the disclosure analysis noted above.

- *Technological Behaviours and Technology Usage*. Information on the types of technology used, as well as the amount of usage, were collected. Individuals were asked to rate their sociability, technological abilities, their technophilia, and their perceptions of Internet behaviours. Additionally, they were asked about their usage of countermeasures in their Internet activities. The technical behaviours and technophilia questions were taken from prior work on idiographic profiling (Steel, 2014). The technologies listed were common devices seized in warrants related to CSEM offences, and the social media platforms were taken from the list of the most commonly used applications in the United States (*Top U.S. Mobile Social Apps by Users 2019 | Statista*, 2019). The Internet usage questions were generated to assess perceived lawlessness and capable guardianship present within specific areas of the Internet.

- *Child Pornography Beliefs*. Beliefs related to child pornographers and CSEM consumption were asked of participants. This included the endorsement of cognitive distortions related to CSEM content, CSEM consumption and offending, the use of sex offender registries, and the general understanding of CSEM risks. The ranking criteria against other crimes was taken from the FBI's Uniform Crimes Reporting (UCR) category list (*Uniform Crime Reporting Statistics*, 2020). The cognitive distortion and belief questions were designed in part based on the

findings from the IBAQ (M. D. O'Brien & Webster, 2007) and C-ISO (Paquette, 2018).

- *Adult Pornography Usage.* The categories of adult pornography consumed, paying for adult pornography, and the age of first consumption were collected. The adult pornography categories were taken from the Pornhub Insights team as the most common categories used (*The 2019 Year in Review – Pornhub Insights*, n.d.), and were supplemented with the categories of deviant pornography (e.g., bestiality) found to be correlated with CSEM viewing (Seigfried-Spellar & Rogers, 2013).

In addition to the questions from the reference survey, the offender survey added three more sections as follows:

- *Investigative Efforts*. The investigative efforts section solicited information on the offenders' perceptions of how they were treated during the investigation. The questions were primarily exploratory in nature and designed to baseline the perceived understanding shown by the investigative team and its potential impact on offender cooperation. Additionally, a question about treatment or counselling specific to CSEM was added to control for offenders that may have received prior Cognitive Behavioural Therapy (CBT) or similar interventions.

- *CSEM Technical Behaviours*. The specific actions related to technology usage and viewing of CSEM by offenders was collected in this section. Information on the devices used to view and store CSEM, countermeasures used, and types and frequency of content viewed were collected using the same question format as for adult pornography to allow for direct comparisons. For specific lawless spaces, the reasons for choosing those spaces were elicited. Data on contact offences committed was solicited, as was recidivism information. Additional information was collected on distribution and production of CSEM, and the details of how offenders searched for and obtained CSEM.

- *Suicidal Thoughts and Behaviours.* Contemporaneous (with arrest) and historical suicidal ideation were identified. The suicidal thoughts and actions of the

offender at the time of their arrest were captured using the Suicidal Ideation Measure (Klein et al., 2013), adapted to make the wording appropriate for the historical nature of the questions. Information on what aspects of their arrest were the most troubling, as well as what investigators did or could have done to reduce their suicidality was solicited. The willingness of the offenders at the time of their arrest to talk to a mental health professional about any suicidal thoughts if provided a contact by investigators was additionally asked.

The majority of the endorsement and technology ownership questions were asked using 7-point Likert scales or as binary choices. For questions where respondents were asked to make estimates and there were statistics on actual prevalence or incidence numbers, the respondents were provided sliders to allow them to make exact percentage estimates from 0 through 100. This permitted direct comparison with known rates for the purposes of identifying and quantifying misperceptions. An example of Likert-scale questions were those that asked about the sentencing guidelines, e.g., asking agreement levels with statements such as “Sentencing of child pornographers should be based on the age of the individuals depicted”. In contrast, asking individuals to estimate the percentage of child pornography offenders that will recidivate (i.e., go on to commit another child pornography-related offence post-arrest) was performed using a slider to allow for comparison to prior research on measured recidivism rates.

Several questions were asked using more nuanced approaches to avoid scale compression (where everyone answers at the top two or bottom two values on a Likert scale) and to reduce social desirability bias issues that may arise from yes/no answers. Based on the systematic review of cognitive distortions in Chapter 3, for example, instead of asking the level of agreement respondents had with CSEM causing victimisation, they were instead given multiple choices and required to select the one they most agreed with:

Viewing child pornography is directly responsible for creating child victims.
Viewing child pornography is indirectly responsible for creating child victims.
Viewing child pornography does not contribute to child victimization.

This allowed for the identification of more subtle cognitive distortions related to Nature of Harm and Virtual is Not Real by differentiating how offenders may consider their victimisation when compared to not offenders (i.e., primary v. secondary victimisation). Similarly, questions about self-recidivism were not asked as binary questions (e.g., "Have you viewed CSEM since your arrest?") to avoid social desirability bias and minimisation in answering. Based on lessons learned in medical questionnaires, for example questions about alcohol use (Saunders et al., 1993), questions that took into account and addressed potential minimisations were used. For example, to assess recidivism, offenders were asked:

Since your conviction, which best describes your viewing of child SEM?

I only viewed it once or twice but did not continue doing so
I have viewed it very infrequently
I have viewed it frequently
I have viewed it on a regular basis
I have not viewed any since my conviction

5.6 Analytics

Unless otherwise noted in the individual investigations, all analyses were performed in R using R Studio. Graphs and tables included in this document were generated in either R Studio or Excel. All tests used a statistical significance (corrected for the number of comparisons) of .01. Individual tests used are detailed in the specific investigations.

The analyses conducted were primarily bivariate analyses, due largely to the small sample size of the offender dataset and the limited number of individuals in each of the subcategories therein. Multivariate analyses were used where there were ranked data could be utilized that reduced the impact of the small sample size, and where there were likely influences that needed to be controlled for. As an example, technophilia (the early adoption of new technologies) was predicted to be correlated with device ownership (the number and diversity of devices owned and utilized). Because device ownership is subject to financial constraints, the analyses needed to control for income.

This was possible even with the small sample size as income could be represented by decile rank, providing a continuum that used all subcategories as opposed to binary or segmented data present in other demographic categories.

In addition to the standard bivariate analyses, the major comparisons between the reference group and the offender group inherently controlled for the major difference between the populations – the overrepresentation of males amongst CSEM offenders. As no individuals in the offender dataset identified as female, the comparator group was created as a matched subsample based on gender identification. The high degree of matches on the other demographic categories between the subsample of the reference group and the offender group is examined in Chapter 13.

5.7 Methodological Considerations

This research used a self-reporting, anonymous survey of individuals previously convicted of child pornography offences. The methodology selected for this research has both inherent advantages and inherent disadvantages compared to alternative options used in prior research. Three other methods, based on previous research approaches, were considered as alternatives. First, utilizing structured interviews with a prison sample of offenders was considered. Second, obtaining digital forensics evidence from convicted CSEM offenders and analysing the information present was considered. Finally, surveying and/or interviewing a sample of CSEM consumers that had not previously encountered the legal system was considered.

The use of structured interviews with individuals who are in prison would have provided the ability to ask follow-up questions and obtain additional detail on responses. Additionally, a prison sample would potentially have allowed for the review of investigative and clinical files, enabling verification of responses. This approach would have introduced potential selection biases, however, as well as increased social desirability effects in responses. Selection biases would have been based on the individuals who were specifically sent to a particular prison, as well as those who volunteered to participate (e.g., individuals seeking parole may be more willing to engage). Social desirability bias would have been present due to the more personal

nature of the direct interaction, as well as other motivations that may be present with a particular offender (e.g., answering in a manner that shows reduced risk). This approach was primarily rejected due to difficulties in obtaining approval to conduct prison studies within the United States and would have been precluded due to conflicts of interest related to the primary researcher.

The second approach considered was the analysis of digital forensics evidence from CSEM offenders. Digital devices gathered by law enforcement as part of their investigations into child pornography offences provide ground-truth results that are not subject to self-reporting or social desirability issues. The specific activities of offenders, including the search methodologies and terms used and interaction with both CSEM and adult SEM content could be objectively cataloged through forensic analysis. This approach was rejected for two primary reasons. First, it did not allow for the collection of specific psychological factors of interest related to the research (e.g., suicidal ideation). Second, the devices collected represent a point-in-time snapshot of offending behaviour and may not have been sufficient to capture the entire timeline of offending for long term offenders.

The final approach considered was to conduct interviews and surveys of a population of previously undetected CSEM offenders (e.g., the members of a dark web forum). This approach would have had the benefits of both an anonymous survey (for reducing social desirability bias) as well as structured interviews for asking detailed follow-up questions. Based on LST, however, this approach was rejected. Under LST, individuals select specific lawless spaces, and limiting the sample pool to individuals from a single lawless space would have inherently limited the testability of the theory.

The approach selected, the use of anonymous surveys, provided the best balance between reducing social desirability bias in a sample with largely known biases (as described above as well as in the general limitations noted in Chapter 14) and collecting sufficient data to identify moderate effect size interactions. While the anonymous nature of the sample did not allow for cross-verification against investigative or clinical files (or digital forensics results), it did permit asking a broad range of questions, and provided

for the ability to perform direct comparison of the reference group who were asked a subset of the same questions.

Specific to the data, a conservative approach was taken to ensure high quality responses, at the expense of the response volume. All responses failing *any* of the integrity checks were rejected in full, and a conservative level of statistical significance given the size of the data set was selected. This approach limited the types of analyses and the power of those analyses that could be conducted, as noted in section 5.6 above, but provided for increased confidence in the results that were obtained and reduced the likelihood of false positive results.

Future analyses, including linear and non-linear predictive modeling as well as more advanced classification approaches are possible, but were beyond the scope of the initial experiments. Additionally, verification of the relevant aspects of the results using the other approaches considered is a critical future step. To facilitate this, dataset has been made publicly available for future research using different approaches as well as more additional statistical techniques.

5.8 Data Protection and Archiving

All data was collected online using the University of Edinburgh Qualtrics platform. The data from the two surveys was solicited and obtained using anonymous links generated by Qualtrics. The surveys were constructed to ensure they did not collect any personally identifiable information, and none of the open text fields involved requests for personally identifiable information. Additionally, the data anonymity features of Qualtrics were used to ensure no incidental personally identifiable information, such as IP addresses, was collected. The survey that collected email addresses was not linked to either the main survey responses or to an IP address. The SOR information used for the mailings as well as the emails provided for the drawings were securely deleted following the completion of the survey data collection. The email addresses selected as winners were securely deleted following the drawing and transfer of the gift cards.

Data integrity checks were incorporated into the surveys using built-in tools from Qualtrics. Additionally, the reference survey data was collected using the Qualtrics

panel, which has additional built-in checks to ensure that questions were being read and answered by an individual. Both surveys contained the following quality assurance mechanisms:

- *Consistency checks.* Consistency checks were incorporated into each survey. This was done using attention questions, requiring the user to read the question and select the specific answer indicated by the question wording.
- *Timing controls.* Built-in timing controls within Qualtrics were used to prevent individuals from filling out the survey without spending a reasonable amount of time reading the questions (more than one standard deviation from the mean time).
- *Mandatory questions.* To avoid incomplete surveys, the majority of the non-narrative questions were made mandatory.
- *Christmas tree and straight line checks.* Any bulk questions exhibiting straight line or Christmas tree responses were identified. A built-in integrity question in large matrix questions was used to facilitate these checks.

Any survey responses not meeting the quality standards above were fully excluded from consideration and discarded.

The majority of the quantitative data was structured by the survey tool and linked directly to the question asked. The qualitative (narrative) data was coded as detailed in the individual investigations. Any content that could be used by offenders to more easily obtain CSEM content (e.g., specific websites) was removed prior to publication, and was sanitized and will only be made available to law enforcement or Institutional Review Board (IRB) approved researchers upon request.

All of the data collected was initially stored on the Qualtrics server and backed up to a private drive on the University of Edinburgh filestore. The Edinburgh filestore used was high quality, enterprise-class storage with guaranteed backup and resilience. The data was automatically replicated to an off-site disaster facility and backed up with a 60-day retention period (von Jungenfeld, 2013). Local copies of portions of the data were

created for data analysis and processing and deleted immediately following that processing.

The final data generated by this project was made available for use by the research and policy communities in perpetuity by utilising University infrastructure in the form of the Edinburgh DataVault repository to ensure continued access[4].

5.9 Ethics Approval

Ethics approval was sought and obtained from the University of Edinburgh Research Ethics Committee on May 20, 2020. Due to the use of United States data and researcher affiliation with George Mason University, additional approval was sought and obtained from the George Mason University Institutional Review Board on May 13, 2020. Copies of the approvals are included in Appendices F and G.

[4] Edinburgh DataVault is an online digital repository of multi-disciplinary research datasets produced at the University of Edinburgh, hosted by the Data Library in Information Services. A persistent identifier and suggested citation is provided for any dataset deposited (*Edinburgh DataVault*, n.d.).

SECTION 4 - PUBLIC PERCEPTIONS

Chapter 6 - Public Perceptions of Lawlessness on the Internet

6.1 Overview

Under lawless space theory (LST) as described in Chapter 2, there are virtual ecosystems on the Internet where perceived lawlessness facilitates ongoing criminal behaviour. As part of the validation of LST, the perception of the Internet as being lawless needs to be measured. Additionally, prior digital compromise, through malware, identity theft, or account takeovers, may increase an individual's perception of lawlessness through the direct, personal impact of its consequences. Finally, the implementation of countermeasures may be performed directly in response to prior compromise, and indirectly in response to perceived lawlessness.

This investigation directly tested a previously proposed instrument for measuring lawlessness (detailed in Chapter 2) for consistency and provided a baseline measurement of the general perception of lawlessness in a representative sample of English-speaking adults within the United States (n=524). Additionally, it baselined the rates of digital compromise and the implementation of specific countermeasures within that same population and identified specific correlations between those factors and the perception of lawlessness.

This investigation provided the base rates of countermeasure usage as well as the validation of the proposed instrument for LST (and the baseline endorsement by non-offenders of perceived lawlessness). The results provided evidence to support a key aspect of LST (that the Internet is viewed as lawless) and the baseline countermeasure usage collected can be used nomothetically to evaluate groups of offenders that commit specific cybercrimes such as digital piracy, identity theft, and online child sexual exploitation.

6.2 Summary of Findings

The major findings of the research were as follows:

- The overall perception of the Internet as lawless was high, with respondents indicating higher agreement than disagreement with all six statements regarding its lawlessness.
- The proposed instrument had an acceptable level of internal consistency, with a Cronbach's alpha of .74.
- Countermeasure usage was commonplace, with approximately 70% of users employing at least one countermeasure.
- Less technically sophisticated countermeasures (e.g., deleting browser history) were more frequently used than more technically sophisticated ones (e.g., encryption).
- Approximately 37% of the population were victims of at least one compromise within the past year.
- There was weak correlation between perceptions of lawlessness and both the use of countermeasures and of having fallen victim to a compromise.

Public Perceptions of Lawlessness on the Internet

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Abstract

Lawless space theory posits, in part, that the perceived lawlessness of virtual ecosystems contributes to criminal behaviour. To-date, there has been no confirmation that the Internet is perceived as lawless nor an instrument for measuring perceived lawlessness. Additionally, baseline information on the usage of digital countermeasures and rates of computer compromise and how these impact the perception of lawlessness have not previously been determined. This research surveyed a non-forensic sample of English-speaking adults in the United States (n=524) to determine their perceptions of lawlessness on the Internet, and any correlations with past compromises (e.g., digital identity theft) and their employment of common digital countermeasures. The study found that the overall perception of the Internet as lawless was high, and the proposed instrument to measure lawlessness had an acceptable level of internal consistency (α=.74). Countermeasure usage was commonplace, and there was weak correlation between perceptions of lawlessness and both the use of countermeasures and of having fallen victim to a compromise. The high use of countermeasures warrants caution in attribution of digital activity, and the high perceived lawlessness of the Internet indicates a need for greater awareness of capable guardianship.

Keywords: Child sexual exploitation material, child pornography, lawless space theory, countermeasures

1. Introduction

A lawless space is a virtual environment where there is a perceived lack of capable guardianship that facilitates criminal activity. Lawless space theory (LST) posits that offenders will perceive areas of the Internet as lawless in comparison to the physical world, which will act as an enabler for their criminal behaviour. LST has four elements - an offender will choose a perceived lawless space that best meets their psychosexual needs in the most frictionless way; habituation and differential association in the lawless space will reduce the perceived risk; normalization will increase comfort in a particular lawless space, increasing friction costs that must be overcome to switch technologies; and additional countermeasures will only be implemented by offenders to reduce perceived risk and lower cognitive dissonance, but not at the expense of utility (Steel et al., 2021).

LST was developed as a theory to explain the technical behaviours of child sexual exploitation material (CSEM) offenders. The utility of the measurement of perceived lawlessness is not limited to CSEM offenses, however. Because lawless spaces represent a general criminogenic environment, LST has potential applicability to malware development, digital piracy, online terrorism, and other cybercriminality. To date, however, there has been no validated instrument developed to measure an individual's perceived lawlessness of a virtual space. Additionally, there has been no comprehensive research looking at how perceptions of lawlessness relate to the usage of countermeasures or previous compromise events, nor the normal use of countermeasures by the general public as a baseline by which to evaluate abnormal use of countermeasures.

To measure perceived lawlessness, an instrument consisting of six questions was proposed as follows:

1. The rules of behaviour on the Internet are different from the physical world;
2. There is more criminal behaviour on the Internet than in the physical world;

3. You can get away with behaviour on the Internet that would be unacceptable in the physical world;
4. It is easier to find illegal goods and services on the Internet than in the physical world;
5. Most activity on the Internet is not monitored by law enforcement;
6. Law enforcement cares less about Internet crimes than crimes in the physical world (Steel et al., 2021)

The questions were grounded in existing research into general criminality as well as distorted cognitions associated with Internet usage amongst CSEM offenders. They were specifically designed to measure three areas that engender perceived lawlessness - first, the view that the Internet is different from the physical world, and that the same rules do not apply. Second, that criminality is more prevalent on the Internet. Third, that law enforcement does not provide effective oversight, either through a lack of an effective Internet presence or through a lack of desire to enforce virtual crimes.

The perceptions that Internet interactions are distinct from physical space interactions and that virtual crimes are different from physical crimes encapsulates two implicit theories - Virtual is Not Real and the Internet is Uncontrollable. The implicit theory that Virtual is Not Real was found to be endorsed by 90% of CSEM offenders (Paquette & Cortoni, 2020), and encompasses the distorted belief that actions taken on the Internet are separate from the real world and what is acceptable in one may not be acceptable in the other. For example, the view that individuals portrayed in CSEM are just images and not “real” victims and that viewing those images is not the same as viewing abuse (Paquette & Cortoni, 2020). The concept that the Internet is Uncontrollable, endorsed by 40% of CSEM offenders, postulates that the Internet facilitates and encourages CSEM-related behaviour (Paquette & Cortoni, 2020) due to greatly increased accessibility (Cooper, 1998). These are both measured in part by the Cognitions on Internet Sexual Offending (C-ISO) scale, which elicits levels of agreement with relevant statements such as “There are no limits on the Internet” and “On the Internet, you can chat with a youth about sex, even if I would never do it in real life” (Paquette & Cortoni,

2019, p. 13). The generalization of these implicit theories to the overall perception of the Internet (not specifically related to CSEM) by both offenders and non-offenders has not been evaluated, and may be useful in determining which endorsements are offense-specific or more general in nature.

The perception that crime is more prevalent on the Internet is affected by both the direct observations of the individual in a relevant environment (Hipp, 2013) and any availability bias present as a result of their interaction with media reporting (O'Connell et al., 1998; O'Connell & Whelan, 1996; Wahlberg & Sjoberg, 2000). The overall perception of the prevalence of Internet crime is believed to be higher than the actual rates, potentially through both of these mechanisms. Public fears of online paedophiles and their own children becoming victimized may be the result of media consumption, whereas the perceptions of software and movie/song piracy prevalence may be more directly related to personal observation, at least amongst the individuals engaged in that activity (Yar, 2010). Under LST, the perception of crime being more prevalent is expected to be high for both offenders and the general public, but potentially based on different mechanisms (observation for offenders and media reporting for the general public).

Routine activity theory has criminality emanating from motivated offenders and suitable targets being present in the same location at the same time, with a lack of capable guardianship (Clarke & Felson, 2017). The concept of capable guardians, individuals that will notice and/or intervene when criminal activity takes place, was incorporated into the questions in the form of law enforcement - specifically, the perception that law enforcement monitors and cares to act on criminality in virtual spaces. There is evidence to suggest that actual capable guardianship is low - for example, a 2017 study estimated that only 1 out of 300 Internet crimes was reported to law enforcement (Bayerl & Rüdiger, 2018) - but the perception of capable guardianship has not been previously measured. Based on the above, the perception of effective guardianship would likely be higher in the general public due to media effects noted, and lower in the offender population due to lack of observed action. Following an interaction with law enforcement, however, offender perception of effective capable guardianship would be

expected to change to a higher view of effectiveness under LST based on the same observed action effect.

The use of countermeasures that are specifically used and not already present (e.g., storage on an iPhone, which is encrypted by default) is proposed by LST to be implemented by offenders primarily to reduce perceived risk, which is directly related to perceptions of lawlessness, and to reduce the psychological strain caused by their behaviours and their understanding of society's views of their behaviours (Steel et al., 2021). Prior work has shown that there is a general trend over time of low adoption of countermeasures in particular, and encryption specifically, by CSEM offenders (Steel et al., 2020), but no baseline work has been conducted to show if this level of usage is significantly different from the general public. Additionally, in general information security terms, controls and countermeasures are considered synonymous (D'Arcy et al., 2009; Morana, 2010), with both being actions taken to protect confidentiality, integrity, and availability. For the research to be meaningful for an offender population, the concept of intent needs to be incorporated. Behavioural analysis defines a precautionary act as "any behavior committed by an offender before, during, or after an offense that is consciously intended to confuse, hamper, or defeat investigative or forensic efforts for the purposes of concealing their identity, their connection to the crime, or the crime itself' (Turvey, 2011, p. 389). A countermeasure becomes a precautionary act based on the intent of its usage (providing a differentiator from a control, which implies a purely defensive intent). Because intent is difficult to assess and a countermeasure can be used for multiple purposes simultaneously, identifying differences in usage between the general public and offenders can serve as a proxy in highlighting potentially problematic usage patterns.

In addition to direct utility, countermeasures may be used in response to prior victimization (Conklin, 1975). Physical countermeasures, for example, have been shown to be part of a coping strategy employed by those who have been previously victimized (Wirtz & Harrell, 1987). This has been extended to cyberspace in simulations, where victims showed similar responses (Rosoff et al., 2014), but has not been directly measured. Additionally, cyber crimes such as identity theft have been

linked to general fear of criminality (Roberts et al., 2013), which may indicate that prior compromise has potential spillover effects to general perceptions of Internet lawlessness.

This quantitative research uses an online survey of a large reference population of adults within the United States (n=524) to provide a baseline measure of perceived lawlessness, and to evaluate the proposed instrument. Countermeasure usage and the rates of compromise are also evaluated to develop baseline rates of normal (non-deviant) usage and exposure, and these are additionally evaluated for any correlations to the levels of perceived lawlessness.

2. Methods

This research was part of a broader research project looking at the technical behaviours and cognitions of CSEM offenders and utilized a survey containing 41 questions that were asked of the general public (non-offenders). The survey contained 11 demographic questions and 3 matrix questions related to perceptions of lawlessness, countermeasure usage, and any cyber-victimization they may have experienced.

The demographic questions were primarily multiple choice and solicited information on the sex, sexual orientation, age, gender, marital status, race, level of education, type of degree, employment status, current occupation, and household income of the participants. The questions related to the respondent's perceptions of lawlessness are detailed below.

2.1 Data collection and Population

This study was conducted through an anonymous survey using the Qualtrics Panel service (*Online Panels: Get Responses for Surveys & Research | Qualtrics*, n.d.). Qualtrics maintains a previously recruited group of diverse individuals that are willing to participate in research and compensates them directly for doing so. This survey population consisted of English-speaking adults (18 or older) within the United States.

Prior to participation in the survey, panel members were required to provide consent after being given details on the content of the survey and the intended uses of the

results. Of the 624 individuals that began the survey, 524 individuals completed the full survey and had their results recorded. Because of the anonymous nature of the survey, partial responses were not recorded (individuals were permitted to withdraw at any point prior to final submission).

2.2 Measures

To measure the perceived lawlessness of the Internet, the statements previously proposed as part of LST were utilized (Steel et al., 2021). The six statements related to perceived lawlessness noted above were evaluated by respondents. For each statement, the respondents were requested to rate their agreement on a 7-point Likert scale ranging from Strongly Disagree to Strongly Agree. The overall level of perceived lawlessness was calculated by summing the individual statement agreement values, resulting in a range of 0 (low perceived lawlessness) to 36 (high perceived lawlessness).

Respondents were additionally asked about 16 specific countermeasures they had potentially employed based on common countermeasures encountered in digital investigations, ranging from the encryption of files to the employment of steganography. A total countermeasure score was calculated by counting the number of countermeasures employed. Respondents were then asked about four compromises they may have experienced in the past 12 months - email and social media takeovers, identity theft, and malware detected on a device. A total compromise score was calculated by counting the number of compromises experienced.

2.3 Analysis

The survey data was stored on a secure University file share and analysed in R-Studio. Exploratory analyses on the results were collected and presented, and a Cronbach's alpha calculated on the lawless space responses. Spearman correlations were used for comparisons between the perceived lawlessness, countermeasure, and compromise rating scales. Likert scales were displayed using a diverging stacked bar chart, where the vertical line indicates the median value (Heiberger et al., 2014). All of the Likert items were scaled between 0 and 6 points, and agreement was considered as any responses of "Somewhat Agree", "Agree", or "Strongly Agree". Subgroup analyses

based on respondent sex were performed, and independence between groups measured using Mann–Whitney–Wilcoxon and one-tailed t-tests for the non-parametric and parametric data. A value of p<.01 or better was used as a minimum for statistical significance.

2.4 Ethics

Ethical approval was received from the Research Ethics Committee at the University of Edinburgh on May 20, 2020. Additionally, Institutional Review Board approval was received from George Mason University on May 13, 2020.

3. Results

The responses received were diverse as to sex, sexual preference, age, relationship status, gender identity, race, employment, and education. The detailed demographics of the respondents are shown in Table A.1.

The overall view of the Internet showed a high level of perceived lawlessness (m=22.04, sd=5.95), with higher overall agreement than disagreement on all statements (Figure 1). Perceived lawlessness was significantly lower (t=3.7, df=520, p<.01) for female respondents (m=21.1, sd=5.85) than for male respondents (m=23.01, sd=5.91).

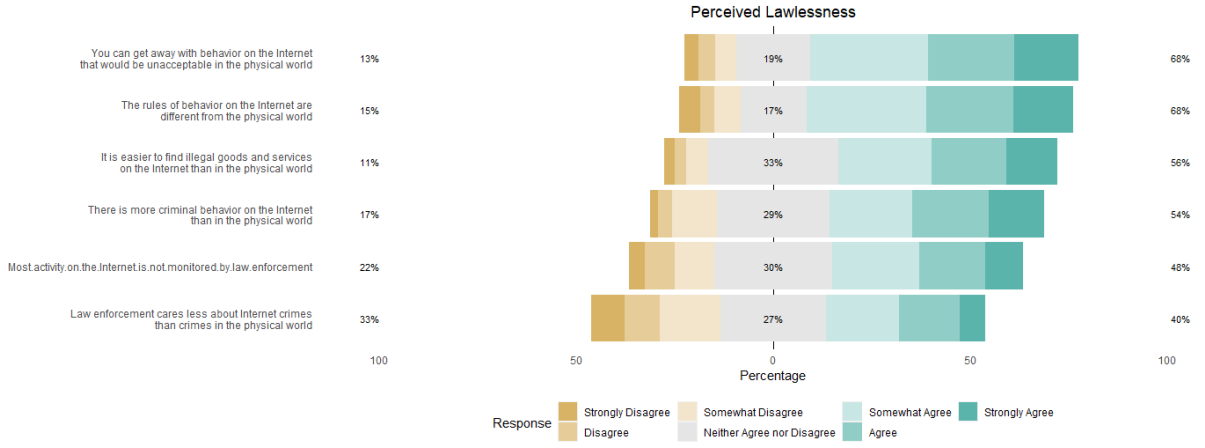

Figure 1: Endorsement of Statements Related to Perceived Lawlessness

The perceived lawlessness scale was found to have an acceptable level of internal consistency, with a Cronbach's alpha of .74. A Cronbach analysis dropping each of the statements individually showed a drop in the alpha value for each statement, indicating the scale is optimized based on the questions included.

Countermeasures were widely employed, with less technical countermeasures such as deleting web history (.47, n=247) having higher levels of usage than more technical countermeasures such as the use of an anonymizing VPN (.23, n=121). Looking at aggregative usage, a substantial number of users (.3, n=157) reported never using any of the countermeasures, with a mean of 2.5 countermeasures used (sd=3.2). Countermeasure usage was higher ($t=5.03$, $df = 435$, $p<.01$), for male respondents (m=3.22, sd=3.68) than female respondents (m=1.85, sd=2.38). The overall adoption of countermeasures is shown in Table 1 below.

Countermeasure	**% of Individuals**
I have deleted my web browsing activity	0.47 (n=247)
I have used In-Private or other browsing modes to hide my browsing activity	0.24 (n=128)
I have used a VPN service to hide my web activity	0.23 (n=121)
I have used peer-to-peer software to download movies, images, or music	0.2 (n=105)
I have formatted my hard drive or another storage device to delete content	0.19 (n=102)
I have encrypted individual files on one of my storage devices	0.18 (n=94)
I have created an email account using a fake name	0.13 (n=69)

Countermeasure	% of Individuals
I have used whole disk encryption on my laptop or desktop	0.12 (n=65)
I have used secure wiping software to erase my hard drive or another storage device	0.12 (n=63)
I have created a social media account using a fake name	0.11 (n=58)
I have used a cryptocurrency (e.g. Bitlocker, Etherium, Monero)	0.09 (n=49)
I have mislabeled a directory or a storage device to hide its contents	0.09 (n=46)
I have used TOR to access content on the dark web	0.07 (n=39)
I have deleted or altered log files to hide my activity	0.07 (n=36)
I have read message boards or forums on hiding my activities	0.07 (n=35)
I have used a virtual machine to hide my activities	0.05 (n=25)
I have downloaded a guide on hiding my activities	0.04 (n=23)
I have used steganography to hide content	0.03 (n=16)

Table 1: Countermeasure usage (all time)

In the prior 12 months, a sizable minority of users, .37 (n=196) suffered at least one compromise. The most common compromise was through malware, at .19 (n=97), followed by email account compromise at .15 (n=81), as shown in the Table 2. There were substantially higher rates of compromises ($t=3.47$, $df = 462$, $p<.01$) for male respondents (m=.7, sd=.99) than female respondents (m=.44, sd=.71).

Compromise Type	% of Individuals
Malware was detected on my computer	0.19 (n=97)
I have had one of my email accounts compromised	0.15 (n=81)
I have had one of my social media accounts compromised	0.14 (n=74)
I have been the victim of identity theft	0.09 (n=45)

Table 2. Compromises reported in the past 12 months

The usage of countermeasures was found to be moderately correlated with compromises (ρ=.31). Perceived lawlessness was weakly correlated with compromises (ρ=.20) and countermeasure usage (ρ=.21) (Table 3).

	Countermeasures	Compromise	Lawlessness
Countermeasures	1	0.31	0.21
Compromise	-	1	0.20
Lawlessness	-	-	1

Table 3: Correlations between perceived lawlessness and characteristics of respondents

4. Discussion

Overall, the perceived lawlessness of the Internet was high, with all statements having higher levels of agreement than disagreement. Agreement with the statements related to the rules of behaviour and criminality (e.g., you can get away with behaviour on the Internet that would be unacceptable in the physical world) were higher than those related to capable guardianship (e.g., law enforcement cares less about Internet crimes than crimes in the physical world), potentially as a result of the availability heuristic (Tversky & Kahneman, 1973), in which we rate the likelihood of rare occurrences too

high based on our recall of specific accounts. Media reporting on the arrests and convictions of Internet criminals through the availability heuristic would impact all three ratings of behaviour and criminality as observed (Lowry et al., 2003). The presence of crime would be highlighted, as would the fact that rules on the Internet were different based on the context of the crime. Capable guardianship would be rated as low (based on the fact that crime was occurring), but would be moderated by the presence of law enforcement in that specific case. For individuals directly impacted by law enforcement (by being personally arrested or having a close relation arrested), the perceived capable guardianship would be predicted as being substantially higher than shown, but further research is required to validate this.

There was an increased usage of countermeasures and a higher rate of compromise for male respondents when compared to female respondents, which is consistent with the higher perceived lawlessness by male respondents. These findings are consistent with previous work identifying higher levels of problematic Internet use in men (Ross et al., 2012), as well as greater consumption of pornography (Carroll et al., 2008). Because greater levels of computer deviance have been associated with greater levels of compromise (Bossler & Holt, 2009), and those same activities would place respondents in a position to observe more deviant behaviours in others, the findings are consistent with prior research.

Countermeasure usage was widespread. Looking at the number of countermeasures used, only the employment of 9 or more would be considered abnormal (two standard deviations from the mean). For individual countermeasures, only three were used by less than 5% of the population - hiding activities using a virtual machine, downloading a guide to hiding activities, and using steganography. The diversity in both the number and type of countermeasures employed indicates that caution is warranted in interpreting the use of any of the countermeasures as indicative of intent, in the absence of other information. For example, use of encryption cannot be considered deviant in and of itself, however the selective encryption of only CSEM material may be considered a precautionary act.

The use of countermeasures was moderately correlated with compromise, though causality could not be determined from this data. Individuals may use more countermeasures in response to a compromise, or individuals who engage in more risky behaviour may use more countermeasures and also be at higher risk for compromise. Perceived lawlessness was weakly correlated to both compromise and the use of countermeasures, though as noted above the research was not designed to show causality. Theoretically, individuals who have experienced a compromise would be more likely to view the Internet as more lawless and to begin using more countermeasures, though further work is needed to confirm the direction of this relationship.

The baseline compromise levels identified highlight the importance of ruling out the potential for misattribution of digital activity. Stolen identities can result in spurious credit card charges, malware can make it difficult to identify user activity within digital artifacts, email takeovers can result in attribution issues for messages and social media compromise can frustrate open source analysis. The importance of running malware scans and of asking about any past compromises in forensic interviews is critical in preventing a future SODDI (Some Other Dude Did It) defence (Steel, 2014).

5. Limitations

This research was conducted on an English-speaking adult population within the United States, and additional work would be required for generalizability beyond that population. While the quality problems inherent in Internet survey research are well known, the steps taken to validate responses and ensure attention are believed to have minimized these in this research. Additionally, the research was conducted during the Covid-19 outbreak, which may have influenced unemployment numbers within the demographic data (Coibion et al., 2020).

The rates of intrinsic countermeasure usage (e.g., default encryption within an iPhone) were not captured to differentiate between individuals who took additional countermeasures as opposed to relying on the default functionality of a technology. Because many users would be unaware of the presence of a particular default

countermeasure and because the default settings for devices and applications change over time, only intentionally employed countermeasures were measured. As a consequence, certain statistics such as the use of encryption represent a lower bound; actual rates encountered in practice are likely to be higher.

6. Conclusions

Using a new measure of perceived lawlessness, this study demonstrates both the measures' internal validity and the perception of a general population sample that the Internet is a lawless space. Under LST, this distorted perception will have a criminogenic effect on specific individuals within particular Internet environments. Although distorted perceptions exist regarding the Internet, these can potentially be changed through a sustained information campaign. For example, providing individuals with accurate information in a sustained manner was shown to correct misperceptions on the prevalence of burglaries and to have a long term effect (Vinæs Larsen & Leth Olsen, 2020).

Overall countermeasure usage was widespread, warranting caution when attributing malicious intent to a particular countermeasure without appropriate context. Additionally, the use of anti-forensics techniques necessitates a cautious approach to attribution - IP addresses, social media account names, and email account information are routinely obfuscated even by a non-offending population.

This work provided evidence to support a key aspect of LST (that the Internet is viewed as lawless), and provided a baseline of countermeasure usage that can be used nomothetically to evaluate groups of offenders that commit specific cybercrimes such as digital piracy, identity theft, and online child sexual exploitation. Additionally, it showed a relationship between countermeasure usage and rates of compromise, and that both were correlated with perceptions of lawlessness. Further work is warranted to determine directionality of those relationships, and to compare the baseline usage to that of the various offender communities.

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Appendices

Category	Proportion and # of Individuals
Sex	
Female	.51 (n=267)
Male	.49 (n=257)
Sexual Orientation	
Heterosexual (straight)	.91 (n=476)
Bisexual	.04 (n=23)
Homosexual (gay)	.04 (n=19)
Other	.01 (n=4)
Prefer not to say	.004 (n=2)
Age Distribution	
18 - 24	.12 (n=65)
25 - 34	.18 (n=92)
35 - 44	.17 (n=88)
45 - 54	.18 (n=93)
55 - 64	.16 (n=86)

Category	Proportion and # of Individuals
65 - 74	.15 (n=81)
75 - 84	.02 (n=13)
85 or older	.01 (n=5)
No Response	.002 (n=1)
Gender Identity	
Female	.51 (n=265)
Male	.48 (n=253)
Transgender Male	.004 (n=2)
Not Listed	.004 (n=2)
Gender Variant/Non-Conforming	.002 (n=1)
Prefer Not to Answer	.002 (n=1)
Relationship Status	
Married	.44 (n=232)
Single, Never Married	.26 (n=137)
Divorced	.12 (n=64)
Widowed	.06 (n=32)

Category	Proportion and # of Individuals
Single, but Cohabiting with a Significant Other	.05 (n=27)
In a Domestic Partnership or Civil Union	.04 (n=21)
Separated	.01 (n=8)
Other	.006 (n=3)
Race (Multiple Selections Permitted)	
White or Caucasian	.72 (n=397)
Black or African American	.14 (n=80)
Hispanic or Latino	.08 (n=43)
Asian	.03 (n=18)
American Indian or Alaska Native	.01 (n=7)
Other	.01 (n=5)
Native Hawaiian or Pacific Islander	.004 (n=2)
Employment Status	
Working (paid employee)	.46 (n=240)
Not working (retired)	.21 (n=110)
Not working (looking for work)	.08 (n=40)

Category	Proportion and # of Individuals
Not working (other)	.07 (n=38)
Working (self-employed)	.07 (n=35)
Not working (disabled)	.06 (n=33)
Not working (temporary layoff from a job)	.05 (n=28)
Education Level	
Bachelor's degree in college (4-year)	.25 (n=131)
Some college but no degree	.24 (n=127)
High school graduate (high school diploma or equivalent including GED)	.23 (n=121)
Master's degree	.11 (n=60)
Associate degree in college (2-year)	.11 (n=56)
Less than high school diploma	.02 (n=11)
Doctoral degree	.02 (n=10)
Professional degree (JD, MD)	.02 (n=8)
Degree Field	
Business	.28 (n=74)
Other	.17 (n=44)

Category	Proportion and # of Individuals
Education	.10 (n=27)
Computer Science	.09 (n=24)
Engineering	.07 (n=19)
Nursing	.06 (n=17)
Social Sciences	.06 (n=16)
Liberal Arts	.05 (n=13)
Psychology	.05 (n=13)
Government/Political Science	.03 (n=9)
Physical Science	.03 (n=9)
Employment Position	
Retired	.23 (n=118)
Unemployed	.21 (n=109)
Management, Business, and Financial	.10 (n=54)
Service	.09 (n=46)
Education, Legal, Community Service, Arts, and Media	.07 (n=35)
Healthcare Practitioners and Technical	.06 (n=32)

Category	Proportion and # of Individuals
Computer, Engineering, and Science	.06 (n=30)
Office and Administrative Support	.05 (n=25)
Sales and Related	.04 (n=23)
Production	.04 (n=20)
Construction and Extraction	.03 (n=14)
Transportation and Material Moving	.02 (n=13)
Installation, Maintenance, and Repair	.004 (n=2)
Not Specified	.004 (n=2)
Military	.002 (n=1)

Table A.1. Demographics of respondents

Annex

Category	Male (n=257) M	Male (n=257) SD	Female (n=267) M	Female (n=267) SD	test statistic	df	p	d
The rules of behavior on the Internet are different from the physical world	4.175	1.496	3.648	1.574	3.930	522	<.001	0.343
There is more criminal behavior on the Internet than in the physical world	4.019	1.418	3.536	1.428	3.891	521	<.001	0.340
You can get away with behavior on the Internet that would be unacceptable in the physical world	4.117	1.498	3.843	1.481	2.105	521	0.036	0.184
It is easier to find illegal goods and services on the Internet than in the physical world	3.961	1.449	3.670	1.311	2.405	512	0.017	0.211
Most activity on the Internet is not monitored by law enforcement	3.545	1.548	3.397	1.487	1.114	519	0.266	0.097

	Male (n=257)		Female (n=267)					
Category	M	SD	M	SD	test statistic	df	p	d
Law enforcement cares less about Internet crimes than crimes in the physical world	3.191	1.663	3.007	1.594	1.286	519	0.199	0.113
Lawlessness Scale	23.008	5.909	21.101	5.848	3.711	520	<.001	0.324
Rate of Compromise	0.700	0.992	0.438	0.709	3.469	462	0.001	0.305
Countermeasure Usage	3.218	3.685	1.850	2.379	5.027	435	<.001	0.443

Table Annex.1: Statistical significance measurements of perceived lawlessness and associated metrics

Chapter 7 - Public Perceptions of Child Pornography and Child Pornography Consumers

7.1 Overview

Public perceptions of child pornography possession offences can influence legislative decision making, reduce or exacerbate stigmatization, and direct resources toward or away from research. Legislative areas, including sentencing guidelines and sex offender registries, can be influenced by perception as much as by empirical evidence, and may be more punitive than rehabilitative. McAlinden (2008), for example, highlighted the failure of punitive measures such as sex offender registries to impact recidivism, despite broad support, and recommended more effort be placed on restorative justice areas. Additionally, current sentencing guidelines in the United States were increased by Congress based in part of a belief that child pornography possession often leads to contact offending, with guidelines that are inconsistent with empirical evidence (Basbaum 2009). Public views about the individuals who commit child pornography possession offenses may be, in part, fear-based and be driven by a lack of awareness of actual risk. If the rates of contact offenses, paedophilia and recidivism are viewed as higher than the rates evinced by the best research evidence available, those factors coupled with a general negative view of paedophiles, may lead to additional stigmatization (Seidler, 2010) and drive emotion-based as opposed to evidence-based policies. Evaluating the public's perceptions in these areas allows for targeting of educational interventions and awareness campaigns to address any misperceptions. Additionally, identifying the public's perceptions serves as a comparison baseline for offender self-perceptions, allowing for the potential identification of subtle cognitive distortions that may be present.

Using the previously described public survey, a quantitative analysis of the public's perceptions was conducted. The public's perceptions of both child pornography and

child pornography offences were evaluated and baselined for later comparison with those of offenders.

The perceptions of the general public were used in evaluating potential minimization-based cognitive distortions by CSEM offenders. The perceptions of the general public provided a baseline for evaluating the self-perceptions of offenders for the presence of subtle distortions, and the overestimation of risk by the general public provided the potential for identifying more accurate self-perceptions in some cases. These are more fully explored in Chapter 8.

7.2 Summary of Findings

The major findings of the research were as follows:

- The public viewed child pornography possession as more severe than all property crimes and all crimes against persons except for rape and criminal homicide.
- The public significantly overestimated the risk of child pornography offenders committing another child pornography offense or committing a contact offence.
- There was a general belief that it was difficult for offenders to stop viewing child pornography.
- The public believed that child pornography was not regularly encountered in normal web browsing.
- The public overestimated the likelihood that individuals convicted of possessing child pornography were paedophiles and that those individuals were sexually abused as children.
- There was broad public support for current sentencing guidelines in the United States, including strong support for sex offender registration for child pornography possession offences.
- While the public generally regarded individuals who viewed child pornography as mentally ill, they did not strongly support treatment over incarceration.
- Better public education is necessary to ensure legislation and sentencing are based on evidence, and to reduce stigmatization of CSEM offenders.

Public Perceptions of Child Pornography and Child Pornography Consumers

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The data that support the findings of this study are available from the corresponding author, Chad M.S. Steel, upon reasonable request. At the completion of this research, the data will be sanitized and will be posted to the University of Edinburgh Datashare.

Abstract

Understanding the public's perceptions of child pornography helps identify gaps in awareness and knowledge, impacts legislative decision-making, quantifies stigmatization, and provides a baseline for identifying differences between lay and offender populations for clinical purposes. This research provides a comprehensive public survey assessing these issues. An Internet-based sample of adults (n=524) within the United States were asked about their understanding and beliefs related to child pornography and individuals who view child pornography. The questions covered three topic areas - general perceptions of child pornography, endorsement of child pornography beliefs, and opinions related to the legality of various forms of child pornography as well as the decision making related to sentencing and sex offender registration for child pornography consumers. The research found that the public viewed these offenses as more severe than most other crimes and that there was an overestimation by the public of risks related to recidivism and contact offending. Additionally, the research found that there was support for most of the current sentencing guidelines in the United States including sex offender registration, and that there was limited support for treatment over incarceration.

Keywords: Child pornography, lay perceptions, sex offender registration, stigmatization, risk assessment

Introduction

The public's views on child pornography are generally an extension of societal and cultural views on child sexual abuse, and public policy in this space can be driven by emotion rather than evidence. In reviewing child pornography laws (primarily in a Canadian and United States context), Ryder noted that "Child sexual abuse is a topic that evokes visceral disgust in all reasonable people" (Ryder, 2003, p. 102). Public perceptions of child pornography have far-reaching consequences, ranging from influences on sentencing guidelines and legislation to contributing to the social stigmatization of child pornography consumers. Despite the far-reaching societal impacts, minimal empirical work has been done to assess the public's views on child pornography and child pornography consumers. Additionally, there are conflicting social trends that impact those perceptions. General viewing of pornography has become more acceptable and normalized (Diamond, 2009; Dugan, 2018), while views regarding the age of consent show a trend toward increasing rather than lowering the legal consent age (Cawson et al., 2000; Graham, 2018).

There are several relevant works associated with how the public generally perceives child pornography consumers. Mears, Mancini, Gertz, and Bratton (2008) used a telephone poll of adults in the United States that showed the majority of the public support incarceration for child pornography consumers (68%) and that there is significant support for both treatment and the use of sex offender registries for these offenses. Lam, Mitchell, and Seto (2010) provided lay individuals (Canadian university students) two scenarios to evaluate, varying the age and gender of victims and offenders. They found that lay individuals overestimated the likelihood that a person possessing child pornography was a pedophile, and that they recommended more severe sentencing inversely related to the age of the victim. Additionally, looking at their awareness of the law, 88% of the individuals knew that distribution, and 84% that possession, of child pornography was illegal. Conversely, 45% were unsure that *viewing* child pornography was illegal and 7% believed it *was* legal. McCabe (2000) found that most United States citizens polled, 95%, knew that distributing child pornography was illegal, and 92% knew that possessing child pornography was illegal.

Conversely, 92% believed that “viewing computer-generated child pornography was okay” (Mccabe, 2000, p. 75), and 32% believed that downloading child pornography from a newsgroup was legal. Additional research polling adults in the United States showed support for the illegality of computer-generated child pornography, though at a level that was differentiated from real depictions of children (Kliethermes, 2015).

Hunn et al. (2020) used vignettes to assess the Australian public’s awareness of legality and their views on victimization. They found high awareness that possession of child pornography is illegal, but limited awareness that possessing virtual child pornography is illegal (possession for virtual child pornography is illegal in both Australia and the United States). In another study evaluating the attitudes of Australian university students, approximately 90% agreed that viewing child pornography had a direct impact on victimization, and 79% agreement that computer-generated child pornography should be illegal (Prichard et al., 2016). Although not evaluating lay individuals, Francis (2015) asked judges and psychologists in the United States their opinions of child pornographers, finding that there were strong beliefs in high rates of recidivism and in the ineffectiveness of sex offender registration.

Individuals who possess child pornography are frequently characterized as mentally ill or having a “sickness” on the basis of the act itself (*US v. Schenberger*, 2007, *US v. Vanderwerfhorst*, 2009). The research, however, provides a picture that is more nuanced. Some studies have found self-reported comorbid psychopathology in the form of personality disorders as high as 40% (Webb et al., 2007), while rates of diagnosed mental illness amongst child pornography possessors has been shown to be as low as 5% (Wolak et al., 2011). The primary psychopathology associated with child pornographers is pedophilia (both as a mental illness and as a subclinical exhibition of pedophilic interests), and Seto, Cantor, and Blanchard (2006) found the percentage of child pornographers that could be classified as pedophiles to be approximately 60% based on a phallometric response to viewing relevant images.

Recidivism is another area with limited lay understanding. Eke et al. (2011) found the 4.1 year recidivism rate for child pornographers committing another child pornography offense to be 6.8%. However, if their only prior conviction was child pornography-

related (possession, distribution, or production), the rate dropped to 4.4%. In evaluating their risk assessment tool, CPORT, Seto and Eke (2015) found a similar rate, with child pornography-only offenders recidivating at 7% in a 5-year follow-up period. Faust et al. (2015) found an even lower rate of recidivism for child pornography-only offenders at 1.6% at an average follow-up time of 4.8 years. Soldino et al. (2020) found a similar 2% rate on a 5-year follow-up with child pornography-only offenders. These rates represent re-arrest data and do not include individuals who continued to offend but were not caught again, and thus represent a lower bound approximation.

Another common belief put forward relates to the victimization of the offender as part of a cycle of abuse. Evidence, however, shows the majority of child pornography offenders had not been sexually abused as a child, with rates ranging from 11.7% (Faust et al., 2015) to 26% (Webb et al., 2007). No comprehensive quantification of the public's perception of childhood sexual abuse has been evaluated to-date.

The sexting trend and ubiquity of mobile phones with high quality cameras has changed the dynamics of victimization. Historically, all child pornography represented primary victimization (the sexual abuse or direct exploitation of a child) as well as secondary victimization (the continuance of sexual abuse through repeated distribution and viewing), though self-generated child pornography has altered that pattern (Leary, 2009). Specifically, there may be no primary victimization with self-generated child pornography, excepting cases of coercion or sextortion (Patchin & Hinduja, 2020), and the percentage of self-generated child pornography is growing (Internet Watch Foundation, 2020).

Sentencing and sex offender registration for child pornographers is another area of ongoing interest (Christensen & Tsagaris, 2020; C. M. Hunn et al., 2018; Proeve & Wolf, 2019). The United States Sentencing Commission provides enhancements that increase the sentences of child pornographers based on viewing habits. These enhancements occur based on the age of the victims portrayed, with an enhancement for possession of images of minors under the age of 12 (minors are defined by statute as individuals under the age of 18 for federal child pornography offenses) and a second if the victim was an infant or toddler. They also occur based on the number of images

or videos, and whether or not sadistic/masochistic content is present (*United States Sentencing Commission Guidelines*, 2018). In addition to traditional sentencing enhancements, many localities require child pornography offenders to register as sex offenders, despite little evidence of their efficacy and their collateral consequences (Drake & Aos, 2009; Pawson, 2002; Tewksbury, 2005). Public support for these registries remains strong, however, particularly with regards to child sex offenses, indicating a disconnect between perception and efficacy (Kernsmith et al., 2009).

This work empirically measures and evaluates the public's perception of child pornography consumers and child pornography offenses. First, general perceptions of child pornography and child pornography consumers are evaluated. Second, the level of knowledge of the public on various issues surrounding child pornography is assessed against current research. Finally, perceptions associated with the legal implications of child pornography and how child pornography consumers should be evaluated for sentencing purposes is presented. This research represents the most comprehensive study to-date of public perceptions on child pornography and provides results that can be utilized to direct public education on issues related to child pornography to reduce the stigmatization of offenders and better align public understanding with evidence.

The term "child pornography" is used in this research in lieu of the broader term child sexual exploitation material (CSEM) (Frangež et al., 2015). Because child pornography is more familiar to the lay public who were the respondents in this research, and because many of the questions relate to the legal concept which uses that term, this phrasing was used in this paper consistent with the Luxembourg guidelines (Terminology and Semantics Interagency Working Group on Sexual Exploitation of Children, 2016), except where the broader definition is needed to encompass child erotica.

Methodology

This work was part of a broader research project looking at the technical behaviors and cognitions of child pornography consumers and consisted of survey questions that were asked of the general public. On the survey, demographic questions and questions

related to the respondents' views and beliefs about child pornography and child pornography consumers were included. The demographic questions were primarily multiple choice and solicited information on the sex, sexual orientation, age, gender, marital status, race, level of education, type of degree, employment status, current occupation, and household income of the participants. The questions related to their beliefs are detailed below.

Data collection and sample population

Data was obtained through an anonymous online survey hosted through the University of Edinburgh's Qualtrics instance. Participants were recruited using the Qualtrics Panel service, which provides pre-identified participants from a pool of individuals recruited and compensated by Qualtrics meeting specific criteria outlined by the researcher (*Online Panels: Get Responses for Surveys & Research* | *Qualtrics*, n.d.). Qualtrics panels have been shown to have appropriate representativeness on the dimensions of interest and to be of sufficient quality for research with the appropriate controls in place (Boas et al., 2020; Miller et al., 2020).

The survey population for this research was English-speaking adults (18 years of age or older) living in the United States. Prior to participation in the survey, panel members were provided with information on how the data collected would be used and both the benefits and risks associated with participation. Participants were required to affirmatively consent prior to starting the survey. Any individuals who chose not to continue with the survey were permitted to withdraw at any point prior to submission, and the results of those individuals were not retained. 624 individuals began the survey, and of those individuals 99 failed to complete the survey and their results were not recorded, resulting in 525 completed surveys.

As part of the survey execution, an initial soft launch with a small number of participants (n=31) was conducted to confirm survey structure and train automated time metrics to address insufficient effort responding (IER) concerns (Kraiger et al., 2019). Additionally, two attention checks were built into the survey, with one as a multiple choice question and a second as part of a matrix question. Responses failing the attention checks were

automatically discarded by Qualtrics to improve response quality (Owens & Hawkins, 2019). Final completion times in seconds were recorded (M=802, SD=598), and any responses taking less than 203 seconds (one standard deviation from the mean) were discarded to eliminate individuals answering without taking adequate time to read the questions and responses (n=1). A total of 524 total surveys meeting quality standards were retained for analysis.

Questionnaire

The questions were broken up into three areas - general perceptions of child pornography and child pornography consumers, endorsement of inaccurate beliefs related to child pornography, and the legality of child pornography and sentencing of child pornography consumers.

General perceptions

To evaluate their overall views on the seriousness of the offense, participants were asked to rank the severity of child pornography possession in relation to other crimes. The reference crimes were taken from the FBI's Uniform Crime Reporting (UCR) category list, which provides a ranking of crimes by judicial severity (*Uniform Crime Reporting Statistics*, 2020). The reference crimes, from most severe to least severe, were as follows:

1) Murder and Nonnegligent Manslaughter
2) Rape
3) Robbery
4) Aggravated Assault
5) Burglary (breaking and entering)
6) Larceny-Theft (except auto)
7) Motor Vehicle Theft
8) Arson

The reference crimes, along with child pornography possession, were presented in a randomized fashion to each of the participants, who were asked to rank them in terms

of their personal perceptions of severity. The median rankings were then calculated for each of the crime categories.

Data related to the perceived victimization of the minors portrayed in child pornography was ascertained by asking what percentage of those portrayed were willing participants. The participants were additionally asked how difficult it is for individuals that view child pornography to stop, on a 7-point Likert scale ranging from “Extremely Easy” to “Extremely Difficult”.

In addition to the above, participants were given four statements related to the likelihood of coming across child pornography and ranked them in order of agreement:

- Anyone can accidentally come across child pornography while browsing the web.
- Individuals visiting mainstream adult websites may accidentally come across child pornography.
- Individuals visiting less mainstream adult websites may accidentally come across child pornography.
- Only individuals that actively seek out child pornography will find child pornography.

To evaluate the perceived impact of viewing child pornography on child victimization, participants were asked to select which of the following statements they most agreed with:

- Viewing child pornography is directly responsible for creating child victims.
- Viewing child pornography is indirectly responsible for creating child victims.
- Viewing child pornography does not contribute to child victimization (Steel et al., 2020).

Endorsement of child pornography beliefs

The participants’ knowledge surrounding the prior sexual victimization of child pornography viewers was evaluated by asking participants to provide a percentage from 0 to 100 (using a slider) of individuals who view child pornography that they believe were sexually abused as children. Similar questions were asked about the percentage of child pornography viewers they believed were pedophiles, what percentage will

commit a contact offence against a minor, and what percentage of convicted child pornography viewers will go on to commit another child pornography-related offense.

Legality

In addition to measuring their knowledge, the participants were asked about their views on various aspects of the legality of child pornography, and specific factors related to sentencing within the United States. All items were measured using a 7-point Likert scale, ranging from Strongly Disagree to Strongly Agree. The statements related to the general legality of child pornography and the specific legality of various forms of child pornography were as follows:

- Viewing child pornography is no different than viewing adult pornography
- Viewing naked pictures of children for artistic (non-sexual) purposes is acceptable
- Viewing images of naked children where there is no display of the genitals should be illegal
- Viewing virtual images (lifelike animations and drawings) of children engaged in sexual activity should be illegal

The additional statements related specifically to sentencing and post-sentencing restrictions were as follows:

- The severity of the acts depicted in child pornography images should be taken into consideration in sentencing decisions
- Individuals that possess more images and videos should receive longer sentences than individuals with a few images and videos
- Sentencing of child pornographers should be based on the age of the individuals depicted
- Individuals who view child pornography should be registered as sex offenders
- Individuals who view child pornography are mentally ill and should be treated and not put into prison

Data Analysis

Exploratory analysis on the results were collected and descriptive statistics presented. Likert scales were displayed using a diverging stacked bar chart, where the vertical line represents the median value (Heiberger et al., 2014). All of the Likert items were scaled between 0 and 6 points, and agreement was considered as any responses of "Somewhat Agree", "Agree", or "Strongly Agree".

To explore demographic associations with the general perceptions of child pornography, independent variables of sex, race, age, income, and education level were examined with the relative severity ranking used as the dependent variable. Sex was analyzed using a Welch's t-test, and race identifications were treated as individual categories with Boolean membership (as individuals could identify with more than one racial category) using individual t-tests corrected for multiple comparisons. Age, income, and education level were treated as ranked values and examined using a Spearman correlation. For the support of treatment over prison and support for sex offender registration, the relationships with perceived risk, measured by perceptions of the prevalence of pedophilia, the perceived contact offending rate, and the perceived recidivism rate, were evaluated with Spearman correlations. All results were collected and analyzed using R, with a p value of .01 used for statistical significance tests (where appropriate).

Results

Overall survey completion dropout rates were low at 16%, likely due to self selection prior to starting the survey. Additionally, of the individuals that completed the survey, only one did not meet the minimum time requirements for inclusion. This is potentially due to a likely correlation between individuals who did not meet the time requirements and those that failed the attention checks, who were automatically discarded by Qualtrics and not provided to the research team. The principal detailed demographics of the respondents are shown in Table A.1.

General perceptions

Child pornography possession was ranked by the general public to be significantly more severe than most other crimes. The median public ranking in perceived severity for child pornography possession was third (after rape and criminal homicide). It was ranked higher than all property crimes and higher than two of the violent crime-against-persons categories, aggravated assault and robbery (Table 1).

Crime	Median Public Ranking	FBI Ranking
Criminal homicide	2	1
Rape	2	2
Child pornography possession	3	9
Aggravated Assault	4	4
Arson	5	8
Robbery	6	3
Burglary (breaking and entering)	6	5
Larceny/Theft (except auto)	8	6
Motor vehicle theft	8	7

Table 1: Child pornography possession - perceived severity rankings.

Males ranked child pornography possession (M=3.9) as less severe than females (M=3.2), ($t(500)=-3.1939$, $p < .01$). Racial group was not significantly correlated with severity, however those identifying as Hispanic or Latino (M=2.8) ranked possession as more severe ($t(57)=2.67$, $p < .01$) than those who did not (M=3.6). Age and income level were not found to be correlated with severity rating, but a higher degree level was weakly correlated with ranking child pornography possession as less severe ($r_s = .13$, $p < .01$).

The majority of respondents believed that, in general, minors were not willing participants (M=23.5, SD=30.5), with 37% (n=193) believing that minors were never willing participants. The perceived ease of desisting was generally viewed as high, with

67% (n=323) believing that it was slightly difficult or higher. Fifty three percent (n=279) of respondents believed that individuals could come across child pornography *without* actively seeking it - accidentally in normal web browsing (18%, n=95), when visiting mainstream adult sites (19%, n=99), or when visiting less mainstream adult websites (16%, n=85). Ninety-seven percent (n=510) of respondents believed that viewing child pornography contributed to victimization, either directly (72%, n=375) or indirectly (26%, n=135).

Endorsement of child pornography beliefs

The public perception that individuals who view child pornography were sexually abused themselves was high (M=.61, SD=.24), with a sizable proportion, 13% (n=70), believing that 90% or more of child pornography viewers were abused. Perceptions were similarly high regarding pedophilia, with the sample believing that most child pornography viewers were pedophiles (M=.79, SD=.24), and 42% (n=242) believing that 90% or more were pedophiles. The percentage of individuals who will go on to commit a contact offense was viewed as high (M=.63, SD=.26), with 17% (n=87) believing that 90% or more will commit a contact offense. Recidivism rates were perceived to be high as well (M=.74, SD=.21), with 27% (n=144) believing that 90% or more of individuals convicted of a child pornography offense will commit another child pornography-related offense. A summary of the results is shown in Figure 1.

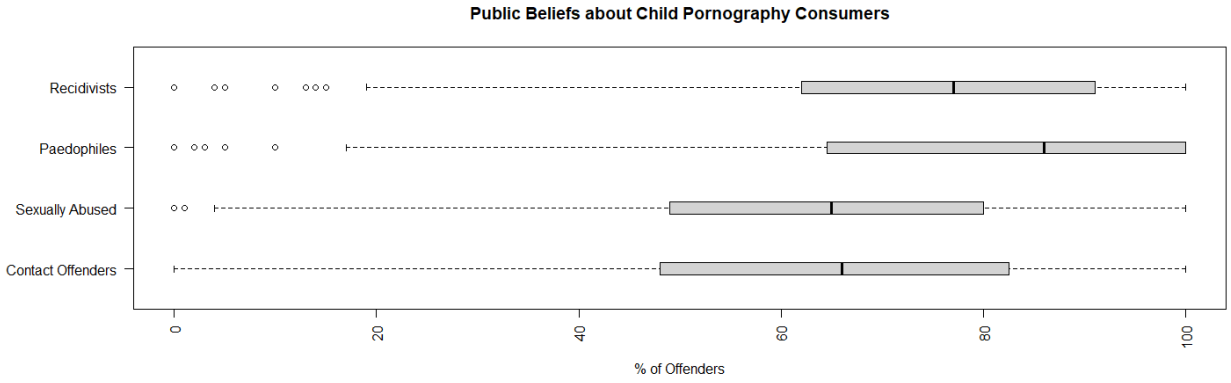

Figure 1: Public perceptions of child pornography consumers

Legality

In terms of general legality, 84% (n=441) of participants agreed that viewing child pornography was different from viewing adult pornography, 78% (n=406) agreed that downloading was not worse than viewing, and 73% (n=381) agreed that viewing CSEM for "artistic" purposes was not acceptable.[5] (Figure 2). Looking at the individual types of CSEM, 81% (n=425) of participants agreed that virtual child pornography (lifelike animations and drawings of children engaged and sexual activity) should be illegal, and 75% (n=393) of individuals agreed that child erotica (images of naked children where there is no display of the genitals) should be illegal (Figure 3).

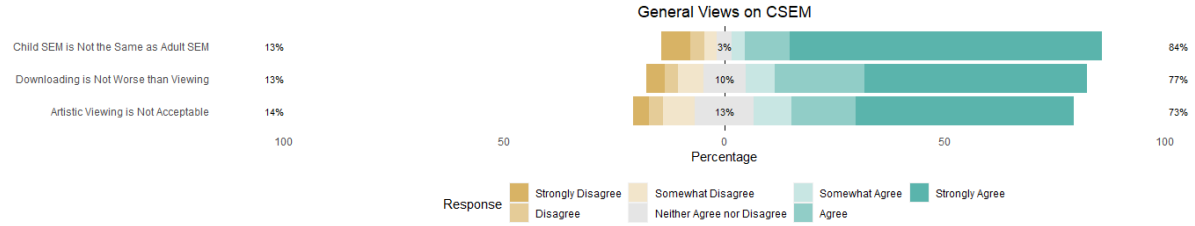

Figure 2: General Perceptions of child pornography

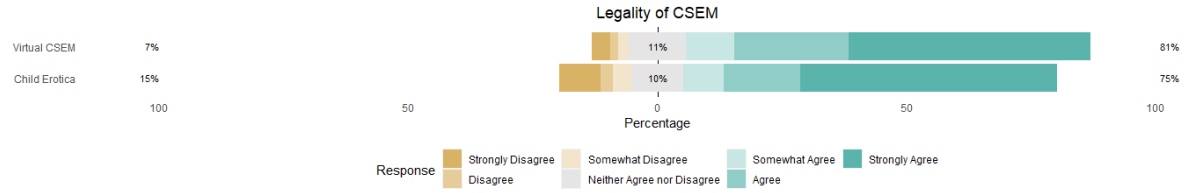

Figure 3: Agreement with child pornography illegality for non-traditional child pornography

For sentencing purposes, there was mixed agreement with the factors that comprise the current sentencing guidelines and restrictions. There was strong agreement for child pornography viewers to be registered as sex offenders, with 84% (n=442) of participants agreeing that sentencing should include registration, and general disagreement for treatment over prison, with only 32% (n=170) supporting treatment. For the specific components that go into sentencing, the overall levels of agreement were mixed, with

[5] These three scales were reverse coded for consistency of display purposes.

agreement for the severity of the sexual act being a factor (69%, n=359), but not the number of images (49%, n=257) or the age of the victims (28%, n=148) (Figure 4).

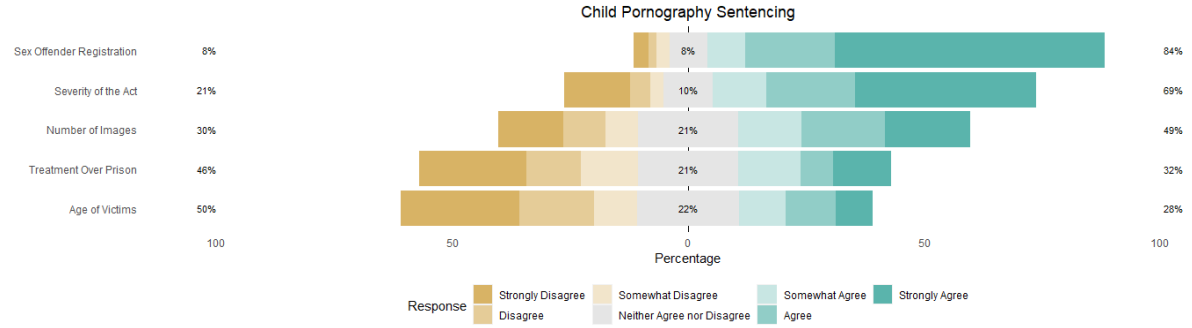

Figure 4: Agreement with child pornography sentencing guidelines and restrictions

Support for sex offender registration was moderately correlated with a greater belief that individuals were likely to commit contact offenses (r_s = .30, p < .01), recidivate (r_s = .40, p < .01), and were pedophiles (r_s = .41, p < .01). Support for treatment instead of prison was negatively correlated with a greater belief that individuals were likely to commit contact offenses (r_s = -.12, p < .01), recidivate (r_s = -.12, p < .01), and were pedophiles (r_s = -.15, p < .01).

Discussion

Members of the public rated child pornography possession as more severe than all property offenses and all but the two most severe offenses against the person, rape and criminal homicide. Male participants ranked child pornography possession as slightly less severe than female participants, which is potentially explained by greater use and acceptance of general pornography by males (e.g., Hald, 2006). The higher severity ranking of child pornography possession associated with identification as Hispanic or Latino is harder to explain, and additional research, potentially incorporating other demographic factors such as religion, is needed to determine the reasons for that difference. There was no perceived difference in severity between viewing and possession, with a very low endorsement of viewing as being a lesser action than downloading and saving child pornography.

There is a current gap in research in evaluating how many minors shown in child pornography were willing participants in the act (separate from the illegal production, distribution and viewing). Preliminary work indicates it may be a significant minority of images, given the patterns of redistribution of self-generated material (Internet Watch Foundation, 2015; Smith, 2012). Recent data from the Internet Watch Foundation indicated that approximately one third of the reports of web images they had received were self-generated (Internet Watch Foundation, 2020), though what percentage of those individuals were groomed or coerced is unknown and prior research indicates the percentage of self-generated images that involve coercion may be as high as two thirds (Quayle et al., 2018). The public's perception that the majority of cases involved non-willing participants (which includes minors, where they cannot willingly consent), is reasonable based on historical production mechanisms, the relative recency of the sexting phenomenon, and the amount of coercion present in self-generated images. This is also consistent with the public's view that child pornography causes direct victimization, which 72% of respondents believed to the most accurate assessment from the choices provided.

More than half of the public sample supported the notion that child pornographers may come across offending material without actually searching for it, despite a lack of evidence that accidental viewing occurs in practice (Corriveau & Fortin, 2011), showing that this is a common, if inaccurate, belief. The public's belief in accidental viewing was higher than that in an offender population - Seto et al. found that a large proportion (40% in a police sample and 32% in a clinical sample) of offenders claimed that they accidentally came across it, though they noted that this explanation was inconsistent with other answers provided by many of those offenders regarding their motives (Seto et al., 2010). Merdian et al. (2013) identified approximately 10% of offenders claiming at least initial accidental access, and Winder et al. (2015) identified similar themes in offender accounts.

The public's estimates of the various risk characteristics of child pornography consumers were substantially different than the actual rates, showing high public endorsement of inaccurate child pornography beliefs. For recidivism, the 72% estimate

is an order of magnitude higher than the actual recidivism rates, which ranged from 1.6% (Faust et al., 2015) to 2.7% (at 5 years) (Elliott et al., 2019) to 7% (Seto & Eke, 2015). This is consistent with prior research asking university students to predict recidivism, which they predicted to be 69%, and with the public's view that stopping is difficult for offenders, which 62% estimated to be difficult (Lam et al., 2010). The perceived risk of contact offending was higher (63%) than the 46% identified in a prior study of university students (Lam et al., 2010), and again an order of magnitude higher than the actual rates, which were measured to be between approximately 3% (Elliott et al., 2019; Faust et al., 2015) and 4% (Seto & Eke, 2005). This is additionally higher than the estimated rate of identified contact offenses at the time of the index offense (12%) as well as the overall self-reported contact offense rate (55%) identified in a previous meta-analysis (Seto et al., 2011), the studies in which primarily looked at individuals who had been arrested for child pornography offenses, representing an upper bound sample. The estimates of the percentage of child pornography offenders that are pedophiles (79%) was also higher than actual estimates of pedophilia of approximately 60% identified by Seto et al. (2006) but consistent with higher estimates from other lay research (Lam et al., 2010).

The overestimates of contact offending, recidivism, and the presence of pedophilia were moderately correlated with the support for sex offender registration for child pornography offenses and provide explanatory power for the strong public support for sex offender registries, which was found to be higher (84%) than earlier research (68%) (Mears et al., 2008), despite a lack of evidence of their effectiveness (Bouffard & Askew, 2019). The highest correlation with support for sex offender registration was with perceiving a high prevalence of pedophilia. This is consistent with the general and often vitriolic public dislike of pedophiles - Jahnke et al., for example, found that 28% of an English speaking sample believed they would be "better off dead" (Jahnke, Imhoff, et al., 2015, p. 8). Conversely, support for treatment instead of prison was generally low at 32%, and had a weak negative correlation with perceived risk related to contact offending, recidivism, and pedophilia prevalence. Tempering those views, the public estimated that approximately 62% of offenders were themselves abused as children. This is substantially higher than the actual rates, which were estimated to be

approximately 21% (compared to 9% for the reference population) in a meta-analysis (Babchishin et al., 2011).

The results confirmed that there is strong public support for the illegality of virtual or computer-generated child pornography, as well as child erotica, indicating support for revised legislation in this area. As virtual becomes closer to real with improvements in technology, and the understanding that child erotica can be exploited equally by offenders, and as the originalist arguments that the offenses be tied to underlying abuse are less frequent, there is the potential for revisiting the definitions of what constitutes illegal child pornography to include other forms of CSEM. Prior work has shown that individuals did not necessarily tie computer-generated child pornography to direct harm (C. Hunn et al., 2020), indicating that other factors may be driving the substantial support for illegality, which additional research is needed to elucidate.

For sentencing purposes, there was generally strong support for using the severity of the content in determining sentence length, but mixed support for using the age of victims and the number of images as part of the consideration. This is somewhat consistent with the United States Sentencing Commission guidelines, which allow for a larger enhancement for sadistic and/or masochistic conduct (4 levels) and quantity (up to 5 levels) than age (2 levels) (*United States Sentencing Commission Guidelines*, 2018)[6]. In particular, the quantity-related enhancement may not be aligned with the viewing of images (as opposed to the possession), which is more difficult to ascertain.

Because most participants are unlikely to personally know someone convicted of possessing child pornography, misperceptions regarding the risk can be, at least in part, attributed to media representation. The availability heuristic (Tversky & Kahneman, 1973), provides that the ease with which we recall instances of a rare event can lead to overestimates of the probability that event occurs. The news media has been shown to favor extreme and atypical crimes, especially those involving vulnerable victims, which are recalled when the availability heuristic is engaged. This causes an overestimation of associated risks (O'Connell, 1999). Because child pornography *production* offenses

[6] Each level indicates a more severe sentence based on tables of offences.

are the most extreme, and because there is a direct victim that can be exemplified, there may be a tendency for individuals to recall these instances more freely and overestimate overall risk (Aust & Zillmann, 1996). Distorted media portrayals may also encourage further victimization. Negative portrayals of mental illness, for example, have been shown to impair help-seeking (Stuart, 2006; Wahl, 1992), and the additional stigma associated with an interest in child pornography may increase offender risk (Seidler, 2010). Encouragingly, prior research has shown that psychoeducation is effective in combating punitive attitudes with other sex offenders, and may be of similar benefit in child pornography offenses (Kleban & Jeglic, 2012).

Limitations

This research was conducted on an English-speaking adult population within the United States, and additional work would be required for generalizability beyond that population. While the quality problems inherent in Internet survey research are well known, the steps taken to validate responses and ensure attention are believed to have minimized these in this research. Additionally, the research was conducted during the 2020 Covid-19 outbreak, which may have influenced unemployment numbers within the demographic data (Coibion et al., 2020).

While attempts were made to use lay terminology, certain clinical terms were included such as pedophilia, whose clinical definition (which requires the attraction to pre-pubescent children) may be more restrictive than the common usage (which may encompass hebephilia). For the ranking criteria, the FBI's UCR rankings were used as they are already categorized based on severity and used for law enforcement reporting in the United States. Additional research using other child pornography crimes (other than viewing), as well as contact abuse categories, would provide further context on public perceptions of viewing in relation to other crimes against children.

Conclusions

Providing a comprehensive view of the public's perceptions on child pornography consumers is critical as an input to both public policy and for clinical purposes. For public policy, this research identified major discrepancies between the perceived risk of

child pornography consumers and the actual risk of both recidivism and committing contact offenses. Greater public awareness and targeted education in these areas is strongly needed. These misperceptions can impact legislation related to the illegality of CSEM, sentencing severity and sex offender registration as well as decisions about prosecution instead of treatment, and better-informed decision making is warranted. They can also directly impact the continuing stigmatization of child sex offenders, which is high and provides a barrier to effective treatment and re-integration into society of those individuals (Jahnke, Imhoff, et al., 2015; Jahnke, Schmidt, et al., 2015; Vitis, 2018).

For treatment purposes, the public's endorsement of inaccurate beliefs and the explanations they provided for child pornography viewing serve as a baseline for comparison. Additional research looking at how they differ in an offender population can assist in identifying cognitive distortions, which can provide individualized treatment targets. Additionally, the confirmation of the public's negative views of child pornographers highlights the need for treatment to include coping strategies for the ongoing stigmatization of these individuals.

Declarations

The authors have no relevant financial or non-financial interests to disclose.

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. Ethical approval was received from the Research Ethics Committee at the University of Edinburgh on May 20, 2020. Additionally, Institutional Review Board approval was received from George Mason University on May 13, 2020.

Informed consent to participate and publish the results was obtained from all individuals included in the study.

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Appendix

Demographic Category	Proportion (n=524)
Sexual Orientation	
Bisexual	0.04 (n=23)
Heterosexual (straight)	0.91 (n=476)
Homosexual (gay)	0.04 (n=19)
Other	0.01 (n=4)
Prefer not to say	0 (n=2)
Age Distribution	
18 - 24	0.12 (n=65)
25 - 34	0.18 (n=92)
35 - 44	0.17 (n=88)
45 - 54	0.18 (n=93)
55 - 64	0.16 (n=86)
65 or older	0.19 (n=99)
Gender Identity	
Female	0.51 (n=265)
Gender Variant/Non-Conforming	0 (n=1)
Male	0.48 (n=253)
Not Listed	0 (n=2)
Prefer Not to Answer	0 (n=1)
Transgender Male	0 (n=2)
Relationship Status	
Divorced	0.12 (n=64)

Demographic Category	Proportion (n=524)
In a Domestic Partnership or Civil Union	0.04 (n=21)
Married	0.44 (n=232)
Other	0.01 (n=3)
Separated	0.02 (n=8)
Single, but Cohabiting with a Significant Other	0.05 (n=27)
Single, Never Married	0.26 (n=137)
Widowed	0.06 (n=32)
Race (Multiple Selections Permitted)	
American Indian or Alaska Native	0.01 (n=7)
Asian	0.03 (n=18)
Black or African American	0.15 (n=80)
Hispanic or Latino	0.08 (n=43)
Native Hawaiian or Pacific Islander	0 (n=2)
Other	0.01 (n=5)
White or Caucasian	0.76 (n=397)
Employment Status	
Not working (disabled)	0.06 (n=33)
Not working (looking for work)	0.08 (n=40)
Not working (other)	0.07 (n=38)
Not working (retired)	0.21 (n=110)
Not working (temporary layoff from a job)	0.05 (n=28)
Working (paid employee)	0.46 (n=240)
Working (self-employed)	0.07 (n=35)

Demographic Category	Proportion (n=524)
Education Level	
Less than high school diploma	0.02 (n=11)
High school graduate (high school diploma or equivalent including GED)	0.23 (n=121)
Some college but no degree	0.24 (n=127)
Associate degree in college (2-year)	0.11 (n=56)
Bachelor's degree in college (4-year)	0.25 (n=131)
Master's degree	0.11 (n=60)
Professional degree (JD, MD)	0.02 (n=8)
Doctoral degree	0.02 (n=10)
Income	
$0 - 9,999	0.1 (n=52)
$10,000 - 20,000	0.11 (n=57)
$20,001 - 29,999	0.1 (n=52)
$30,000 - 40,000	0.11 (n=58)
$40,001 - 50,990	0.12 (n=64)
$50,991 - 67,000	0.1 (n=54)
$67,001 - 79,000	0.1 (n=53)
$79,001 - 100,000	0.1 (n=52)
$100,001 - 190,000	0.1 (n=52)
Greater than $190,000	0.06 (n=30)

Table A.1. Demographics of respondents

Annex

Category	n	M	SD	test statistic	df	p	d
Sex							
..Male	257	3.860	2.504	3.194	500	<.001	0.280
..Female	267	3.213	2.103				
Race							
..White or Caucasian	397	3.499	2.308	-0.541	206	0.589	0.056
..Non-White or Caucasian	127	3.630	2.400				
..Hispanic or Latino	43	2.837	1.717	-2.667	57	0.010	0.325
..Non-Hispanic or Latino	481	3.593	2.367				
..Black or African American	80	3.788	2.559	0.991	103	0.324	0.130
..Non-Black or African American	444	3.484	2.285				
..American Indian or Alaska Native	7	3.286	1.113	-0.573	7	0.585	0.106
..Non-American Indian or Alaska Native	517	3.534	2.341				
..Asian	18	4.000	2.521	0.806	18	0.431	0.209

Category	n	M	SD	test statistic	df	p	d
..Non-Asian	506	3.514	2.323				
..Native Hawaiian or Pacific Islander	2	5.500	2.121	1.315	1	0.412	0.849
..Non-Native Hawaiian or Pacific Islander	522	3.523	2.328				

Table Annex.1: Statistical significance of demographic categories related to perceived severity of child pornographic possession

Category	r_s	p
Income	0.100	0.020
Age	0.090	0.040
Degree Level	0.130	<.001

Table Annex.2: Correlation between ranked demographic categories and perceived severity of child pornographic possession

SECTION 5 - COGNITIONS OF CSEM OFFENDERS

Chapter 8 - Self Perceptions and Cognitions of Child Sexual Exploitation Material Offenders

8.1 Overview

The presence of offence supportive cognitions in child pornography offenders has been questioned and found to have overall weak endorsement as shown in Chapter 3. Previous work has generally compared online child pornography offenders to contact offenders (Babchishin et al., 2015), or used instruments that were designed for adult sex offences (Bumby, 1996), as opposed to making a comparison to the general public. By using the public baseline from Chapter 7, there is the potential to identify new criminogenic cognitions as treatment and deterrence targets. Self-perceptions of offenders in the areas of risk (recidivism and contact offending) as well as their beliefs related to the availability child pornography, the difficulty in stopping viewing activity, and the victimisation of the individuals portrayed can assist in providing a more nuanced view of child pornography possession to assist in investigative, deterrence, and treatment efforts.

Using the previously described public and offender surveys, a quantitative analysis of the self-perceptions of previously convicted CSEM offenders was conducted. The results were evaluated in comparison to a reference group from the public perceptions identified in Chapter 7.

The more accurate self-perceptions of CSEM offenders in many of the areas analysed showed a lack of cognitive distortions as viable treatment targets. This supports the arguments put forth in this thesis for a greater focus on a more behavioural-based

approach to treatment, if any treatment is warranted. There were a few nuanced distortions present, particularly in support of the Nature of Harm and Virtual is Not Real distortions (Howitt & Sheldon, 2007; Paquette & Cortoni, 2020; Ward & Keenan, 1999), that indicate the potential for more precise cognitive targeting where specific distortions are present and whose presence supports further research in this area.

8.2 Summary of Findings

The major findings of the research were as follows:

- The offender group assessed the risks of recidivism and contact offending more accurately than the reference group.
- The severity of child pornography possession was ranked lower than the reference group, with offenders viewing it as less severe than all crimes against persons as well as arson, but more severe than other property crimes.
- The offender group had significantly lower agreement with virtual child sexual exploitation material and child erotica being illegal.
- The offender group strongly opposed sex offender registration for child pornography possession but supported treatment over prison.
- Victimisation was more likely to be viewed as indirect as opposed to direct by the offender group.
- A small minority (8%) of offenders said they would be more likely than not to commit a sexual contact offense against a minor if the opportunity presented itself.
- Some CSEM offenders exhibited nuanced distortions, providing potential treatment targets, however offenders' overall assessments were more accurate than the general public.

Self Perceptions and Cognitions of Child Sexual Exploitation Material Offenders

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Abstract

Identifying the self-perceptions of child sexual exploitation material (CSEM) offenders compared to a reference population of non-offenders is critical in establishing distorted cognitions that may not be elucidated when comparison is made with other offender groups. This exploratory work utilizes a quantitative approach toward identifying how previously convicted CSEM offenders view CSEM and CSEM offending, using a group of non-offenders as a baseline. The offender group was selected based on their inclusion in two sex offender registries for child pornography offences (n=78). A reference group of non-offenders (n=254) was gender-matched from a subset of a prior study evaluating the public perceptions of CSEM. Both groups were adults located within the United States and were asked questions using an online survey about their general perceptions of CSEM, their endorsement of CSEM beliefs, and their opinions related to the legality of various forms of CSEM and associated laws and sentencing guidelines. The study found that offenders more accurately assessed risks associated with CSEM offending, but that they exhibited potential minimization-based cognitive distortions related to severity and victimisation and more strongly endorsed child erotica and virtual child pornography being legal. Additionally, they endorsed treatment over prison, and were strongly opposed to sex offender registration for child pornography offences. The results provide potential treatment targets, including behavioural areas that may be pathways to CSEM offending.

Keywords: Child pornography, self-perceptions, sex offender registration, risk assessment, cognitive distortions

Introduction

Cognitions related to offence-specific behaviour amongst child sexual exploitation material (CSEM) consumers have been frequently put forth as distorted and offence-supportive (for example, Howitt & Sheldon, 2007; Merdian et al., 2014; Paquette et al., 2019; Soldino et al., 2019). At the same time, the overall endorsement of cognitive distortions by CSEM consumers has generally been low (Steel et al., 2020). This may be due to several factors, including the use of instruments that asked about the wrong distortions, for example those related to contact offending, and the use of suboptimal reference groups. This research explores those factors and evaluates the differences between a reference group of non-offenders and a group of individuals previously convicted of child pornography offences to assess the accuracy of their beliefs and to identify any specific cognitive distortions. For the purposes of this study, the term child pornography was used in multiple locations consistent with the Luxembourg guidelines (Terminology and Semantics Interagency Working Group on Sexual Exploitation of Children, 2016) as several of the endorsement statements were asked of lay individuals and related to the specific legal definition and specific criminal offences within the United States. Where a broader reference is made (e.g., when talking about "virtual" sexualized images of children) or the more general concept is discussed, the more inclusive term of child sexual exploitation material (CSEM) was employed.

Historically, the identification of the relevant distortions potentially endorsed by CSEM offenders began by viewing them as similar to child contact offenders. As research became more refined, differences in cognitions began to emerge (Howitt & Sheldon, 2007; Khanna, 2013; Merdian et al., 2014). Internet-only CSEM offenders were found to have lower overall endorsement of traditional cognitive distortions exhibited by contact offenders and fewer deficits in areas such as victim empathy (Elliott et al., 2009). In more recent research, qualitative studies identified Internet-specific distortions such as Virtual is Not Real and the Internet is Uncontrollable (Paquette et al., 2019). Newer assessment instruments such as the Cognitions of Internet Sexual Offending (C-ISO) scale (Paquette & Cortoni, 2019) were designed to address these differences and focus on the specific cognitions most relevant to CSEM offending.

While there have been significant advances in the instruments available to measure CSEM offender cognitions, most of the work still baselines “normal” cognitions against a population of child contact offenders (e.g., Babchishin et al., 2015; Merdian et al., 2014), which were in-turn traditionally baselined primarily against adult sexual offenders (e.g., Stermac & Segal, 1989), with very few studies offering comparison to non-offending reference groups (e.g., Mann et al., 2007). Each of these reference points have merit for comparison but fail to address the question of what cognitions make CSEM offenders different from the general (non-offending) population. Specific traits related to general psychopathology or rationalization and minimizations of their own behaviour may be common to many areas of criminality, but to be considered as statistically deviating from the norm, a non-offending reference population may provide a better baseline. While comparing the implicit theories of contact and non-contact child sex offenders is very important for differentiation and risk assessment purposes, it may fail to identify significant deviance from the general public. Since the treatment target is to bring CSEM offenders toward non-offending cognitions (not other-offending cognitions), this is an important distinction (Harrison et al., 2020).

There are several areas in which to evaluate cognitions related to CSEM and CSEM offences. First, there is the general question of perceived severity in relation to other crimes. Offences involving children are historically viewed with high levels of disgust, and this has been identified as being present and potentially influencing legislation and judicial outcomes (Lynch, 2002). There has been no significant research to-date evaluating how individuals who previously committed child pornography offences view their actions in the context of other crimes. Similarly, distancing their online actions from direct victimisation has been shown in CSEM offenders. In particular, the Internet version of the Nature of Harm distortion was found to be present in all child pornography offenders in a recent study (Paquette & Cortoni, 2020). This may be compounded by recent trends showing large increases in the amount of CSEM available being self-generated (Internet Watch Foundation, 2020). In cases of self-generated depictions (excepting those where their production has been through extortion or coercion), the victimisation may be principally secondary (Patchin & Hinduja, 2020), which may facilitate offence-supportive cognitions. Further enumeration of this distortion is of

clinical interest to identify whether the distortions are based on the difference between direct or indirect harm and how that relates to perceived victimisation in general.

The prevalence (and forms) of mental illness present in CSEM offenders as well as developmental issues that may contribute to CSEM offending may be perceived differently as well. Rates of mental illness in CSEM offenders has been previously studied, with prevalence rates ranging from 5% for all mental illness (Wolak et al., 2011) to 60% for paedophilia only (Seto et al., 2006). Other mental illnesses with a likely high occurrence in CSEM offenders include depression and substance abuse, based on work looking at paraphilias in general (Galbreath et al., 2002). The self-perceived prevalence of mental illness in CSEM offenders as well as the perceived potential for treatment over incarceration have not been studied. Similarly, when evaluating the potential for CSEM viewing to be part of a cycle for abuse, understanding the baseline rates of childhood sexual victimisation in CSEM offenders is useful. Past estimates of prevalence have ranged from 11.7% (Faust et al., 2015) to 26% (Webb et al., 2007), but further quantification is needed.

Risk related to CSEM offenders has two major dimensions - recidivism and the propensity to commit a contact offence. Recidivism within the CSEM offender community has largely been measured through post-conviction arrests over a specific period of time. In studies using approximately five-years as a follow-up period, the rates of individuals committing another CSEM offence ranged from 1.6% (Faust et al., 2015) to 7% (Seto & Eke, 2015). The rate of contact offending varies dramatically based on the specific study, with a meta-analysis finding a rate of 55% (Seto et al., 2011). The overall rate of future contact offending once convicted of a child pornography offence ranged from 3% (Elliott et al., 2019; Faust et al., 2015) to 4% (Seto & Eke, 2005). The accuracy of offender risk evaluations for this population has not previously been comprehensively studied, but may provide insight in the presence or absence of cognitive distortions.

This research evaluates the cognitions related to CSEM and CSEM offences by a group of adults previously convicted of child pornography offences (n=78) within the United States. Using a quantitative approach utilizing an anonymous online survey, the

general perceptions of availability and impact of child pornography and the severity of the offence are evaluated. Additionally, the endorsement of common inaccurate beliefs related to CSEM are assessed, as are the respondent's views on the legality of CSEM, as well as the legal response. These are compared to a reference population of non-offenders (n=254), in the context of actual numbers where available (e.g., perceived recidivism v. actual recidivism). This is the first research to broadly assess self-perceptions against public perceptions, and to enumerate levels of distortion related to minimization or rationalizing behaviour when compared to the general public.

Methods

This research was part of a larger project looking at the technological behaviours and cognitions of CSEM offenders. The research consisted of two surveys using two different populations - one of the general public (used primarily as a baseline for reference purposes) and one of individuals previously convicted of child pornography offences.

Participants and Setting

This research was conducted using data obtained through two anonymous online surveys hosted through Qualtrics - a public survey of non-offenders ("reference sample") and a survey of individuals previously convicted of child pornography offences on one of two sex offender registries ("offender sample"). The populations for both surveys were English-speaking adults within the United States, and informed consent was required before participating. Prior to participation, individuals were provided with information on how the data collected would be used and both the benefits and risks associated with participation. Participants were required to affirmatively consent prior to starting the survey. Any individuals who chose not to continue with the survey were permitted to withdraw at any point prior to submission, and the results of those individuals were not retained.

The reference sample consisted of 524 qualifying participants identified through the Qualtrics panel service (*Online Panels: Get Responses for Surveys & Research | Qualtrics*, n.d.). Of these, 254 individuals were matched to the offender sample based

on gender identity, given the large predominance (99%) of individuals in the offender sample that identified as primarily male (.95, n=74) or gender variant/non-conforming (.04, n=3).

Participation in the offender sample by individuals previously convicted of child pornography offences was solicited via postal mail (N=2,508), and the respondents requested to fill out an anonymous online survey. A total of 141 individuals (a 5.6% response rate) responded to the survey. Of these, three individuals declined to consent and 40 individuals did not complete the survey. Two attention checks were built into the survey to ensure its integrity, and individuals failing either of the checks (n=20) were not included in the analysis (Owens & Hawkins, 2019). A total of 78 individuals passed the attention checks and their responses were analysed as described below.

Questionnaire

The survey questionnaire was broken up into three areas - general perceptions of CSEM and CSEM consumers, endorsement of inaccurate beliefs related to CSEM, and the legality of CSEM and sentencing of child pornography offenders. To facilitate lay understanding and to comport with the legal definition in the United States, the questions were primarily asked using the term “child pornography”, except where noted.

General Perceptions

To evaluate the perceived severity of child pornography possession offences, the respondents were asked to compare and rank them against the offence categories present in the FBI’s Uniform Crime Reporting (UCR) list. The UCR categories are ranked according to severity, and the respondents were requested to place child pornography possession within the context of those offences (*Uniform Crime Reporting Statistics*, 2020). The crimes from the UCR as well as the child pornography viewing offence were presented to the respondents in a randomized list, and they were asked to rank all of the crimes in order of perceived severity. The median response rank for each of the crime categories was then calculated to identify the relative perceived severity.

The perceived percentage of individuals depicted in child pornography who were willing

participants was measured by asking the respondents to estimate a percentage using a slider from 0 to 100. The respondents were additionally asked about the difficulty for offenders to stop viewing child pornography using a 7-point Likert scale ranging from “Extremely Easy” to “Extremely Difficult”. Finally, individuals were asked about the likelihood of encountering child pornography by asking which of four statements they most agreed with:

- Anyone can accidentally come across child pornography while browsing the web.
- Individuals visiting mainstream adult websites may accidentally come across child pornography.
- Individuals visiting less mainstream adult websites may accidentally come across child pornography.
- Only individuals that actively seek out child pornography will find child pornography.

The linkage between viewing child pornography and the victimisation of children was assessed by asking which of four ranked statements the respondents viewed as the most accurate:

- Viewing child pornography is directly responsible for creating child victims.
- Viewing child pornography is indirectly responsible for creating child victims.
- Viewing child pornography does not contribute to child victimization.

Endorsement of Child Pornography Beliefs

The respondents’ perceptions about the characteristics of offenders and re-offending likelihood were assessed by asking them to specify a percentage using a slider from 0 to 100. The following items were evaluated:

- What percentage of individuals who view child pornography do you believe were sexually abused as children?
- What percentage of individuals who view child pornography do you believe are pedophiles?

- What percentage of individuals convicted of child pornography offences will go on to commit another child pornography offence after serving their sentence?
- What percentage of individuals that view child pornography will have sexual contact with a child at some point?

As a baseline reference, the offender sample was additionally asked about the youngest individual they had sexual contact with since turning 18. Any reported contact with individuals under 16 was considered to be a contact offence. They were asked about any child pornography they had viewed post-release, and about whether or not they had sexual contact with an adult prior to the age of 16 (to evaluate past sexual abuse). Finally, the offender sample was asked to respond to the question "If the opportunity presented itself, how likely would you be to have sexual contact with someone under the age of 18?" using a 7-point Likert scale ranging from Extremely Unlikely to Extremely Likely.

Legality

Respondents were asked about their views on several legal issues surrounding child pornography offending. The questions were based on current federal law in the United States as well as sentencing guidelines and practice (*United States Sentencing Commission Guidelines*, 2018). Sentencing and post-sentencing impacts were assessed using a 7-point Likert scale, ranging from Strongly Disagree to Strongly Agree with the following questions:

- The severity of the acts depicted in child pornography images should be taken into consideration in sentencing decisions
- Individuals that possess more images and videos should receive longer sentences than individuals with a few images and videos
- Sentencing of child pornographers should be based on the age of the individuals depicted
- Individuals who view child pornography should be registered as sex offenders
- Individuals who view child pornography are mentally ill and should be treated and

not put into prison

Respondents were asked about the overall legality of child pornography, and the legality of various forms of child erotica, evaluated by their levels of agreement with the following statements:

- Viewing child pornography is no different than viewing adult pornography
- Viewing naked pictures of children for artistic (non-sexual) purposes is acceptable
- Viewing images of naked children where there is no display of the genitals should be illegal
- Viewing virtual images (lifelike animations and drawings) of children engaged in sexual activity should be illegal

Analysis

Likert scales were displayed using a diverging stacked bar chart, with a vertical line representing the median value (Heiberger et al., 2014). Comparisons between populations were performed using a one-tailed t-test (for parametric data) or a Mann-Whitney-Wilcoxon test (for non-parametric data). All results were collected and analysed using R, with a p value of .01 used for statistical significance tests (where appropriate).

Ethics

Ethical approval was received from the Research Ethics Committee at the University of Edinburgh on May 20, 2020. Additionally, Institutional Review Board approval was received from George Mason University on May 13, 2020.

Results

The survey responses received on the public survey were diverse as to sex, sexual preference, age, relationship status, gender identity, race, employment, and education. The responses received on the offender survey were diverse given the previously

identified demographics of CSEM offenders (Faust et al., 2015; Reijnen et al., 2009) The full demographics are provided in Appendix A.

General Perceptions

The offender sample ranked child pornography possession as having a median severity of 6, placing it after all crimes against persons in addition to arson, compared to a median of 3 in the reference sample (Table 1). For victimisation, 83% (n=65) of the offender sample believed that child pornography consumption contributed to victimisation, either directly (35%, n=27) or indirectly (49%, n=38), compared with 96% (n=245) of the reference sample, who more strongly supported direct victimisation (67%, n=170) over indirect victimisation (30%, n=75).

Category	Reference Sample Median Ranking	Offender Sample Median Ranking	FBI Ranking
Criminal homicide	2	1	1
Rape	2	2	2
Child pornography possession	*3*	*6*	*10*
Aggravated Assault	4	3	4
Arson	5	4	8
Robbery	6	6	3
Burglary (breaking and entering)	6	7	5
Larceny/Theft (except auto)	7	8	6
Motor vehicle theft	7	7	7

Table 1: Respondent rankings of crime severity

The offender sample believed that the minors depicted in child pornographic images were willing participants (m=14.21, sd=23.48) at a lower rate (t=4.1, df =172, p<.01) than the reference sample (m=27.9, sd=31.9).

The majority of the offender sample (59%, n=46) believed that it was at least slightly difficult for offenders to stop browsing child pornography, which was not significantly different to that of the reference sample (57%, n=145).

For coming across child pornography, most of the offender sample believed that it was difficult to come across, with the highest number of respondents believing an individual could come across it only on less mainstream adult websites (42%, n=33) or when actively seeking it (14%, n=11). This was similar to the reference sample, however the individual category rates were largely inverse, with (41%, n=103) believing that you could only find it when actively seeking it as opposed to on a non-mainstream adult website (16%, n=40). A substantial minority of the offender sample believed that you could come across child pornography accidentally, either through visiting mainstream adult websites (26%, n=20) or general web browsing (18%, n=14), as did the reference sample by visiting mainstream adult websites (19%, n=47) and general web browsing (25%, n=64).

Endorsement of Child Pornography Beliefs

The respondents predicted a mean recidivism rate of .21 (sd=.20), which was significantly lower (t =18.5, df = 139, p<.01) than that of the reference group (m=.70, sd=.22). The perceived proportion of offenders that were paedophiles was similarly significantly lower (t=9.4, df=118, p<.01) for the offender sample (m=.42, sd=.28) than the reference sample (m=.75, sd=.25). The estimated likelihood of child pornography consumers escalating to a contact offence by the offender sample (m=.21, sd=.20) was also significantly lower (t=13.4, df=164, p<.01) than the reference sample (m=.58, sd=.26), and higher than the self-reported contact offence rate (.15, n=12). The self-estimates of committing a future contact offence showed that 8% (n=6) said that they were more likely than not to commit an offence if the opportunity presented itself.

For the numbers of child pornography consumers that were sexually abused as children, the offender sample respondents identified a mean proportion of .54 (sd=.26), although only 19% self-reported having sexual contact with an adult before they turned 16. This number was not significantly different from the reference group's estimates of the proportion of offenders abused as children (m=.61, sd=.25) (Figure 1).

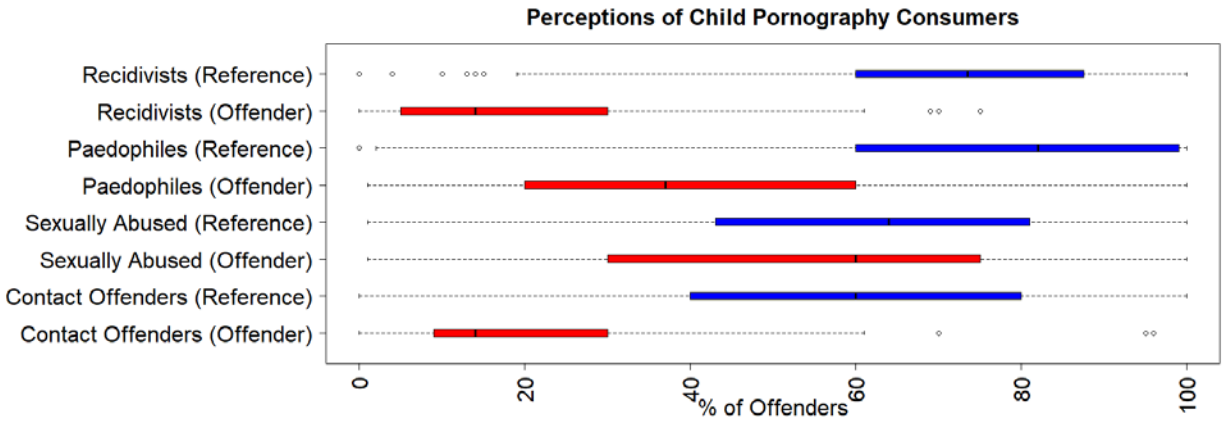

Figure 1: Perceptions of the child pornography consumers related to risk

Legality

The offender sample showed strong agreement that child pornography is different from adult pornography, with 94% (n=73) agreeing there was a difference, which was not significantly different from the 83% (n=212) of the reference sample. Additionally, 80% (n=62) of the offender sample agreed that downloading is not worse than just viewing, which was not significantly different from the reference group at 70% (n=177). Agreement with viewing for artistic purposes not being acceptable in the offender sample was mixed at 44% (n=34), which was significantly different than the level of agreement in the reference group (W=6940, p<.01) at 67% (n=171) (Figure 2)[7].

[7] The three items noted were reverse coded for consistency in display

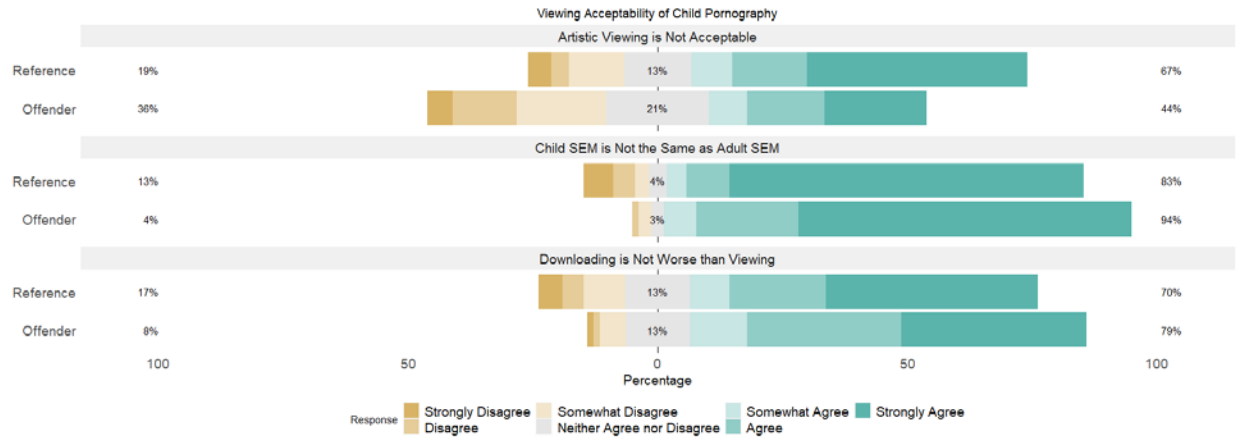

Figure 2: Acceptability of CSEM viewing behaviours

There was mixed agreement with the illegality of child erotica, with 49% (n=38) of the offender sample agreeing it should be illegal, which was significantly different (W=6876, p<.01) than the reference sample at 74% (n=187). For virtual CSEM, 54% (n=42) of the offender sample believed it should be illegal, which was significantly different (W=6988, p<.01) than the reference sample at 74% (n=188) (Figure 3).

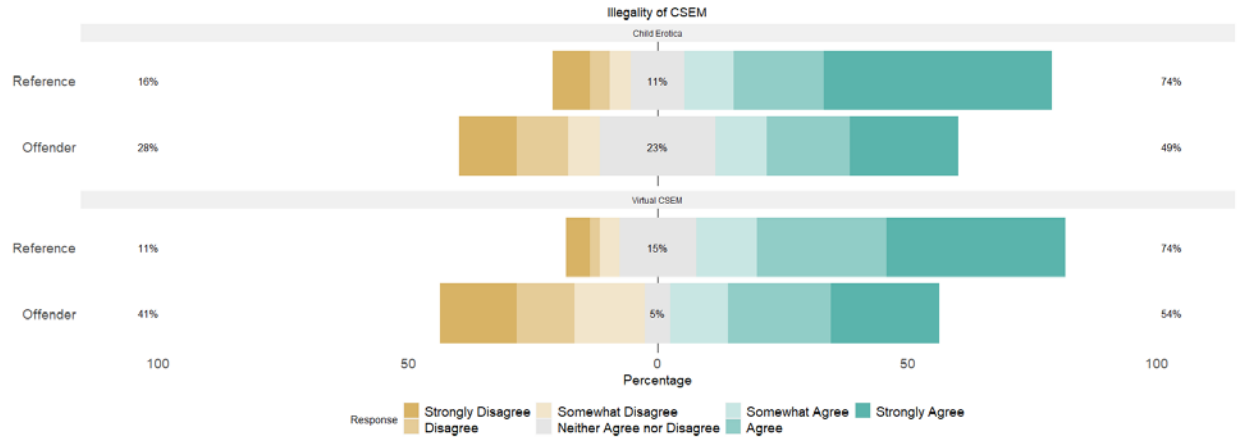

Figure 3: Views on child erotica and virtual CSEM

There were two areas with a statistically significant difference related to views of sentencing. The view that individuals should be treated instead of sent to prison had greater agreement (W=13834, p<.01) within the offender sample at 71% (n=55) than the reference sample at 33% (n=83). Individuals on a sex offender registry also showed substantially lower (W=2677, p<.01) agreement with sex offender registration for child

pornography viewing offenses at 21% (n=16) compared to the reference sample at 78% (n=197).

For the components of sentencing, most of both the offender sample at 72% (n=56) and the reference sample at 71% (n=180), agreed that the severity of the act depicted should be a factor. For using the number of images as a factor, 51% (n=40) of the offender sample and 49% (n=125) of the reference sample indicated agreement. For the age of the individuals depicted being used as a factor, 44% (n=34) of the offender sample and 37% (n=95) of the reference sample indicated agreement (Figure 4).

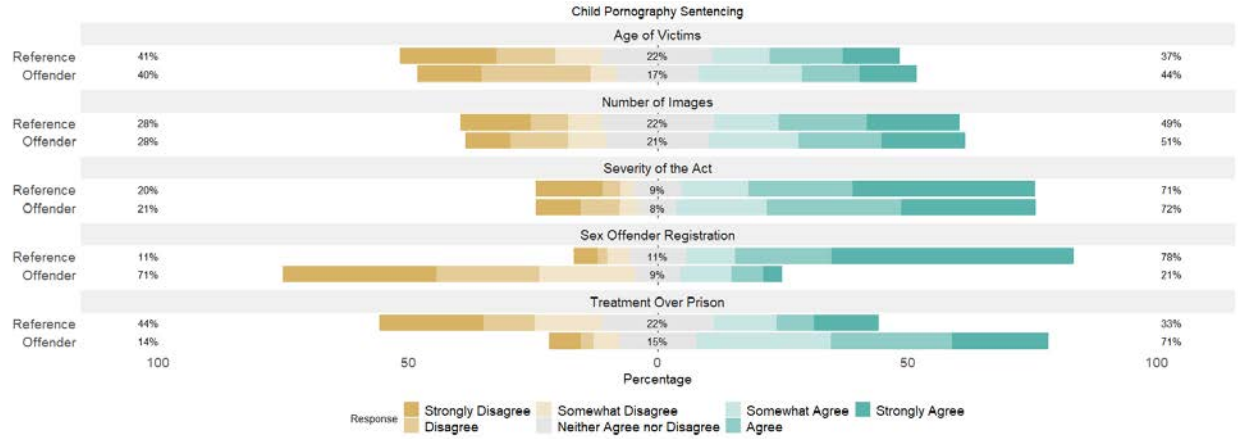

Figure 4: Views on sentencing guidelines

Discussion

The offender sample rated child pornography viewing offences as less severe than all of the crimes against persons, but more severe than all of the property offences with the exception of arson, providing a median ranking of 6. This contrasts with the reference sample's median ranking of 3. This could be interpreted as a minimization distortion, but it could also represent an over-estimation of severity by the reference group.

Support for cognitive distortions related to both the Nature of Harm and Virtual is Not Real (e.g., looking at pictures is not as bad as contact offending) (Howitt & Sheldon, 2007; Paquette & Cortoni, 2020; Ward & Keenan, 1999) was mixed. The majority (83%) of offenders acknowledged that viewing child pornography contributed to the vicitmization of children, and that the majority of individuals depicted (86%) were not willing participants. When compared to the reference sample, offenders believed that

significantly *fewer* individuals depicted were willing participants. This may be due to a greater exposure to a broad range of CSEM content. While most of the offender sample (83%) agreed that child pornography was related to victimisation, this was significantly *less* than the reference sample (96%). Particularly, there were different percentages of direct v. indirect harm by the offender sample (35% and 49%) than the reference sample (67% and 30%), supporting the presence of a substantial but nuanced distortion. The lower endorsement of victimisation by the offender sample, and specifically direct victimisation, is consistent with the Nature of Harm and Virtual is Not Real distortions and shows distancing of the offender sample's prior activities from direct harm.

A higher percentage of the offender sample (71% v 33%) supported the statement that offenders were mentally ill and should receive treatment over prison. Similarly, the offender sample respondents estimated that fewer offenders were paedophiles (42% v 75%). These results support the presence of cognitive dissonance within the offender population. The presence of mental illness is endorsed when it is directly tied to potential leniency in punishment (e.g., support of treatment over prison), but not when it is tied to the stigmatizing label paedophile (Jahnke et al., 2015).

The offender sample respondents had more realistic views of recidivism rates at 21% when compared with the reference sample at 70%, though the estimates were still substantially higher than previously measured rates which have ranged from 1.6% (Faust et al., 2015) to 7% (Seto & Eke, 2015). A similar effect was present in estimates of abuse - although only 19% of the reference sample reported being sexually abused as a child, they estimated the group rate at 54%. The self-reported rate was similar to that of 21% found in a prior meta-analysis (Babchishin et al., 2011). Likewise, the self-reported rate of contact offending was 15%, which was lower than the perceived overall rate of 21% and substantially lower than the reference sample estimate of 58%. Taking into account the conditional probability, this estimate was more accurate when compared to the future contact offending rate estimates of approximately 3% (Elliott et al., 2019; Faust et al., 2015) to 4% (Seto & Eke, 2005). More troubling, 8% of the registry group noted that they would be slightly likely or higher to have sexual contact

with an individual under the age of 18 if the opportunity presented itself. This highlights the potential need for behavioural modifications for a substantial subset of child pornography offenders to reduce the likelihood of situations that may lead to future contact offending.

With regards to sentencing, there was general agreement that the severity of the act should play a role, but support for sentencing based on the age of the victims and the number of images present was mixed. Within the registered sample, there was a substantial aversion toward sex offender registration for child pornography offences. Prior research has shown that, in addition to the shaming associated with registration, offenders experienced job loss, property loss, and physical threats as a result of registries (Levenson & Cotter, 2005), which provides a basis for the lack of support shown.

Limitations

Several of the results noted relied on self-reporting of behaviour and are potentially subject to biased responses based on social desirability, though several subjects did report beliefs that would not generally be considered socially desirable. Additionally, some of the results asked the respondents to predict the behaviour of other offenders, which would potentially be influenced by their own behaviours. Finally, the majority of the previously convicted offenders reported having received counselling and/or other mental health interventions following their arrest, which may have influenced both the qualitative responses and the cognitions post-treatment.

The populations for the two surveys were both English-speaking individuals at least 18 years of age living in the United States and cannot be generalized beyond that population.

Conclusions

This research provided a comparison of the views on CSEM and CSEM offending between a reference group of non-offenders, and a group of previously convicted offenders. Overall, the offenders had more accurate estimates of risk associated with

CSEM offending. The offender group, however, supported the legality of virtual CSEM and child erotica at higher rates, as well as “artistic” viewing of CSEM, and exhibited some distancing of their viewing when compared to the reference group related to victimisation. These indicate potential minimization distortions, and warrant further research investigation for their viability as a treatment target. Conversely, the lack of endorsement for the victims being willing participants supports the notion that victim empathy may not be a productive treatment target (Mann & Barnett, 2013).

The offender group did not estimate a high prevalence of paedophilia amongst the population. Additionally, the perception that individuals could come across child pornography on “non-mainstream” adult websites by many offenders provides an indicator of how it is initially accessed. This provides a behavioural target (e.g., cessation of browsing non-mainstream adult websites) that can be addressed in the context of facilitating and/or triggering behaviours to potentially reduce future offending. Finally, the addition of a simple question asking the offenders to self-identify their likelihood of committing a contact offence if the opportunity arose (using a Likert scale to incorporate minimization) provides a potential basic assessment mechanism in identifying the need for future contact-based treatment planning.

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Appendix A: Demographic Data

Demographic Category	Offender (n=78)	Reference - Gender Matched (n=254)
Sexual Orientation		
Bisexual	0.14 (n=11)	0.03 (n=7)
Heterosexual (straight)	0.72 (n=56)	0.91 (n=231)
Homosexual (gay)	0.13 (n=10)	0.05 (n=13)
Other	0.01 (n=1)	0.01 (n=3)
Prefer not to say	0 (n=0)	0 (n=0)
Age Distribution		
18 - 24	0.01 (n=1)	0.17 (n=44)
25 - 34	0.28 (n=22)	0.11 (n=27)
35 - 44	0.24 (n=19)	0.17 (n=42)
45 - 54	0.17 (n=13)	0.24 (n=61)
55 - 64	0.22 (n=17)	0.19 (n=47)
65 or older	0.08 (n=6)	0.13 (n=32)
Gender Identity		
Female	0 (n=0)	0 (n=0)
Gender Variant/Non-Conforming	0.04 (n=3)	0 (n=1)
Male	0.95 (n=74)	1 (n=253)
Not Listed	0.01 (n=1)	0 (n=0)
Prefer Not to Answer	0 (n=0)	0 (n=0)
Transgender Male	0 (n=0)	0 (n=0)
Relationship Status		

Demographic Category	Offender (n=78)	Reference - Gender Matched (n=254)
Divorced	0.23 (n=18)	0.09 (n=23)
In a Domestic Partnership or Civil Union	0.03 (n=2)	0.03 (n=7)
Married	0.23 (n=18)	0.48 (n=122)
Other	0 (n=0)	0 (n=1)
Separated	0.04 (n=3)	0 (n=1)
Single, but Cohabiting with a Significant Other	0.04 (n=3)	0.05 (n=12)
Single, Never Married	0.41 (n=32)	0.32 (n=82)
Widowed	0.03 (n=2)	0.02 (n=6)
Race (Multiple Selections Permitted)		
American Indian or Alaska Native	0.01 (n=1)	0.02 (n=5)
Asian	0 (n=0)	0.04 (n=9)
Black or African American	0.01 (n=1)	0.17 (n=42)
Hispanic or Latino	0.12 (n=9)	0.07 (n=19)
Native Hawaiian or Pacific Islander	0.01 (n=1)	0 (n=1)
Other	0.01 (n=1)	0.01 (n=3)
White or Caucasian	0.88 (n=69)	0.75 (n=191)
Employment Status		
Not working (disabled)	0.13 (n=10)	0.05 (n=12)
Not working (looking for work)	0.15 (n=12)	0.09 (n=24)
Not working (other)	0.04 (n=3)	0.02 (n=6)
Not working (retired)	0.09 (n=7)	0.17 (n=43)

Demographic Category	Offender (n=78)	Reference - Gender Matched (n=254)
Not working (temporary layoff from a job)	0.03 (n=2)	0.05 (n=13)
Working (paid employee)	0.49 (n=38)	0.54 (n=137)
Working (self-employed)	0.08 (n=6)	0.07 (n=19)
Education Level		
Less than high school diploma	0 (n=0)	0.01 (n=3)
High school graduate (high school diploma or equivalent including GED)	0.13 (n=10)	0.24 (n=62)
Some college but no degree	0.29 (n=23)	0.19 (n=49)
Associate degree in college (2-year)	0.13 (n=10)	0.1 (n=25)
Bachelor's degree in college (4-year)	0.33 (n=26)	0.26 (n=67)
Master's degree	0.09 (n=7)	0.13 (n=32)
Professional degree (JD, MD)	0 (n=0)	0.03 (n=7)
Doctoral degree	0.01 (n=1)	0.04 (n=9)
Income		
$0 - 9,999	0.09 (n=7)	0.09 (n=22)
$10,000 - 20,000	0.19 (n=15)	0.07 (n=19)
$20,001 - 29,999	0.1 (n=8)	0.1 (n=25)
$30,000 - 40,000	0.24 (n=19)	0.1 (n=26)
$40,001 - 50,990	0.09 (n=7)	0.14 (n=35)
$50,991 - 67,000	0.08 (n=6)	0.07 (n=19)
$67,001 - 79,000	0.1 (n=8)	0.12 (n=31)
$79,001 - 100,000	0.05 (n=4)	0.12 (n=31)

Demographic Category	Offender (n=78)	Reference - Gender Matched (n=254)
$100,001 - 190,000	0.05 (n=4)	0.12 (n=31)
Greater than $190,000	0 (n=0)	0.06 (n=15)

Table A1: Demographics of Offender and Reference Samples

Annex

	Reference		Offender					
Category	M	SD	M	SD	test statistic	df	p	d
Recidivists	70.375	22.058	21.312	19.835	18.450	139	<.001	2.276
Paedophiles	74.909	25.395	41.513	28.014	9.408	118	<.001	1.283
Sexually Abused	60.654	25.263	54.244	26.393	1.895	123	0.060	0.251
Contact Offenders	58.469	25.985	20.974	19.900	13.481	164	<.001	1.518

Table Annex.1: Estimates of child pornographer characteristics and significance

	Reference		Offender			
	M	SD	M	SD	W	p
Age of Victims	2.839	2.004	2.910	1.955	9622	0.699

	Reference		Offender			
	M	SD	M	SD	W	p
Number of Images	3.398	2.001	3.436	1.884	9856	0.946
Severity of the Act	4.150	2.082	4.064	1.936	10494	0.414
Sex Offender Registration	4.713	1.689	1.821	1.771	2677	<.001
Treatment Over Prison	2.701	1.985	4.038	1.631	13834	<.001

Table Annex.2: Agreement with sentencing factors and significance

Chapter 9 - Suicidal Ideation in Offenders Convicted of Child Pornography Offenses

9.1 Overview

Suicide is one of the leading causes of death within the United States (Centers for Disease Control and Prevention, 2017). Suicide rates are particularly high in the sex offender population, including child sex offenders (Jeglic et al., 2013; Katsman & Jeglic, 2019; Pritchard & King, 2005). Despite anecdotal evidence of a high incidence of suicide with CSEM offenders, there has been no comprehensive research to-date looking at suicidality in the CSEM offender population. Understanding the prevalence of suicidal ideation and the reasons behind it form a basis for early intervention and treatment efforts and can inform investigative and assessment practices.

This research evaluated the suicidal ideation and past suicide attempts in a population of individuals previously convicted of child pornography offences. The research examined the period after the offenders became aware they were under investigation for a CSEM offence. Suicidal ideation was evaluated using a previously validated instrument (Klein et al., 2013), and additional quantitative and qualitative questions were asked of participants related their interaction with investigators and proximal concerns that may have influenced their suicidality.

The high levels of suicidal ideation found support changes to treatment timing and treatment modality. Additionally, the lack of perceived fairness, compassion, and understanding shown by investigators highlights the proposed need for better investigative approaches. Specifically, implementing understanding-based investigative techniques and investigators facilitating rapid access to crisis management-based treatment for suicide risk are supported by this study.

9.2 Summary of Findings

The major findings of the research were as follows:

- Significant suicidal ideation was present in 73% of respondents, with 19% reporting they attempted suicide after they were made aware they were under investigation.
- The most endorsed proximal concerns were their families finding out about their CSEM activities and going to jail, while the least endorsed was losing their CSEM collection.
- A substantial minority (41%) would have been likely to seek counselling if provided contact information.
- The majority of offenders did not agree that they were treated with fairness, compassion, and understanding by investigators.
- The results show the need for the incorporation of proximal suicide risk assessment and rapid treatment into investigative planning and the use of understanding-based interviewing techniques.

Suicidal Ideation in Offenders Convicted of Child Pornography Offences

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The authors have declared no conflicts of interest. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all individual participants included in the study.

Abstract

Understanding the prevalence of suicidal ideation in Child Sexual Exploitation Material (CSEM) offenders and their psychological concerns provides the basis for early treatment and intervention. This research solicited responses (n=78) via an anonymous, web-based survey from adults in the United States previously convicted of CSEM offences. Significant suicidal ideation was present in 73% of respondents (n=57), and 19% (n=15) reported attempting suicide after they were made aware of an investigation, with 41% (n=32) stating they would have been likely to seek counselling if provided a contact. Most of the respondents felt they were not treated with fairness, understanding, and compassion by investigators, and that their primary psychological strains were going to jail and their families finding out. This research highlights the need for more empathetic investigative approaches, as well as the need for more rapid assessment and treatment of proximal suicide risk in this population.

Keywords: Child pornography, child sexual exploitation material, suicidal ideation, suicide

Introduction

According to the United States Centers for Disease Control (CDC), the suicide rate in 2017 was 14 per 100,000, and suicide was the second leading cause of death in individuals aged 10 to 34 and fourth for individuals aged 35 to 54 (Centers for Disease Control and Prevention, 2017). Suicidal ideation amongst adults in the United States, which includes thinking about and/or planning suicide, was 5.8% in 2019 (National Institutes of Mental Health, 2020). For individuals convicted of a crime, the levels of suicidal ideation and the risks of suicide are higher. A study of inmates in Australia found suicidal ideation to be present in 33.7% of those surveyed, and that 20.5% of those surveyed had attempted suicide at some point in their lives (Larney et al., 2012), while a similar study of inmates in the United States found that 23.5% had suicidal ideation and 13.9% had attempted suicide (Favril et al., 2020). While not all individuals who have suicidal ideation will attempt suicide, in the same study of inmates in the United States, Favril and colleagues found that 59% of subjects experiencing ideation attempted suicide (Favril et al., 2020), and even in those that did not attempt suicide high suicidal ideation may be an indicator of other mental health issues such as depression (Beck et al., 1993).

Sex offenders may exhibit even higher rates of suicidal ideation and attempted suicide compared to those convicted on non-sexual offences (Dooley, 1990; R. T. Webb et al., 2012). A study by Jeglic et al. found that 14% of sex offenders had attempted suicide, with 11% attempting suicide prior to incarceration (Jeglic et al., 2013). Katzman and Jeglic (Katsman, 2018; Katsman & Jeglic, 2019) found that 17.9% of sex offenders in a United States sample self-reported attempting suicide at some point in their lives, and suicidal ideation of those who did not attempt suicide was reported to be 15.1%.

There is the potential that child sex offenders have higher rates of suicide than even non-child sex offenders. Though some studies have found no difference between adult and child sex offenders (Jeglic et al., 2013; Katsman, 2018), an Irish prison study by Brophy (2003) found a risk ratio of suicide while incarcerated of 1/24 for child sex offenders, compared to 1/1644 for those who committed sex offences against adults. Additionally, studies have found higher rates amongst those whose criminal histories

only included sexual offences (Pritchard & King, 2005). Of particular interest for intervention, the suicides were found to be primarily clustered around the time the investigation became publicly known (Pritchard & King, 2005).

The potential for higher suicide rates in those individuals facing convictions for child sexual exploitation material (CSEM) offences was highlighted as early as 2007 as an area for further investigation, based on the type of crime as well as the demographics of the offenders (Byrne & Stowell, 2007). Particular characteristics of many CSEM offenders potentially make them more likely to die by suicide. Male offenders have been found to have higher suicide rates (Mumola, 2005), as have those who have suffered childhood trauma, and sexual abuse in particular (Jeglic et al., 2013; Jennifer et al., 2014; Katsman, 2018; Rabinovitch et al., 2015). Additionally, the stigma associated with being labelled a paedophile may increase social isolation (Hoffer et al., 2010; Jahnke et al., 2015), another predictor of suicide attempts (Jennifer et al., 2014). In a study of individuals with paedophilic interests, 38.1% endorsed suicidal ideations (Cohen et al., 2020), and another study of minor-attracted persons found that 30% of participants had suicidal thoughts and 23% had attempted suicide (Levenson & Grady, 2019). The rates of suicide attempts for individuals committing CSEM offences specifically has not been adequately measured to-date, despite the potential risk due to the increased suicidal ideation and attempts in the above-mentioned categories with characteristics in common.

Two theories of suicide - the strain theory and the interpersonal theory - have potential relevance to CSEM offenders. The strain theory of suicide identified sources of strain, particularly the difference between aspiration and accomplishment, as a primary cause of suicide (Zhang, 2012). Specific to CSEM offending, an individual's situation relative to their life aspirations may be negatively impacted, they may have coping issues with their current situation, and investigators may exacerbate strain by imposing value judgements (Zhang, 2012). Under the strain theory, the collapse of an individual's life following their arrest for a CSEM offence may increase their proximal risk, and understanding what specific psychological strains they have would be of direct value for treatment (Hoffer et al., 2010; Zhang & Lester, 2008). This has been borne out with

general offenders, with individuals showing a rate of suicide attempts approximately five times higher than the general population immediately following an arrest (Cook, 2013). Additionally, Hoffer and Shelton (2013) found that approximately one quarter of all sex offender suicides they identified occurred within the first 48 hours following the offender being made aware of the investigation. Similarly, under the interpersonal theory of suicide, which states that thwarted belongingness and perceived burdensomeness are the primary causes of suicidal desire, both social isolation and a history of childhood abuse are relevant factors in CSEM offenders (Van Orden et al., 2010). A history of childhood abuse is higher in CSEM offenders than the general public (L. Webb et al., 2007), and social isolation is higher for those on sex offender registries (Bailey & Klein, 2018). CSEM offenders, at the time of arrest, are likely to have additional interpersonal loss when compared to general sex offenders. They are more likely to be employed, in a relationship, and to have stronger social ties, providing a higher degree of potential psychological impact following that arrest (Babchishin et al. 2015). Despite the risk factors based on the theories noted, there has been little work done examining the state of mind of CSEM offenders and their suicidal ideation, in particular during the immediate post-investigation period.

In the United States, individuals who are suspected of CSEM offences are generally first made aware of the investigation when they are approached by law enforcement and requested to participate in a voluntary interview. Interview practices in the United States tend to be largely accusatory (Walsh et al., 2017), despite best practice recommendations to the contrary (Read et al., 2009) and improvements in child sex crime interviewing practice in other countries (Read et al., 2014). Humanity and compassion in particular have been identified as important characteristics for interviewing sex offenders (Kebbell et al., 2008).

Post-interview, individuals who are suspected of CSEM offences are frequently released, either immediately or following an arrest and initial court appearance. The United States has few services available for proximal pre-trial intervention to prevent suicide. In one of the few programs available, the United States Pretrial Services Office in the Central District of California began a pilot program for sex offenders with five aims

- providing a referral after initial court appearance for psychological assessment and counselling, offering group support sessions, providing coping skills training, providing cognitive behavioural therapy, and assistance in adapting to going to prison (Byrne et al., 2009; Byrne & Stowell, 2007). The program showed high levels of participation, though direct impact on suicide rates was not evaluated and the authors cited a need for more research on prevalence (Byrne et al., 2012). A broader program, Stop It Now!, offers offender counselling both before investigative action occurs and based on investigator referrals. In addition to their efforts to reduce offending behaviour, they address suicide risk in both the offender and the offender's family (Grant et al., 2019; Van Horn et al., 2015).

Addressing suicide in the CSEM offender population is critical for their own benefit, but there are additional benefits to reducing the rates of CSEM offender suicide. These include negative effects on first responders and law enforcement investigating both the suicide and the CSEM offence, and on the family of the offender who are already undergoing strain from the stigma associated with the investigation as well as cognitive dissonance between their interactions with the subject and the subject's CSEM interests (Hoffer et al., 2010). Additionally, child sex offender suicides, including those who committed CSEM offences, may impact the victims by not allowing closure through a conviction (Hoffer et al., 2010).

This exploratory cross-sectional study represents the first targeted investigation of suicidal ideation and suicide attempts amongst convicted CSEM offenders. Suicidal ideation is measured using a validated instrument, and information on suicide attempts are directly solicited. The specific strains associated with their investigation and the perceptions of the sample of their treatment during the investigation are quantified and a qualitative analysis of what investigators could have done differently to reduce suicide risk are performed.

Methods

This research utilized a mixed methods approach to analyse the suicidal ideation, suicide attempts, and interaction with investigators of individuals previously convicted of

CSEM offences after their initial engagement with the investigative process. The details of each of the analyses are identified below, followed by the analytical tests performed.

Participants and Setting

This research was conducted using survey data obtained online from individuals previously convicted of child pornography offences within the prior 10 years. The individuals were recruited based on their inclusion in the sex offender registries of two states within the United States. Adults on the list with prior CSEM offences were sent a mailing (N=2,508), and requested to fill out an anonymous online survey on the University of Edinburgh's Qualtrics platform regarding their prior behaviours related to CSEM, as well as their technology usage and associated cognitions, as part of a larger research project. They were incentivized to participate through the voluntary inclusion of their email into a drawing for one of two $150 Amazon gift cards.

Prior to participation in the survey, participants were provided detailed information on data collection and usage, as well as the specific risks and benefits of the survey. Of the population, 141 individuals responded to the survey (a 5.6% response rate). Three individuals declined to consent and 40 individuals did not complete the survey. The survey was anonymous, and because individuals who chose not to complete the survey were allowed to withdraw prior to final submission, partial responses were not retained. Two attention checks were built into the survey to ensure individuals were reading the questions. One attention check was based on a multiple choice question, and the second was part of a matrix question, and individuals failing either of the checks (n=20) were not used in the analysis to improve the overall quality of responses (Owens & Hawkins, 2019). A total of 78 individuals passed the attention checks and their responses were analysed as described below.

Questionnaire

The survey included demographic questions as well as questions related to the respondents' suicidal ideations and behaviours and their interactions with law

enforcement during the investigative process. The demographic questions were primarily multiple choice and solicited information on the sexual orientation, age, gender, marital status, race, level of education, type of degree, employment status, current occupation, and household income of the participants. Income ranges were based on decile groups from a separate reference sample of non-offenders. The questions related to suicidal ideation and investigative efforts are detailed below.

Suicidal ideation was measured using the Suicidal Ideation Measure, a validated instrument with a previously identified Cronbach's alpha of .84 (Klein et al., 2013a). The instrument was found to have an alpha of .95 in this study. The instrument consisted of four items asking respondents to rate how often they had specific thoughts (e.g., “I felt my family and friends would be better off if I were dead”) from 1 (Rarely or none of the time) to 4 (Most or all of the time), with the summed scores representing overall suicidal ideation (Klein et al., 2013a).

Participants were asked to retrospectively rate their ideation using the instrument immediately following their becoming aware of being under investigation for a CSEM-related offence. For reference purposes, Klein et al. identified a baseline mean rate for the instrument of 4.55 with a standard deviation of 1.55 in a study looking at United States adult participants (Klein et al., 2013b). This research defined the presence of significant suicidal ideation as any values above one standard deviation from that of the reference sample (6.1 or higher). In addition to measuring their ideation, participants were asked if they had ever attempted suicide at any point after they became aware of the investigation. Prior childhood sexual victimization was evaluated by asking the respondent if they had sexual contact with an adult before the age of 16.

The reflections and impressions of the respondents on the investigative process, including their particular strains, were elucidated with a series of questions based on the prior work of Kebbel and Hurren (2008). First, the level of fairness, understanding, and compassion exhibited by investigations was measured using a 7-point Likert scale asking the participants’ agreement with three questions (from Strong Disagree to Strongly Agree):

- The investigators treated me fairly
- The investigators showed an understanding of my child pornography viewing
- The investigators were compassionate

The results of each question were evaluated individually and displayed using a diverging stacked bar chart, with a vertical line representing the median value (Heiberger et al., 2014).

To ascertain the specific strains on the participants during the investigation that caused anxiety, they were asked to rank seven negative outcomes associated with CSEM offences based on common concerns expressed during investigations and treatment as well as concerns cited in prior research (Byrne et al., 2012; Lanning, 2010; Steel, 2014) from 1 to 7, with 1 being the most concerning:

- Being registered as a sex offender
- Going to prison
- Losing my collection of child SEM
- Losing my job
- My family finding out what I did
- My friends finding out what I did
- The public finding out what I did

To identify any protective behaviours investigators could have exhibited in the interview, an exploratory qualitative question, “What could investigators have said to you to reduce your thoughts of suicide?”, was asked and inductively coded. Common words and phrases were extracted and grouped inductively to identify relevant themes present. The relevant responses were reported with no edits to spelling, punctuation, or grammar.

Finally, to evaluate the potential effectiveness of offering mental health contacts following an interview, the participants were asked to rate the question “If investigators provided you with a contact point to talk to a medical professional about suicide, how likely is it that you would have contacted that individual or organization?” on a 7-point Likert scale from Extremely Unlikely to Extremely Likely.

Analysis

Exploratory analyses on the results were conducted and descriptive statistics presented. For nominal/ordinal comparisons, Mann-Whitney-Wilcoxon tests were used. For nominal/nominal, standard chi-square analysis was used. Comparison between group means was performed using a one tailed Welch's t-test. All results were collected and analysed using R, with a p value of .01 used for statistical significance tests (where appropriate).

Ethical approval was received from the Research Ethics Committee at the University of Edinburgh on May 20, 2020. Additionally, Institutional Review Board approval was received from George Mason University on May 13, 2020.

Results

The respondents were 72% (n=56) heterosexual, 88% white (n=69), and 95% (n=74) gender identified as males. For marital status, 41% (n=32) were single and never married, 23% (n=18) were divorced, and 23% (n=18) currently married. For employment and education, 56% (n=44) were currently employed, and 56% (n=44) held a college degree. Detailed demographics of the respondents in the key areas measured are shown in the appendix.

Overall, 19% (n=15) of the respondents reported attempting suicide after being made aware of the presence of an investigation into their CSEM activities. The mean score on the suicidal ideation measure was 10.64 (SD=4.61), and 73% of the respondents (n=57) reported significant suicidal ideation (one standard deviation above the mean for a reference population). The sample was found to have significantly higher suicidal ideation, $t(390)=19.4$, $p<.01$, than the reference sample (Klein et al., 2013b).

The respondents' having had sexual contact with an adult as a minor younger than 16 was not related to either suicidal ideation nor suicide attempts. Suicidal ideation was found to be significantly higher, $t(69)= 6.9$, $p<.01$, in those who attempted suicide (M=14.53) than those who did not (M=9.68). No statistically significant relationships

between the primary demographic variables (income, age, race, sexual orientation) and suicidal ideation or suicide attempts were identified.

With regards to their treatment during the investigation, 44% (n=34) of the respondents agreed that they were fairly treated, 19% (n=15) agreed that the investigators showed compassion, and 18% (n=14) that investigators showed understanding (Figure 1).

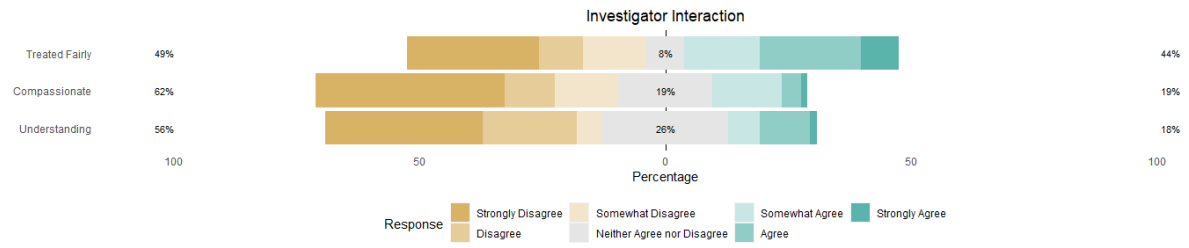

Figure 1: Respondents' perceptions of their interactions with investigators

When asked what investigators could have said to reduce thoughts of suicide, 55% of respondents (n=43) indicated there was nothing that could have been said and 19% (n=15) that they were not suicidal and it was not applicable to them, with one individual reporting that they were framed for the crime. Some of responses that noted that nothing could be done provided reasons potentially external to the investigation:

- "Nothing. It's the social stigma and threat of prison that get you."
- "I didn't listen to them anyway. I was in a deep hole."
- "I don't think they could have said or done anything. They were actually very good people that helped my then fiance [sic] get through this. I already had a history of suicide thoughts and attempts"

Of the remaining individuals, 12% (n=9) identified in their responses that having investigators offer a positive way forward was an important factor:

- "Reassured me that no matter what happens there are ways to redeem yourself."
- "Provided a path that didn't involve me losing everything I had worked for in my life."

- “that i [sic] would not be on a registry, that i [sic] would not be a social outcast, that people would not know about it.”

An additional 9% (n=7) indicated that showing understanding of the issue being a mental illness and offering treatment would have been helpful:

- “Focused more on treatment programs to help understand my desire to view pornography, to help me understand how children may be affected by my viewing, even though I had no actual contact. Help me to understand that I am no [sic] alone in my desires and that counseling and treatment helps.”
- “That I'm not a bane on society, that they wouldn't try to lock me away for eternity, that help was available, and that this may be yet another manifestation of my struggles with addiction”
- “They could have informed me that people and family love and need me. That there is affective treatment for pornography addition.”

The respondents’ greatest concerns were going to prison and their families finding out, both with a median rank of 2. Losing their CSEM collection was the lowest concern, with a median rank of 7 (Table 1). The respondents’ level of suicidal ideation was not significantly correlated with any of the ranked concerns.

Concern	**Median Rank**
Going to prison	2
My family finding out what I did	2
My friends finding out what I did	3.5
Being registered as a sex offender	4
The public finding out what I did	4
Losing my job	4.5
Losing my collection of child SEM	7

Table 1: Median ranking of severity of concerns (1 was the most concerning)

In terms of seeking assistance, a substantial minority of respondents, 41% (n=32), reported that they would have been likely to seek assistance in addressing suicidal thoughts and behaviours if investigators had provided contact information (Figure 2). More critically, 80% (n=12) of the individuals who reported attempting suicide reported they were likely to seek assistance if offered, with the remaining individuals reporting that they were neither likely nor unlikely.

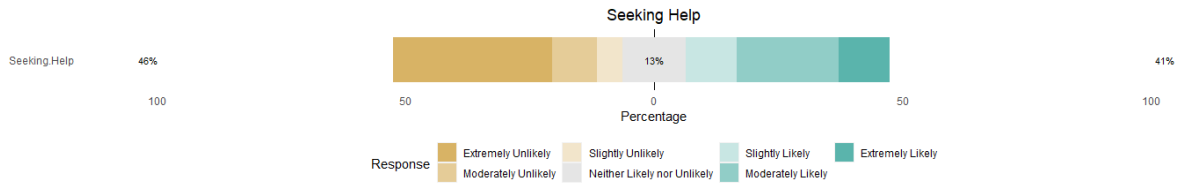

Figure 2: Likelihood of respondents seeking counselling assistance if offered

Discussion

The levels of significant suicidal ideation were very high within the CSEM offender sample. The 73% of individuals who reported suicidal ideation represents a significant increase over that found previously in paedophiles at 38.1% (Cohen et al., 2020) and general sex offenders at 15.1% (Katsman & Jeglic, 2019). The added strains introduced by being caught provide a potential explanation for the higher ideation than in Cohen et al., (2020), in which only 37% of their sample had reported a prior arrest, and the additional stigma associated with having paedophilic interests (Jahnke et al., 2015) potentially explains the higher ideation than in the general sex offender population (Katsman & Jeglic, 2019). While suicidal ideation was substantially higher than other populations, the 19% of individuals who reported attempting suicide was consistent with a prior sample of sex offenders in a United States population of 17.9% (Katsman, 2018; Katsman & Jeglic, 2019).

High levels of ideation and suicide attempts were not significantly related to the demographic variables, however this is to be expected given the homogeneity of the

sample, which is consistent with the overall high representation of specific demographics within the CSEM offender population. Being the victim of childhood sexual abuse was likewise not correlated with either ideation or attempts, though this may be the result of how the question was phrased, as it solicited the presence of sexual contact with an adult before the age of 16 (which may or may not have been viewed as abusive by the respondent), and was potentially confounded by disclosure issues in men who were sexually abused (Holmes et al., 1997). CSEM offenders may have been abused as children, but subsequently rationalized those relationships as consensual. Additionally, even if the interactions were viewed as abusive, the guilt and shame associated with the abuse may have resulted in underreporting.

The high levels of suicidal ideation are supported by existing theory. Consistent with the strain theory of suicide, going to prison has a negative impact on most life aspirations, and going to prison was the highest ranked concern in this study (Zhang, 2012). Under the theory, strain can be caused by cognitive dissonance, which may be increased by confrontational investigative approaches. Their initial interaction with law enforcement related to CSEM, which is likely to be their first interaction with the criminal justice system, may be dispositive to their proximal suicide risk. Investigators can potentially influence that risk in two ways – through their demeanor during the interview of the offender and through their post-interview interactions. Respondents reported viewing investigators as exhibiting low levels of fairness, understanding, and compassion. The impact of a failure to show understanding, in particular, can exacerbate this strain by highlighting social shame. Respondents noted that investigators could have provided both reassurance and a path forward, addressing and potentially reducing both aspects of strain. Those same factors can influence perceived belongingness under the interpersonal theory of suicide (Van Orden et al., 2010), with the additional strain caused by social isolation. The second and third ranked concerns of respondents were the individual's social network (family and friends) finding out about their CSEM activities. This indicates an awareness of the potential negative social ramifications for them of those notifications, exacerbating any perceived issues with belongingness.

Practice Implications

The high levels of proximal suicidal ideation and general perceived lack of empathy in the investigative process have direct practice implications for both law enforcement and clinicians. Looking at the investigative process, while most participants were unable to offer insight into what investigators could have said to reduce their suicidal ideation, those who did indicated the need for a "way forward" and showing understanding. Investigators can address the perceived lack of fairness, understanding, and compassion by helping to place the offender's actions in a whole-person context, as evidenced in some of the qualitative responses, and by highlighting the positive aspects of the offender apart from their criminal behaviour. Effective interviewing of CSEM offenders requires the investigator to not show contempt or further stigmatize the subject to build effective rapport (Steel, 2014), and the Federal Bureau of Investigation advocates that "investigators must respond with compassion and understanding" (Bowling & Resch, 2005, p. 5) in subject interviews and interrogations regarding CSEM. Because investigators are also psychological first responders, adopting a Rogerian unconditional positive regard approach to their interaction may assist in reducing the immediate strain on the offender and in encouraging further counselling interactions (Rogers, 1957). This may reduce the proximal suicide risk and the associated impacts on the offenders, law enforcement, and the child victims. In addition to the obvious impact to the offender, suicide attempts and the taking of their own lives can impact their families, law enforcement and child victims. Families of CSEM offenders are already likely to face stigmatization as well as interpersonal and financial strains due to the offender's actions, and the added stress and stigma related to suicide compound those strains. Law enforcement and other first responders may feel guilt or may have post-traumatic stress issues from responding to an offender taking their own life (Hoffer et al., 2010). Finally, child victims may not receive adequate closure that is offered through conviction (and associated compensation, in many cases) (Hoffer et al., 2010). Additionally, this approach is likely to be more effective in eliciting information, as shown previously in work looking at humanitarian rapport-orientated interviews in a therapeutic jurisprudence context (Madsen, 2017) and in vignettes where convicted sex offenders identified an understanding and compassion-based approach as increasing the

likelihood of confession (Kebbell et al., 2008). Additionally, following the interview, law enforcement can ask offenders about their immediate plans and about any suicidal thoughts or intentions. Law enforcement interventions can range from providing a pamphlet containing helpful information and mental health contacts, to proactively assisting the offender in engaging with mental health professionals for proximal assessment and support. A substantial minority of respondents (41%) reported that they would be at least somewhat likely to use those resources if they were made available.

Initial mental health assessment should include suicide risk, and short term interventions should take into consideration the immediate concerns of offenders. Mental health professionals can additionally discuss strategies with offenders for telling their families and provide them with resources that can offer them immediate counselling support as well as family member support (Grant et al., 2019). Services like those offered in the pilot study in California (Byrne et al., 2012), which cover adaptation to prison in addition to life path coping skills, and the family member and offender support offered by Stop It Now! (Grant et al., 2019), would have high potential for having a positive impact on the suicidal ideation of offenders.

Limitations

This research was conducted on a previously convicted CSEM offender population within the United States and is not generalizable beyond that population. The research was conducted via a survey during the Covid-19 outbreak in 2020, which may have influenced unemployment numbers within the demographic data (Coibion et al., 2020) and altered the self-selection bias inherent in a voluntary, online survey methodology. The increased social isolation during this period may have influenced responses as well (Folk et al., 2020). The response rate of 5.6% was low, but not unexpected given the population being sampled. The most similar study soliciting individuals on a sex offender registry via postal mail had a 15% response rate, but was significantly shorter, targeted general sex offenders (not exclusively CSEM offenders), and used paper-based survey response that limited the types of questions asked (Tewksbury, 2006).

This study only examined self-reported suicidal behaviour. Nonsuicidal Self-Injury (NSSI) was not reviewed and may be of further interest in this population. Additionally, prior sexual victimization of the respondents was limited to sexual by adults, and did not include victimization by other minors.

This study was retrospective in nature and asked individuals convicted of child pornography offences to reflect on past behaviours and attitudes. As such, there is the potential for both the presence of both recollection bias and social desirability bias. Additional research conducted at the time of arrest or proximal treatment is needed to confirm these results. As with all self-reported studies involving suicide, there is a built-in survivor bias. The numbers presented in this study represent lower bounds of actual suicide attempt rates and levels of suicidal ideation as those who have died as a result suicide attempts were not included.

Conclusions

This research identified the CSEM offender community as having very high levels of suicidal ideation, even when compared to other criminal populations, including other sex offenders. Additionally, the number of offenders who attempted suicide was high, highlighting the need for better training of law enforcement personnel in understanding-based interview approaches, as well as psychological first aid techniques.

While this research contributed to the understanding of suicidal ideation in the CSEM offender population, there is significantly more research needed to fully understand the overall prevalence and impact of suicidal ideation, attempts, and completions. In particular, there is the need for a fully inclusive, longitudinal study starting at the point that the offenders become aware of the investigation, that tracks deaths by suicide in addition to attempts. Additional, larger studies are needed to confirm the high levels of ideation and to identify the specific reasons why it is higher than other sex offender populations.

Finally, this research presented the unique strains related to concerns identified by offenders, which provide a guide for treatment programs, and underscored the need for

much greater availability of treatment options such as that offered by Stop it Now! and the California pilot program starting immediately as part of the investigative process.

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Appendix

Demographic Category	Proportion of Sample (n=78)
Sexual Orientation	
Bisexual	0.14 (n=11)
Heterosexual (straight)	0.72 (n=56)
Homosexual (gay)	0.13 (n=10)
Other	0.01 (n=1)
Prefer not to say	0 (n=0)
Age Distribution	
18 - 24	0.01 (n=1)
25 - 34	0.28 (n=22)
35 - 44	0.24 (n=19)
45 - 54	0.17 (n=13)
55 - 64	0.22 (n=17)
65 or older	0.08 (n=6)
Gender Identity	
Female	0 (n=0)
Gender Variant/Non-Conforming	0.04 (n=3)
Male	0.95 (n=74)
Not Listed	0.01 (n=1)
Prefer Not to Answer	0 (n=0)
Transgender Male	0 (n=0)
Relationship Status	
Divorced	0.23 (n=18)

Demographic Category	Proportion of Sample (n=78)
In a Domestic Partnership or Civil Union	0.03 (n=2)
Married	0.23 (n=18)
Other	0 (n=0)
Separated	0.04 (n=3)
Single, but Cohabiting with a Significant Other	0.04 (n=3)
Single, Never Married	0.41 (n=32)
Widowed	0.03 (n=2)
Race (Multiple Selections Permitted)	
American Indian or Alaska Native	0.01 (n=1)
Asian	0 (n=0)
Black or African American	0.01 (n=1)
Hispanic or Latino	0.12 (n=9)
Native Hawaiian or Pacific Islander	0.01 (n=1)
Other	0.01 (n=1)
White or Caucasian	0.88 (n=69)
Employment Status	
Not working (disabled)	0.13 (n=10)
Not working (looking for work)	0.15 (n=12)
Not working (other)	0.04 (n=3)
Not working (retired)	0.09 (n=7)
Not working (temporary layoff from a job)	0.03 (n=2)
Working (paid employee)	0.49 (n=38)
Working (self-employed)	0.08 (n=6)

Demographic Category	Proportion of Sample (n=78)
Education Level	
Less than high school diploma	0 (n=0)
High school graduate (high school diploma or equivalent including GED)	0.13 (n=10)
Some college but no degree	0.29 (n=23)
Associate degree in college (2-year)	0.13 (n=10)
Bachelor's degree in college (4-year)	0.33 (n=26)
Master's degree	0.09 (n=7)
Professional degree (JD, MD)	0 (n=0)
Doctoral degree	0.01 (n=1)
Income	
$0 - 9,999	0.09 (n=7)
$10,000 - 20,000	0.19 (n=15)
$20,001 - 29,999	0.1 (n=8)
$30,000 - 40,000	0.24 (n=19)
$40,001 - 50,990	0.09 (n=7)
$50,991 - 67,000	0.08 (n=6)
$67,001 - 79,000	0.1 (n=8)
$79,001 - 100,000	0.05 (n=4)
$100,001 - 190,000	0.05 (n=4)
Greater than $190,000	0 (n=0)

Annex

Category	n	M	SD	test statistic	df	p	d
Race							
..White or Caucasian	69	10.913	4.498	1.440	10	0.182	0.565
..Non-White or Caucasian	9	8.333	5.123				
..Hispanic or Latino	9	11.889	5.061	0.811	10	0.436	0.312
..Non-Hispanic or Latino	69	10.449	4.565				

Table Annex.1: Correlation between reported race and suicidal ideation levels. Note: Insufficient numbers of individuals were present in the sample in the other racial categories for analysis.

Category	χ^2	df	p
Sexual Orientation	34.022	36	0.563
Income	84.609	96	0.791
Age	65.09	60	0.304

Table Annex.2: Correlation between demographic categories and suicidal ideation

Category	χ^2	df	p
Sexual Orientation	2.0869	3	0.555
Income	8.4476	8	0.391
Age	6.5988	5	0.252

Table Annex.3: Correlation between demographic categories and suicide attempts

SECTION 6 - TECHNICAL BEHAVIOURS OF CSEM OFFENDERS

Chapter 10 - Technical Behaviours of Child Sexual Exploitation Material Offenders

10.1 Overview

CSEM offences in the Internet age are directly influenced by the enabling technologies that facilitate the acquisition and sharing of content as shown in Chapter 4. The specific technical behaviours of CSEM offenders, including their choice of gateway technologies and how that usage evolves over time has not been previously studied. Understanding how individuals first obtain CSEM can form the basis for deterrence efforts, while understanding progression can be important for risk assessments and treatment. Additionally, the specific reasons for individuals choosing a technology, and what features of that technology are most important, can provide insight into the nature of the offender. Finally, the use of countermeasures by offenders has been historically low (Eneman, 2009; Wolak et al., 2012), but little exploration has been made into the reasons for their countermeasure usage.

This investigation used a mixed-methods approach to review the technology behaviours of individuals previously convicted of child pornography offences. Both qualitative and quantitative information was elicited on the choice of viewing and storage technologies, the usage patterns over time with those technologies, and the employment of countermeasures.

This investigation tested and found support for several key features of LST. First, individuals were found to incorporate both utility and perception of risk in their choice of

ecosystems. Second, individuals preferred ecosystems with higher risk but more content availability and continued using those technologies despite the presence of more capable alternatives. Finally, countermeasures were used primarily to support a reduction in psychological strain, and not purely for utility reasons, supporting the final aspect of LST.

10.2 Summary of Findings

The major findings of the research were as follows:

- In general, CSEM consumers choose technologies based on a mix of utility and perceived risk.
- Peer-to-peer networks and open web browsing were the most common gateway technologies used by CSEM offenders.
- CSEM offenders tended to continue to use the same gateway technology they started using, with a minority of offenders switching to other technologies.
- Most CSEM offenders used more than one technology to acquire CSEM.
- CSEM users employed more countermeasures than the general public, but not higher levels of encryption.
- Countermeasures were used primarily to reduce psychological strain and not for utility reasons.
- The technology usage by CSEM offenders supported LST, and the identification of gateway technologies provides for better targeting of deterrence efforts.

Technical Behaviours of Child Sexual Exploitation Material Offenders

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Abstract

An exploration of the technological behaviours of previously convicted child sexual exploitation material (CSEM) offenders provides a foundation for future applied research into deterrence, investigation, and treatment efforts. This study evaluates choices and transitions of individuals previously convicted of CSEM offenses. Based on their inclusion in two sex offender registries, anonymous survey results (n=78) were collected from English-speaking adults within the United States. CSEM offenders chose technologies based on both utility and perceived risk; peer-to-peer and web-browsers were the most common gateway technologies and showed substantial sustained usage; a substantial minority of users never stored CSEM and only viewed it; most respondents used more than one technology to view CSEM; CSEM offenders used more countermeasures than the public but did not use encryption at higher rates; almost all CSEM consumers started viewing adult SEM first; and countermeasures were used primarily to reduce psychological strain (anxiety).

Keywords: Child pornography, child sexual exploitation material, storage, viewing, countermeasures

Introduction

The technology usage of child sexual exploitation material (CSEM) offenders is inextricably and reciprocally linked to their offending behaviours and cognitions (O'Brien & Webster, 2007; Paquette & Cortoni, 2019). On the Internet, the choice of technologies creates a de facto distinct ecological niche (Ward & Beech, 2016), therefore the initial selection of technologies and continued (or discontinued) usage of those technologies influence offending. Because of this, understanding the patterns of technology usage by CSEM offenders is important for investigative, deterrence, and treatment efforts.

Prior research has focused on the prevalence of the usage of specific technologies at a particular point in time. The National Juvenile Online Victimization (NJOV) series studies (Wolak et al., 2005, 2012; Wolak, Finkelhor, Mitchell, et al., 2011), the largest of these, looked at arrest data to identify collection composition, technologies used, storage, and other characteristics of CSEM offenses. These studies provided high quality data on what was found during investigations but were not designed to identify usage trends that were not identified through investigative means nor identify the reasons particular offenders employed a technology. These and other studies (Lukas, 2013; O'Halloran & Quayle, 2010; Prichard et al., 2011; Steel, 2015; Wolak et al., 2014) also looked at long term trends in the overall prevalence of the usage of particular technologies, but focused on changes in aggregate usage and not changes in an individual's usage of technology.

There are three primary mechanisms in which technology is utilized by CSEM consumers - to obtain or view material, to store material, and as a countermeasure to protect them or hide their activities. Limited research has been conducted looking at what devices individuals have used to view CSEM, with a higher focus on storage. An overall review of the general trends in technology usage by CSEM consumers, including storage and viewing, can be found in Steel et al. (2020). The prevalence of storage on floppy disks was not thoroughly studied, though following the transition to the hard drive era research found that 95% of users stored CSEM on either hard drives or removable media (Wolak, Finkelhor, Mitchell, et al., 2011). Current storage methods are not well

studied, and prior research has either not incorporated current storage methods (e.g., USB flash drives) or the methods themselves have evolved substantially (e.g., mobile storage). For example, in the NJOV-2 study, 3% of individuals were found to have stored their CSEM collections on mobile devices, including iPods and media cards, and 4% used cyberlockers (Wolak, Finkelhor, Mitchell, et al., 2011), but these were based on law enforcement observations and not offender reporting. While specific devices used to view CSEM were not comprehensively quantified, the use of specific applications has been well quantified [e.g., (Hurley et al., 2013; Mehta, 2001; Steel, 2009a, 2009b; Wolak et al., 2014)], although data on the usage of multiple applications, as well as transitions between applications, is lacking. Additionally, the location where CSEM was viewed has been evaluated, with 2005 data showing home viewing being the primary location, with a small subset viewing CSEM primarily at work (7%) or at other locations (2%), and 18% viewing CSEM in multiple locations (Wolak, Finkelhor, & Mitchell, 2011). This information has not been updated, however, to reflect changes in mobile technology and subsequent increases in the use of mobile platforms for content consumption.

Countermeasures in this context are controls, technical or behavioural, that impact the confidentiality, availability, or integrity of CSEM material. They may be employed for technical purposes ranging from ensuring anonymity to frustrating law enforcement efforts to hiding activity from a spouse or partner. Countermeasures have been proposed as an integral part of typologies of CSEM consumers, with the use (or non-use) being a key differentiator between classifications (Krone, 2005). Balfe et al. (2015), in reviewing prior studies, found that the majority of CSEM offenders did not employ countermeasures. Wolak et al. (2005) found that 20% of offenders used "sophisticated" methods to hide their activities, and McCarthy (2010) found that 22% of offenders took steps to conceal their actions. Other work has found similar rates - Krone et al. (2017) found that 27% of CSEM offenders changed file or directory names, 22% deleted material, 7% used passwords, and 25% used other methods to conceal their actions. Looking specifically at encryption, usage rates by CSEM offenders have ranged from 3% (Wolak, Finkelhor, Mitchell, et al., 2011) to 7.7% (Krone et al., 2017). Countermeasures may also be employed for psychological purposes. As an

example, Norris and Kaniasty (1992) identified that the installation of door locks as a countermeasure in physical crimes reduced the psychological distress of homeowners.

This research enumerates and evaluates the usage of technology by English-speaking adults previously convicted of CSEM offenders (n=78) living in the United States. It represents the first research to examine the progression of technology usage within the CSEM offender community, including the identification of “gateway” technologies. Additionally, it provides quantitative information on the methods of viewing and storage of CSEM, as well as qualitative information on why individuals utilized a particular technology. Finally, it looks at countermeasure usage compared directly to a baseline population and examines the criminological as well as the psychological reasons for employing countermeasures.

Methodology

This research was part of a larger project looking at the technological behaviours and cognitions of CSEM offenders. The research consisted of two surveys using two different populations - one of the general public (used primarily as a baseline for reference purposes) and one of individuals previously convicted of CSEM offenses.

This research was conducted using data obtained through two anonymous online surveys hosted through Qualtrics - a public survey (of non-offenders) and a survey of individuals previously convicted of CSEM offenses. The public survey population was composed of English-speaking adults located in the United States and consisted of 11 demographic questions and one question related to their usage of countermeasures. Participants were recruited by Qualtrics using the Qualtrics Panel service (*Online Panels: Get Responses for Surveys & Research | Qualtrics*, n.d.). 524 participants successfully completed the survey and passed the integrated integrity checks. Because the population of previously convicted CSEM offenders who selected a listed gender identity (.99, n=77) identified primarily as male (.95, n=74) or gender variant/non-conforming (.04, n=3), only the subset of the population from the public survey matching those criteria (n=254) were used for comparisons in this research.

The second survey solicited responses via a postal mail requesting individuals previously convicted of CSEM offenses take an anonymous online survey related to their prior CSEM activities. The individuals solicited had been convicted of a CSEM offense within the past 10 years and were identified based on their inclusion on one of two United States sex offender registries. Of the population sent a request letter (n=2,508), a total of 78 individuals successfully completed an online survey that included 10 demographic questions and 10 relevant questions related to their usage of technologies associated with CSEM.

Respondents were provided the following definition for CSEM, which encompassed child pornography as well as child erotica, but was limited to visual depictions (as opposed to text stories):

> Sexually explicit material (SEM) is considered to be any pornographic and/or erotic images or movies depicting nude or semi-nude individuals, or individuals engaged in sexual activity, viewed for arousal purposes. Child SEM is considered to be any SEM containing at least one individual believed to be under the age of 18.

The options provided regarding technology were generated based on a review of technology usage by CSEM offenders (Steel et al., 2020) as well as commonly used technologies encountered as part of CSEM investigations (Steel, 2014).

Initial and Technology Evolving Usage

The ecosystem where respondents first encountered CSEM was identified through a multiple choice question where respondents were asked to select which of the most common technologies used to access CSEM (traditional websites, dark web, peer-to-peer, IRC, email, non-digital, or other) they used as a gateway. Progression was measured indirectly through the breadth of technologies they used. Respondents were asked the percentage of time they spent using each of the technologies noted. For each respondent, the gateway they used was then compared to each of the overall technologies they used, and directional pairings generated for each transition. The

transitions were then tabulated to identify the stickiness (continued usage) and exclusivity of each technology, as well as the most frequent progression pathways. Finally, respondents were asked whether in their history of viewing sexually explicit media (SEM) they initially viewed adult SEM or CSEM.

To identify the decision-making process used by respondents in choosing an application, they were asked about the importance of the following common features if CSEM technologies:

- Anonymity
- Ability to chat with others interested in child SEM
- Ability to chat with children
- Diversity of content available
- Ease of use
- Encryption
- Familiarity based on past usage
- Lack of Law Enforcement Presence
- Message boards where I could post questions
- Message boards where I could find links to child SEM
- Previews for images/movies
- Quantity of content available
- Recommendations from child SEM forums
- Search functionality
- Speed

Respondents were requested to rate the various features on a 5-point Likert scale with choices ranging from Not at All Important to Extremely Important.

Viewing and Storage of CSEM

Viewing of CSEM was measured by asking which devices a respondent ever used over the course of their viewing history to access CSEM content. Respondents were able to select multiple technologies from the provided choices (laptop computer, desktop computer, tablet, smartphone, game console, other, or none of the above), and were required to fill in an open text field if "other" was selected. The locations where individuals viewed CSEM were also elicited, with choices provided of home, hotel/motel, work, vehicle, and other; individuals were required to fill in an open text field if "other" was selected.

The technologies used by respondents to store CSEM were evaluated separately from the technologies they used to view CSEM. The categories provided were cloud storage services (e.g., Google Drive, Dropbox), external USB thumb drives, external USB hard drives, CD/DVDs, smartphones, game consoles, tablets, other, or none of the above. Respondents were able to select multiple technologies and were required to fill in an open text field if "other" was selected.

An open-ended question was asked regarding the reason they stored CSEM in the devices mentioned and inductively coded as noted below.

Use of Countermeasures

To evaluate their use of countermeasures specific to CSEM, respondents were asked which of 16 countermeasures they employed in general, and which countermeasures they employed specifically for CSEM. Following that, the respondents were asked to provide their agreement with the following statements about why they employed those countermeasures on a 7-point Likert scale from Strongly Disagree to Strongly Agree:

- To reduce my anxiety about getting caught
- To remain anonymous
- To hide my activities from a spouse or significant other
- To hide my activities from law enforcement if caught

- To hide my activities from other individuals
- To reduce my risk of getting caught

These countermeasures were compared to the countermeasures used by the non-offending population to identify any deviations.

Analysis

Likert scales were displayed using a diverging stacked bar chart, with a vertical line representing the median value (Heiberger et al., 2014). Comparisons between populations were performed using a one-tailed t-test, with countermeasure compared using a two proportion z-test. For the qualitative questions, common words and phrases were identified and were inductively grouped to facilitate the identification of common themes. The selected responses were included with no edits to spelling, punctuation, or grammar. All results were collected and analysed using R, with a p value of .01 used for statistical significance tests (where appropriate).

Ethics

Ethical approval was received from the Research Ethics Committee at the University of Edinburgh on May 20, 2020. Additionally, Institutional Review Board approval was received from George Mason University on May 13, 2020.

Results

The responses received in the non-offending group were diverse as to sex, sexual preference, age, relationship status, gender identity, race, employment, and education. The respondents within the group of individuals previously convicted of CSEM offenses were predominantly heterosexual (.72, n=56), white (.88, n=69), and gender identified as males (.95, n=74).

Initial and Evolving Usage

Of the respondents that indicated using a technology (n=76), peer-to-peer software was the most common gateway technology, with 46% (n=35) of respondents using it to

access CSEM for the first time. Traditional websites (sites on the open web, as opposed to those on the dark web) were the second most common at 30% (n=23), followed by the dark web and non-digital media (e.g., print magazines), each at 7% (n=5). In terms of overall usage, peer-to-peer was the highest at 46%, with the largest number of users (.66, n=50) using it as part of their technical CSEM activities. Traditional websites were the second most used at 22%, with the second highest number of users (.45, n=34), followed by the dark web at 15% and the third most users (.29, n=22). The greatest divergence present was with instant messaging, which had a small gateway role (.01, n=1), but larger overall usage at 12% and number of users at 12% (n=9). The detailed results are shown in Table 1.

Technology	**Gateway Usage**	**Overall Usage %**	**Proportion and # of Respondents**
Peer-to-Peer software (BitTorrent, Shareaza, Ares, Kazaa)	0.46 (n=35)	0.46	0.66 (n=50)
Traditional websites	0.30 (n=23)	0.22	0.45 (n=34)
Dark web (using TOR)	0.07 (n=5)	0.15	0.29 (n=22)
Non-electronic (magazine, photograph, etc.)	0.07 (n=5)	0.01	0.01 (n=1)
IRC (Internet Relay Chat)	0.03 (n=2)	0.02	0.12 (n=9)
None Provided	0.03 (n=2)	-	0.03 (n=2)
eMail	0.01 (n=1)	0.01	0.04 (n=3)
Newsgroups	0.01 (n=1)	0.01	0.04 (n=3)

Technology	Gateway Usage	Overall Usage %	Proportion and # of Respondents
Yahoo Groups	0.01 (n=1)	0	0.01 (n=1)
Unspecified/Other	0.03 (n=2)	0	0.01 (n=1)
Instant Messaging	0.01 (n=1)	0.12	0.12 (n=9)
Cyberlockers	-	0.01	0.03 (n=2)
Local/Self-Produced	-	0.01	0.01 (n=1)
Other Chat	-	0.01	0.01 (n=1)
Skype	-	0.01	0.03 (n=2)

Table 1: Starting and overall usage of technologies by CSEM offenders

In terms of breadth, the most common pattern was the usage of a single technology (.46, n=35), with no respondents using more than 4 technologies. 54% of respondents (n=41) indicated the use of at least one additional technology (Figure 1). Additionally, 54% (n=41) of individuals used their primary technology of choice more than 90% of the time.

Looking at progression of usage, the most frequently followed pathway was continued usage of the gateway technology, with 87% (n=66) indicating overall continued usage. Of the transitions to a different technology, the transition from Peer-to-Peer to traditional websites (.13, n=10), the transition from Peer-to-Peer to the dark web (.12, n=9), and the transition from traditional websites to Peer-to-Peer (.08, n=6) were the most frequent (Table 2).

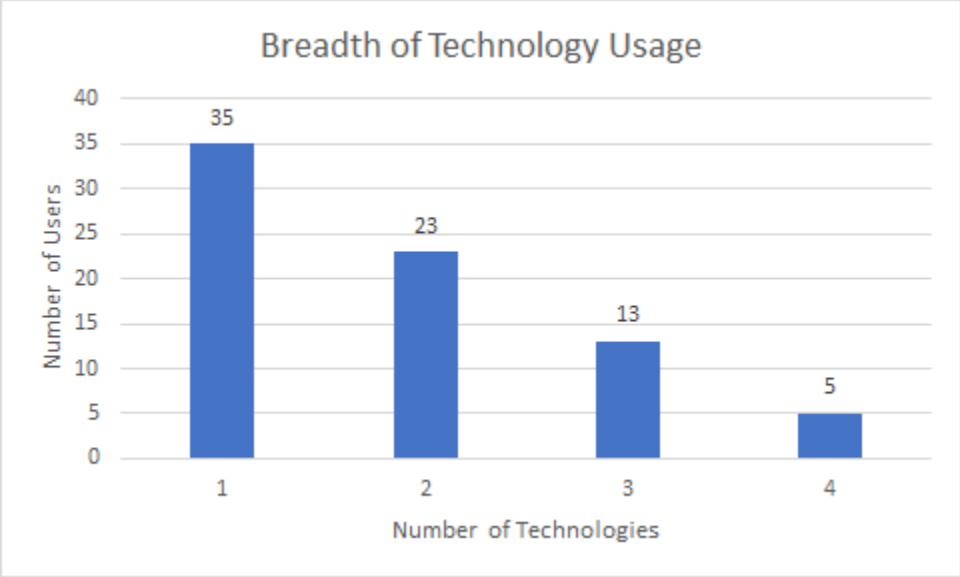

Figure 1: Breadth of Technology Usage

Pathway	Proportion and # of Respondents
P2P->Web	0.13 (n=10)
P2P->Tor	0.12 (n=9)
Web->P2P	0.08 (n=6)
Web->Tor	0.07 (n=5)
Web->IM	0.05 (n=4)
Web->IRC	0.04 (n=3)
P2P->IM	0.03 (n=2)
IRC->P2P	0.03 (n=2)

Pathway	Proportion and # of Respondents
Non-Digital->Web	0.03 (n=2)
Web->Other	0.03 (n=2)
P2P->IRC	0.03 (n=2)
Web->Skype	0.03 (n=2)
Newsgroups->P2P	0.03 (n=2)

Table 2: Most frequent pathways of technology progression

Looking at the use of adult SEM as a gateway, only a single respondent (1%) indicated that they started viewing CSEM first. Three additional respondents (4%) indicated that they started viewing both SEM and CSEM at the same time. The remainder, 95% (n=74), indicated that they began viewing adult SEM and transitioned to CSEM.

When choosing a technology to engage with CSEM, the most important factor cited was anonymity, with 82% (n=64) indicating that aspect was of at least moderate importance. That was followed by ease of use at 69% (n=54), a lack of law enforcement presence at 67% (n=52), familiarity with the technology at 65% (n=51), and the amount of content available at 64% (n=50). Social functions, including the ability to chat with others about CSEM (.15, n=12), the ability to chat with children (.05, n=4), and the ability to ask questions on message boards (.04, n=3) had very few individuals indicating they were important. Detailed factor information is shown in Figure 2.

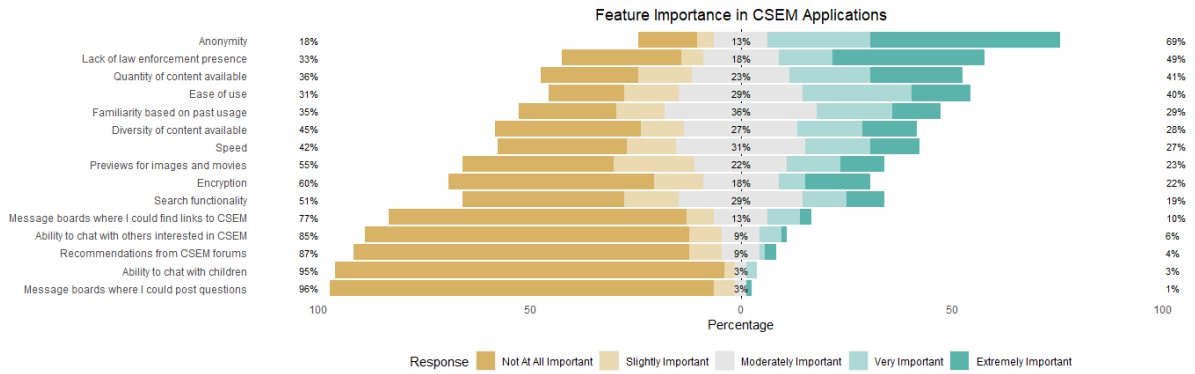

Figure 2: Importance of Features in Choosing a CSEM Application

Viewing and Storage of CSEM

The majority of respondents utilized either a desktop (.59, n=46) or a laptop (.58, n=45) to view CSEM, with 92% (n=72) using at least one of the two options. Smartphones were used by 27% of respondents (n=21), and 35% (n=27) viewed CSEM on more than one device (Table 3).

Device Type	**Proportion and # of Respondents**
Desktop Computers	0.59 (n=46)
Laptop Computers	0.58 (n=45)
Smartphones	0.27 (n=21)
Tablets	0.05 (n=4)
Game consoles	0.03 (n=2)
None of the above	0.05 (n=4)

Table 3: Devices used to view CSEM

For viewing location, four individuals indicated they did not view CSEM at any location and were excluded from the results. Of the remaining individuals, 99% (n=73) viewed CSEM at home, 22% (n=16) at a hotel/motel, 9% (n=7) from a vehicle and 9% (n=7) at work. Additionally, 3% (n=2) indicated they used open WiFi hotspots and one individual indicated they viewed it from a friend's house. 32% (n=24) of individuals viewed CSEM in at least two different locations.

External thumb drives (.31, n=24), followed by external hard drives (.28, n=22), were the most common methods of storing CSEM. Looking at all external media, 50% of users (n=39) stored their CSEM on at least one external device. Remote storage, including email and cloud-based storage (but not including smartphone storage, which may be backed up to the cloud), was used by approximately 8% (n=6) of users. 32% (n=25) reported storing CSEM on at least two different media types. Details on storage locations are shown in Table 4.

Technology	**Proportion and # of Respondents**
External USB thumb drives	0.31 (n=24)
External USB hard drives	0.28 (n=22)
Local Hard Drive	0.27 (n=21)
CD/DVDs	0.17 (n=13)
Smartphones	0.14 (n=11)
Cloud storage services (e.g., Google Drive, Dropbox)	0.05 (n=4)

Technology	Proportion and # of Respondents
Email	0.03 (n=2)
Tablets	0.01 (n=1)
Game consoles	0 (n=0)

Table 4: Storage location for CSEM

When asked why they stored CSEM using their chosen technology, the largest number of individuals (.45, n=35) cited convenience and ease of use to facilitate future viewing:

- “Because in 2003, It was easier to store the files rather than streaming or re-downloading them.”
- “Easily accessible for organizing and peer to peer file sharing.”
- “Because I didn't want to look for it in the internet again.”
- “To view later. It was like a hoarding addiction. Then I would cycle into depression and delete and destroy the evidence.”

The second most common reason (.19, n=15) cited involved the storage device being used as a countermeasure, either to hide the files or facilitate encryption:

- “I was trying to hide my addiction and did not want to alert others, so I just downloaded it to the computers hard drive and put the images in folders under different names.”
- “easy access and child could not accidentally find as hard drive was disconnected when i was not there”
- “To encrypt and hide.”

The third most cited reason was that it was the default location, and/or that there was no specific choice to store it using that technology (.14, n=11), with a smaller number indicating that they never stored any on the listed devices (.12, n=9). The remaining responses had no common theme (.14, n=11) (Table 5).

Rationale Given	**Proportion and # of Respondents**
For Ease of Access and Convenience	0.45 (n=35)
As a Countermeasure	0.19 (n=15)
Because it was the Default Location	0.14 (n=11)
Never Stored Any	0.12 (n=9)
Other	0.14 (n=11)

Table 5: Rationale for choice of storage

Use of Countermeasures

Overall, 96% (n=75) of respondents indicated using at least one countermeasure in general usage (m=5.1, sd=3.4), a significantly higher proportion than a reference population of non-offenders (m=3.2, sd=3.7) ($t = 4.2$, $df = 135$, $p<.01$). When asked specifically about their use of countermeasures in their CSEM viewing, the number decreased to 88% (n=69) of respondents using countermeasures (m=3.6, sd=3.0). The most frequently used countermeasure for both non-CSEM and CSEM related actions was the deletion of web browsing, at .86 (n=67) and .68 (n=53), respectively (Table 6).

Looking at the differences between the public respondents and the CSEM respondents, deletion of web browsing history ($z=5.7$, $p<.01$) , use of peer-to-peer software ($z=7.0$, $p<.01$), use of In-Private browsing ($z=4.6$, $p<.01$), the use of TOR $z=3.8$, $p<.01$),

mislabelling a directory (z=4.3, p<.01) and securely wiping hard drives (z=4.2, p<.01) were significantly more used in the CSEM group.

Activity	Proportion and # (All)	Proportion and # (CSEM)	Reference Population
I have deleted my web browsing activity	0.86 (n=67)*	0.68 (n=53)	0.49 (n=125)
I have used peer-to-peer software to download movies, images, or music	0.69 (n=54)*	0.63 (n=49)	0.26 (n=66)
I have used In-Private or other browsing modes to hide my browsing activity	0.56 (n=44)*	0.38 (n=30)	0.28 (n=71)
I have formatted my hard drive or another storage device to delete content	0.4 (n=31)	0.31 (n=24)	0.26 (n=66)
I have used secure wiping software to erase my hard drive or another storage device	0.4 (n=31)*	0.31 (n=24)	0.17 (n=43)
I have mislabeled a directory or a storage device to hide its contents	0.33 (n=26)*	0.28 (n=22)	0.12 (n=31)
I have encrypted individual files on one of my storage devices	0.31 (n=24)	0.18 (n=14)	0.24 (n=61)
I have used a VPN service to hide my web activity	0.26 (n=20)	0.15 (n=12)	0.28 (n=72)
I have used TOR to access content on the dark web	0.26 (n=20)*	0.22 (n=17)	0.09 (n=23)

I have created an email account using a fake name	0.26 (n=20)	0.13 (n=10)	0.17 (n=44)
I have used whole disk encryption on my laptop or desktop	0.18 (n=14)	0.08 (n=6)	0.18 (n=46)
I have created a social media account using a fake name	0.18 (n=14)	0.06 (n=5)	0.13 (n=34)
I have deleted or altered log files to hide my activity	0.17 (n=13)	0.1 (n=8)	0.08 (n=21)
I have read message boards or forums on hiding my activities	0.12 (n=9)	0.12 (n=9)	0.1 (n=25)
I have used a cryptocurrency (e.g., Bitlocker, Etherium, Monero)	0.05 (n=4)	0.01 (n=1)	0.13 (n=32)
I have used a virtual machine to hide my activities	0.05 (n=4)	0.04 (n=3)	0.09 (n=22)
I have never taken any of these actions	0.04 (n=3)	0.04 (n=3)	0.21 (n=54)
I have downloaded a guide on hiding my activities	0.04 (n=3)	0.12 (n=9)	0.07 (n=18)
I have used steganography to hide content	0 (n=0)*	0 (n=0)	0.05 (n=13)

Table 6: Countermeasure usage by CSEM Offenders *difference between offender and reference population p<.01

In terms of using countermeasures related to CSEM, reduction of anxiety was the reason with the highest aggregate agreement, with 71% (n=55) of respondents

indicating agreement. This was followed by the need to remain anonymous, with 67% (n=52) of CSEM respondents indicating agreement (Figure 3).

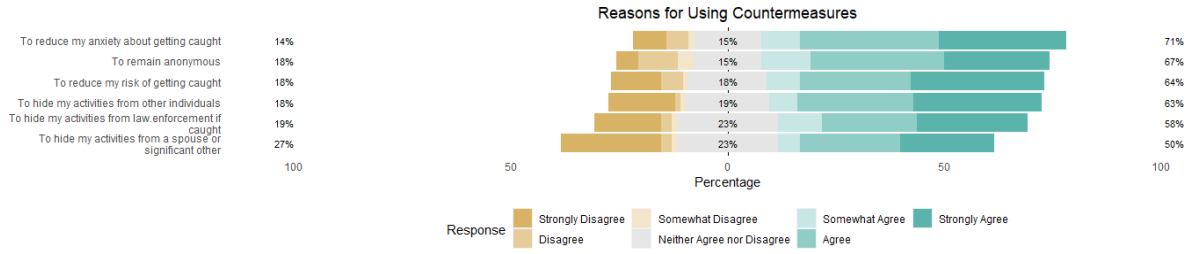

Figure 3: CSEM respondents' reasons for using countermeasures

Discussion

Viewing of CSEM was primarily done on laptops and desktops, although a substantial minority (27%) indicated the use of mobile phones to view material. Given the growth of mobile usage amongst CSEM offenders (Steel et al., 2020) and the age of the offenses in the sample, this number is very likely higher at the present time. Only 35% of individuals indicated they used more than one technology to view CSEM (although this may be influenced by the aforementioned age of the offense), indicating that the majority (65%) of offenders had an exclusive technology preference in how they viewed their material.

Most offenders (53%) viewed CSEM on at least two different ecosystems. Peer-to-peer and web ecosystems were the most frequently employed, and these were also the most frequent technologies used as gateways. Additionally, the majority of individuals (95%) indicated that they started viewing adult SEM first, indicating initial viewing of erotic material was not child-focused.

Most offenders (87%) kept using the same ecosystem they started with, supporting a normalization effect being present. Even when transitioning, most of the transitions occurred between the two of the ecosystems with the lowest barriers to entry (web browsing and peer-to-peer), with transitions to the dark web being the next most common. The primary gateway technologies were largely non-social, and transitions from primarily non-social mechanisms to social mechanisms occurred more than from

social to non-social. Qualitative research to identify the specific reasons for individual transitions was beyond the scope of this project but would help elucidate the specific needs or events that caused the change in technology usage.

The lack of a strong social mechanism in most gateway technologies is inconsistent with the *causal* mechanisms proposed by differential association (Sutherland et al., 1992). Differential association would suggest that initial CSEM offending behaviour is learned through communication with other, potentially more experienced, offenders. Because there is no a priori peer interaction in initial usage (there is the possibility of offline peer influence, though the likelihood of a high prevalence of this is improbable), individuals would not initially learn values, attitudes, techniques, and motives and then turn to criminality, or alternatively seek to emulate high status individuals within their social structure (at least initially). Post hoc differential association, however, would still have an influence on values, attitudes, techniques, and motives as well as rationalizations to facilitate and exacerbate continued usage, differentiating CSEM usage from other criminal behaviours. This is further supported by the relatively low overall importance given to social features in choosing CSEM consumption technologies. Because of this, for deterrence and treatment efforts, targeting dysfunctional social relationships is unlikely to be effective as a general approach and may only be appropriate for small subsets of offenders.

When choosing a technology, the most important factors were a mix of safety-related factors such as the ability to remain anonymous (82%) and the lack of capable guardianship (67%), as well as usability factors such as ease of use (69%), and the overall availability of content of interest (64%). This shows that both utility-based factors (ease of use and content availability) as well as protective factors (anonymity and lack of capable guardianship) were important. Ease of use is not necessarily a viable target for deterrence efforts, however the other main factors do represent viable targets. Since *perceived* anonymity and capable guardianship (in the form of law enforcement) were of high importance, timely interventions and education targeting these perceptions are potentially viable. This is consistent with the reduction seen in usage of web browsing commensurate with the implementation of warning messages

(Steel, 2015), and may indicate that including the individuals IP address in those messages might have an even higher deterrence effect (targeting perceived anonymity). Additionally, investigative efforts prioritizing large distributors on peer-to-peer networks (targeting content availability) have a potential deterrence effect, and there is a theoretical basis for the efficacy of seeding peer-to-peer networks with "warning" messages integrated into fake CSEM files.

For risk evaluation, digital forensics and sentencing purposes, 19% of respondents reported not storing CSEM at all (viewing only). As a result, the breadth and quantity of images and videos found are not an accurate measure of the actual content consumption behaviour for a substantial proportion of respondents. Expecting the presence of images and videos to confirm illegal activity is therefore neither sufficient nor should it be necessary to determine consumption. As bandwidth increases and persistence of CSEM for availability purposes remains high, viewing without storage may become more commonplace.

When storing content, the most common reason for choosing a particular medium was related to convenience and later viewing, with a smaller proportion citing the mechanism of storage as a countermeasure. This dynamic would be expected to change over time based on two competing mechanisms. First, if deterrence efforts (or other factors) cause the availability and persistence of specific content to decline (Bissias et al., 2016), storage would be likely to increase. Second, increases in bandwidth and other technological advances that allow more ready access to CSEM would likely cause the storage to decrease. Previously, the costs of storage (e.g., floppy disks and early spinning hard drives) provided a limiting factor on storage, however the low cost of storage and inexpensive availability of tens of terabytes of local storage have largely removed that as a factor.

Of particular interest in the locations chosen to store content, a larger number of individuals cited the benefits of easy access and usage over those doing so as a countermeasure. Additionally, while the overall use of countermeasures was higher in the CSEM group, the countermeasures used more frequently were mostly those that

were low-tech (deleting browsing history, using In-Private browsing) or specific to the CSEM content acquisition (using peer-to-peer and Tor). Of specific interest, there was no statistically significant difference in the use of encryption between the non-offender and the CSEM respondent groups. Because the use of encryption is uncommon, selective encryption of CSEM content can be considered a significant factor in showing awareness by an offender that its possession is not socially (or potentially legally) acceptable. Future research is needed to determine if there are common characteristics in the subset of CSEM offenders that use technically advanced countermeasures.

Countermeasure usage appears to have been used to reduce the psychological strain of CSEM activities, with using it to reduce anxiety having the highest levels of overall agreement. This was followed by anonymity, which serves a psychological as well as a precautionary role. Although these were the highest rated motivations, the use of encryption for precautionary purposes (to avoid detection or hinder law enforcement) was also rated high, showing that there were mixed motivations present.

Limitations

Due to the age of the convictions, which were as far back as ten years prior to the study, the reported technology usage represents historical usage and may not be representative of current usage of new technologies. In particular, the move toward mobile may only be partially reflected in the data above. The large focus of law enforcement on peer-to-peer investigations in the period under investigation may also have had an influence on the results. The specific conviction dates were not solicited for anonymity purposes to avoid the potential identification of an individual when combined with the responses to other demographic questions.

For countermeasure usage, the rates reported are those that were intentionally used beyond the built-in countermeasures present. For example, storage on a mobile phone with default encryption (*iPhone 6 Plus - Technical Specifications*, 2019), would be present for a subset of users and therefore actual usage in practice is expected to be higher than the explicitly chosen usage identified in this research. Additionally, the

aggregate agreement with reasons for using countermeasures were elicited, but the respondents were not asked to rank the individual reasons, limiting comparisons of relative value to a specific individual. Finally, there is a potential sampling bias in that the use of countermeasures may have precluded detection or conviction.

The populations for the two surveys were both English-speaking individuals at least 18 years of age living in the United States. This limits generalization of the findings without additional research. Finally, there was a Covid-19 outbreak that occurred during the course of this research, which may have influenced response rates and unemployment numbers (Coibion et al., 2020).

Conclusions

This research provided insight into which technologies individuals use to consume and retain CSEM material. CSEM consumption and storage patterns of CSEM indicated individuals showed preferential behaviour toward a single technology, with a substantial minority of users using multiple technologies. Changes in technology usage patterns over time support social factors being a potential facilitator of ongoing CSEM usage, but not initial CSEM usage. For deterrence efforts, therefore, attempts to interdict initial CSEM viewing by preventing associations (or vicarious associations), is less likely to be successful than attempts to disrupt ongoing reinforcement through those same associations.

Previously convicted CSEM offenders used more countermeasures than non-offenders, though these may be in response to having been previously caught. Although they use more countermeasures, they tended to use countermeasures that were less sophisticated - notably, encryption usage was no higher in the CSEM group than the reference group. The most supported reason for using countermeasures in their CSEM activities was to reduce psychological strain, not as a precautionary action. The use of countermeasures as an unhealthy coping mechanism provides input to treatment plans and supports approaches that provide alternative coping mechanisms, particularly if the consumption of CSEM is related to life stressors for a particular individual.

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Annex

Countermeasure	Offender (N=78)	Public Matched (N=254)	Z	p
I have deleted my web browsing activity	0.86 (n=67)	0.49 (n=125)	5.739	<.001*
I have used peer-to-peer software to download movies, images, or music	0.69 (n=54)	0.26 (n=66)	6.954	<.001*
I have used In-Private or other browsing modes to hide my browsing activity	0.56 (n=44)	0.28 (n=71)	4.620	<.001*
I have formatted my hard drive or another storage device to delete content	0.4 (n=31)	0.26 (n=66)	2.337	0.010
I have used secure wiping software to erase my hard drive or another storage device	0.4 (n=31)	0.17 (n=43)	4.235	<.001*
I have mislabeled a directory or a storage device to hide its contents	0.33 (n=26)	0.12 (n=31)	4.328	<.001*
I have encrypted individual files on one of my storage devices	0.31 (n=24)	0.24 (n=61)	1.195	0.116
I have used a VPN service to hide my web activity	0.26 (n=20)	0.28 (n=72)	-0.467	0.320

Countermeasure	Offender (N=78)	Public Matched (N=254)	Z	p
I have used TOR to access content on the dark web	0.26 (n=20)	0.09 (n=23)	3.816	<.001*
I have created an email account using a fake name	0.26 (n=20)	0.17 (n=44)	1.629	0.052
I have used whole disk encryption on my laptop or desktop	0.18 (n=14)	0.18 (n=46)	-0.032	0.487
I have created a social media account using a fake name	0.18 (n=14)	0.13 (n=34)	1.002	0.158
I have deleted or altered log files to hide my activity	0.17 (n=13)	0.08 (n=21)	2.140	0.016
I have read message boards or forums on hiding my activities	0.12 (n=9)	0.1 (n=25)	0.432	0.333
I have used a cryptocurrency (e.g., Bitlocker, Etherium, Monero)	0.05 (n=4)	0.13 (n=32)	-1.856	0.032
I have used a virtual machine to hide my activities	0.05 (n=4)	0.09 (n=22)	-1.016	0.155
I have never taken any of these actions	0.04 (n=3)	0.21 (n=54)	-3.567	<.001*
I have downloaded a guide on hiding my activities	0.04 (n=3)	0.07 (n=18)	-1.028	0.152

Countermeasure	Offender (N=78)	Public Matched (N=254)	Z	p
I have used steganography to hide content	0 (n=0)	0.05 (n=13)	-2.038	0.021

Table Annex.1: Countermeasure usage differences between offender and reference groups. * Statistically significant difference at p<.01 after Bonferroni correction.

Chapter 11 - Collecting and Viewing Behaviours of Child Sexual Exploitation Material Offenders

11.1 Overview

Historically, collecting behaviour has been viewed as an essential part of CSEM offending for a subset of offenders (Quayle & Taylor, 2004). By understanding the nature of their collections as well as their motivations for collection (if collecting is a motivation), greater insight can be gained to inform treatment initiatives. In addition to collecting, the breadth of their viewing habits of both adult SEM and CSEM, particularly when compared to a non-offending population, allows for an indirect examination of novelty-seeking behaviour. Finally, the importance of the collection can be viewed through the lens of its deletion - when and why individuals delete their collections and what cognitions are associated with these actions can highlight target areas for future treatment efforts.

This research used a mixed-methods approach to collect both quantitative and qualitative information using an online survey tool. The previously described offender population's collecting and viewing behaviours were identified and compared as appropriate against that of the reference population.

With respect to the overall thesis, the results of this investigation confirmed the presence of additional non-traditional treatment targets, including novelty-seeking and guilt/shame cycles. There was a high degree of novelty-seeking present, with evidence confirming adult pornography is a potential enabler of and gateway toward CSEM for a subset of offenders. As such, understanding adult pornography usage needs to be considered in developing behavioural treatment plans, as both a potential legal alternative outlet for behaviour and a potential trigger. Similarly, the periodic deletion of

CSEM by the majority of offenders calls into question the importance of the collection and collecting itself as a broadly used treatment target, and provides a timing target for deterrence efforts.

11.2 Summary of Findings

The major findings of the research were as follows:

- The majority (78%) of the offenders did not organize their CSEM content into collections.
- The majority (74%) of the offenders deleted their content on at least one occasion. The deletions occurred primarily as a result of a periodic guilt/shame cycle.
- None of the offenders viewed CSEM exclusively, and the majority (74%) viewed more adult SEM than CSEM.
- CSEM offenders viewed more categories of adult SEM than the reference population.
- The age range of the CSEM content viewed did not support the concept of highly preferential viewing but did support general novelty seeking as a behaviour of interest.
- The self-reported recidivism rate was 10%, with infrequent post-conviction CSEM activity.
- The prevalence of novelty-seeking behaviour and the guilt/shame cycle of deletions provide potential treatment targets, while the low self-reported recidivism rates support selective and not universal treatment.

Collecting and Viewing Behaviors of Child Sexual Exploitation Material Offenders

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Abstract

Background

The collecting behaviors of child sexual exploitation material (CSEM) offenders provide an understanding of cognitions and motivations that have clinical application.

Objective

This study analyzed the CSEM collecting and viewing behaviors of previously convicted offenders.

Participants and Settings

A postal mail solicitation soliciting participation in an online survey was sent to individuals previously convicted of CSEM offenses in the United States. Comparison information from a non-offending population (N=524) was collected and compared to the CSEM respondents (N=78).

Method

A mixed-methods approach was utilized. The CSEM group was compared to a gender-matched sample from the non-offending group for general adult SEM collecting behavior, and exploratory analyses of the CSEM responses related to collecting behavior, collection diversity, and recidivism were conducted.

Results

The majority (78%) of the respondents did not organize their content into collections and 74% deleted their entire collection on at least one occasion, with periodic deletion as part of a guilt/shame cycle. None of the participants viewed CSEM exclusively, and 74% viewed more adult material than CSEM. The age range of CSEM content viewed did not support highly preferential viewing but did support general novelty seeking. The self-reported recidivism rate was 10%, with infrequent post-conviction CSEM activity.

Conclusion

Treatment professionals should not assume that pedophilic interests are the sole or even primary motivator for CSEM behavior - problematic Internet usage, general pornography consumption, coping issues, or novelty seeking may be more appropriate targets for some offenders.

Keywords: Child pornography, child sexual exploitation material, collecting behavior, recidivism, novelty seeking

1. Introduction

The treatment of individuals who commit child sexual exploitation material (CSEM) offenses can take multiple forms, and developing an effective treatment approach can be informed by an assessment of the collecting and viewing behaviors of the patient. Pre-conviction, treatment may rely on addressing pedophilic interests and distorted cognitions surrounding CSEM content and the associated victims. The German Dunkelfeld project, for example, targets self-reported pedophiles, and uses a mix of cognitive behavioral and pharmacological approaches. The project's primary treatment targets include coping skills, emotional self-regulation, victim empathy, and offense-supportive cognitions (Beier et al., 2015), and reports of its efficacy have been mixed (Beier, 2016; Mokros & Banse, 2019). Post-conviction, treatment may be directed at reducing recidivism, and target criminogenic needs. The Internet Sex Offender Treatment Program (I-SOTP) combines aspects of Problematic Internet Use (Quayle & Taylor, 2003) and the Good Lives Model (Ward & Stewart, 2003), focusing in part on distorted, offense-supportive cognitions; increased victim empathy; replacing the use of CSEM as part of a coping strategy; and developing pro-social behaviors (Middleton et al., 2009). Both treatment paths can utilize a behavioral approach, addressing the activities that facilitate the patient's engaging in problematic viewing habits.

Potential differentiators informing treatment choice include the presence of specific, pedophilic interests and the absence or presence of compulsions underlying collecting behavior. For non-pedophilic CSEM offenders, novelty-seeking may be more important than the content (Knack et al., 2020), or collecting itself (including the act of searching) may be a more important driver (Quayle & Taylor, 2002). This research seeks to evaluate CSEM consumers' viewing habits as well as the content of and their interaction with their CSEM collections, including the breadth of that content and its composition, to better understand their behaviors.

The viewing and collecting habits of CSEM offenders have been previously identified as an important characteristic of offending behavior (Quayle & Taylor, 2002). Collecting behavior itself has been noted as being of primary importance for a subset of collectors - for example, Krone noted that "Digital technology and the Internet make it possible for

child pornography consumers to become obsessive collectors so that the collection of images becomes an end in itself." (Krone, 2004, p. 3) Despite the interest in collecting behavior, minimal work has been done looking at the content of collections and the overall activities of CSEM offenders related to their collections. Small case studies have identified a predominance of CSEM activity when compared to adult sexual exploitation material (SEM) activity as a salient indicator of pedophilia (Seigfried-Spellar & Rogers, 2014), and prior work has looked at the age and gender distribution of individuals in the corpus of known victims (Quayle & Jones, 2011). Additionally, prior work has identified a homology between the quantity and composition of CSEM collections and contact offending behaviors, including victim selection (Long et al., 2013). In one of the few studies looking specifically at digital evidence from case studies, Glasgow (2010) identified characteristics of CSEM and SEM collections that point to preferential interest, but population-based quantitative research looking at specific collections is lacking.

Chronophilias, the sexual preference for children based on age including but not limited to pedophilia and hebephilia, have been proposed as a potential independent sexual preference (Seto, 2017), with some support in phenomenological studies (Walton & Duff, 2017). Pedophilic interest in particular has been previously cited as a primary motivation for CSEM offending, with 60% of offenders exhibiting phallometric response to CSEM material and CSEM viewing behavior proposed as a diagnostic indicator for pedophilia (Seto et al., 2006). Pedophilia has additionally been proposed to be better represented as a continuum as opposed to a taxon (Stephens et al., 2017), though how this is reflected in the behavior of CSEM offenders has not been explored.

The importance of pedophilic interest as the primary driver for a majority of CSEM offenders has been questioned, particularly in light of novelty-seeking behavior and general deviance (Quayle, 2020), and the evidence that a significant proportion of offenders do not exhibit a phallometric response (Seto et al., 2006). Problematic Internet usage in general (Quayle & Taylor, 2003), as well as pornography addiction (Seto et al., 2010) are potential drivers of CSEM activities separate from pedophilic interest. CSEM consumers are also frequent consumers of other deviant pornography

(Endrass et al., 2009). Deviant categories can be identified based on statistical deviation from general public usage, for example Hald and Stulhofer identified sadomasochism, fetishism, violent sex, BDSM, and bizarre or extreme SEM as deviant based on a latent class analysis (Hald & Štulhofer, 2016). Seigfried-Spellar and Rogers (2013) found that CSEM consumers were more likely to consume deviant pornography such as bestiality content and were also frequent consumers of adult content (60% viewed adult and bestiality content), and Fortin and Proulx (2019) identified a progression of deviance in terms of both age and extremity of SEM consumed over time. Additionally, prior work has shown that engagement with CSEM may be principally through a transition from adult SEM viewing (Garman et al., 2019)

In terms of post-conviction interactions, little work has been done to identify actual recidivism rates and the extent of re-engagement in collecting and viewing activities. Extant work has centered on subsequent arrests and convictions. In examining CSEM-related arrests approximately five years after an CSEM-only offence, Seto and Eke (2015) identified CSEM-only offenders as having a 7% recidivism rate, and Eke et al. (2011) found the rate to be 6.8%. Faust et al. (2015) found an even lower rate for CSEM offenders of 1.6% at a mean of five years following initial conviction. While the overall rates were low, they are considered to be lower bounds, as a percentage of recidivists will not be caught.

This research seeks to better quantify and qualify the viewing and collecting behaviors of CSEM offenders through an exploratory cross-sectional study. First, the scale of traditional collecting was defined by asking about attempts to find and obtain content from a specific series or of a specific victim (Jenkins, 2001; Taylor & Quayle, 2003). The organization of this content, and the rate and reasons for deleting the content, were ascertained. Second, the diversity of the CSEM with respect to age and gender of the individuals depicted (including adult SEM) were quantified. The categories of both adult SEM and CSEM viewing were identified and compared to a reference population of non-offenders. Finally, any post-conviction viewing was evaluated and reviewed for any correlation with prior mental health treatment.

2. Methods

This research utilized a mixed methods approach to analyze the collecting and viewing behaviors of individuals previously convicted of CSEM offenses. The analyses performed were broken into three categories - collecting behaviors, collection diversity, and recidivism. The details of each of the analyses are identified below, followed by the analytical tests performed.

2.1 Participants and Setting

This research was conducted using data obtained through two anonymous online surveys hosted through the University of Edinburgh's Qualtrics instance. The public survey was of non-offenders, specifically English-speaking adults in the United States, and consisted of 11 demographic questions and 30 questions related to adult SEM viewing and beliefs about CSEM offenders. Participants were recruited by Qualtrics using their Qualtrics Panel service (*Online Panels: Get Responses for Surveys & Research | Qualtrics*, n.d.), and 524 participants successfully completed the survey and associated integrity checks. Because the population of previously convicted CSEM offenders who specified a gender identity (.99, n=77) identified primarily as male (.95, n=74) or gender variant/non-conforming (.04, n=3), only the subset from the reference population identifying with those options (n=254) were used for comparisons in this research.

The second survey solicited responses from individuals previously convicted of child pornography offenses within the prior 10 years. The individuals were English-speaking adults within the United States solicited via postal mail based on their inclusion in two sex offender registries for the states of Texas and Illinois, which were selected based on the availability of both offence and residence data. Of the solicitations sent (N=2,508), 141 individuals responded by taking an online survey that included 10 demographic questions and 80 questions related to their beliefs and behaviors associated with their CSEM activities. The survey contained two integrity check questions, one multiple choice question and one embedded within a matrix, to confirm attention. Of those starting the survey, three respondents declined the informed consent and were not presented the questions. Additionally, 40 respondents failed to complete the survey in its entirety and partial responses were not maintained (this was done to allow

individuals to opt-out at any point by stopping the survey). Twenty respondents failed the integrity checks, resulting in a total of 78 responses.

2.2 Collecting Behavior

General collecting behavior was assessed by asking respondents if they ever tried to collect all of the images in a given series or for a given individual depicted. The respondents were additionally asked how they had organized their collections (multiple selections were permitted) based on common categorizations found during digital forensics examinations (Steel, 2014):

- All in the same directory
- By the age of the individual portrayed
- By the acts performed
- By how much I like the content
- I only viewed content, I didn't download it
- Other

Individuals selecting “Other” were asked to provide a text explanation.

Respondents were additionally asked if they had ever deleted their entire collection. If they had deleted their collection, they were asked an open-ended question about why they had deleted it and the results qualitatively analyzed for themes using inductive coding as noted below.

2.3 Collection Diversity

To evaluate the diversity of sexual content collected by the previously convicted CSEM offenders and how that differed from the reference population, a series of popular categories of adult SEM as well as more deviant SEM such as bestiality were identified. Respondents were asked to select all of the categories in which they had viewed adult SEM on at least one occasion. The categories were identified based on the top eight categories identified by the Pornhub Insights team as the most popular on their site, the largest adult SEM site on the Internet (*The 2019 Year in Review – Pornhub Insights*, n.d.). Additionally, four categories of deviant SEM frequently associated with CSEM

(Endrass et al., 2009; Seigfried-Spellar & Rogers, 2013; Steel, 2014) were identified for inclusion - bestiality, nudism/naturism, rape/forced sex, and hentai. The categories were presented in a randomized order to both populations. The previously convicted CSEM offender population was additionally asked in which of those categories they specifically viewed CSEM content.

In addition to the diversity in the content depicted, the ages depicted were elicited from the previously convicted CSEM offender population based on the totality of their viewing history. The respondents were asked to indicate what percentage of pornography they ever viewed was CSEM as opposed to adult SEM, as well as what percentage of the CSEM they ever viewed fell into each of six evenly distributed age groups covering all minors (0-17). The weighted average age for each of the respondents was calculated as the average of the median age for each group multiplied by the percentage for that group. Finally, they were asked the total percentage of CSEM they had ever viewed in which child was male and what percentage the child was female.

2.4 Self-Reported Recidivism

Self-reported recidivism was measured by asking respondents to indicate their viewing of CSEM since their conviction in five categories, with any viewing considered recidivating behavior. The categories were used instead of a simple yes/no question to reduce minimization and provide additional resolution on post-conviction activities:

- I only viewed it once or twice but did not continue doing so
- I have viewed it very infrequently
- I have viewed it frequently
- I have viewed it on a regular basis
- I have not viewed any since my conviction

Respondents were asked if they had ever attended counselling or treatment related to their CSEM activities, and correlations between recidivism and prior treatment were assessed.

2.5 Analysis

The demographics for the groups were evaluated for significant differences using a one-tailed, two proportion z-test for the categorical data proportions and a Wilcoxon ranked sum test for the income data, with a Bonferroni correction applied for multiple comparisons.

Chi-square tests were used for categorical category comparisons and proportion comparisons. Distributions of collection size were evaluated using a one-tailed t-test. For the continuous data, one-way ANOVA tests followed by a pairwise Tukey analysis (where appropriate) corrected for multiple comparisons was used. For the qualitative questions, common words and phrases were identified and were inductively grouped to facilitate the identification of common themes. The selected responses were included with no edits to spelling, punctuation, or grammar. All results were collected and analyzed using R, with a p value of .01 used for statistical significance tests (where appropriate).

2.6 Ethics

Ethical approval was received from the Research Ethics Committee at the University of Edinburgh on May 20, 2020. Additionally, Institutional Review Board approval was received from George Mason University on May 13, 2020.

3. Results

The respondents to the public survey were diverse as to sex, sexual preference, age, relationship status, gender identity, race, employment, and education. The previously convicted offender survey was demographically reflective of the CSEM offender community, with 95% (n=74) of respondents gender identifying as males, 72% (n=56) as heterosexual, and 88% (n=69) as white or Caucasian. The only areas with significant differences the between the gender-matched sample and the previously convicted offender sample were that the offender sample were more likely to be bisexual ($z=3.70$, $p < .01$) and to have a liberal arts degree ($z=3.79$, $p < .01$), whereas the public matched sample were more likely to be heterosexual ($z=-4.30$, $p < .01$), black or African American ($z=-3.65$, $p < .01$), and married ($z=-3.91$, $p < .01$) using one-tailed, two proportion z-tests with Bonferonni corrections applied. Additionally, the offender

group was found to have a lower income using a Wilcoxian ranked sum test (W=12792, $p < 01$) Full demographic details of the respondents can be found in Appendix A.

3.1 Collecting Behavior

Of the respondents, 42% (n=33) confirmed that they had attempted to collect all of the pictures of a series or of an individual. The majority of individuals, 78% (n=62), did not employ any organization for their content or bundled it into the same directory (Table 1). Of the remainder, the most common organization method was by how much they liked particular content at 8% (n=6), followed by the acts depicted in that content at 6% (n=5).

Categorization	Proportion and # of Respondents
All in the same directory/No Organization	0.78 (n=62)
By how much I like the content	0.08 (n=6)
By the acts performed	0.06 (n=5)
By the age of the individual portrayed	0.05 (n=4)
I only viewed content, I didn't download it	0.04 (n=3)
By Content Type (Images v. Videos)	0.03 (n=2)
Other (please specify)	0.08 (n=6)

Table 1: Organization of Collections

For collection maintenance, 74% (n=58) of respondents indicated that they deleted their entire collection at least once. Of those that deleted their collections 47% (n=27), had a theme present in their explanations of why they did so of guilt, shame, and remorse, example statements of which included:

- “I was absolutely repulsed and sick to my stomach that I had sunken to such lows. I knew this was exploitative and I was ashamed. I was frightened and knew this was illegal behavior which could ruin my life-which it did.”
- “Shame and embarrassment of what I was doing, fear of being caught, regret for doing it.”
- “Trying to stop. Disgusted with myself.”

The combination of guilt and shame associated with deletions was also noted by several individuals as being cyclic:

- “Usually every time after I finished masturbating I felt ashamed and realized that was not the life I wanted to live. So I'd delete everything only to redownload it later”
- “I knew my deviant behavior was a problem and I had promised to rehabilitate myself. I would delete my entire collection but always go back and view/download after a period of time. This would occur numerous times over a few year [sic] period. It wasn't until after I was caught that I came to the realization that I was an addict and that deleting my collection was a standard phase of remorse in the cycle that I was stuck repeating time and time again.”
- “Guilt. Anger. Shame. Admitting to it to wife and family. Seeking help. Deletion was always part of the cycle.”

A second theme present was a desire to stop (often co-existing with the first theme), expressed by 33% (n=19) of respondents:

- “I was addicted to pornography. I would delete and saved [sic] adult SEM or child SEM shortly after I would save it. I would delete it with the thought that [sic] is the last time I am going to look at this crap.”
- “I was trying to stop looking at it, but the urges were to [sic] great and I went back to it.”

Twenty six percent (n=15) highlighted fear, focused on a fear of getting caught and the associated consequences:

- “Combination of fear of getting caught and not wanting to be attracted to [sic] child sem anymore.”
- “Fear of doing something unethical, immoral, and illegal. Fear of encountering law enforcement.”

A final theme present in 14% (n=8) of the responses was the deletion of content as part of routine computer hygiene practices or as a specific countermeasure related to CSEM viewing:

- “I was looking for certain adult users. I deleted all after every search.”
- “I deleted everything I downloaded after every session.”

3.2 Collection Diversity

Overall, the previously convicted offender group were more likely to view adult pornography in every category. Table 2 shows the proportion of individuals that viewed SEM (for the public and for the offender groups) or CSEM (for the offender group) in each of the enumerated categories. Additionally, the ratio of offender viewing to public viewing is shown to indicate relative differences in viewing. In particular, the ratio between the previously convicted offender group and the reference population was highest in the bestiality (15.8:1), hentai (5.6:1), teen (5:1), and nudist/naturist (4.7:1) categories. Additionally, the number of categories viewed, indicating the breadth of content viewed, was significantly higher using a one-tailed t-test, $t(113) = 14.4$, $p < .01$, for the offender group (m=7.12, sd=2.88) than the reference group (m=1.93, sd=2.44).

Category	Offender (SEM)	Offender (CSEM)	Public	Offender/ Public SEM Ratio	$\chi 2$
Bestiality	0.44	0.18	0.03	15.82	$\chi 2 = 88.2$, $p < .01$
Hentai	0.54	0.31	0.09	5.95	$\chi 2 = 73.2$, $p < .01$

Category	Offender (SEM)	Offender (CSEM)	Public	Offender/ Public SEM Ratio	χ2
Teen	0.90	0.71	0.18	4.96	$\chi2 = 131.6$, $p < .01$
Nudist/Naturist Images	0.68	0.59	0.15	4.66	$\chi2 = 83.4$, $p < .01$
Anal	0.76	0.36	0.17	4.37	$\chi2 = 92.1$, $p < .01$
Rape/Forced Sex	0.31	0.31	0.07	4.34	$\chi2 = 28.2$, $p < .01$
Japanese	0.69	0.38	0.17	4.19	$\chi2 = 78.1$, $p < .01$
Lesbian	0.81	0.37	0.25	3.21	$\chi2 = 75.7$, $p < .01$
Amateur	0.90	0.71	0.29	3.12	$\chi2 = 88.1$, $p < .01$
Ebony	0.47	0.15	0.21	2.23	$\chi2 = 19.3$, $p < .01$
MILF	0.63	0.10	0.32	1.97	$\chi2 = 22.7$, $p < .01$

Table 2: Pornography viewing habits of offenders and non-offenders

For age diversity, the average respondent indicated that they viewed primarily adult SEM over their total viewing history (m=71.8, sd=29.8), with four respondents indicating 100% adult SEM[8] and no individuals indicating that they exclusively viewed CSEM. Overall, 74% (n=58) indicated that they viewed more adult pornography than child

[8] One individual denied personally viewing any CSEM. The others may be a result of rounding off percentages - the slider used for the question did not allow for increments below half a percent.

pornography. For the ages portrayed, the largest age band represented by proportion of total CSEM viewed was 15 - 17 (m=.37, sd=.33), and the lowest age represented was 0 - 2 (m=.02, sd=.11) (Table 3). When evaluating the diversity of age groups viewed by each user, the median number of age ranges viewed was 4 (representing a span of 11 years), with a mode of 6, and 23% (n=18) of individuals viewed at least some content in all of the age ranges. All but two of the individuals, 95% (n=76), exhibited a flat or strictly decreasing distribution of viewing in other age bands when compared to their age band of most frequent viewing. Looking at the weighted average of ages viewed in CSEM material, the mean age viewed overall was 12.5 (sd=2.7). Sexual orientation was not found to be correlated with the weighted average age of content viewed based on a one-way ANOVA (F(3,74)=.72, p=0.543).

Age Range	Mean	SD	Kurtosis	Skew
0..2	0.02	0.11	0.65	0.08
3..5	0.03	0.07	0.07	0.03
6..8	0.09	0.15	0.14	0.03
9..11	0.17	0.17	0.02	0.01
12..14	0.32	0.24	0	0.01
15..17	0.37	0.33	-0.01	0.01

Table 3: Composition of Collections by Age

In addition to age diversity, the diversity of male/female composition of the content was found to be high. The content viewed was found to be primarily female (m=.74, sd=.33), but only 4% (n=3) viewed exclusively male content and 24% (n=19) viewed exclusively female content, leaving 72% (n=56) having viewed a mix of content. An ANOVA showed a difference between groups based on self-reported sexual orientation of the

respondents in the percentage of content viewed ($F(3,74)=25.7$, $p < .01$). A pairwise Tukey analysis, correcting for the number of comparisons, found that there were significant differences between the Heterosexual and Homosexual groups (.71, $p < .01$, 95% CI [.50, .93]) and between the Bisexual and Homosexual groups (.55, $p < .01$, 95% CI [.28, .83]).

3.3 Self-Reported Recidivism

Overall, the self-reported recidivism rate was 10% (n=8), with a small number of individuals indicating that they viewed CSEM once or twice (.05, n=4) or very infrequently (.05, n=4). No individuals indicated that they viewed CSEM more than very infrequently.

A large proportion of the respondents (.94, n=73) indicated that they had engaged in mental health treatment (the type of treatment or voluntariness was not elucidated) for their CSEM activities. Seven of the individuals that viewed CSEM following their conviction had attended treatment, and one individual had not. No statistically significant effect was identified related to recidivism between the treatment and non-treatment groups ($\chi 2=.55$, df = 1, p=.46, 95% CI [-.46, .25]).

4. Discussion

A substantial minority (42%) of the CSEM respondents reported collecting behavior, specifically trying to obtain all of the images or videos related to a particular victim or in a particular series. This behavior may not be unusual or related directly to CSEM - mainstream adult pornography sites organize or tag content based on the individuals depicted, and searches for specific adult film stars are highly represented in search volume (*The 2019 Year in Review – Pornhub Insights*, n.d.). Additionally, the importance of the collection is tempered by the large number of individuals (74%) that deleted their entire collection at some point, showing that fear of discovery, desire to stop, or general shame and guilt outweighed, at least at a point in time, the desire to maintain their content. This is further supported by the lack of any particular categorization of CSEM collections by the majority of respondents.

What was not measured by this research is the difference between CSEM collecting behavior that is consistent with typical adult pornography collecting patterns and behavior that is pathological, i.e., obsessive behavior. At the extreme, stalking behavior such as trying to identify and contact victims (*US v. Hoffman*, 2013) has been seen in CSEM cases, but similar stalking behavior has also been seen with adult film actors (Clarridge & Sullivan, 2011). As such, collecting behavior alone should not be considered a treatment target, but rather should be further evaluated for the presence of obsessions or fixations or similar behaviors of clinical interest.

Looking at the public's consumption of pornography, if we define deviance as anything more than a standard deviation from the mean viewing proportion, only rape/forced sex and bestiality content would qualify as deviant. While previously convicted CSEM offenders had higher overall proportions in all categories, the ratios for bestiality, hentai, teen, and nudist/naturist images showed the highest differences between offending and non-offending viewing, with a higher prevalence within CSEM viewing. With the exception of rape/forced sex, the offender group viewed specific categories of pornography less frequently in their CSEM viewing than in their adult SEM viewing. This potentially highlights CSEM as a separate category of deviance, as opposed to a modifier to other categories of deviance.

The diversity in viewing habits extended to age-related viewing as well. Most consumers viewed pedophilic CSEM content, with only 6% of offenders viewing exclusively hebephilic content, though this may be influenced by the sample and a result of higher prosecution rates in cases of content depicting younger victims. The indicators are that only a very small subset of offenders (12%) target a single age group and that adult pornography usage is more prevalent that CSEM usage. Even amongst previously convicted CSEM offenders, the prevalence of a preferential offender (Lanning, 1987) and highly specific collecting behavior (Howitt, 1995) does not appear to be well supported as a widespread phenomenon. This may be partially reflective of the more ready availability of content that was not present in the earlier days of the Internet, but it also may be reflective of prior qualitative responses reflecting socially acceptable rationalizations (Quayle & Taylor, 2002), e.g., identifying collecting behavior

as a more acceptable explanation than pedophilic interest or general interest in deviant pornography.

The sexual orientation of the respondents was found to be related to the proportion of male/female content viewed between the heterosexual and homosexual identification groups as well as the homosexual and bisexual identification groups, but was not significantly correlated with the age of the content viewed. The research was not intended to identify specific diagnostic criteria for the presence of a chronophilia (Seto, 2017), so generalization of the results is not reasonable, but the findings do not support the concept of CSEM viewing behavior being an independent construct from sexual orientation, though they are consistent with CSEM viewing being closer to a continuum than a taxon.

Multiple respondents noted that their guilt and shame were cyclic, leading to their deleting their collections only to restart the activity at a later point. The expression of guilt is encouraging for treatment and has been shown to be positive in addressing transgressions (Baumeister et al., 1995), however the use of CSEM as a dysfunctional coping mechanism (Knack et al., 2020; Merdian et al., 2018) may encourage this becoming a vicious cycle that requires outside action to break, similar to substance abuse issues (Dearing et al., 2005).

For recidivism, the self-reported rate (10%) is slightly higher than previous work looking at follow-on convictions. This is consistent with some offenders recidivating but not being caught, however the level of self-reported activity in the population was reported as very low. Most of the sample reported having received treatment related to CSEM, and the small number that had not received treatment limited the ability to detect a treatment effect (if any) on recidivism.

The research shows that, at a minimum, clinicians need to avoid making specific assumptions regarding CSEM viewing activities before engaging in a treatment plan. Detailed questions about the specific technical behaviors a patient engaged in may be more helpful than self-reporting of reasons for viewing, which are subject to social desirability-based biases (and routine use of penile plethysmography is not practical).

5. Limitations

This research was conducted on a relatively small sample of English-speaking adults within the United States and further work is needed to generalize the results beyond that population. There are known quality problems with the use of Internet surveys in research, but built-in quality and attention checks and a conservative approach to the results included are believed to have minimized those issues. The response rate from the individuals previously convicted of CSEM offences was low, but consistent with other research using sex offender registry data (Tewksbury, 2006).

While shame and guilt may have different clinical implications and be separate and distinct, with shame indicating feeling bad about the self and guilt feeling bad about an act or behavior, this research was not designed to distinguish between them and further work is required to obtain finer resolution on the distinction (Dearing et al., 2005).

The results must be viewed in the context of prosecutorial discretion - lower ages of individuals depicted and any correlated behaviors may be over-represented due to the likelihood that more extreme cases are more likely to be prosecuted. The mean age of interest in CSEM material is useful for comparisons within the offender population as well as for evaluating breadth, but cannot be considered an average “age of interest”. Because the majority of SEM viewing was adult and was not incorporated into this number, the actual mean age of interest is likely much higher.

Offender motivations are more likely to be complex in nature. An individual having pedophilic indicators, including responses to phallometric testing, does not necessarily mean that is their primary motivation for the offending behavior. Despite the prevalence of pedophilic indicators, general problematic pornography usage, problematic internet use and novelty seeking may be more important behaviors to target than an interest in pre-pubescent children. Newer treatment programs incorporating these factors have been developed but empirical outcomes are not year available (Henshaw et al., 2020). Additionally, it should not be assumed that collecting behavior is pathological without strong confirmation before addressing it as a criminogenic target.

6. Conclusions

Individuals who view CSEM were found to have diverse interests in all types of SEM, and, on the whole, to view more adult SEM than CSEM. Their diversity in interests extends to the sex and the ages of the individuals portrayed, which was indicated by the low number of exclusive male/female viewers and in the breadth of age categories viewed by most respondents. This highlights the need in risk assessments to avoid assumptions about the likelihood of a potential contact offense based on the individuals a CSEM offender has access to, especially when derived from a potentially non-representative sample of CSEM content found forensically. The regular deletion of content as part of a viewing/guilt-remorse/deletion cycle must also be considered for both digital forensics (viewing length may be longer than indicated by the content present) and for treatment composition. Asking about collecting behaviors, past deletions and the reasons underlying both behaviors may help elicit relevant specifics on an individual's mindset, as well as an understanding of the triggers and cues that led to re-engagement.

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Appendix A

Demographic Category	Offender (n=78)	Public (n=524)	Public - Gender Matched (n=254)
Sexual Orientation			
Bisexual	0.14 (n=11)	0.04 (n=23)	0.03 (n=7)
Heterosexual (straight)	0.72 (n=56)	0.91 (n=476)	0.91 (n=231)
Homosexual (gay)	0.13 (n=10)	0.04 (n=19)	0.05 (n=13)
Other	0.01 (n=1)	0.01 (n=4)	0.01 (n=3)
Prefer not to say	0 (n=0)	0 (n=2)	0 (n=0)
Age Distribution			
18 - 24	0.01 (n=1)	0.12 (n=65)	0.17 (n=44)
25 - 34	0.28 (n=22)	0.18 (n=92)	0.11 (n=27)
35 - 44	0.24 (n=19)	0.17 (n=88)	0.17 (n=42)
45 - 54	0.17 (n=13)	0.18 (n=93)	0.24 (n=61)
55 - 64	0.22 (n=17)	0.16 (n=86)	0.19 (n=47)
65 or older	0.08 (n=6)	0.19 (n=99)	0.13 (n=32)
Gender Identity			
Female	0 (n=0)	0.51 (n=265)	0 (n=0)
Gender Variant/Non-Conforming	0.04 (n=3)	0 (n=1)	0 (n=1)
Male	0.95 (n=74)	0.48 (n=253)	1 (n=253)
Not Listed	0.01 (n=1)	0 (n=2)	0 (n=0)
Prefer Not to Answer	0 (n=0)	0 (n=1)	0 (n=0)
Transgender Male	0 (n=0)	0 (n=2)	0 (n=0)

Demographic Category	Offender (n=78)	Public (n=524)	Public - Gender Matched (n=254)
Relationship Status			
Divorced	0.23 (n=18)	0.12 (n=64)	0.09 (n=23)
In a Domestic Partnership or Civil Union	0.03 (n=2)	0.04 (n=21)	0.03 (n=7)
Married	0.23 (n=18)	0.44 (n=232)	0.48 (n=122)
Other	0 (n=0)	0.01 (n=3)	0 (n=1)
Separated	0.04 (n=3)	0.02 (n=8)	0 (n=1)
Single, but Cohabiting with a Significant Other	0.04 (n=3)	0.05 (n=27)	0.05 (n=12)
Single, Never Married	0.41 (n=32)	0.26 (n=137)	0.32 (n=82)
Widowed	0.03 (n=2)	0.06 (n=32)	0.02 (n=6)
Race (Multiple Selections Permitted)			
American Indian or Alaska Native	0.01 (n=1)	0.01 (n=7)	0.02 (n=5)
Asian	0 (n=0)	0.03 (n=18)	0.04 (n=9)
Black or African American	0.01 (n=1)	0.15 (n=80)	0.17 (n=42)
Hispanic or Latino	0.12 (n=9)	0.08 (n=43)	0.07 (n=19)
Native Hawaiian or Pacific Islander	0.01 (n=1)	0 (n=2)	0 (n=1)
Other	0.01 (n=1)	0.01 (n=5)	0.01 (n=3)
White or Caucasian	0.88 (n=69)	0.76 (n=397)	0.75 (n=191)
Employment Status			
Not working (disabled)	0.13 (n=10)	0.06 (n=33)	0.05 (n=12)
Not working (looking for work)	0.15 (n=12)	0.08 (n=40)	0.09 (n=24)

Demographic Category	Offender (n=78)	Public (n=524)	Public - Gender Matched (n=254)
Not working (other)	0.04 (n=3)	0.07 (n=38)	0.02 (n=6)
Not working (retired)	0.09 (n=7)	0.21 (n=110)	0.17 (n=43)
Not working (temporary layoff from a job)	0.03 (n=2)	0.05 (n=28)	0.05 (n=13)
Working (paid employee)	0.49 (n=38)	0.46 (n=240)	0.54 (n=137)
Working (self-employed)	0.08 (n=6)	0.07 (n=35)	0.07 (n=19)
Education Level			
Less than high school diploma	0 (n=0)	0.02 (n=11)	0.01 (n=3)
High school graduate (high school diploma or equivalent including GED)	0.13 (n=10)	0.23 (n=121)	0.24 (n=62)
Some college but no degree	0.29 (n=23)	0.24 (n=127)	0.19 (n=49)
Associate degree in college (2-year)	0.13 (n=10)	0.11 (n=56)	0.1 (n=25)
Bachelor's degree in college (4-year)	0.33 (n=26)	0.25 (n=131)	0.26 (n=67)
Master's degree	0.09 (n=7)	0.11 (n=60)	0.13 (n=32)
Professional degree (JD, MD)	0 (n=0)	0.02 (n=8)	0.03 (n=7)
Doctoral degree	0.01 (n=1)	0.02 (n=10)	0.04 (n=9)
Degree Field			
Business	0.13 (n=10)	0.14 (n=74)	0.17 (n=42)
Computer Science	0.06 (n=5)	0.05 (n=24)	0.07 (n=19)
Education	0.04 (n=3)	0.05 (n=27)	0.04 (n=11)
Engineering	0.08 (n=6)	0.04 (n=19)	0.06 (n=16)
Government/Political Science	0.03 (n=2)	0.02 (n=9)	0.02 (n=5)
Liberal Arts	0.12 (n=9)	0.02 (n=13)	0.02 (n=5)

Demographic Category	Offender (n=78)	Public (n=524)	Public - Gender Matched (n=254)
Nursing	0 (n=0)	0.03 (n=17)	0.01 (n=3)
Other	0.06 (n=5)	0.08 (n=44)	0.08 (n=20)
Physical Science	0.03 (n=2)	0.02 (n=9)	0.02 (n=5)
Psychology	0 (n=0)	0.02 (n=13)	0.02 (n=6)
Social Sciences	0.06 (n=5)	0.03 (n=16)	0.03 (n=8)
Employment Position			
Computer, Engineering, and Science	0.06 (n=5)	0.06 (n=30)	0.1 (n=25)
Construction and Extraction	0.03 (n=2)	0.03 (n=14)	0.04 (n=11)
Education, Legal, Community Service, Arts, and Media	0 (n=0)	0.07 (n=35)	0.05 (n=12)
Farming, Fishing, and Forestry	0.01 (n=1)	0 (n=0)	0 (n=0)
Healthcare Practitioners and Technical	0.01 (n=1)	0.06 (n=32)	0.04 (n=9)
Installation, Maintenance, and Repair	0.06 (n=5)	0 (n=2)	0.01 (n=2)
Management, Business, and Financial	0.05 (n=4)	0.1 (n=54)	0.15 (n=37)
Military	0 (n=0)	0 (n=1)	0 (n=1)
Office and Administrative Support	0.05 (n=4)	0.05 (n=25)	0.03 (n=7)
Production	0.09 (n=7)	0.04 (n=20)	0.04 (n=11)
Retired	0.15 (n=12)	0.23 (n=118)	0.2 (n=52)
Sales and Related	0.08 (n=6)	0.04 (n=23)	0.04 (n=10)
Service	0.09 (n=7)	0.09 (n=46)	0.11 (n=27)
Transportation and Material Moving	0.04 (n=3)	0.02 (n=13)	0.04 (n=11)

Demographic Category	Offender (n=78)	Public (n=524)	Public - Gender Matched (n=254)
Unemployed	0.26 (n=20)	0.21 (n=109)	0.15 (n=38)
Income			
$0 - 9,999	0.09 (n=7)	0.1 (n=52)	0.09 (n=22)
$10,000 - 20,000	0.19 (n=15)	0.11 (n=57)	0.07 (n=19)
$20,001 - 29,999	0.1 (n=8)	0.1 (n=52)	0.1 (n=25)
$30,000 - 40,000	0.24 (n=19)	0.11 (n=58)	0.1 (n=26)
$40,001 - 50,990	0.09 (n=7)	0.12 (n=64)	0.14 (n=35)
$50,991 - 67,000	0.08 (n=6)	0.1 (n=54)	0.07 (n=19)
$67,001 - 79,000	0.1 (n=8)	0.1 (n=53)	0.12 (n=31)
$79,001 - 100,000	0.05 (n=4)	0.1 (n=52)	0.12 (n=31)
$100,001 - 190,000	0.05 (n=4)	0.1 (n=52)	0.12 (n=31)
Greater than $190,000	0 (n=0)	0.06 (n=30)	0.06 (n=15)

Chapter 12 - Technical Profiles of Child Sexual Exploitation Material Offenders

12.1 Overview

Profiles of CSEM offenders have focused principally on demographics (Reijnen et al., 2009), with some work looking at traditional psychological features (Babchishin et al., 2011). There has been little work, however, evaluating the overall sociability of offenders, as well as their technical abilities and their adoption of new technologies (technophilia). Understanding these characteristics informs behavioural and cognitive targets in treatment efforts. As an example, several CSEM offender treatments focus on enhancing social relationships (Middleton et al., 2009). If an offender has low sociability, this becomes a necessary target, whereas if sociability is high there may be a need for a higher focus on changing maladaptive social functioning. Similarly, understanding the technophilia and technical ability of an offender may drive behavioural strategies for future desistance. Low technophilia offenders will be more predisposed to eschew the usage of a technology, whereas high technophilia offenders may have difficulties abstaining from overall usage and require proscribed desistance.

This research identifies the baseline levels of sociability, technical ability, and technophilia present in both the previously described reference and offender samples. The questions included a validated instrument to measure sociability (Cheek & Buss, 1981) as well as self-ratings of technical ability and technophilia. These were evaluated in the context of social media, messaging, and technology usage, as well as degree and occupation fields.

In looking at traditional treatment concerns, particularly those in a Risk-Needs-Responsivity approach, sociability is a key area. This investigation challenges that need for the majority of offenders, showing that social deficits were not at a clinically significant level. Additionally, for the incorporation of behavioural information into

investigations, this study did not support the traditional wisdom that CSEM offenders were early adopters of technology and had strong overall technical abilities.

12.2 Summary of Findings

The major findings of the research were as follows:

- CSEM offenders had slightly lower sociability than non-offenders, though not at a level of clinical interest.
- The overall technophilia of CSEM offenders was *lower* than that of non-offenders.
- The technical ability of CSEM offenders was not significantly different than that of non-offenders.
- Investigators should not overestimate the technical abilities or device ownership of CSEM offenders, and treatment professionals should carefully consider the need for socialization as a general treatment target.

Technical Profiles of Child Sexual Exploitation Material Offenders

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Abstract

The idiographic technical profiles of child sexual exploitation material (CSEM) offenders provide insight into their behaviours and context for their interactions with technology. Despite extensive work looking at the demographics of CSEM offenders, minimal quantitative work has been done to evaluate their sociability, technical ability, and technophilia in relation to non-offenders. This work utilizes a quantitative approach to evaluate these characteristics in a sample of CSEM offenders. An offender group consisting of English-speaking adults previously convicted of CSEM offenses (n=78) in the United States were evaluated through an online survey and compared to a reference population of non-offenders (n=254) matched for gender identity. The survey used a previously validated instrument to assess sociability, and evaluated technical ability and technophilia through self-rating, background information on occupation and level of education, and device ownership. The study found that CSEM offenders had slightly lower sociability than non-offenders, though not at a level of clinical interest. Additionally, CSEM offenders had no statistically significant difference in technical ability and lower overall technophilia when compared to non-offenders. This study fails to support popular perceptions of CSEM offenders being technically savvy loners who are early adopters of new technologies.

Keywords: Child pornography, technical profiles, sociability

1. Introduction

When asked to picture a child sexual exploitation material (CSEM) offender, the lay individual is likely to picture a male loner in their 30's or 40's, surrounded by digital equipment, with strong technical skills. While the demographics of CSEM offenders have been extensively studied (e.g., Babchishin et al., 2011, 2015; Houtepen et al., 2014) to address these stereotypes, the social and technical traits and abilities of CSEM offenders have not been comprehensively researched in relation to a non-offending population.

Evaluating the psychosocial and technical skills and behaviours of CSEM offenders is important as misplaced stereotypes can drive investigative actions (e.g., planning investigations based on an "early adopter" model), deterrence efforts (e.g., increasing the technical difficulty of obtaining CSEM) and treatment efforts (e.g., treating sociability to enhance community engagement). Clinically, assessing the technical skills and sociability of CSEM offenders has been proposed as necessary in evaluating collections and collecting behaviours (Fortin & Proulx, 2019). Evaluation of these characteristics can be broken into three factors - sociability (the desire and tendency to seek out and engage in social relationships), technical ability (the skills needed to navigate the digital world), and technophilia (the adoption and ownership of new technologies).

For sociability, media reporting has exacerbated the "loner" image. For example, one individual, arrested for possession of 7,000 images of CSEM, was described as "The defendant is a very sad and lonely man who has few friends. His motivation was not to see and use the images of the children, but to have some people to talk to so he posed as having an appetite for this sort of activity." (Collie, 2008), and David Bennett, arrested for possession and prior production of CSEM, was described as "... a sad and lonely individual. This is a man who has never had any intimate relationship in his life. He has comparatively little contact with the outside world." (Lloyd, 2015). At the extreme, Asperger's Syndrome, which is marked in part by issues with sociability (Frith, 1991) has been anecdotally associated with CSEM offending, though more research is needed to empirically validate this (Allely & Dubin, 2018; Steel, 2016). Other work has

shown higher socioaffective needs within CSEM offenders (Magaletta et al., 2014), and social anxiety has been correlated with general problematic online pornography consumption (Wéry et al., 2020). Treatment programs have reported increased sociability for CSEM offenders, but have not specifically highlighted any baseline deficits in this area (Dervley et al., 2017). Additionally, increased social engagement has been presented as a positive factor for desistance (Merdian et al., 2018). Previous findings, however, have shown that "online offenders do not either actively (or want to) avoid being with or talking to others" (Armstrong & Mellor, 2016, p. 55). Despite the clinical interest, there has been insufficient empirical work to-date directly assessing the baseline sociability of CSEM offenders compared to the general public.

Technophilia has been used in a psychological context as a general favourable disposition toward technology and as a contrast to technophobia (Richards, 1993), and can be summarised as an individual's innate desire to possess and interact with technology.[9] Investigatively, high technophilia individuals are likely to be early adopters and possess more and newer devices, potentially posing challenges related to the volume of content that needs to be reviewed as well as forensic challenges related to encryption (Steel, 2014). The use of multiple devices has also had legal ramifications - while the courts have not fully resolved the issue, separate counts of a crime can be charged if different images are found on multiple devices (United States v. Kuhnel, 2020), encouraging investigators to examine all media seized. Individuals with high technophilia are more likely to have more devices (and applications on those devices). If each individual device or application has its own set of affordances, or potentials for action (Quayle, 2020), then more technophilia would be potentially associated with higher clinical risk of recidivism and escalation of actions. Behavioural modifications that address the acquisition and usage of technology may be potential treatment targets for these individuals. Prior research studies, while not specifically targeting technophilia, have found preliminary results that are not consistent with increased ownership of new and sophisticated devices by CSEM offenders. The 2005

[9] Technophilia in relation to CSEM has alternatively been described as a separate type of paraphilia by McLaughlin (McLaughlin, 1998), however this definition is not widely adopted and not used in this research.

National Juvenile Online Victimization (N-JOV) study found, for example, that most individuals arrested for child pornography did not own sophisticated equipment, with 65% owning a basic computer system, 22% the system of a power user (an individual with more advanced computer skills and expertise) , and 7% a sophisticated, expert computer system (Wolak et al., 2005). To date, there has been no research identified that directly measured the device ownership, application usage, and self-identified technophilia in CSEM consumers.

Technical ability is separate but related to technophilia. An individual can be technically proficient but be prevented from owning the latest technologies due to socioeconomic factors. Additionally, an individual with high socioeconomic status may own numerous devices but not fully utilize them. Prior research has been mixed with regards to the technical skill of CSEM offenders. Wolak et al. (2005) found that more than half (54%) of CSEM offenders were scored by law enforcement as being very or extremely knowledgeable technology-wise. Similarly, Carr (2004) found that the self-reported computer literacy of CSEM offenders was mostly above average, with 30% of individuals rating themselves at a medium skill level and 32% at a high skill level, though self-reporting with a lack of specific rating scale limits cross-comparison. There has been no work, however, comparing the reports of technical ability within the CSEM offender community to those within a non-offending group.

This research evaluates the technical ability, technophilia, and sociability of individuals in the United States previously convicted of CSEM offenses (n=78) in comparison to a baseline reference group of non-offenders (n=254). Both groups were asked a series of questions in an online questionnaire related to their Internet usage and asked to self-rate on each of the areas above. They were evaluated using an existing, validated instrument for sociability and single point evaluations of technophilia and technical ability. These were compared to demographic data related to their career field (technical v. non-technical) as well as their actual self-reported usage and ownership of various technologies. This research represents the first work to take an integrative look at sociability, technical ability, and technophilia within the CSEM offender population.

2. Methodology

This research was part of a larger project looking at the technological behaviours and cognitions of CSEM offenders. The research consisted of two surveys using two different populations - one with the general public (used primarily as a baseline for reference purposes) and one of individuals previously convicted of child pornography possession offenses.

2.1 Data Collection and Population

This research was conducted using data obtained through two anonymous online surveys hosted through Qualtrics. Individuals on the sex offender registries of two states ("offender sample") that were previously convicted of child pornography possession offenses were sent a mail-based solicitation requesting they complete an anonymous online survey for a chance to obtain one of two $150 gift certificates. The same questions were asked of non-offenders ("reference sample") that were identified by Qualtrics from their panel service (*Online Panels: Get Responses for Surveys & Research | Qualtrics*, n.d.). The populations for both surveys were English-speaking adults within the United States, and informed consent was solicited and required before participation. Both surveys contained demographic questions, as well as questions related to sociability, technical ability, and technophilia as noted below. The reference sampled had 524 overall respondents. Of these, 254 individuals were matched to the offender sample based on gender identity.

2.1 Sociability

To measure sociability, individuals were requested to rate themselves on a five-point Likert scale using the five sociability questions from the Shyness and Sociability Scales ($\boldsymbol{\alpha}$=.7) (Cheek & Buss, 1981). For comparison purposes, individuals were asked about the volume of their personal daily email and text messaging communications and asked to select one of five ranked ranges of 0-10, 11-20, 21-30, 31-40, or Over 40. For the average time they took responding to emails, they were asked to select if they generally responded in a matter of minutes, hours, within a day, or more than a day, and they

were asked to provide a count of the number of social media accounts they held based on the most commonly used mobile applications (*Top U.S. Mobile Social Apps by Users 2019* | *Statista*, 2019).

2.2 Technical Ability

For technical ability, individuals were asked how others would rate their technical expertise in one of five ranked categories:

- Novice - little to no technical ability.
- Casual User - ability to use most computer services and technologies without assistance.
- Power User - you frequently use most computing technologies; Others consult you for computing advice.
- IT/Computing Professional - your career is focused on configuring, managing, or maintaining networks, hardware, or software.
- Computer Scientist - you develop new computing technologies or conduct peer-reviewed research into computing (Steel, 2014).

Professions within STEM (Science, Technology, Engineering, Math) fields as well as degrees within the STEM field were rated as a Boolean variable (technical or non-technical) based on the United States Department of Homeland Security STEM list (Department of Homeland Security, 2016).

2.3 Technophilia

Technophilia was evaluated through a self-assessment by participants who were asked to rate their adoption of new technology on a five-point Likert scale from Very Low to Very High as follows:

- Very Low - you own very few computing devices. You upgrade only when the existing device breaks or is no longer supported.

- Low - you own computing devices in several of the major technology areas, but are frequently the last of your friends to start using a new technology.
- Average - you own computing devices in most of the major technology areas, but hold off on purchases until technologies are mature and in widespread usage. You only upgrade devices when major new functionality is available.
- High - you keep up with technology and own computing devices in all of the major technology areas. Some of the devices may be last year's model, but you stay within one generation of the current release.
- Very High - you are an early adopter and own computing devices in all of the major areas (smartphones, ereaders, tablets, laptops, home automation).

Additionally, the total number of devices owned based on a reference list of common technologies was obtained and compared between the groups. The correlation between the number of computing devices and income was additionally calculated to identify any potential confound based on socioeconomic factors.

2.4 Analysis

Comparisons between populations were performed using a one-tailed t-test (for parametric data) or a Mann-Whitney-Wilcoxon test (for non-parametric data). Correlations were performed using the Spearman method. All results were collected and analysed using R, with a p value of .01 used for statistical significance tests (where appropriate).

2.5 Ethics

Ethical approval was received from the Research Ethics Committee at the University of Edinburgh on May 20, 2020. Additionally, Institutional Review Board approval was received from George Mason University on May 13, 2020.

3. Results

The survey responses received on the public survey were diverse as to sex, sexual preference, age, relationship status, gender identity, race, employment, and education. The responses received on the offender survey were diverse given the previously identified demographics of CSEM offenders (Faust et al., 2015; Reijnen et al., 2009) The full demographics are provided in Appendix A. The Cheek and Buss (1981) scale was found to have a good Cronbach's alpha consistency within both the offender (***α***=.82) and the reference (***α***=.89) samples.

3.1 Sociability

The sociability of the offender sample by the Cheek and Buss scale (1981) ranged from 0 to 20 points (M = 10.91, SD = 4.41) with higher scores indicating higher sociability, and was significantly less [t(142) = 2.54, $p < .01$] than the reference sample (M = 12.41, SD = 4.98). The number of social media accounts used by the offender sample (M = 3.71, SD = 3.15) was not significantly different from the reference sample (M = 4.54, SD = 3.77). Offenders sent significantly fewer personal emails per day (W = 12549, p < .01) and IMs per day (W = 11680, p < .01) than the reference group (Figure 1). Additionally, offenders' response times on emails skewed toward longer delays than non-offenders (W = 6467, $p < .01$) (Figure 2), with substantially higher proportions of offenders taking more than a day (.18, n = 14) than non-offenders (.04, n = 11) and within a day (.31, n = 24) than non-offenders (.15, n = 37).

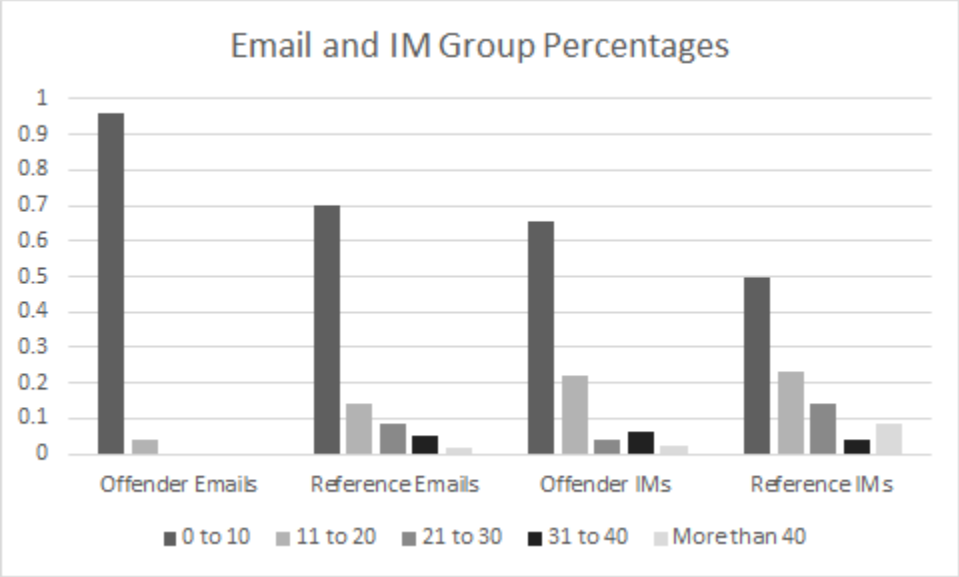

Figure 1: Personal emails and IMs sent daily

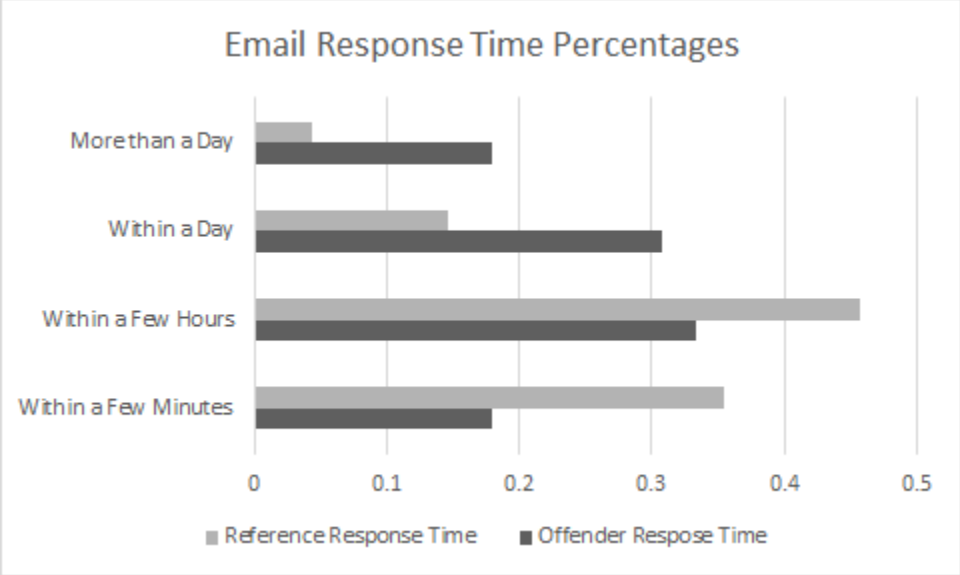

Figure 2: Email response times

3.2 Technical Ability

The overall technical ability of offenders did not differ significantly from that of the general public. The highest proportion of respondents for both the offender (.44, n = 34) and non-offender (.41, n = 105) samples were casual users, followed by power users at (.36, n = 28) and (.35, n = 89) respectively. Very few users of either the offender (.01, n = 1) or non-offender (.01, n = 3) groups had the highest level of technical ability (Figure

3). Slightly lower proportions of the offender group had STEM degrees (.17, n = 13) compared to the reference group (.18, n = 46), and slightly fewer worked in STEM occupations (.05, n = 5) compared to the reference group (.10, n = 25). This trend held even when normalized based on only those individuals with degrees and only those individuals currently employed (Table 1). Technical ability was correlated with having a technical occupation in the offender group (ρ = .48, $p < .01$) and the reference group (ρ = .48, $p < .01$), and a technical degree was correlated with technical ability in the public (ρ = .38, $p < .01$) but not the offender group (ρ = .31, $p > .01$).

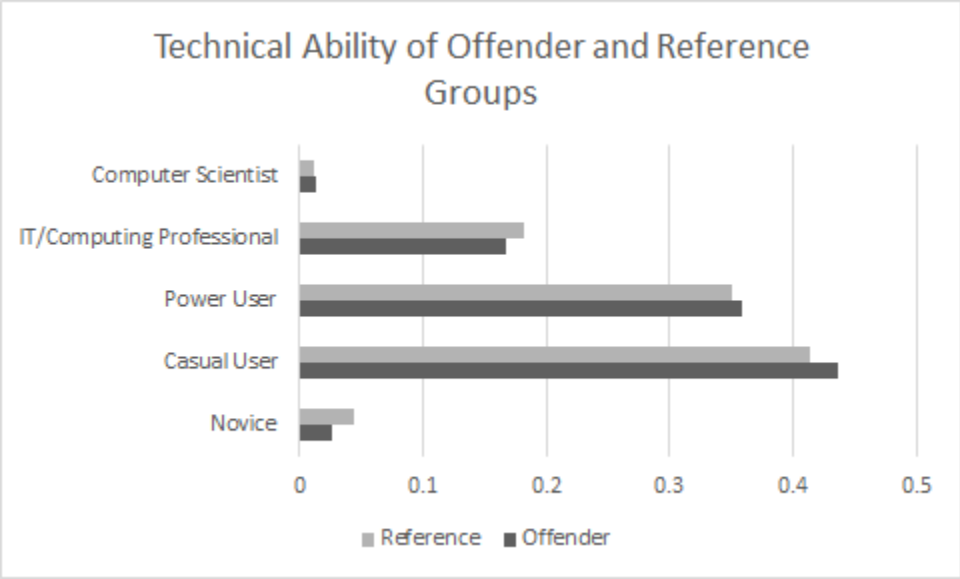

Figure 3: Breakdown of technical abilities of offender and reference groups

	Offender	**Offender (Normalized)**	**Reference**	**Reference (Normalized)**
Tech Degree	.17 (n=13)	.28 (n=13)	.18 (n=46)	.35 (n=46)
Tech Occupation	.06 (n=5)	.11 (n=5)	.10 (n=25)	.16 (n=25)

Table 1: STEM degrees and occupations (Note: Normalized results include only those with a degree/currently employed)

3.3 Technophilia

The technophilia of offenders was skewed significantly lower than that of non-offenders (W=12358, $p < .01$), with a higher proportion of offenders (.29, n = 23) reporting that they had below average technophilia compared to the reference group (.15, n = 37) (Figure 4). Offenders owned significantly t(190) =-3.38, $p < .01$ fewer devices (M = 2.95, SD = 2.45) than the reference group (M = 4.17, SD = 3.65). Offender device ownership was not significantly correlated with income rank ($\rho = .13$, $p > .01$), however public device ownership was correlated with income rank ($\rho = .35$, $p < .01$).

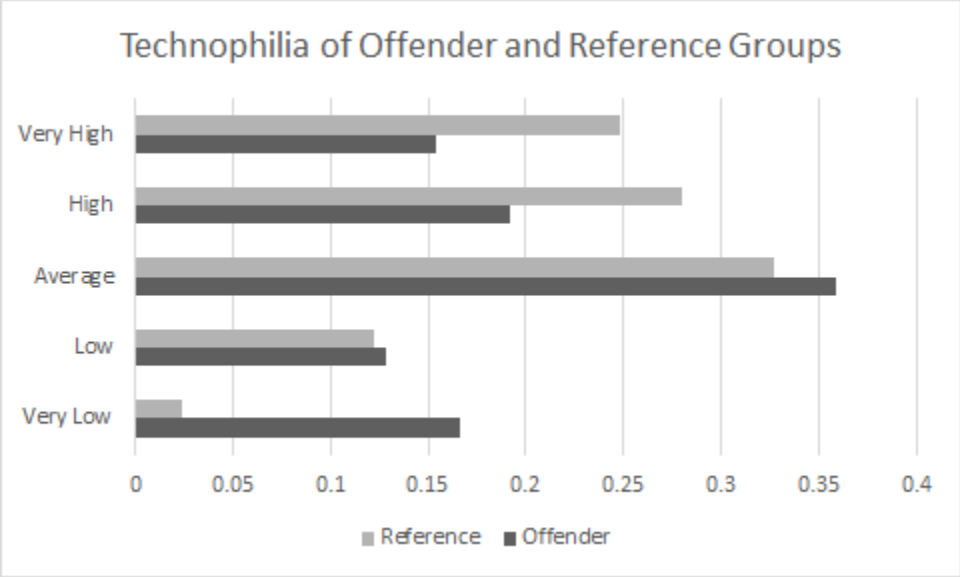

Figure 4: Overall self-rated technophilia

4. Discussion

Individuals convicted of CSEM offenses had slightly lower sociability than the reference group, consistent with findings of Armstrong and Mellor (2016). While the difference in scores was statistically significant (10.9 v 12.4), the small differential is likely not of clinical significance. Offenders also sent fewer personal emails and IMs, and took longer to respond to emails, than the reference group. This is consistent with reduced sociability scores, but the variance in scores was very high between the groups. Additionally, there have been subgroups of CSEM offenders that have been

identified as highly social - seeking our forums and other interactive spaces (Merdian, 2012). This was borne out in this research as well - a substantial subset (.21, n = 16) of the offenders scored in the highest quartile on the sociability scale. As such, treatment programs that focus on increasing general sociability (as opposed to targeting attachment style or specific relationships) would be better served by focusing only on individuals with a functional deficit due to low sociability following an assessment. For investigative purposes, digital forensics findings showing higher than average communications history can be explored in an interview to evaluate the potential for trading or distribution and to identify other potential subjects.

Technical ability was not significantly different between the offender group and the reference group and did not support the belief that CSEM offenders are more adept at technology than non-offenders. Since this was a measurement of general technical knowledge, it does not preclude CSEM offenders being more adept at domain-specific knowledge related to their area of criminality (Steel, 2014). Because of this, CSEM offenders may still develop highly specialized technical skills over time related to conducting more effective searches or more effectively utilizing niche technologies that facilitate further offending (Elliott & Beech, 2009; Quayle & Taylor, 2003). Additionally, moderate correlations existed between being employed in a STEM field for offenders and technical ability, showing that a priori information on employment may be an indicator for encountering an individual with greater technical sophistication. This may also impact the type of countermeasures employed, and the methods of accessing CSEM material, which are necessary for effective investigative planning. Because individuals in a STEM field are likely to need ongoing access to technology, tailored digital behavioural interventions need to balance potential access to CSEM with employment-related knowledge acquisition.

Separate from technical ability is technophilia. The offender group exhibited substantially lower technophilia than the reference group, and the effect was not significantly correlated with income. The implications for this are important for future research. First, this supports the concept that CSEM offenders do not necessarily gravitate toward new technology, and their pattern of continued usage of older

technology, despite the presence of objectively better options (Steel et al., 2020), which is important for search warrant planning. Second, if CSEM offenders are, on the whole, not early adopters, deterrence efforts focused on extant technologies are likely to continue to be effective with a smaller transference effect (e.g., driving individuals from one method of acquisition to another as opposed to stopping the activity). This is consistent with the drops in the offending usage of specific technologies due to interventions without a commensurate increase in other technologies (Steel, 2015), though exact measurement is difficult as reporting improvements have shown conflicting results (Bursztein et al., 2019). Third, treatment targeting technology-specific behavioural interventions is also more viable for the same reason as deterrence (i.e., less of a transference effect) if technophilia is lower.

5. Limitations

The pool of individuals arrested and convicted of CSEM offenses may not represent the most technically sophisticated offenders. It is possible that individuals with higher technical sophistication are less likely to be caught. Law enforcement are more likely to target peer-to-peer CSEM trading activities and specific reports of one-to-one transactions, which are easier to detect and investigate. Offenders using anonymizing techniques are potentially less likely to be detected and identified, while individuals using encryption are potentially less likely to have adequate evidence to prosecute them uncovered. While offenders sent fewer email and IMs and took more time responding to emails, there are numerous potential confounding factors, ranging from employment status and field to preferences in methods of communicating, that may be present. Additionally, further research is needed to determine if the lower sociability is a post-prison effect related to sex offender registration (Tewksbury, 2005) or stigmatization (Jahnke et al., 2015) or a stable, pre-existing trait.

The ratings rely on self-reporting of behaviour and are potentially subject to overestimates of skill, particularly related to technical ability. Additionally, the populations for the two surveys were both English-speaking individuals at least 18 years

of age living in the United States and caution should be used in any generalization beyond that population.

This research was conducted during the 2020 Covid-19 pandemic. As such, there may have been impacts to the income levels of participants (Coibion et al., 2020), and there may also have been an impact on sociability based on social distancing restrictions (Folk et al., 2020). There is insufficient information available to determine if both groups were equally impacted or if a disproportionate impact on one group may have influenced the results.

6. Conclusions

This research analysed the overall sociability, technical ability, and technophilia of online CSEM offenders as compared to a non-offending population. For investigative planning purposes, the results of the analysis provide key insights. With regards to sociability, the average sociability of the offenders was close to that of the non-offending group, however their use of messaging to communicate was lower than that of non-offenders. While this may be impacted by disrupted social networks post-conviction, it indicates that less extensive communication histories found forensically may not be abnormal. For a small but substantial subset of offenders with high sociability, however, there may be an increased likelihood they are part of a network of offenders, though further research is needed to evaluate this. Additionally, of interest in planning search warrants, offenders did not exhibit an overall high degree of technical ability and exhibited lower technophilia and device ownership. This puts less onus on digital forensics teams to plan for high volumes of devices or to plan for encounters with cutting-edge technology. Since technical ability was correlated with being in a technical occupation, however, this biographical information may be an indicator that more advanced technical planning is necessary.

For treatment, the general lack of clinical differences in sociability brings that into question as a general treatment target. At a minimum, testing for low sociability as well as any functional impact of low sociability would be necessary before including this in a treatment plan. For higher sociability individuals that use CSEM forums and networks

as an outlet, there may additionally be a need to replace those social structures with more healthy alternatives. Additionally, lower technophilia and average technical abilities may indicate less desire to actively acquire and use new technologies, but more targeted domain-specific desires and risks. Avoidance-based approaches may be better suited to highly specific behavioural patterns (e.g., use of a particular application or engagement in a particular behaviour such as visiting non-mainstream adult websites), as opposed to more general technology restrictions.

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Appendix - Sample Demographics

Category	Offender (n=78)	Public - Gender Matched (n=254)
Sexual Orientation		
Bisexual	0.14 (n=11)	0.03 (n=7)
Heterosexual (straight)	0.72 (n=56)	0.91 (n=231)
Homosexual (gay)	0.13 (n=10)	0.05 (n=13)
Other	0.01 (n=1)	0.01 (n=3)
Prefer not to say	0 (n=0)	0 (n=0)
Age Distribution		
18 - 24	0.01 (n=1)	0.17 (n=44)
25 - 34	0.28 (n=22)	0.11 (n=27)
35 - 44	0.24 (n=19)	0.17 (n=42)
45 - 54	0.17 (n=13)	0.24 (n=61)
55 - 64	0.22 (n=17)	0.19 (n=47)
65 or older	0.08 (n=6)	0.13 (n=32)
Gender Identity		
Female	0 (n=0)	0 (n=0)
Gender Variant/Non-Conforming	0.04 (n=3)	0 (n=1)
Male	0.95 (n=74)	1 (n=253)
Not Listed	0.01 (n=1)	0 (n=0)
Prefer Not to Answer	0 (n=0)	0 (n=0)
Transgender Male	0 (n=0)	0 (n=0)
Relationship Status		
Divorced	0.23 (n=18)	0.09 (n=23)

Category	Offender (n=78)	Public - Gender Matched (n=254)
In a Domestic Partnership or Civil Union	0.03 (n=2)	0.03 (n=7)
Married	0.23 (n=18)	0.48 (n=122)
Other	0 (n=0)	0 (n=1)
Separated	0.04 (n=3)	0 (n=1)
Single, but Cohabiting with a Significant Other	0.04 (n=3)	0.05 (n=12)
Single, Never Married	0.41 (n=32)	0.32 (n=82)
Widowed	0.03 (n=2)	0.02 (n=6)
Race (Multiple Selections Permitted)		
American Indian or Alaska Native	0.01 (n=1)	0.02 (n=5)
Asian	0 (n=0)	0.04 (n=9)
Black or African American	0.01 (n=1)	0.17 (n=42)
Hispanic or Latino	0.12 (n=9)	0.07 (n=19)
Native Hawaiian or Pacific Islander	0.01 (n=1)	0 (n=1)
Other	0.01 (n=1)	0.01 (n=3)
White or Caucasian	0.88 (n=69)	0.75 (n=191)
Employment Status		
Not working (disabled)	0.13 (n=10)	0.05 (n=12)
Not working (looking for work)	0.15 (n=12)	0.09 (n=24)
Not working (other)	0.04 (n=3)	0.02 (n=6)
Not working (retired)	0.09 (n=7)	0.17 (n=43)
Not working (temporary layoff from a job)	0.03 (n=2)	0.05 (n=13)
Working (paid employee)	0.49 (n=38)	0.54 (n=137)
Working (self-employed)	0.08 (n=6)	0.07 (n=19)

Category	Offender (n=78)	Public - Gender Matched (n=254)
Education Level		
Less than high school diploma	0 (n=0)	0.01 (n=3)
High school graduate (high school diploma or equivalent including GED)	0.13 (n=10)	0.24 (n=62)
Some college but no degree	0.29 (n=23)	0.19 (n=49)
Associate degree in college (2-year)	0.13 (n=10)	0.1 (n=25)
Bachelor's degree in college (4-year)	0.33 (n=26)	0.26 (n=67)
Master's degree	0.09 (n=7)	0.13 (n=32)
Professional degree (JD, MD)	0 (n=0)	0.03 (n=7)
Doctoral degree	0.01 (n=1)	0.04 (n=9)
Degree Field		
Business	0.13 (n=10)	0.17 (n=42)
Computer Science	0.06 (n=5)	0.07 (n=19)
Education	0.04 (n=3)	0.04 (n=11)
Engineering	0.08 (n=6)	0.06 (n=16)
Government/Political Science	0.03 (n=2)	0.02 (n=5)
Liberal Arts	0.12 (n=9)	0.02 (n=5)
Nursing	0 (n=0)	0.01 (n=3)
Other	0.06 (n=5)	0.08 (n=20)
Physical Science	0.03 (n=2)	0.02 (n=5)
Psychology	0 (n=0)	0.02 (n=6)
Social Sciences	0.06 (n=5)	0.03 (n=8)
Employment Position		
Computer, Engineering, and Science	0.06 (n=5)	0.1 (n=25)

Category	Offender (n=78)	Public - Gender Matched (n=254)
Construction and Extraction	0.03 (n=2)	0.04 (n=11)
Education, Legal, Community Service, Arts, and Media	0 (n=0)	0.05 (n=12)
Farming, Fishing, and Forestry	0.01 (n=1)	0 (n=0)
Healthcare Practitioners and Technical	0.01 (n=1)	0.04 (n=9)
Installation, Maintenance, and Repair	0.06 (n=5)	0.01 (n=2)
Management, Business, and Financial	0.05 (n=4)	0.15 (n=37)
Military	0 (n=0)	0 (n=1)
Office and Administrative Support	0.05 (n=4)	0.03 (n=7)
Production	0.09 (n=7)	0.04 (n=11)
Retired	0.15 (n=12)	0.2 (n=52)
Sales and Related	0.08 (n=6)	0.04 (n=10)
Service	0.09 (n=7)	0.11 (n=27)
Transportation and Material Moving	0.04 (n=3)	0.04 (n=11)
Unemployed	0.26 (n=20)	0.15 (n=38)
Income		
$0 - 9,999	0.09 (n=7)	0.09 (n=22)
$10,000 - 20,000	0.19 (n=15)	0.07 (n=19)
$20,001 - 29,999	0.1 (n=8)	0.1 (n=25)
$30,000 - 40,000	0.24 (n=19)	0.1 (n=26)
$40,001 - 50,990	0.09 (n=7)	0.14 (n=35)
$50,991 - 67,000	0.08 (n=6)	0.07 (n=19)
$67,001 - 79,000	0.1 (n=8)	0.12 (n=31)
$79,001 - 100,000	0.05 (n=4)	0.12 (n=31)

Category	Offender (n=78)	Public - Gender Matched (n=254)
$100,001 - 190,000	0.05 (n=4)	0.12 (n=31)
Greater than $190,000	0 (n=0)	0.06 (n=15)

Annex

	Reference		Offender					
Category	M	SD	M	SD	test statistic	df	p	d
Sociability	12.409	4.978	10.910	4.414	2.544	142	0.006	0.309
Social Media Accounts	4.539	3.770	3.705	3.146	1.951	151	0.026	0.230
Devices Owned	4.165	3.651	2.949	2.449	3.382	190	<.001	0.357

Table Annex.1: Sociability and application/device usage comparison between reference and offender groups

	Reference		Offender			
Category	M	SD	M	SD	W	p
Emails Sent Per Day	0.547	0.984	0.038	0.194	12549	<.001
IMs Sent Per Day	0.980	1.259	0.590	1.012	11680	0.009
Email Response Times	0.878	0.813	1.487	0.990	6467	<.001
Technical Ability	1.705	0.855	1.705	0.824	9932	0.971

Table Annex.2: Communications usage and technical ability comparison between reference and offender groups. Note: Means represent average rank value.

Category	Reference (N=254)	Offender (n=78)	Reference	Offender	Z	p
STEM Degree	46	13	0.181	0.167	0.292	0.385
STEM Field	25	5	0.098	0.064	0.925	0.178

Table Annex.3: Proportion of reference and offender groups with STEM degrees or working in a STEM field

SECTION 7 - GENERAL ANALYSES

Chapter 13 - General Analyses

13.1 Overview

Prior chapters detailed various aspects of the perceptions of both the general public and a sample population of CSEM offenders. For the purposes of all of the prior studies, the detailed demographics of both populations and how the CSEM offender population differs from the reference population is contextually important. Additionally, details regarding the viewing habits of CSEM offenders related to adult SEM as well as CSEM provide insight into potential behavioural cues from a developmental and a technological perspective. Finally, measuring the perceived lawlessness of the Internet by CSEM offenders is used to test a key element of lawless space theory (LST).

Online offenders have previously been found to be significantly different than a normative population. In a meta-analysis conducted by Babchishin et al. (2011), online CSEM offenders were more likely to be Caucasian, younger than the general population, to have never been married and to have been unmarried at the time of assessment. They were also more likely to have been unemployed.[10]

The overall consumption by CSEM offenders of commercial adult SEM and CSEM has not been comprehensively studied. In one study comparing acquitted with convicted CSEM offenders, a substantially higher percentage of convicted offenders were found to have had commercial adult SEM accounts (28% v. 10%) (Endrass et al., 2009). Looking at offenders in a sex offender treatment program, McCarthy (2010) found that 29% of online offenders had paid for CSEM and 38% had paid for adult SEM, though no statistically significant differences were found between the online-only offenders and contact offenders with these factors. Since those studies, free adult SEM has risen in

[10] Absolute rates are not reported here due to the broad number of social factors present based on the differing locales of the underlying meta-analysis).

popularity at the expense of commercial adult SEM, though the impact on commercial CSEM is not known (Alptraum, 2018).

Measuring the rates of CSEM production and trading amongst CSEM consumers is difficult. Production charges by necessity directly involve a victim[11], though the individual producing the video may not have committed a contact offense. Additionally, trading is generally a combination of receipt or production and then distribution of CSEM, and conviction records may reflect the result of plea agreements as opposed to the underlying actions. Based on the data available, however, only a minority of CSEM offenders are believed to be engaged in trading or production of CSEM. McCarthy found that 36% of CSEM-only offenders admitted to trading CSEM (2010), though the mechanisms for trading were not identified. Approximately 19% of law enforcement cases involving Internet CSEM were found to include production (Wolak, Finkelhor, Mitchell, et al., 2011), though prosecutorial and investigative discretion would be expected to be exercised significantly less frequently than in simple possession cases. Additionally, most producers maintain their content locally - only 23% of individuals who produced CSEM were found to have distributed it online (Wolak, Finkelhor, Mitchell, et al., 2011).

The age at which SEM is first viewed is of potential interest as a factor in CSEM offending and general sexual novelty-seeking. In 2008, a study looking at United States undergraduate students found that men were first exposed to SEM at a mean age of 14.3, and women at an age of 14.8 (Sabina et al., 2008). An Australian study found that the median age for first viewing SEM was 13 for men and 16 for women (Lim et al., 2017). Looking at sexual and non-sexual offenders, a 2010 study found that early exposure to pornography was correlated with sexual offending, identifying that within both groups over 50% of the individuals were exposed to SEM before the age of 10, and that 11% of sex offenders and 6.8% of non-sex offenders were exposed to CSEM before the age of 10 (Burton et al., 2010). Early exposure to SEM was also found to be weakly predictive of sexual risk taking in a 2010 Croatian sample, which found a mean first exposure age in men of 11.5 and in women of 13.5 (Sinković et al., 2013). Early

[11] For non-consensually shared images, the victimization may be secondary.

sexual experience has additionally been proposed as a distal factor for problematic Internet use (Quayle & Taylor, 2003). Paedophilic behaviour and mixed offending have both been associated with early peer sex play before the age of 12 (Howitt & Sheldon, 2007b), though detailed comparisons with age of first sexual contact in CSEM consumers and a non-offending reference group have not been made.

In past research, CSEM offenders had reported addiction as a potential reason for their ongoing viewing activities (Christensen & Tsagaris, 2020). Potentially indicative of addiction is the amount of time spent on CSEM consumption. CSEM offenders have reported spending an average of 12.9 hours a week (Ray et al., 2014) to 18 hours per week (McCarthy, 2010) viewing all pornography, and 10 hours specifically on CSEM (McCarthy, 2010). This may be recent, emergent behaviour due to the availability of large quantities of CSEM through the Internet. Early CSEM offenders had limited access to small collections of content - in 2000, 18% of offenders were found to have had non-digital CSEM (e.g., photographs, magazines) (Wolak et al., 2005) - but the prevalence of non-digital media in current offenders is unknown.

When confronted with their CSEM activities by investigators, many CSEM offenders have admitted to their activities (while minimizing their behaviour), but the specific rates of admission have not been extensively studied. The Federal Bureau of Investigation notes that investigators must approach interviews with compassion and understanding, though how this is viewed by the offenders and its impact on obtaining admissions has not been directly measured (Bowling & Resch, 2005).

This research provides additional context to the prior work related to CSEM offenders through a series of analyses. First, the acquisition of SEM and CSEM through commercial services, as well as the trading and distribution of CSEM amongst offenders is quantified. Second, the age of first viewing SEM and CSEM, as well as that of first sexual contact are evaluated for both offenders and a reference population. Third, the perception of addiction to CSEM and the associated viewing hours is quantified for offenders. Fourth, the perceived lawlessness of the Internet by CSEM offenders is measured and compared to that of the reference population. Finally, the perceived compassion, fairness, and understanding shown by investigators is analysed in the

context of admissions, and the perceptions of offenders prior to their arrest that they would get caught is measured.

13.2 Methodology

These analyses were performed using the data collected from two surveys, one of the general public (n=524) and one of previously convicted CSEM offenders (“Offender”) (n=78). The surveys supported multiple analyses looking at the technical behaviours and cognitions of CSEM offenders. A summary of the collection and processing were provided in previous chapters, and only the specific details relevant to the current analyses are included below. Because all of the offenders who listed a gender identity were male or gender variant/non-conforming, only individuals identifying with those categories from the public profile (“Reference”) were used for comparison purposes (n=254).

13.2.1 Demographics

The descriptive statistics on the demographic data from both the reference and offender groups were tabulated. The groups were evaluated for significant differences using a one-tailed, two proportion z-test for the categorical data proportions and a Wilcoxon ranked sum test for the income data, with a Bonferroni correction applied for multiple comparisons.

13.2.2 Commercial SEM, Production, and Distribution

Commercial SEM use was measured by asking both groups if they had ever paid for adult SEM, and the offender group if they had ever paid for CSEM (for ethics and mandatory reporting reasons, the public group was not asked about CSEM usage). The groups were compared using a one-tailed, two proportion z-test. The CSEM group was additionally asked if they ever traded or produced CSEM. The results for trading were compared to the sociability scores captured in prior analyses using a Spearman chi-square test to determine if they were correlated.

13.2.3 Age Factors and SEM

Both populations were asked at what age they first viewed adult SEM, and the offender group was additionally asked at what age they first viewed CSEM[12]. Invalid responses that were earlier than the general age of recollection (before the age of 4) or older than the current, stated age of the individual were removed. Each group was additionally asked at what age they first had any sexual contact, with an option provided for never having had sexual contact. The groups were compared on the dimensions noted using one-tailed t-tests.

13.2.4 CSEM Viewing Activity and Frequency

The offender group was asked, at their highest, how many hours per week they viewed CSEM and provided five options:

- <1 Hour
- 1 - 3 Hours
- 4 - 6 Hours
- 7 - 9 Hours
- 10 or More Hours

Additionally, the offender group was asked if they were ever addicted to SEM. This was evaluated against the ranking of the hours watched using a one-tailed t-test. The group was also asked if they had ever viewed CSEM in a non-digital form and the associated proportions calculated.

13.2.5 Perceived Lawlessness

The offender group was asked about their perceptions of lawlessness using the perceived lawlessness instrument previously proposed and evaluated against the reference group. Descriptive statistics were generated on the responses provided. Additionally, differences in perceived lawlessness between the offender and reference groups were identified using Mann-Whitney tests.

[12] For the question on age of first viewing of adult SEM, a selection of having never viewed SEM was not provided as an option in the survey.

13.2.6 Investigative Efforts

The offender group was asked if they fully, partially, or did not admit to their CSEM activities during their investigative interview, and descriptive statistics generated. Additionally, the offender group was asked to rate their perceptions of whether or not investigators showed fairness, compassion, and understanding of their behaviours during their interview on a 7-point Likert scale ranging from Strongly Disagree (0) to Strongly Agree (6). A mean score for each category was calculated, and a sum of the means used to measure overall positive perceptions. They were additionally asked if they admitted to their CSEM activities, either in full or in part. Using ANOVA, their level of admissions was compared to the overall measure, as well as each individual category using a Tukey analysis controlled for multiple comparisons. Finally, the offender group was asked to evaluate their perception of their likelihood of getting caught prior to being approached by investigators on a 7-point Likert scale from Extremely Unlikely to Extremely Likely and descriptive statistics were generated.

13.3 Results

13.3.1 Demographics

The overall demographics are shown below in Table 13.1. Overall, the samples showed minimal statistically significant differences. The only areas with a significant difference were the offender group were more likely to be bisexual ($z=3.70$, $p<.01$) and to have a liberal arts degree ($z=3.79$, $p<.01$), whereas the reference group were more likely to be heterosexual ($z=-4.30$, $p<.01$), black or African American ($z=-3.65$, $p<.01$), and married ($z=-3.91$, $p<.01$). Additionally, the offender group was found to have an overall lower income rank ($W=12792$, $p<.01$) at the time of the survey.

Category	Offender (n=78)	Public - Gender Matched (n=254)	Z	p
Sexual Orientation				
Bisexual	0.14 (n=11)	0.03 (n=7)	3.701	<.001*
Heterosexual (straight)	0.72 (n=56)	0.91 (n=231)	-4.300	<.001*
Homosexual (gay)	0.13 (n=10)	0.05 (n=13)	2.442	0.007
Other	0.01 (n=1)	0.01 (n=3)	0.000	0.500

Category	Offender (n=78)	Public - Gender Matched (n=254)	Z	p
Prefer not to say	0 (n=0)	0 (n=0)	N/A	N/A
Age Distribution				
18 - 24	0.01 (n=1)	0.17 (n=44)	-3.647	<.001*
25 - 34	0.28 (n=22)	0.11 (n=27)	3.678	<.001*
35 - 44	0.24 (n=19)	0.17 (n=42)	1.388	0.083
45 - 54	0.17 (n=13)	0.24 (n=61)	-1.298	0.097
55 - 64	0.22 (n=17)	0.19 (n=47)	0.583	0.280
65 or older	0.08 (n=6)	0.13 (n=32)	-1.196	0.116
Gender Identity				
Female	0 (n=0)	0 (n=0)	N/A	N/A
Gender Variant/Non-Conforming	0.04 (n=3)	0 (n=1)	2.516	0.006
Male	0.95 (n=74)	1 (n=253)	-3.585	<.001
Not Listed	0.01 (n=1)	0 (n=0)	1.596	0.055
Prefer Not to Answer	0 (n=0)	0 (n=0)	N/A	N/A
Transgender Male	0 (n=0)	0 (n=0)	N/A	N/A
Relationship Status				
Divorced	0.23 (n=18)	0.09 (n=23)	3.294	<.001
In a Domestic Partnership or Civil Union	0.03 (n=2)	0.03 (n=7)	0.000	0.500
Married	0.23 (n=18)	0.48 (n=122)	-3.911	<.001*
Other	0 (n=0)	0 (n=1)	N/A	N/A
Separated	0.04 (n=3)	0 (n=1)	3.203	0.001
Single, but Cohabiting with a Significant Other	0.04 (n=3)	0.05 (n=12)	-0.363	0.358
Single, Never Married	0.41 (n=32)	0.32 (n=82)	1.466	0.071
Widowed	0.03 (n=2)	0.02 (n=6)	0.523	0.301
Race (Multiple Selections Permitted)				
American Indian or Alaska Native	0.01 (n=1)	0.02 (n=5)	-0.587	0.279
Asian	0 (n=0)	0.04 (n=9)	-1.794	0.036
Black or African American	0.01 (n=1)	0.17 (n=42)	-3.647	<.001*
Hispanic or Latino	0.12 (n=9)	0.07 (n=19)	1.410	0.079
Native Hawaiian or Pacific Islander	0.01 (n=1)	0 (n=1)	1.596	0.055
Other	0.01 (n=1)	0.01 (n=3)	0.000	0.500
White or Caucasian	0.88 (n=69)	0.75 (n=191)	2.426	0.008
Employment Status				
Not working (disabled)	0.13 (n=10)	0.05 (n=12)	2.442	0.007
Not working (looking for work)	0.15 (n=12)	0.09 (n=24)	1.518	0.065

Category	Offender (n=78)	Public - Gender Matched (n=254)	Z	p
Not working (other)	0.04 (n=3)	0.02 (n=6)	0.995	0.160
Not working (retired)	0.09 (n=7)	0.17 (n=43)	-1.725	0.042
Not working (temporary layoff from a job)	0.03 (n=2)	0.05 (n=13)	-0.743	0.229
Working (paid employee)	0.49 (n=38)	0.54 (n=137)	-0.774	0.220
Working (self-employed)	0.08 (n=6)	0.07 (n=19)	0.298	0.383
Education Level				
Less than high school diploma	0 (n=0)	0.01 (n=3)	-0.887	0.188
High school graduate (high school diploma or equivalent including GED)	0.13 (n=10)	0.24 (n=62)	-2.071	0.019
Some college but no degree	0.29 (n=23)	0.19 (n=49)	1.885	0.030
Associate degree in college (2-year)	0.13 (n=10)	0.1 (n=25)	0.750	0.227
Bachelor's degree in college (4-year)	0.33 (n=26)	0.26 (n=67)	1.209	0.113
Master's degree	0.09 (n=7)	0.13 (n=32)	-0.949	0.171
Professional degree (JD, MD)	0 (n=0)	0.03 (n=7)	-1.548	0.061
Doctoral degree	0.01 (n=1)	0.04 (n=9)	-1.298	0.097
Degree Field				
Business	0.13 (n=10)	0.17 (n=42)	-0.842	0.200
Computer Science	0.06 (n=5)	0.07 (n=19)	-0.308	0.379
Education	0.04 (n=3)	0.04 (n=11)	0.000	0.500
Engineering	0.08 (n=6)	0.06 (n=16)	0.628	0.265
Government/Political Science	0.03 (n=2)	0.02 (n=5)	0.523	0.301
Liberal Arts	0.12 (n=9)	0.02 (n=5)	3.787	<.001*
Nursing	0 (n=0)	0.01 (n=3)	-0.887	0.188
Other	0.06 (n=5)	0.08 (n=20)	-0.585	0.279
Physical Science	0.03 (n=2)	0.02 (n=5)	0.523	0.301
Psychology	0 (n=0)	0.02 (n=6)	-1.259	0.104
Social Sciences	0.06 (n=5)	0.03 (n=8)	1.227	0.110
Employment Position				
Computer, Engineering, and Science	0.06 (n=5)	0.1 (n=25)	-1.076	0.141
Construction and Extraction	0.03 (n=2)	0.04 (n=11)	-0.406	0.342
Education, Legal, Community Service, Arts, and Media	0 (n=0)	0.05 (n=12)	-2.014	0.022
Farming, Fishing, and Forestry	0.01 (n=1)	0 (n=0)	1.596	0.055

Category	Offender (n=78)	Public - Gender Matched (n=254)	Z	p
Healthcare Practitioners and Technical	0.01 (n=1)	0.04 (n=9)	-1.298	0.097
Installation, Maintenance, and Repair	0.06 (n=5)	0.01 (n=2)	2.648	0.004
Management, Business, and Financial	0.05 (n=4)	0.15 (n=37)	-2.324	0.010
Military	0 (n=0)	0 (n=1)	N/A	N/A
Office and Administrative Support	0.05 (n=4)	0.03 (n=7)	0.844	0.199
Production	0.09 (n=7)	0.04 (n=11)	1.744	0.041
Retired	0.15 (n=12)	0.2 (n=52)	-0.988	0.162
Sales and Related	0.08 (n=6)	0.04 (n=10)	1.426	0.077
Service	0.09 (n=7)	0.11 (n=27)	-0.503	0.307
Transportation and Material Moving	0.04 (n=3)	0.04 (n=11)	0.000	0.500
Unemployed	0.26 (n=20)	0.15 (n=38)	2.232	0.013
Income				
$0 - 9,999	0.09 (n=7)	0.09 (n=22)	0.000	0.500
$10,000 - 20,000	0.19 (n=15)	0.07 (n=19)	3.115	0.001
$20,001 - 29,999	0.1 (n=8)	0.1 (n=25)	0.000	0.500
$30,000 - 40,000	0.24 (n=19)	0.1 (n=26)	3.186	0.001
$40,001 - 50,990	0.09 (n=7)	0.14 (n=35)	-1.155	0.124
$50,991 - 67,000	0.08 (n=6)	0.07 (n=19)	0.298	0.383
$67,001 - 79,000	0.1 (n=8)	0.12 (n=31)	-0.484	0.314
$79,001 - 100,000	0.05 (n=4)	0.12 (n=31)	-1.775	0.038
$100,001 - 190,000	0.05 (n=4)	0.12 (n=31)	-1.775	0.038
Greater than $190,000	0 (n=0)	0.06 (n=15)	-2.215	0.013

Table 13.1: Overall Demographics

Note: * indicates statistical significance at a level of p<.01 following a Bonferroni correction

13.3.2 Commercial SEM, Production, and Distribution

Overall, 11% (n=26) of the reference group paid for adult SEM, while 35% (n=27) of the offender group paid for adult SEM, which was found to be significantly greater (z=4.98, p<.01). Only 2.6% (n=2) of offenders paid for CSEM at any point.

Only 2.6% (n=2) of the offenders produced CSEM, however 21.8% (n=17) traded CSEM with others. There was no correlation between sociability scores and trading of CSEM ($\chi 2=19.92$, df =18, p>.01).

13.3.3 Age Factors and SEM

The mean age of first viewing adult SEM was 14.01 (sd=9.4, skew=3.43, kurtosis=13.64) in the offender group, which was significantly lower [t(193) = 3.9, p<.01] than the reference group, which had a mean age of 20.6 (sd=9.55, skew=2.58, kurtosis=8.41). Viewing of CSEM occurred at a significantly later age than adult SEM [t(119)=7.3, p<.01], with a mean first viewing age of 29.76 (sd=16.38, skew=1.2, kurtosis=2.1).

A small minority of offenders, 4% (n=3) reported that they had never had sexual contact with any other individuals. For those that did report having sexual contact, the mean age for their first sexual contact of any nature was 14 (sd=6.33), with 54% (n=42) of offenders having their first sexual contact before the age of 16 (Figure 13.1).

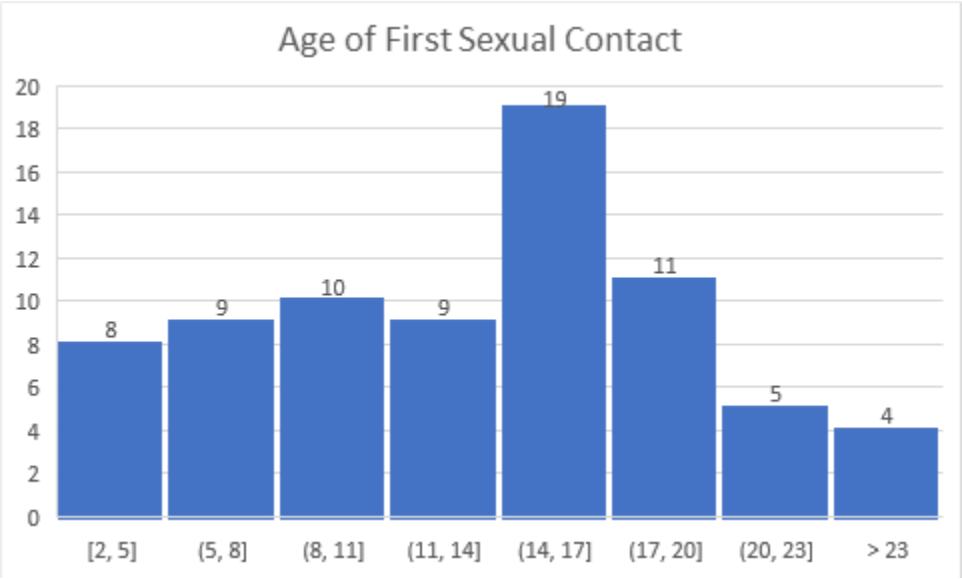

Figure 13.1: Age of First Sexual Contact

13.3.4 CSEM Viewing Activity and Frequency

The largest proportion of the offenders viewed CSEM more than 10 hours per week (.24), however the overall proportions were relatively flat across the various viewing amounts (Table 13.2). Almost half, 49% (n=38) of respondents indicated that they were addicted to CSEM at some point, and the group of individuals reporting addiction reported significantly higher [t(74)=3.9, p<.01] levels of weekly viewing. Highlighting the digital nature of CSEM offending, only 14% (n=11) of offenders reported ever having viewed CSEM in a non-digital format.

Hours	Proportion
<1 Hour	0.23 (n=18)
1 - 3 Hours	0.19 (n=15)
4 - 6 Hours	0.23 (n=18)
7 - 9 Hours	0.1 (n=8)
10 or More Hours	0.24 (n=19)

Table 13.2: Hours Per Week Spent Viewing CSEM

13.3.5 Perceived Lawlessness

Using the perceptions of lawlessness scale, CSEM offenders rated the overall lawlessness as moderately high at 19.23 (sd=5.91, skew=-0.31, kurtosis=-0.12). The questions related to illegal activities and behaviours on the Internet were rated as having higher overall agreement. The two questions related to capable guardianship (specifically, law enforcement activity on the Internet) were rated as having lower overall agreement (Figure 13.2).

The perceived lawlessness for offenders was lower (W=6449, p<.01) than that of the reference group (m=23.05, sd=5.96, skew=-0.26, kurtosis=0.5). Only two of the components were significantly different, with lower agreement by the offender group.

First, the agreement with the statement “Most activity on the Internet is not monitored by law enforcement”, was substantially lower (W=6771, p<.01) in the offender group (33% agreement) than the reference group (49% agreement). Additionally, the agreement with the statement “Law enforcement cares less about Internet crimes than crimes in the physical world” was substantially lower (W=4609, p<.01) in the offender group (10% agreement) than the reference group (43% agreement).

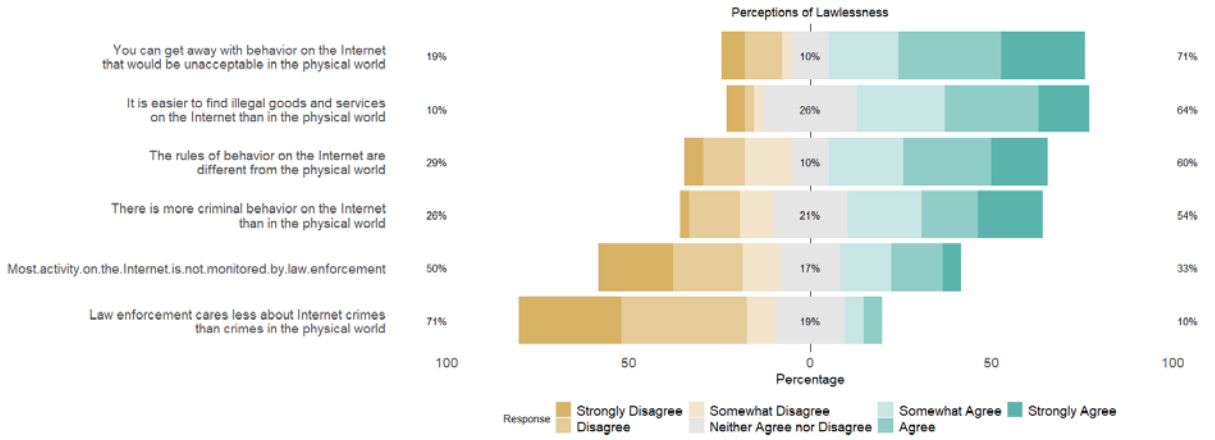

Figure 13.2: Perceived Lawlessness

13.3.6 Investigative Efforts

During their interviews, 63% (n=49) of offenders fully admitted to their CSEM activities, 18% (n=14) partially admitted to their activities, and 19% (n=15) did not admit their activities. The offenders’ overall perceptions of a positive interview were found to be significantly different based on their admissions [F(2,75) = 6.3, p<.01] (Figure 13.3). A Tukey pairwise comparison was conducted and found that between those who fully admitted to their CSEM activities (m=2.58, sd=1.59) and those who partially admitted to them (m=1.14, sd=1.05) there was a statistically significant difference (p<.01) with those making full admissions having a more positive perception of their interviewers. No differences were identified between the two groups and those who did not admit to their activities (m=1.53, sd=1.60).

Looking at the individual components, the only component with a significant difference between groups was compassion [F(2,75) = 7.7, p<.01], with the showing of compassion having a statistically significant difference (p<.01) between those who fully

admitted to their CSEM activities (m=2.31, sd=1.72) and those who partially admitted to them (m=.71, sd=1.27).

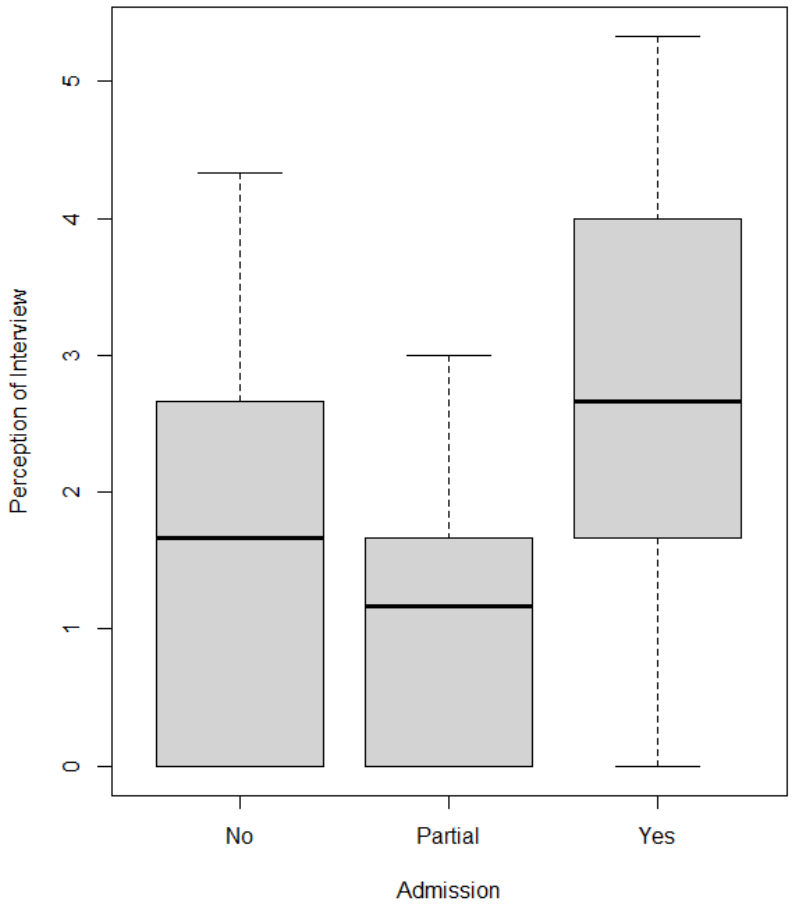

Figure 13.3: Perceptions of Interviewers Related to Admissions (higher scores indicate a more positive perception)

Before they were arrested, the majority of offenders believed it unlikely that they would be caught, with a majority, 64% (n=47) believing that it was at the less likely or lower probability. Only 23% (n=17) believed it was even slightly likely that that would be caught.

13.4 Discussion

The overall demographics of the offender group and the reference group were well matched for analysis. The differences in sexual orientation showed a slightly higher number of offenders identified as bisexual, compared to a slightly higher number of the reference group that identified as heterosexual. This may indicate a higher degree of sexual fluidity within CSEM offenders. Additionally, offenders were found to have a lower income rank and the reference group was more likely to be currently married. Because of the impacts of prison and the limitations on post-prison employment, a lower overall income is expected. Given the strains of conviction, imprisonment, and sex offender status, the lower numbers of the offender group that were currently married compared to the reference group is likewise expected. The one item that is not adequately explained by past research is the higher likelihood that offenders had a degree in liberal arts - given the lack of a theoretical basis for this difference, this is potentially an artifact and a higher-powered study would be required for validation.

The percentage of offenders that paid for adult SEM (35%) was consistent with prior research results (Endrass et al., 2009; McCarthy, 2010). The low incidence in the reference group of paying for SEM (11%) was expected given the high availability of free SEM (Alptraum, 2018). The majority of offenders did not, however, pay for CSEM. The 2.9% of offenders who paid for CSEM was lower than previously measured (McCarthy, 2010), but may be reflective of the timeframe of this study. The individuals present in the offender population would have engaged in the behaviours leading to their convictions prior to the widespread use of cryptocurrencies and the resurgence of commercial CSEM. Alternatively, it is potentially reflective of a greater availability of free CSEM in that same time period.

Very few (2.6%) of the offenders admitted to producing CSEM, while 21.8% of offenders traded CSEM at some point. Because there was no correlation with sociability, the majority of those who traded CSEM may not have done so to meet social needs (e.g., normalization of their actions) and may have done so for functional reasons. Future research is needed to distinguish social v. non-social trading from a technological standpoint (e.g., the difference between peer-to-peer and IM-based trading). Because a substantial minority of offenders did trade CSEM, investigative and forensic efforts

should look for potential trading for the purposes of distribution charges when evaluating cases.

The offender group started viewing adult SEM at a substantially younger age than the reference group. The reference group had a higher (20.6) mean age than prior research, however several of those studies involved university samples or targeted younger adults (e.g., Sabina et al., 2008; Sinković et al., 2013; Lim et al., 2017), which would have had a lower mean age of the sample populations. The offenders additionally reported a mean age for their first sexual contact of 14. These findings are consistent with early sexualisation as a potential factor in problematic Internet use (Quayle & Taylor, 2003) and sexual risk taking (Sinković et al., 2013).

Consistent with prior research (Christensen & Tsagaris, 2020), a substantial minority of offenders believed they were addicted to CSEM at some point in time. Approximately 24% of offenders reported that they spent more than 10 hours per week viewing CSEM at their highest, which is consistent with one aspect of addictive behaviour. The qualitative responses from earlier experiments with the same group frequently cited addiction, with substantial overlap in coping themes as well as sexual gratification themes. The reinforcing nature of CSEM viewing explains the overlap with sexual gratification, but there may be a subset of offenders that use it *primarily* for coping, though coping alone does not explain their initial reasons for viewing CSEM.

Similar to the reference group, the offender group primarily viewed the Internet as lawless, though to a slightly lower degree. The differences were present on the two statements related to capable guardianship. The offender group was more likely to believe the Internet was monitored by law enforcement, and that law enforcement cared about Internet crimes. This is fully consistent with the post-conviction status of the population sampled. It is additionally consistent with the finding that the majority of offenders did not believe they would get caught prior to their being made aware of the investigation. Their arrest and subsequent conviction provided a strong reinforcement that their behaviour was monitored and that law enforcement did care about their actions. Their convictions, however, did not change their overall perception of

lawlessness, and further work evaluating the perceptions of offenders who have not been caught would be needed to confirm causality.

In their interactions with law enforcement, offenders generally viewed the investigators conducting their interviews in a negative light. They rated their perceptions of the investigators' fairness, compassion, and understanding as generally low, showing that better training on rapport building and education on CSEM offending for investigators is needed. Showing compassion was found to be positively correlated with obtaining full admissions, highlighting the fact that an understanding-based approach to interviews is critical not just for potentially mitigating offender suicide risk but for furthering the investigation. The potential for sampling bias must be considered in the absolute reported numbers for admissions, however, as individuals who made full admissions may have been more likely to have been convicted.

13.5 Conclusions

The results of these additional analyses provide context to some of the earlier analyses and provide baseline comparators for future research. In terms of CSEM offenders that trade content, they might not principally do so to meet social needs. Early sexualization was present in the offender group, and there was evidence of addictive behaviours present in a subset of the group. Under LST, perceived lawlessness is a prerequisite and was found to be present in the offender population, though the influence of capable guardianship potentially moderated their perceptions, which provides a basis for deterrence efforts that highlight the presence of law enforcement. Finally, the correlation between law enforcement using an understanding-based approach to interviews and obtaining a full confession, coupled with the perceived lack of understanding, fairness, and compassion from most interviewers, highlights the need for better training of law enforcement on effective interview techniques.

SECTION 8 - DISCUSSION AND CONCLUSIONS

Chapter 14 - Discussion

14.1 Lawless Space Theory

In Chapter 2, this research presented lawless space theory (LST), which provides explanatory power for the technical behaviours of CSEM offenders. While providing explanatory power is a critical component of any theory, that theory must also provide some predictive power and be actionable to be useful. This chapter summarizes the empirical basis for LST based on this research, and provides considerations for deterrence, investigative and legal response, and treatment utilizing LST as a foundation.

LST is predicated on the idea that specific virtual spaces are perceived as lawless. This work developed a six question instrument to measure perceived lawlessness (detailed in Chapter 2), which was found to have an acceptable Cronbach's alpha (.74) in the reference population of members of the general public. As shown in Chapters 5 and 12, the reference population and the offender population both viewed the Internet as a whole as lawless, but the offender population had slightly lower perceptions of lawlessness. Examining the individual categories, the offender population had similar ratings for the acceptability of behaviours and the presence of illegal activities, but differed in their perceptions of capable guardianship. The reference group's agreement with the statement "Law enforcement cares less about Internet crimes than crimes in the physical world" was 40%, compared to 10% of the offender group, and likewise their agreement with the statement "Most activity on the Internet is not monitored by law enforcement" was 48%, compared to 33% of the offender group. This result was expected, as all of the offenders were provided the most direct reminder of capable guardianship - through arrest and subsequent conviction. Future research looking at the perceived lawlessness of specific virtual spaces within the Internet by non-convicted

offenders is needed and is expected to be correlated to criminal activity (and CSEM activity in particular) within that space. Additionally, pre-arrest ratings of law enforcement presence would be expected to be significantly lower than those post-arrest, though identification of a relevant population to measure this would be difficult.

The four specific components of LST were supported by the findings from this research. First, that offenders will primarily choose and utilize a perceived lawless space that best meets their psychosexual needs in the most frictionless way, was evaluated in the context of the factors that offenders utilized in selecting a lawless space to view CSEM. In Chapter 10, the top five features sought were anonymity, ease of use, lack of law enforcement presence, familiarity, and the amount of content available, representing a mix of psychosexual value (amount of content available) and cost-related (anonymity, ease of use, familiarity, lack of law enforcement) elements.

The second component, that habituation and differential association in the lawless space will reduce the perceived risk, was supported by the perceived likelihood of getting caught prior to arrest. The majority of offenders (64%) believed it was unlikely they would get caught at the time of their arrest. There was some perceived risk prior to being caught, evidenced by the deletion of CSEM collections detailed in Chapter 11. Of those who deleted their collections, 26% reported doing so out of fear of getting caught, but the presence of shame/guilt (47%) and a desire to stop (33%) were more common reasons for deletion.

The third component of LST, that normalization will increase comfort in a particular lawless space, increasing friction costs that must be overcome to switch technologies, was supported by the slow adoption of new technologies and the continued usage of gateway lawless spaces shown in Chapter 10. The majority of offenders (87%) continued to use their initial lawless space of choice, and 46% of offenders only used a single lawless space. Additionally, looking at the time using a single technology, 54% of offenders used the technology enabling their primary lawless space more than 90% of the time.

The final component of LST, that additional countermeasures will only be implemented by offenders to reduce perceived risk and lower cognitive dissonance, but not at the expense of utility, was borne out by the low level of countermeasure usage and the stated reasons for doing so detailed in Chapter 10. While overall countermeasure usage was high, usage specific to CSEM behaviours was focused primarily on easy-to-use but less technically sophisticated countermeasures, with the use of In-Private browsing being the most frequent at 68%. Complex countermeasures that slow down the acquisition of CSEM such as anonymizing VPNs (15%) and encryption (18%) showed low adoption. Additionally, supporting the idea that a reduction in strain was important, the reason provided by the most individuals for using countermeasures was a reduction in anxiety (71%), followed by a need to remain anonymous (67%).

14.2 Deterrence

LST can be used to improve messaging as part of deterrence efforts to stop CSEM consumption. There are two aspects of deterrence that are informed by LST and by this research. First, the timing of deterrence is critical to its long-term efficacy. Second, the content of the deterrence messaging is important and needs to be considered in the context in which an individual views it. Both of these are considered in relation to specific technical deterrence efforts.

14.2.1 Timing of Deterrence

There are two basic principles relevant to the timing of deterrence efforts. First, deterrence efforts that prevent an individual from ever engaging with CSEM material are preferable to those that cause offenders to stop offending. Second, long-term deterrence is preferable to short-term deterrence. Long term deterrence consists of complete desistance and has ongoing benefits, while short-term deterrence is temporary and event-focused (e.g., stopping an offender from downloading a specific file or terminating a browsing session).

Deterrence efforts must take into account the technological as well as the psychological friction costs of offending. As noted previously, decisions can be involvement decisions (the decision to start viewing CSEM) or event decisions (the decision to initiate a new

session of CSEM viewing or to continue CSEM activities). Involvement decisions are long-term and have a significantly higher friction cost, both psychological and technical, while event decisions are proximal, have lower psychological engagement requirements, and may have minimal or no technical costs (R. V. Clarke & Felson, 2017; Cornish & Clarke, 2014).

The first viewing of CSEM has the highest friction costs - the offender must make the conscious decision to start viewing the content, may need to construct a technological environment that allows access to a virtual lawless space, and may need to acquire specific technological skills (or criminal domain skills) to effectively navigate that lawless space (Quayle & Taylor, 2003). Viewing other deviant SEM, including bestiality, legal child erotica, and similar content lowers the psychological cost for viewing CSEM in that the offender is already engaging in activities that may be legal (depending on the jurisdiction) but are not socially acceptable. As such, transitioning to CSEM still requires the burden of choice to move from socially unacceptable to illegal, but the incremental cost is lower. Additionally, when viewing legal but deviant SEM, the chances of encountering CSEM are greater (as indicated in the viewing of non-mainstream adult sites in Chapter 8), and an incidental first viewing now switches the dynamics of a second viewing from an involvement decision to an event decision.

Under the biopsychosocial model, there are neurological reasons for early deterrence as well. The mesolimbic dopamine pathway is a primary component of the brain's reward system (De Sousa & Lodha, 2017). Kuhn and Gallinet (2014) found that pornography consumption was associated with increases in volume in the right striatum (caudate) and with left striatum (putamen) activation due to pornographic cues (though this was a correlation study, not a causation study). Building on the work of Kuhn and Gallinet (2014), a study by Prause et al. (2015) found that the difference in the late positive potential component of event related potentials, which is an indicator of emotional response (Schupp et al., 2006), was lower in those with high Internet pornography consumption when shown sexual stimuli as compared to neutral stimuli. They cited habituation as one reason for this, and it provides an explanation for

continuous novelty-seeking. Love et al. (2015), citing Doidge (2007), summarized the research in that

> … the continued release of dopamine into the reward system when an individual compulsively and chronically watches Internet pornography stimulates neuroplastic changes that reinforce the experience ... these neuroplastic changes build brain maps for sexual excitement ... previously established brain maps for "natural" sexuality cannot compare to the newly developed and continuously reinforced maps generated by continued compulsive watching of Internet pornography, and thus the addicted individual progresses to more explicit and graphic Internet pornography in order to maintain the higher level of excitement.(Love et al., 2015, p. 407)

Additionally, perceived capable guardianship is potentially at its highest before engagement, as evidenced by the difference between the public and offender perceptions discussed previously. Therefore, deterrence efforts that occur prior to the first viewing of CSEM are proposed to be the most effective, and the longer the time allowed for habituation through continued viewing the stronger the potential reward/learning pathways that need to be overcome are. Because the majority of offenders began by viewing adult pornography using two primary gateway technologies, through open web and the through the use of peer-to-peer software, it may be feasible to provide deterrence at these junctures. Additionally, any general, non-targeted deterrence (e.g., awareness campaigns) that occur prior to engagement with CSEM are more likely to be effective than campaigns that occur during periods of active engagement.

The second choice for deterrence, if early deterrence is not feasible, is during the guilt/shame cyclic deletion of content found in Chapter 11. If deletion includes the removal of tools necessary to obtain CSEM, the decision making to re-engage shifts back to a higher cost involvement decision. Additionally, if the desistance continues for a significant portion of time, the habituation will attenuate to a degree, and will be easier to maintain. Coupled with the attenuated habituation, if we use traditional addiction models as a corollary, tolerance levels will go down as well, which may translate into a

reduction in the need for novelty within SEM usage, opening the door to legal adult SEM consumption, absent the presence of triggering cues that re-open engagement into CSEM behaviour.

The third choice of timing is immediately following a law enforcement intervention. Because most law enforcement engagements will result in the removal of CSEM as well as the removal of the equipment used to engage in CSEM activities, this greatly increases the friction costs to re-engage in offending. Additionally, direct engagement with law enforcement provides the most salient awareness of capable guardianship possible, increasing perceived risk under LST. For multiple-technology offenders, it would benefit law enforcement not to specify to the offender how they were identified to avoid a displacement from less secure to more secure mechanisms.

There is a final consideration for the timing of deterrence efforts, and that is related to the relative state of arousal. Because the reward-potential trigger can occur earlier in the offending process with habituation (during searching and anticipation), any disruption following the start of a CSEM session will potentially be occurring post-reinforcement, which is likely suboptimal. Additionally, when the CSEM offender is in an aroused state with diminished impulse control (Ariely & Loewenstein, 2006), they are less likely to be swayed by rational logic. While a strong enough deterrent may overcome this (e.g., law enforcement knocking on the front door), subtle efforts are less likely to deter the individual at this stage.

14.2.2 Content of Deterrence

The timing of deterrence efforts is important, but it is equally important to provide the right *messaging* at the right time. There are multiple types of deterrence messaging that can occur - societal signalling (general negative social acceptance of CSEM), empathy-based messaging (highlighting victims), elucidation of paths for help seeking, and reminders of capable guardianship.

General signalling regarding the social acceptance of CSEM has been successful. Chapter 7 highlighted that the general public viewed CSEM offences as more severe than other crimes except for criminal homicide and rape. Even within the offender

community, the viewing of CSEM was largely acknowledged as socially unacceptable, with offenders generally ranking it more severe than property crimes but less severe than crimes-against-persons as measured in Chapter 8. While this shows a perceived severity gap between offenders and the general public, it still indicates that offenders recognize the illegality of the activity. Both groups recognized that CSEM viewing was different from adult SEM viewing, however offenders were more likely to endorse the acceptability of viewing of child erotica and virtual CSEM. Because these are potential gateway SEM types, more effective messaging about a lack of societal acceptance of these forms of SEM may be warranted. General sexualization of children in advertising (Merskin, 2004) and other media (Gigi Durham, 2009) can have the opposite impact of deterrence - it not only normalizes child erotica from a social acceptance perspective, it provides ready access to the material, which may be triggering (Rush & La Nauze, 2006). Additionally, a lack of clarity and enforcement within the legal system on virtual CSEM promotes similar social acceptance. As such, additional general deterrence messaging about the social acceptability and legality of CSEM (e.g., “Viewing CSEM is wrong”) beyond the current messaging is not warranted, though targeted social acceptability messaging regarding child erotica and virtual CSEM is.

Other types of messaging involve enhancing empathy with victims and have been used as interventions for contact sex offences. As an example, in an experimental session involving a short video followed by a directed written exercise, college students were found to have increased empathy for rape victims as a general prevention measure (Stephens & George, 2009). While there is at least short-term effectiveness with empathetic messaging for at least some other sex offence scenarios, there is reason to believe it will not be effective with most CSEM offenders. CSEM offenders have been found to view their consumption of digital CSEM as separate from the underlying acts depicted (Paquette & Cortoni, 2020). Additionally, CSEM-only offenders tend to have fewer empathy deficits when compared to mixed and contact offenders (Babchishin et al., 2018), and there is no significant research showing that empathy deficits enable this particular offence type.

A current pathway for CSEM prevention messaging content is to emphasize help-seeking. Web-based search engines effectively implemented such messaging when users typed terms associated with child pornography and coupled this messaging with the blocking of easy to find CSEM sites, increasing the frictions costs (Steel, 2015). Currently, Microsoft's Bing search engine (*PTHC - Bing*, 2020) provides messaging that partially includes language to "Get help now", which links to StopItNow, a non-profit organization aimed at child sex abuse prevention (*StopItNow - About Us*, 2020). Google has a similar link, with the caption ""Seeking sexually explicit images of children can have grave consequences. If you are concerned about your online viewing of sexual images of children or if you have not looked at them but have an urge to do so, you can access anonymous, confidential and effective help from Help Wanted" (*Child Pornography PTHC - Google Search*, 2020), which links to a short video geared at empathetic understanding by the non-profit Help Wanted (*Help Wanted Prevention Intervention*, 2020). Facebook recently added harm-focused deterrence messaging as well, with similar links to obtain help (*Facebook - Search Results*, 2021). Prevention-based messaging targeting help-seeking may have limited effectiveness for several reasons. First, it is generally present on gateway technologies, where novelty-seeking users with a lack of exclusive paedophilic interests may come across content. These individuals may not consider themselves paedophiles or be actively seeking help. Second, the ideal timing for messaging related to getting help would likely be after content deletion as part of the guilt-shame cycle identified in this research, not at gateway usage. Third, the effectiveness of current treatment efforts for this community is not extremely high (Mews et al., 2017). Fourth, Bing couples this messaging with wording that CSEM viewing is illegal, providing a barrier toward individuals using the link embedded within that messaging. Although its effectiveness may not be high, as long as it does not displace other messaging it will likely have a positive effect with a small subset of offenders at minimal cost (Henry, 2020).

The final major messaging area focuses on showing that capable guardianship is present. Both Bing (*PTHC - Bing*, 2020) and Google's (*Child Pornography PTHC - Google Search*, 2020) messaging highlight capable guardianship. Google (*Child Pornography PTHC - Google Search*, 2020), for example, states "Protect children from

abuse ...The intentional viewing or possession of sexually explicit imagery of anyone under 18 is illegal" and provides links to report CSEM. Because the message comes up at a context-appropriate time (when searching for CSEM-related terms), and because the open web is a gateway technology, this is a theoretically effective general as well as specific deterrence messaging option supported by LST. Individuals first searching for CSEM may be actively deterred from continuing to search, and individuals returning are provided a time and context-sensitive reminder (though having a static, non-changing reminder will likely have lower effectiveness each time it is shown where no negative consequences occur). Coupling capable guardianship messaging with help-seeking messaging may be warranted for precautionary purposes to reduce suicide risk due to the high incidence of depression (Magaletta et al., 2014) present in CSEM offenders. Because minimal research has been done on the effectiveness of CSEM deterrence campaigns in general, future campaigns (including those proposed here) must be empirically studied for efficacy.

14.2.3 Possible Technical Deterrents

While the below deterrence efforts are by no means comprehensive, they provide examples of several options available that are consistent with LST. The recommendations below focus specifically on the consumption of CSEM, though efforts to reduce the production of additional CSEM provide an alternative primary prevention strategy. All of the proposed would need to be tested for effectiveness but they have a sound theoretical basis. Several have been partially implemented already but could benefit from more widespread usage. A comprehensive overview of current deterrence strategies can be found in the work of Quayle and Koukopoulos (Quayle, 2020; Quayle & Koukopoulos, 2019).

14.2.3.1 Primary Prevention

Primary prevention, for the purposes of this discussion, is the limitation of the distribution of and access to CSEM materials, as well as awareness campaigns that improve offender knowledge of the laws and the associated risks of offending.

For limiting access, general blocking of search terms associated with child pornography by web providers was shown to be effective in reducing access to web-based CSEM (Steel, 2015). Additionally, efforts like Project Arachnid focus on crawling the web for CSEM images and videos, then automatically reporting the offending sites to the associated Internet providers (*Project Arachnid Home*, 2020). As of November 2020, Project Arachnid had sent out over 6.2 million takedown notices to web providers. Additionally, their Shield product provides a near-realtime list of offending URLs to other providers, allowing them to block known CSEM sites even if the originating provider fails to do so (*Project Arachnid Home*, 2020). For repeat offenders, Interpol publishes its Internet Worst of List (IWOL), which includes sites that have been verified by two independent agencies to be sharing images of severe CSEM (*Interpol - Blocking and Categorizing Content*, 2020).

The above efforts are primarily open web-based and appear effective at reducing web-based CSEM consumption (Steel, 2015). Under LST, this is expected as it changes the value proposition for open web searching. With less material available, and longer and more exhaustive searches required to find information, the friction costs to offend, particularly to do so for the first time (as web-based searching is one of two primary gateway technologies), are greatly increased. The risk of blocking efforts in particular is that they will have a displacement rather than a deterrence effect. As peer-to-peer networks are the other major gateway technology, comparable efforts need to be enacted in these virtual spaces.

Efforts to identify CSEM on peer-to-peer have been primarily investigative, with tools like CPS Gridcop and Roundup identifying offending IP addresses, which are made available to local law enforcement for interdiction (Wolak et al., 2014). These could be greatly enhanced by identifying the IP addresses of repeat offenders sharing CSEM and providing them to the relevant ISPs for port-specific blocking. They could also be used at a more global level on a peering basis - similar to the Arachnid Shield product, ISPs could be provided lists of IPs that they could dynamically block (even if only for a fixed period). This would increase the costs to both share CSEM (requiring individuals to use

more advanced technologies) and to find CSEM, requiring additional psychological involvement to initially engage in the offending activity.

Offender (or pre-offender) education campaigns are more difficult to enact as there are competing interests present, which may work at cross-purposes. Traditional media coverage of offender arrests serves as a direct reminder of capable guardianship and those that contain basic details about the offender's technical activities (e.g., using peer-to-peer) without providing details about how the offender got caught (which might enable greater usage of countermeasures) are likely to be the most effective. These efforts may not be sufficient, however, as this research found in Chapter 13 that the majority of offenders did not personalize the messaging and believed that they were not likely to be caught (prior to actually being caught). Increasing the number of details about previously caught individuals that relate directly to the potential offender's virtual space of choice may trigger increased recall under the availability heuristic (Tversky & Kahneman, 1973). These efforts are most likely to be effective in preventing initial access, as the negative arousal effect (Slovic et al., 1986) of continued offending through habituation without getting caught will become weaker over time, and general messaging will become less effective under LST.

The efforts to increase the perceived risk in the mind of the potential offender are potentially at cross purposes with promoting help-seeking behaviour and reducing social stigmatization (which may prevent offending) (Brennan et al., 2019). Including messaging about help-seeking, especially if it can be offered confidentially (Beier, 2016), directly alongside messaging about the illegality of the behaviour (demonizing the act but not the actor) can be used to balance these competing needs. This messaging may be more effective in countries without mandatory reporting for mental health providers.

This research identified distorted public perceptions about the risks posed by CSEM offenders in terms of recidivism and contact offending, which increases social stigmatization, showing there is a need for more effective public education. While changing these perceptions may lead to greater fairness in sentencing guidelines and legislative action, doing so runs the risk of reducing the social stigma of the action itself

in the mind of the offender, which would potentially lower one of the psychological deterrents to offending. As such, educating journalists to include details about individual actions and punishment, while including details on the low risk of recidivism, would be consistent with restorative justice principles (Braithwaite, 2002). A journalism bootcamp, similar to those held for general mental health reporting (Johns Hopkins University, 2020), could easily be developed providing crime journalists the background material they need to effectively report on CSEM offending.

14.2.3.2 Secondary Prevention

Secondary prevention is event-specific and can be incorporated alongside primary prevention (e.g., by blocking and providing deterrence messaging). It can also occur during two other timeframes - while actively seeking and/or viewing CSEM and during the interregnum period between deletions in the guilt/shame cycle.

Website blocking and the associated warnings provide a reminder of capable guardianship in a specific lawless space. The messaging, however, could provide more salient, personalized warnings. In particular, many individuals seeing these messages have already made a prior involvement decision and are now making a lower-cost event decision. They may also be in an aroused state, requiring more direct intercession to have a deterrence effect. For example, when a web-based search is conducted, the warning could include the IP address of the searcher in the warning message, as well as the approximate location (which can be determined from the IP address) (*GeoIP® Databases & Services: Industry Leading IP Intelligence*, 2020). A more valid warning might be implemented as follows:

> **WARNING**: Your search for the term “pre-teen hardcore” is consistent with illegal searches for child pornography. Your IP address has been logged as **192.168.1.1**, located near **Washington, DC**, Continued searches for terms associated with child pornography may result in notification to law enforcement.

Similar to web-based searching, previous efforts have been made in the peer-to-peer space with voluntary messaging in clients (*The First New Program to Combat Child Pornography*, 2014), but better options are available with the increased

multifunctionality of peer-to-peer clients. As with web-based messaging, it is possible to host servers on peer-to-peer networks that dynamically generate files with CSEM-oriented names that have custom messages (including the IP address of the requestor) based on problematic search queries (as opposed to statically seeding networks with fake CSEM). This would reduce the perceived availability of content while simultaneously providing a direct, high impact reminder that capable guardianship was present. A static version of this concept, Police2Peer, was enacted by Europol and seeded peer-to-peer networks with files named similarly to CSEM content that contained pictures of police from around the world delivering warning messages. Police2Peer showed efficacy in that individuals downloaded and viewed the messages, but the impact on cessation of activities has not been directly measured (Europol, 2020). In addition to seeding networks, multifunctional clients could also have automated messaging sent when they are found to be hosting CSEM, or when they search for CSEM-related terms, to the social networking functions present in some peer-to-peer clients.

Because of the broad nature of adult SEM consumed by CSEM offenders as shown in Chapter 11, non-CSEM novelty-seeking provides another path for deterrence. Adult websites could provide similar warnings when offenders search for CSEM-specific terms, with the need for high impact language related to the likely hot state of arousal present. Additionally, organizations offering help-seeking would potentially benefit from advertising on adult websites. Instead of targeting exclusive paedophiles, they would be better served targeting problematic pornographic internet usage and dysfunctional coping skills in their messaging to prevent forays into CSEM by vulnerable populations.

14.2.3.3 Tertiary Prevention

Tertiary prevention strategies, in the form of general investigative response and post-investigation treatment are incorporated into their respective sections of this chapter. One consideration in tertiary prevention is the need to investigate and the possibility of pursuing other interventions for first time offenders.

One potential low-cost intervention would be the tracking of first time offenders and sending a cease-and-desist letter in lieu of investigative action or having investigators

provide a verbal warning to the offender (Wormald, 2016). As an example, an IP address found to be downloading CSEM on peer-to-peer networks could have the source identified through a subpoena to the appropriate ISP, which would provide the physical address where the content was being viewed. A letter could be sent indicating the evidence identified and notifying the individuals in the household of future prosecution if the behaviour continues. Under LST, this would serve as a strong reminder of capable guardianship and would provide a direct cost (imprisonment) in the mind of the offender to contrast the desire to continue the offending activity. The value would be less than that of an investigation, as all current CSEM would not necessarily be removed from the household, leading to future triggering content. Additionally, there is the potential for severe unintended consequences. By targeting a household and not an individual, non-offending relatives may be made aware of the offending behaviour, which was one of the major concerns indicated by participants in Chapter 9. The resultant life stress caused by the discovery could be a strong event trigger for suicidal behaviour, and any such intervention should include information on help-seeking.

Additional tertiary prevention mechanisms include efforts to remove images associated with the discovered offence. Many investigations focus exclusively on prosecuting the individual acquiring the content, and do not seek to identify victims portrayed or to identify the source of the CSEM. By allowing the offending content to remain present (and, in the worst case, for new content to be created by further sexually abusing a portrayed victim), the overall supply remains undiminished. This provides continued value for other offenders in that virtual space, missing out on a possibility for deterrence. As such, at a minimum all identified images should be submitted to NCMEC (National Center for Missing and Exploited Children, 2020) or the IWF (*Hash List*, 2020) for inclusion in future hash lists for monitoring and blocking purposes.

14.3 Investigation and Legal Response

Investigations of and the legal response to CSEM offences have several areas for improvement based on this research. Better education for law enforcement on the techniques used by CSEM offenders, including the usage of multiple technologies and

the expectations for forensics, needs to be implemented. Investigative techniques need to improve as well - in particular understanding-based interview approaches and crisis response planning need to be incorporated into investigations. Similarly, education of prosecutors, judges, and the public on CSEM offender risk and behavioural aspects should be furthered to provide a basis for more risk-oriented legislative and sentencing decisions.

14.3.1 Investigations

This research evaluated several aspects of CSEM offender cognitions and behaviours related to investigative activities. By incorporating this knowledge into investigative approaches, more successful outcomes for all parties involved are possible. First, the specific technical behaviours of offenders, how they store and process CSEM, and their usage of countermeasures need to be taken into account in digital forensics examinations. Second, additional rapport building during interviewing is necessary and the cognitive distortions present (and those not present) can drive effective interrogations. Finally, the immediate aftermath of discovery presents a critical time of psychological strain for both the offender and their families that needs to be considered in investigative planning.

14.3.1.1 Forensics

Digital forensics is primarily used for enforcement and victim identification purposes but can also be used in support of risk assessments (Glasgow, 2010). This research confirmed past work showing that the use of sophisticated countermeasures by CSEM offenders was low, particularly with regards to encryption (Krone et al., 2017; Wolak, Finkelhor, Mitchell, et al., 2011). Additionally, a small but substantial subset of users reported using VPNs and TOR to obfuscate their IP addresses. For forensic purposes, this means that confirmation should be sought before relying exclusively on an IP address to identify the address of offending behaviour. In particular, confirming that the address is not a TOR exit node (*TOR Exit Node List*, 2020), and that the address does not belong to a shared hosting provider that may be providing anonymizing VPN services should be performed before taking action against based solely on IP

information. Forensically, the IP address history of any routing devices in the location eventually searched should be obtained to corroborate network-based evidence.

Once a location has been identified, the presence of CSEM is generally sought. Based on the behaviours identified, individuals who view CSEM at work and other locations are statistically likely to have CSEM in their house. For establishing probable cause, as established in Chapter 10, every single individual that viewed CSEM at work reported also viewing it at home. Though viewing CSEM at home was common, there are potential barriers to finding CSEM on devices in the home, and a lack of finding CSEM does not negate viewing having occurred. A significant minority (12%) of individuals reported only viewing CSEM and not storing it, 38% reported using In-Private browsing which leaves fewer forensic artifacts, and 31% reported using secure wiping software to delete their content. Coupled with the number of individuals who may have recently deleted their entire collections as part of a guilt-shame cycle, the absence of CSEM is not dispositive of CSEM viewing by the alleged offender. As such, enumerating the presence of wiping tools, applications consistent with CSEM viewing, deletion history, and other artifacts are important for the purposes of a thorough forensic examination. Additionally, because of the same countermeasures noted, the total duration and volume of viewing may not be digitally identifiable and may need to be elucidated as part of the interview process.

This research further confirmed the move to mobile devices (Steel, 2015), with 27% of offenders using smartphones to view CSEM, though only half of those stored CSEM on the devices. Since convenience was the most frequent reason for storing CSEM on devices, most external storage with CSEM content is likely to be easily accessible to the main computing devices, and half of all users reported using external storage. When searching, it is critical to find all computing devices with CSEM, as any content left behind may trigger re-offending. Practically, however, some devices may not be worth seizing for in-depth review - although 3% of offenders reported using game consoles to view content, none stored any on the devices.

Cataloguing the absence or presence of adult content is helpful but not dispositive in identifying target ages of interest. This research showed in Chapter 11 that none of the

respondents reported viewing CSEM exclusively, and that viewing adult SEM (or even having the majority of their collections composed of adult SEM) did not preclude an interest in CSEM. If no adult SEM viewing is present, it may be indicative that the offender has an exclusive sexual interest in minors, which is an important treatment consideration discussed elsewhere. In their collecting habits, most CSEM offenders showed a highly fluid interest in multiple age ranges and across genders. The ratio of boy/girl content has been found to be predictive of risk (Seto & Eke, 2015), and should be noted if possible. Though the ratio of boy/girl content is relevant, any risk-based conclusions about potential contact offences based on the age or sex of children the individual has access to compared with their preferential CSEM content range should be avoided, beyond the general increased risk of any access to children (Long et al., 2016). Additionally, any forensic information on the duration of offending, as well as the presence of any non-visual CSEM (e.g., stories) are potentially important for risk assessment purposes and should be noted (Seto & Eke, 2015, 2017; Soldino et al., 2020).

14.3.1.2 Interviewing

In Chapter 9, offenders overwhelmingly indicated that investigators were perceived as lacking fairness, compassion, and understanding. Because developing rapport and trust are critical to effective interviews and interrogations (Brimbal et al., 2019), investigators need to broaden their knowledge of CSEM offenders and take an understanding-based approach toward their interviews. In other studies, investigators were most successful when police were viewed as associated with having Humanity/Integrity and Rapport characteristics (Cleary & Bull, 2019). This can be applied directly in CSEM investigative interviews to both elicit confessions and to potentially reduce overall psychological strain on offenders.

For building rapport and obtaining non-coercive admissions, both the investigator's demeanour and the location of the interview are important. Demeanour-wise, the investigator should adopt a Rogerian unconditional positive regard approach toward the offender (Rogers, 1957). By allowing the offender to talk without feeling as if they are being judged, they will have less cognitive strain caused by the discrepancy between

their own knowledge of their acts and their self-perceptions of the investigator's views of their actions. Additionally, knowing the offender's relationship dynamics provides an understanding of potential areas of concern to the offender during the interview. While going to jail was the single biggest concern expressed by offenders in this research, it was very closely followed by friends and family finding out about their activities. Because of this, the interview should occur in a neutral location if possible and the offender should be allowed to control their own narrative with their relatives; this will reduce potential barriers toward admissions related to their CSEM activities.

If interrogation is used, the specific themes employed should match the cognitive distortions endorsed by the offender, adjusted for social desirability. The same rationalizations that the offender may use to allow them to psychologically continue to reoffend can be brought up as direct themes to minimize the risk of coercion. Specific behavioural assessment questions can be asked in the interview related to non-offending behaviour, including those regarding the offender's usage of lawless spaces and their engagement with adult SEM. Their reasons for engaging with adult SEM (e.g., as a coping mechanism, for excitement, because of an addiction) likely have overlap with the reasons they engage in CSEM behaviour. Additional attention should be paid to any behaviours consistent with novelty seeking or coping strategies in general SEM viewing as potential areas of theme development.

For specific themes, the work of Paquette and Cortoni (2020) looked at the offence-supportive cognitions of CSEM offenders, which this and other research (Elliott, 2012; Elliott et al., 2013; Paquette & Cortoni, 2019) have shown are different than those of contact and mixed offenders. The most common cognition they identified was related to the Nature of Harm, which was essentially a minimization-based theme. It had overlap with the third most common cognition they identified (2020) which was that Virtual is Not Real, which was endorsed by 90% of CSEM offenders. The two primary themes of relevance to these distortions are a bit-and-bytes theme and novelty-seeking. The bits-and-bytes theme relies on distancing the offender from the underlying abuse (that they were "just images") and minimizing the level of their harm when compared to contact abusers, though caution is warranted with this approach if a contact offence is

suspected. For novelty seeking, the breadth of adult SEM identified in this work indicates that many offenders may have CSEM as just one of many deviant interests and may be more willing to discuss their CSEM activities in that context.

Two additional, relevant common cognitions identified were the Uncontrollability of the Internet, present in 40% of CSEM offenders, and general Uncontrollability, which was present in 95% of CSEM offenders (Paquette & Cortoni, 2020), which is consistent with the coping and addiction cognitions presented by individuals in this work. Incorporating LST, there are three potential themes that emerge for interviews from this - that the offender acted out of character due to an underlying stressor and used CSEM as a coping mechanism, that the specific lawless space facilitated behaviour that they otherwise would not have engaged in (e.g., they would never visit the back room of an adult book store and ask for CSEM), or that they had an Internet pornography addiction that transitioned into CSEM. Looking at the general Uncontrollability of the Internet, another theme emerges that fits particularly well with LST, where perceived lawlessness of specific environments are reinforcing of this belief. The theme that the lawless space itself facilitated actions that the offender otherwise would not have engaged in, as well as contrasting the material the individual chose not to view in that lawless space (e.g., CSEM that was too “extreme”, either by age or by content) are likely to resonate with this cognitive distortion, and it allows the offender to self-justify their behaviour as an inadvertent extension of viewing adult SEM.

14.3.1.3 Modified Crisis Response Planning

Given that this research has identified high suicidal ideation in CSEM offenders post discovery, management of suicidal risk should be part of all investigations. Reducing suicide risk is critical for both the offender’s health and the mental health of others potentially impacted by their suicidal behaviour - offender suicides impact already traumatized family and friends as well as law enforcement and may prevent victims from finding closure (Hoffer et al., 2010). Risk management starts during the interview. As noted above, providing compassion and understanding is the first passive step toward risk reduction, but characteristics of crisis response planning can also be incorporated into all post-interview actions (Rudd et al., 2001).

Before beginning crisis response planning, investigators should take steps to normalize the investigative process by letting the offenders know that they are not alone. Additionally, any attempts to place the behaviour in context (using the same minimization techniques they may already endorse) through comparison to other offending behaviour can be utilized. Finally, asking the offender about their current state of mind and what proximal concerns or questions they have may help to reduce immediate stress.

The core of response planning is the development of a crisis response plan. Crisis response plans are a short series of steps that can be taken when suicidal thoughts are triggered to provide proximal risk reduction (Rudd et al., 2001), and have been shown to be an effective prevention technique (Bryan et al., 2017). Some of the steps in crisis response planning are therapeutic in nature (identifying problematic cognitions) and not suitable for law enforcement intervention but other aspects can be incorporated into the modified crisis response plan (M-CRP) proposed below.

The M-CRP consists of several components. First are a series of relevant contacts. The offender should be provided a list of already generated contacts to assist if they are feeling distress, which should include a twenty four hour suicide hotline appropriate to the jurisdiction. If immediate suicidal risk is evident, law enforcement should attempt to persuade the offender to contact a suicide hotline (or do so for them with their consent) from a neutral, private area at the interview location. Additionally, contacts for organizations that can assist with family-related stress, including assistance to family members, such as StopItNow (*StopItNow - About Us*, 2020), should be provided. In addition to the pre-established contacts, the offender should be asked who they feel comfortable contacting and who they would be willing to discuss their situation with. This can include family, friends, clergy, physicians, therapists, or others - the law enforcement officer should elicit specific names and encourage the offender to write them down. Additionally, the offender should be provided written guidance on how to discuss their situation with others and be reassured that law enforcement will not directly contact family or friends of the individual (if it is investigatively necessary, e.g., if

a contact offence has occurred, law enforcement should not make any false promises in this regard).

In addition to a contact plan, the M-CRP should assess proximal risks that might facilitate suicide. Any potential enablers for suicide should be discussed, in particular access to firearms. If the offender owns firearms, law enforcement should request they voluntarily surrender them into the government's custody, or alternatively into the custody of a third party they trust for the near future.

Finally, the M-CRP should go through the next steps that will occur in the legal process and ask what the offender's immediate next actions will be. Explaining and providing documentation on the next steps from a law enforcement perspective, as well as the expected timeframes, will reduce offender anxiety. Any critical path steps that relate to the specific offender anxieties noted in this research, such as the issuance of a press release, should be discussed as well (if at all possible, law enforcement should delay any press release at least 48 hours). The offender should also be asked where they will go immediately following the interview. Many offenders may not know where to go, and law enforcement can ask open-ended questions to help the offender work through potential options and to avoid high-risk alternatives (e.g., the local pub).

If the offender is expressing direct suicidal intentions and refuses to seek assistance, a temporary, involuntary psychiatric commitment can be considered. Most jurisdictions permit a 72-hour commitment for assessment based on law enforcement referral of immediate risk. While this only delays the process of the individual integrating into their new situation, it may provide immediate deterrence of suicide and begin an engagement for treatment related to non-criminogenic issues as discussed below.

14.3.2 Legal Response

The legal response to CSEM offending needs to be informed by evidence. Based on the public and offender opinions expressed, as well as the empirical evidence of risk in this and other research, there is a need for improvement in prosecutorial and investigative decisions as well as post-release sentencing and supervision.

14.3.2.1 Investigative and Prosecutorial Decisions

There are two early key decision points in determining the outcome for individual CSEM offenders - the decision to investigate and the decision to prosecute. Investigative decisions are inherently biased - the ready availability of monitoring on peer-to-peer networks and the ease of identification of offenders results in higher rates of investigation for this space (Wolak et al., 2014). Additionally, individuals sharing CSEM on the open web are easier to identify than those using direct communication technologies like instant messaging or better protected virtual spaces like those on Tor, making them more viable secondary investigative targets (Steel, 2009b, 2015). From an LST standpoint, because these are gateway technologies, the tertiary deterrence caused by the act of investigation is likely to have the highest overall impact. This can be seen in the low recidivism rates represented in this and prior research discussed in Chapters 7 and 8.

Because gateway users are more likely (but not exclusively) to be more recent users than those other technologies, and because any individuals sharing large amounts of CSEM on peer-to-peer networks or running a large open-web site quickly become high priority targets, growth in these areas is self-limiting and as such the offenders investigated may not be the most prolific or the most deviant offenders, who may gravitate toward other technologies. For individuals transitioning to contact offences, in particular those that are facilitated by online grooming, social lawless spaces such as that created by WhatsApp (Constine, 2018) may be more attractive, and due to the presence of end-to-end encryption as well as the one-on-one nature of the interactions, these spaces are more difficult to monitor.

As noted in the section on deterrence, it may be preferable to use interventions that do not lead directly to prosecution for first time and low risk gateway offenders, and to focus on the more egregious offenders, even if they are principally harder targets to identify and prosecute due to the use of more advanced countermeasures. From a cost-benefit perspective, the amount of effort spent in investigation, forensics, and prosecution of the low risk, first time offenders could be better used targeting recidivists,

long-term offenders, social offenders engaging directly with children, distributors, and producers.

Prosecutorially, there is discretion present within many legal systems. In the United States, for example, non-corroborated possession (where forensic evidence to confirm CSEM activity is not available), individuals with very small amounts of CSEM (generally 1-3 images), those with media portraying only older CSEM victims (16 or older), and minors who shared or received voluntary CSEM content from a peer are examples where alternatives to prosecution may be considered. These can include not prosecuting and suspending charges for a set period of time based on specific criteria (pretrial diversion), choosing a nolle prosequi option for cases already in legal proceedings, or offering deferred prosecution agreements, where the offender pleads guilty but the conviction is vacated if the defendant meets specific criteria (generally including not re-offending for a period of time) set by a plea agreement. From an LST perspective, the primary contributor to preventing re-offending is the evidence of the presence of capable guardianship, with additional preventative measures including the cost to re-acquire the associated technologies (or accesses) to enter and function effectively in a particular lawless space and psychologically re-engage with CSEM, given the now-salient costs to social relationships. As such, prison time is more likely to be punitive and not rehabilitative and could potentially be reserved for those offenders with the highest risk on validated instruments (Seto & Eke, 2015) and those whose offences are the most egregious. The presence of additional civil penalties, including payments to victims depicted (Cassell & Marsh, 2015), can provide a further reminder of their actions, particularly if they are recurrent and amortized over an extended period.

This research and past research show tremendous public support for the prosecution of CSEM offenders. Much of this support may be due to the misperceptions of risk that the public believes exist within the offender community. To expand prosecutorial discretion under existing public scrutiny, greater public education is required before substantive changes can be enacted. General public education on sex offender recidivism, less sensationalized journalism, and more sympathetic and nuanced media

portrayals of others impacted by CSEM consumption behaviour (e.g., families of offenders) in addition to victims are needed.

14.3.2.2 Sentencing and Post-Conviction

The crime of child pornography possession was shown to be one of the most serious crimes in the estimation of the public in Chapter 7. Child pornography (and the broader category of CSEM) is reviled for good reason - it involves the sexual victimization of members of a vulnerable population, with potential lifelong consequences for the victim (Gewirtz-Meydan et al., 2019; Maas et al., 2019). Each viewing of CSEM material constitutes a re-victimization event, and as such requiring prosecutors to seek punitive action for offenders is reasonable. Given the limited funding within the criminal justice system and the broad range of culpability in CSEM offences, however, there are a range of penalties possible including punitive actions in the form of civil penalties.

For the risk-based component of sentencing, the concept of incarceration to prevent further offending behaviour is not warranted for the majority of offenders given the recidivism rates. Historically, CSEM offenders have had a very low overall recidivism rate. The re-arrest rates at approximately five years have ranged from 1.6% (Faust et al., 2015) to 2% (Soldino et al., 2020) to 4.4% for CSEM-only offences (Eke et al., 2011). Because these rates relied upon re-arrest data and did not measure actual re-offending, the actual rate of re-offending would be expected to be higher. In this research, the re-offending rate was found to be approximately 10%, consistent with that expectation, however half of those individuals indicated that they had viewed CSEM post-conviction only once or twice but did not continue doing so (indicating no ongoing risk), and the other half labelled their viewing as “infrequent”. Similarly, the risk of a convicted CSEM offender committing a contact offence is low, with Seto et al. (Seto et al., 2011) finding a 2% contact offence rate looking at offenders between 1.5 and 6 years after conviction. Similarly, Elliott et al. (2019) found a 2.7% rate of contact offending after an average 13-year follow-up.

Identifying the specific offenders likely to recidivate is difficult, and the traditional instruments used to identify risk for contact sex offenders such as the Risk Matrix 2000 (Thornton, 2007) and Static-99/Static-99R (Helmus & Thornton, 2012), have been found

to overestimate risk for CSEM offenders (Osborn et al., 2010). A promising recent instrument, the Child Pornography Offender Risk Tool (CPORT), showed moderate predictive accuracy for sexual recidivism, but given the extremely low base rates its overall efficacy for sentencing decisions is limited. In addition to general risk indicators (younger offenders with prior criminal history), a demonstrated interest in pubescent or earlier children and more boy than girl CSEM were associated with higher risk (Seto & Eke, 2015). CPORT provides a new model for risk assessment and can be further extended based on this research. In lieu of admissions to pubescent or earlier content (or diagnosis of the same), digital forensics can be used to identify the areas of primary interest. Additionally, in lieu of asking specifically about hebephilic or paedophilic interests (which may be subject to social desirability bias), asking about their viewing habits may be informative. In particular, individuals who are exclusive or predominant CSEM offenders based on collection makeup may be a proxy for interest, though additional research is needed to validate this. Similarly, forensics can provide ratios of boy/girl content, but asking about viewing habits may again be more useful, in particular if the offenders have deleted their collections recently and the identified content is insufficient to make an accurate judgement. The findings of the CPORT work can also inform evidence-based revisions to sentencing guidelines.

In the United States, sentencing for CSEM possession offences is based on a series of enhancements, where the sentence is stricter if more of the criteria are met. The specific criteria for enhancements, along with recommendations based on evidence, are as follows (*United States Sentencing Commission Guidelines*, 2018):

CSEM that includes pre-pubescent (below the age of 12) content. While this is consistent with public opinion based on this research, it is not specifically risk-based. Additionally, in this study, 77% of offenders reported at least one CSEM depiction of an individual under the age of 12, making this a largely guaranteed enhancement. This would be better served by being replaced by an enhancement that is better indicative of exclusive paedophilic interest, such as a predominance of pubescent and pre-pubescent CSEM content when compared to all SEM content.

Distribution, trading or commercial gain. This research was not designed to look at commercial and non-commercial distribution or trading of CSEM. This includes distribution to a minor and coercion, which may be better modelled under mixed-offender or contact offender risk classification and are outside the scope of this work.

The presence of sadistic/masochistic or other violent content. Overall, 31% of the CSEM offenders in this research identified having forced/rape oriented CSEM content in their collections. While there is no risk-based reason for the enhancement, the increased violence of the underlying victimization may warrant additional punitive sanction, and the majority of the public viewed the severity of the act as a valid factor for enhancement.

The presence of exploitation of an infant or toddler. Approximately one quarter (26%) of offenders reported at least one depiction that met the criteria of an infant or child. As with the other age-based content, the existing risk tools indicated no additional recidivism risk, and this would be better incorporated into the recommendation above for paedophilic exclusivity.

The use of a computer or computing service in CSEM activities. All of the offenders used a computer, and the majority (86%) never viewed any non-digital CSEM. As such, this enhancement should be removed and incorporated into the base offence level as it applies to all offenders.

The number of images/movies present, up to 600 (with movies counting as 75 images). Because the number of images is not directly related to risk, there is no risk-based reason for this inclusion, and public endorsement of this inclusion was mixed. This is also qualitatively and quantitatively not consistent with the habits identified in this research. First, it implicitly penalizes individuals for storage over viewing, as legally proving viewing without retention is substantially more difficult. Second, the collections of the offenders contained slightly more movies than still images, and this trend is expected to continue. Third, the mean number of movies was 12.5, and under the guidelines only 6 movies are needed to hit the maximum. This guideline would be better removed and replaced with a guideline indicating the duration of offending.

Under LST, the longer the duration, the higher the levels of habituation, which would potentially increase risk for recidivism. Additionally, a longer duration of offending would translate to more victims, which would be consistent with the punitive nature of other statutes. This is consistent with the findings of the Correlates of Sexual Interest in Children scale (CASIC) scale, which identified a more than two-year duration of CSEM usage as a risk factor (Seto & Eke, 2017).

While CPORT (Eke et al., 2019; Seto & Eke, 2015) identified a higher proportion of boys present in collections as an indicator for risk of recidivism, caution is warranted in including any such factor in sentencing guidelines. While not dispositive, this research identified that the self-reported sexual orientation of the offenders was correlated with the sex of the individuals depicted in their collection, raising the risk of disproportionate, discriminatory practices against individuals in the LGBTQ community.

Parole and post-release conditions for CSEM offenders have several general areas of interest when viewed through the lens of LST and the technology usage of offenders. Two of these, computer and Internet usage restrictions and sex offender registration, are common and have varying degrees of efficacy and impact.

Computer usage restrictions are frequent post-release requirements for CSEM offenders. Originally, a complete ban on Internet usage (or computer usage) was recommended and relatively common (Durkin, 1997), though early restrictions did not take into account the current, integral nature of the Internet in everything from employment to reducing social isolation. As a result, total bans are no longer standard, and proposals for tailored bans based on the specific offender have been proposed and are feasible for spaces that have minimal non-criminogenic value (Ramirez, 2014). This is supported by LST - restrictions placed on engaging in specific lawless spaces that are either gateways to CSEM (e.g., peer-to-peer) or were used exclusively for lawless activity can be restricted. This relies on accurate digital forensics and a comprehensive technical behavioural assessment to identify all relevant lawless spaces and technologies, as elimination of only a single technology the offender is familiar with may result in displacement behaviour. Removal of technologies that would have to be re-acquired increases the costs to re-offend and is also warranted under LST. Social

commitment contracts to avoid specific technologies that are enablers may be useful as well, as they increase the psychological friction costs to re-offend.

One areas of particular concern to the CSEM offender community, and a primary stressor, is the inclusion of CSEM consumers in sex offender registries. Sex offender registration is controversial, with mixed results in terms of efficacy in reducing recidivism in other sex offences (Vásquez et al., 2008). Within CSEM offences, the low base rate of recidivism brings their efficacy into further question, and the expenses of running registries could be potentially put to better use in reducing child victimization (Zgoba et al., 2008). Sex offender registration was shown to be strongly supported by the general public, and strongly opposed by offenders in this research. Increased social isolation and shame, leading to poor re-integration have been identified as being present within the offender population as a result of registries (Bailey & Klein, 2018), providing a basis for the disparity in support between the two groups.

Under LST, the continued requirements of registration provide an ongoing reminder of capable guardianship, though not specific to a particular lawless space. While this has the potential of deterrence as a recurrent engagement, it has not been studied to-date in that capacity. This effect can also be generated without the shaming and societal integration issues through non-public registration and can be made available to appropriate entities for background check purposes where the conditions of release are relevant (e.g., a requirement of no employment in a school system). Time-based sex offender registration, as opposed to lifetime registration, would be another alternative, though in the era of permanent Internet records, the end result may be the same as lifetime registration, and the effect on reducing habituation would attenuate long before any multi-year registration period expired. Although it would be politically difficult to remove registration requirements based on their broad public support, carving out low risk offender groups where there is minimal, non-exclusive CSEM consumption and no contact offending or aggravating factors may be possible.

14.4 Treatment

There are two separate and distinct areas of treatment that need consideration for CSEM consumers - non-criminogenic and criminogenic treatment. Non-criminogenic treatment areas include those related to suicidal ideation, coping with the stressors of incarceration and sex offender registration, and dealing with proximate family situations. Criminogenic areas include targeting offence supportive cognitions and performing behavioural modifications to reduce the risk of future offending. The need for treatment and the goals are separate and distinct (although non-criminogenic skills training such as emotion regulation and development of coping skills may have positive impacts on recidivism), and for this population the research supports handing the non-criminogenic needs first (and potentially exclusively). This differs from the traditional, initial focus of the Risk-Needs-Responsivity model (Andrews et al., 2006) on criminogenic factors (and what those factors are), which needs to be reconsidered for applicability to this population. This work primarily considers CSEM offenders after they have had engagement with law enforcement and does not address individuals who volunteer for treatment prior to their activities being uncovered except where noted. Additionally, this work provides treatment and assessment considerations, but the provision of a specific treatment plan or modality is beyond the scope of this research.

14.4.1 Non-Criminogenic Treatment

Assessment for non-criminogenic treatment is advisable for all CSEM offenders following their initial interaction with law enforcement and should be engaged as soon as possible. There are two areas of specific interest - suicidality, and coping strategies for the immediate events that are likely to occur. For suicidality in particular, a study by Hoffer and Shelton (2013) found that 25% of CSEM offender suicides occurred within the first 48 hours after law enforcement interaction, requiring rapid initial assessment and intervention. Additionally, the stress of family and friends finding about their activities was the highest initial concern of a large number of the participants in this research, and rapid efforts to deal with these concerns need to be enacted.

14.4.1.1 Assessment

This research identified suicidality as an important issue across the CSEM offender population following their initial interaction with law enforcement, with 73% of respondents having reported a high ideation and 19% having reported making a suicide attempt. These numbers represent a lower bound as well due to survivor bias - those who took their own lives were not included in the population sample. Because of this, an assessment for immediate suicide risk needs to occur.

There are numerous suicide risk measures available, and a detailed discussion can be found in Rudd and Roberts (2019) of the latest evidence-based approaches. CSEM offenders may not align well to traditional risk models, however. In most risk models for suicide (Nock et al., 2013), risk can be viewed as a combination of protective factors, vulnerability factors, and triggering life events. Protective factors include social relationships (family/friends), stable life factors (financial stability and employment), and pre-existing psychological factors (related to resilience). Vulnerability factors include prior serious mental illness, addiction issues, negative psychological traits, and prior suicide attempt history. Life events include early life stressors (including childhood) as well as proximal stressful events (Nock et al., 2013).

There are several issues with CSEM offenders that are fundamentally different from traditional risk models. First, the stressful life event may be the precipitating factor causing the other vulnerability factors to increase, as opposed to a trigger that occurs and exacerbates a pre-existing situation. Second, there is an immediacy to the overwhelming nature of the life event, which belies current thinking on risk that looks at a history of negative cognitions over time as part of the assessment (Bryan et al., 2019), Finally, the proximal event in this case is severe enough to cause a chain reaction which may break the protective factors.

Following the engagement with law enforcement, other vulnerability factors may be created. Anxiety and depression are potential post-arrest responses in general (Moore & Tangney, 2017), which may be exacerbated by the additional stigma associated with CSEM offences. If there were predispositions present for any of these, they may be very rapidly exacerbated by the event, and require assessment for recurrence.

Because many of the diagnostic criteria require extended periods before actual diagnosis can occur, prophylactic treatment based on an assessment of the non-time based factors may preclude the clinical presentation of the diagnosable illness and is consistent with any suicide risk abatement intervention.

Traditional suicide risk indicators look at negative events as potential triggers for suicidal thoughts. Events like a divorce, the death of a family member, and the loss of a job can be sudden and tragic but do not necessarily have the same whole-life impact that an arrest for a CSEM offence does. Many of the standard event stressors are unilateral or bilateral in terms of scope, and directly impact one life system (e.g., the loss of a job primarily impacts financial stability, though that can lead to relationship stress and other issues). A CSEM arrest may mean an immediate loss of a job, loss of an offender's social network, loss of an offender's freedom, and a lifetime of shaming and isolation (Berlin & Sawyer, 2012). This is coupled with an immediacy of anxiety related to each of these events occurring, as indicated by the participants in this research. Because of this, the impact of this event needs to be weighted more heavily than other life events in any suicide risk assessment. Additionally, the suddenness of the event (offenders may have no prior indication they are going to be arrested) means that there is insufficient time to look at trends in negative cognitions and past history.

The final assessment issue related to suicide comes from the destruction of protective factors. Disruptions related to friends and family, a stable job, and general psychological resilience can all occur simultaneously with the arrest event. Any assessment needs to focus not only on identifying these factors but also shoring them up rapidly and identifying other protective factors that can be quickly engaged.

Related to suicide is an assessment of an offender's coping abilities in the context of their current environmental situation. CSEM offenders may already have deficits in general coping skills that facilitated their offending (Knack et al., 2020), and have been found to use distraction and avoidance strategies as a way to address negative emotions (Dervley et al., 2017). The presence of pre-existing, maladaptive strategies may need to be assessed rapidly to ensure that they do not aggravate attempts to adjust to the new realities presented by being caught as a CSEM offender, and to

identify an approach toward accepting the likely imprisonment and social consequences of their behaviour. If offenders have used CSEM or adult SEM as their main stress reliever as part of their coping strategies, the lack of access could cause heightened suicide risk, and if access is re-obtained could facilitate short-term re-offending.

14.4.1.2 Treatment Considerations

If suicidality is assessed as high, primary treatment should focus on short-term interventions. There is limited research available on the duration of suicidal ideation and its course over time for CSEM offenders, but the immediate impact has been shown in this research and through other work (Hoffer & Shelton, 2013). Because coping skills are entangled with both offending behaviour and suicide risk, addressing both should have reciprocal benefit and can be done simultaneously.

One potential model program is the pilot initiated in the state of California for sex offenders, which performs assessments, offers coping skills training and adaptation to prison, and provides group support sessions (Byrne et al., 2009; Byrne & Stowell, 2007). A component of their overall approach, led by mental health provider *Sharper Future*, performs assessments (including depression and anxiety inventories) directly related to suicide risk as noted above right after the defendant's initial court appearance (Byrne et al., 2012). The group sessions related to suicide are explicitly non-criminogenic in their targeting - offenders are expressly prohibited from discussing the details of their crimes. They provide a built-in social structure of individuals facing similar life altering circumstances, and a forum to discuss strategies for dealing with prison, family issues, and other areas relevant to their shared situation. Preliminary results showed promise for the program, though detailed, experimental outcome data are not available (Byrne et al., 2012).

There are several enhancements that could be made to the California program. From a timing perspective, the first court appearance may occur well after the initial engagement with law enforcement. Any individuals who took their own lives before that appearance would not have been entered into the program. The timing of the program also fails to take into account one of the highest strain areas identified in this research - family and friends finding out about the events (which would have occurred before the

intervention in most cases). Ideally, the California program could be used as a model, but expanded and incorporated earlier and more aggressively into the investigative process.

Directly addressing suicide, interventions such as cognitive behavioural therapy for suicide prevention (CBT-SP), an evidence-based approach, build upon the M-CRP intervention by law enforcement (Bryan, 2019). CBT-SP adds self-management strategies for emotional distress and incorporates reasons for living into crisis response planning. The mental health professional can additionally utilize the information collected on the M-CRP in terms of contacts and assist in developing a notification plan for the individual's social network.

In assisting offenders with notification planning, there are CSEM-specific considerations for both the offender and the individuals being notified. Unlike other criminal offences, CSEM offenders have the added burden of explaining (whether present or not) a sexual interest in children, and potentially any sexual orientation-based content differences in their collections that may not align with their expressed orientation and that of their current partner. Notifications and subsequent discussions should occur in an appropriate environment, and consideration given to that environment being a joint counselling session. Any notification discussion should not only focus on how to notify others (and who) but the level of information provided. All attempts to avoid further traumatizing those being told about the situation through explicit content discussions should be stressed to the offender. Contact points for family support through counselling resources or through organizations such as StopItNow! (*StopItNow - About Us*, 2020) can and should be provided.

New coping strategies will be needed by almost all CSEM offenders as well. Of the two major types of coping strategies, those that involve changing environmental factors are likely to be outside of the control of the individual, placing additional focus on those that involve emotional regulation (Folkman & Lazarus, 1984). Self-management strategies under CBT-SP incorporate emotion regulation, which includes enhancement of positive mental states through mindfulness and relaxation, as well as longer term positive behaviours such as effective sleep management (Bryan, 2019). Because emotional

regulation will be impacted by the very rapid need to adapt their lifestyles to the upcoming events, development of new coping skills can be incorporated into the emotional regulation treatment. Due to the lack of criminal history for many CSEM offenders, discussions on the impact of prison life and post-prison sex offender registration will assist in demystifying the next steps and can be incorporated with family and financial planning. Because these are shared experiences and non-criminogenic, group sessions with other CSEM offenders are potentially appropriate (Byrne et al., 2012).

14.4.2. Criminogenic Treatment

Treatment for criminogenic factors is a secondary consideration for CSEM offenders after non-criminogenic treatment concerns. Based on the low risk of recidivism identified in this work and elsewhere (Eke et al., 2011; Faust et al., 2015; Soldino et al., 2020), and the fact that existing treatment options have not been shown to have significant success within the CSEM offender population (Mews et al., 2017), there is a general question about whether or not to treat CSEM offenders at all. This research identified a recidivism rate of 10% for the CSEM-only population, which was higher than previous research, likely due to the fact that previous research focused on arrests. Additionally, the qualitative impact of the reported recidivism was extremely low, with half of the offenders (5%) only viewing CSEM “once or twice” and the other half (5%) viewing it “very infrequently”. The addition of this qualitative information makes treatment less valuable overall. Additionally, the fact that there was no statistically significant difference in recidivism between those in this research that had treatment and those that did not casts further doubt onto the need to treat. There is still a need to assess individuals, however, and to confirm they are CSEM-only offenders. Additionally, there is potentially a small proportion of individuals who might benefit from treatment, though what that proportion is, which treatment modality is most effective, and the relative value of treatment are open questions (Babchishin et al., 2018).

14.4.2.1 Assessment

In addition to a general case formulation approach, specific areas need to be considered in assessment related to CSEM offenders (Craig & Rettenberger, 2018). As

with any psychological assessment, a neurological basis for CSEM behaviour should be ruled out first. Klüver–Bucy syndrome, which results from medial temporal lobe lesions, has been shown to manifest as hypersexuality, which can include CSEM viewing behaviours (Devinsky et al., 2010). Similarly, other individuals with right orbitofrontal tumours (Burns & Swerdlow, 2003) or temporal lobe epilepsy (Mokhber et al., 2018) may exhibit emergent CSEM-related behaviour. While rare, these will generally manifest as "acquired paedophilia" following a neurological event.

Once a neurological basis for offending behaviour has been ruled out, the assessment needs to identify if the offender is a CSEM-exclusive offender or a mixed offender. Mixed and contact offenders have different psychological profiles and may be better treated under traditional sex offender treatment regimens (Elliott et al., 2013). Information obtained from the investigation, as well as a detailed forensic interview may provide indications of prior contact offending, though the latter may be precluded in many cases by disclosure laws. If prior contact offending cannot be asked about directly, questions about the likelihood of future contact offending (e.g., "If provided the opportunity, how likely would you be to have sexual contact with an individual under the age of 16") may serve as proxy indicators.

To address behavioural issues, a detailed understanding of the offender's routines must be elicited, which can be done through a combination of a self-assessment and a structured interview. Based on the findings of this research, a provisional outline for a self-report checklist and structured interview are presented in Appendix G. The self-assessment is intended to be used online and can identify specific technologies, age ranges, and interests that may be more difficult for the offender to verbalize initially, and the structured interview can follow-up on the self-assessment to elicit triggers and cues for CSEM activity as well as routines of behaviour that can be useful in treatment planning.

The first component of the CSEM assessment is developmental. It focuses on early issues related to abuse and early sexual contact. The self-assessment questionnaire asks about abuse in three ways. First, related to sexual abuse, the questionnaire asks about the offender's first sexual contact and about any adults that had sexual contact

with them as a minor (below 16 for the purposes of this question). The phrasing specifically asks if any adult had sexual contact with the offender (as opposed to the offender having sexual contact with the adult). The follow-up in the structured interview asks about sexual abuse while growing up (which would include other sexual abuse, including by other minors). The contrast is intentional - individuals may have normalized sexually abusive behaviour and any disparity in the answers to the questions may be clinically relevant. Finally, a structured interview question about physical abuse is asked. A significant minority of offenders will have been sexually abused as a child, with this research identifying that 19% had sexual contact with an adult while they were minors and 19% reported childhood trauma, consistent with prior research that identified sexual abuse rates of 21% and physical abuse rates of 24% (Babchishin et al., 2011). This study found that the mean age for first sexual contact for the offender group was 14, with 36% having their first sexual contact at age 12 or younger. Because of this, the age of first sexual contact and their description of that contact may provide information on any abuse they enacted while still a minor, and on any early sexualization that may provide contributory information toward understanding later sexual activities.

Following the questions on childhood abuse, additional questions on the first viewing of SEM and other early sexual experiences are asked. CSEM offenders reported having first viewed any SEM at a significantly earlier age (m=14) than the reference population (m=19) and having first viewed CSEM at a much later age (m=30). These questions indirectly provide two significant items for consideration - the number of years until the individual “discovered” CSEM and the duration of CSEM viewing (the time since the first CSEM viewing until their subsequent arrest or any post-arrest viewing). These are followed up with structured interview questions asking the offender to detail each of these experiences, which includes questions about why and how they accessed the material and may provide a basis for comparison to more contemporary behaviours.

After covering developmental issues, the breadth and depth of both adult SEM and CSEM viewing is assessed[13]. Direct and indirect measures, including penile plethysmograph and implicit association tests have been shown to be effective in forensic settings (Rosburg et al., 2020), but are not practical in many clinical situations. These activities are primarily detailed through the self-assessment tool to reduce altered responses due to embarrassment-based social desirability bias. A range of popular categories of SEM are provided, and individuals are then asked whether or not they have ever viewed content in any of those categories. They are then asked to sort the content into a ranked order of preference (the general categories can be adjusted based on localized preference for pornography). The number of categories serves as a proxy for novelty-seeking, with the more categories viewed the stronger that behavioural drive, and provides potential alternatives for displacement of CSEM based on ranked preference. Alternatively, ranking pre-teen and teen content highly may be indicative of an exclusive or near-exclusive sexual interest in minors. Specific categories of grey area legal SEM viewing, in particular rape, hentai, nudism and bestiality content, have strong associations with CSEM and exclusion of their viewing may need to be considered in behavioural treatment to prevent entering lawless spaces where crossover to CSEM is easily facilitated.

The second proxy for novelty-seeking relates to the breadth of the age ranges of content viewed. There are two components that are treated separately - adult SEM and child SEM viewing. Because almost all adult SEM is legal and is generally consistent with post-pubescent development, age ranges are less important for the purposes of CSEM treatment, though a strong focus on generally younger-looking adults may need to be considered for triggering purposes. For child SEM, the assessment asks the offender to identify the percentage of content they viewed in each range, whereas a binary measure may result in a loss of key information. The therapist can review the age distributions for novelty-seeking (a relatively broad group of ages present with less of a clear range preference or a declining age range with 15-17 as the highest

[13] General problematic cyber pornography usage can be assessed using existing instruments (Eleuteri et al., 2014)

percentage), or for strong paedophilic or hebephilic preference (most or all viewing in a narrow range). This can be corroborated by search term usage and viewing histories gathered by digital forensics or other investigative activity. The proportion of child SEM viewed provides another proxy for exclusivity of CSEM interest - if adult SEM is a much more substantial portion of the whole, exclusivity is less likely. In the structured interview, the opposite questions are asked - what age ranges and content types were explicitly excluded from their viewing and why. This may provide strength-based internal deterrence mechanisms that trigger for a specific age range or category of content and may be leveraged to avoid additional age ranges or categories.

In addition to the questions related to breadth in depictions, individuals may have cross-media interests in content (between still images, videos, and stories), with stories being potentially higher risk (Seto & Eke, 2017). If mixed media content was present, the offender should be asked why they preferred each of the forms of media. Because different types of content have different acquisition methods and may have different legal restrictions (i.e., stories involving children may be legal in some jurisdictions), knowing the breadth of media consumed may assist in developing more comprehensive avoidance strategies.

Detailed technical behaviours are next elicited, focusing on the enabling technologies and lawless spaces used by the offender and how they fit into triggers and associated routines. Technology and lawless space usage provide targets for desistance, triggers provide areas to recognize and either avoid or approach cognitively, and routines put the offender's actions into a causal chain, identifying key areas for cost increase to enable hot state disruption.

The core technical questions identify devices and technologies that an individual has used to access CSEM. The self-assessment first elicits which virtual lawless space (or spaces) the individual has used to access CSEM. The nature of the lawless space and its necessity to non-criminogenic use will dictate behavioural intervention options - eliminating the use of Tor or peer-to-peer clients is significantly easier than eliminating open web access. Therapists should pay attention to the social nature of the lawless spaces chosen as well - instant messaging, for example, may indicate differential

association issues, whereas peer-to-peer access is likely non-social. The specific technologies used to view and store CSEM are further enumerated, highlighting potential targets for monitoring. Finally, enabling locations are identified for inclusion in behavioural intervention planning.

The technical enablers of offending are important for enumerating CSEM behaviours but are generally only a part of specific routines (which may also be habits). Identifying specific routines that are followed, as well as any trigger events, including the individual steps taken, can provide insight into the cognitions of an offender and identify specific steps in the routine that are most appropriate for behavioural intervention. Consider three hypothetical routines (based on actual cases):

Offender A: This individual accessed CSEM primarily from work using their work-provided laptop computer while working as a dispatcher for a delivery company, which they had done for several years. They typically waited until the drivers left in the morning, then began browsing adult SEM images on the open web using the In Private browsing mode. Because they had audio contact with drivers, they avoided videos. They gradually transitioned to CSEM each day over the course of half an hour using sites located in countries where CSEM enforcement is lax for almost every session. Once they found an image that caused them to climax, they cleared any browsing history and visited the website of a prayer group to which they belonged. They never stored any images and maintained a paper list of foreign websites to use as starting points for their browsing.

Offender B. This individual began using peer-to-peer software to download copyrighted movies and music and found that they could search for SEM videos in the same lawless space. They had occasionally used the open web to visit mainstream adult websites but had grown bored with the content. Approximately six months earlier, they began downloading quasi-legal SEM, including bestiality content, over peer-to-peer networks and encountered several videos that contained CSEM. They bulk-downloaded additional CSEM at the same time as they downloaded multiple categories of adult SEM on a routine basis. They would enter search terms into their peer-to-peer client on their home laptop each morning, select hundreds of files, then leave for work. When they

returned, they would watch the videos that had completed downloading, moving the files that most interested them to another directory titled “My Stuff”, and would then delete any partially downloaded content. They rarely returned to the movies they had previously downloaded and were constantly seeking new content. Approximately three months earlier, they deleted all of their content and used a secure wiping tool on their hard drive, expressing that they felt guilt over some of what they were viewing. They started the routine over again a month later after re-installing the peer-to-peer client to obtain a new, pirated movie.

Offender C. This individual primarily downloaded stories involving sexual activity with pre-teens and had a collection of stories obtained over the course of a decade. The stories were categorized by theme, and the individual changed the names in some of the stories to reflect the names of minors that lived nearby. They infrequently sought out still images of pre-teen girls, generally after reading a story about a pre-teen or when seeing a sexualized image of pre-teen on television. When seeking images, they would open Tor and find a current mirror of a dark web site they knew contained CSEM. They would browse the dark web site until they found an image of interest. If the dark web site was unavailable or slow, they maintained a small number of their favourite images in an encrypted .zip file on an external flash drive that they would return to as a backup option.

For all three offenders, differences in their routines and the associated technologies provide very different behavioural targets. Offenders A and B had directly incorporated CSEM viewing into their daily routines, whereas Offender C viewed CSEM in response to triggers from legal images and stories. Offender A viewed CSEM primarily at work, while offenders B and C viewed it at home and stored it for later consumption. Offender B’s collection was large and unorganized, while Offender C maintained a small collection of curated images. Offender C exhibited exclusive paedophilic interest, while Offender A exhibited preferential CSEM viewing and Offender B exhibited primarily novelty-seeking behaviour.

The structured interview has several questions related to routines designed to elicit a behavioural profile similar to that of the examples provided, starting with any specific

triggers that may be present. As noted, not all offenders will have a trigger event, and may have incorporated CSEM consumption into other routines. For each trigger, the virtual space that the offender utilized should be elicited, including why they chose that space and all of the details of which technologies were used to enable that virtual space. Any countermeasures used to hide their behaviour in that space should be identified, and any CSEM that was stored and why it was stored enumerated.

The self-assessment questionnaire and structured interview questions provided are meant to be a starting point in eliciting behavioural information for treatment. The self-assessment provides baseline information to inform the structured interview, and the interview is intended to start a dialog, with extensive follow-up expected to obtain as much detail as possible about the relevant consumption routines.

14.4.2.2 Treatment Considerations

Whether or not to treat CSEM offenders (excluding those self-requesting treatment) for criminogenic factors at all is an open area of debate, as is the form of treatment if warranted (Ly et al., 2018). The decision to treat CSEM offenders at all needs to be considered under a traditional medical paradigm not routinely used in psychological studies, the Number Needed to Treat (NNT), which is the number of individuals you need to treat to prevent one negative outcome (recidivation), and the Number Needed to Harm (NNH), which is the number of individuals you need to treat to cause one adverse outcome. In a review of the few psychological studies identifying an NNT for traditional mental health treatment, the numbers ranged from approximately 5 to 7 (Shearer-Underhill & Marker, 2010), and a meta-analysis looking at sex offender treatment identified an NNT between 13 and 23 (DeClue & Zavodny, 2014). The lack of recidivism is the primary criminogenic target, therefore the maximum NNT value of any treatment for CSEM based on the identified recidivism numbers in this research would be 10, which would occur only in a program that was 100% efficacious. If we assume a highly effective program consistent with other psychotherapy, a 50% reduction in those re-offending would be considered an exceptional program. Under this theoretical program, the NNT would rise to 20, which is substantially worse than other psychological interventions and must be weighed against the actual costs as well as the

NNH numbers. Additionally, if the target is a lack of recidivism, treatment is in competition with legal restrictions and deterrence efforts. Under LST, reminders of capable guardianship, increased involvement costs, and reduced habituation can occur through non-treatment mechanisms, which may or may not be more efficient and effective.

Tools like CPORT can provide guidance on which offenders are most likely to recidivate and can improve an NNT-based approach if only those at highest risk are treated. In a combined sample of non-contact CSEM offenders, the highest risk score category (5+) was identified as associated with a 32% recidivism rate (Eke et al., 2019). If all offenders were assessed using CPORT, and only the highest risk individuals were referred for treatment, the NNT would be approximately 3 with completely effective treatment, and 6 with treatment that was 50% effective, which would be consistent with other psychological interventions measured above. Additionally, if the actual reoffending is de minimis and self-limiting (i.e., ceases on its own), the overall treatment proposition becomes even less attractive.

With regards to efficacy, the current treatment approaches have not shown a substantive impact on the primary criminogenic target, and have tended to measure secondary targets (e.g., reduction on scores for instruments that have not been shown to be predictive of recidivism). Looking at a large UK sample of CSEM-only offenders (n=584), Elliott et al (2019) found that interventions related to traditional psychological variables provided poor treatment targets. Aside from group sessions where offenders may learn criminal strategies to facilitate offending, there are other potential downsides to treatment using traditional sex offender programs also, which decreases the NNH. An evaluation of the Core Sex Offender Treatment Programme (SOTP) found that CSEM offender receiving treatment recidivated at a higher rate, 4.4%, compared to non-treated counterparts at 2.9%, though caution in attributing any specific causality is warranted (Mews et al., 2017).

Aside from the differences between contact and Internet-only offenders, many existing treatment programs are based on the risk-needs-responsivity model, of which there is

little evidence that CSEM offenders have marked deficits. Looking at the original seven risk/need factors (Bonta & Andrews, 2007):

Antisocial personality pattern. Internet-only CSEM offenders have not been found to have comparable antisocial patterns to contact offenders. Antisocial behaviour patterns showed much lower clinical significance in this population (Magaletta et al., 2014).

Procriminal attitudes. There is no substantial evidence of anti-law attitudes in the CSEM population. This research showed general support for the illegality of CSEM in the offender population, and CSEM only offenders tend to have limited criminal histories when compared to mixed offenders, with prior contact offending being associated with higher risk in the mixed offender category (Seto & Eke, 2015).

Social support for crime. The majority of the offenders in this research did not indicate strong preferences for social networking within their CSEM offending behaviours. While a subset of individuals used inherently social tools (e.g., forums), the social support was more likely through secondary normalization through observation rather than direct, substantial association with other criminal offenders for the majority of CSEM offenders. The predominance of non-social (peer-to-peer) consumption is consistent with this.

Substance abuse. The majority of CSEM offenders have been reported as having no alcohol or substance abuse at the time of the offence (Seto & Eke, 2015; Webb et al., 2007). They may exhibit addictive behaviours as indicated by this and past research (Taylor & Quayle, 2003) related to CSEM consumption but this is separate from a facilitative chemical dependence.

Family/marital relationships. CSEM-only offenders are substantially more likely to be married than contact offenders at the time of their offence (Faust et al., 2015), though this research identified lower post-offence marriage rates (consistent with divorce related to the repercussions of the arrest). There is a higher history of childhood sexual abuse in the CSEM population, though this is not necessarily indicative of contemporary support structures at the time of arrest (Babchishin et al., 2011).

School/work. This research did not show any difference in educational achievement at the time of the study for offenders compared to the reference population, consistent with prior research (Babchishin et al., 2011). There was a lower overall income rank for offenders, though no significant differences in overall employment were noted.

Prosocial recreational activities. The general level of positive social activities for CSEM offenders has not been exhaustively studied. This research showed normal levels of sociability within the population, however, and given the positive school and work associations there is no basis to believe there is a substantive deficit in pre-offence prosocial activities.

The lack of impact in addressing pro-offending attitudes, coupled with different characteristics than contact offenders (e.g., fewer empathy deficits) calls into question current treatment approaches (Ly et al., 2018). One current pilot approach has incorporated the learning from these efforts and has focused on the behavioural approach, incorporating self-regulation, self-management and relapse planning. This targeting has the added benefit of providing secondary value in reducing other areas of functioning that may be facilitative of general dysfunctional behaviour (e.g., problematic Internet usage), though primary and secondary outcome numbers are not available yet (Henshaw et al., 2020).

For those high-risk offenders (as well as those who volunteer for treatment), a primarily behavioural approach as opposed to a primarily cognitive approach should be considered. For non-high-risk offenders, the evidence does not support routine treatment at this time and many of the same goals of behaviourally oriented treatment can be provided through non-treatment alternatives (e.g., probation use of monitoring software). Under LST, the specific prompts that lead an individual to engage in a particular lawless space (cues and triggers) and the tools and steps that those individuals would need to take to enter that space (the costs) provide treatment targets. Additionally, positive displacement of behaviours (e.g., viewing pornography) away from areas that may trigger recidivism should be considered. The basis for these treatment possibilities can be obtained from the assessment approach above. Suggested

potential treatment targets based on LST, incorporating the current research, are as follows:

14.4.2.2.1 Triggers

The specific triggers that may lead to CSEM offending are targets for avoidance, displacement, or delay (Wortley & Smallbone, 2006). These may be environmental triggers (entry into a virtual lawless space), psychosexual triggers (engaging with specific non-child SEM), or life triggers (stressors driving coping behaviour). Which behavioural modification is most appropriate depends on the type of offender engagement with CSEM - incidental, preferential, or exclusive - as well as the environment in which the offending occurs.

The level of engagement with CSEM is important in determining the appropriate approach for behavioural modification. Offenders with incidental CSEM engagement (e.g., where CSEM is an extremely small portion of their SEM consumption) may not have a strong drive to obtain future CSEM but may engage in risky behaviours related to novelty-seeking that place them in a future situation where obtaining CSEM becomes easier, and likely need no additional deterrence beyond the initial law enforcement engagement to modify behaviour. Offenders who engage preferentially with CSEM but have other sexual interests that may be co-equal or greater in stimulation have valid targets for displacement of CSEM activities toward legal content of interest. Exclusive CSEM interest in an individual with no stimulation from adult SEM may require management in the form of complete avoidance of triggering environments and activities as the redirection of exclusive paedophilic interest may not be possible (Seto & Ahmed, 2014). Additionally, evidence shows that for exclusive paedohebephiles, increasing arousal to adult stimuli has not been successful, though pharmacological and behavioural treatments specifically targeting the paedohebephilic interests have been moderately successful (Mcphail & Olver, 2020).

Triggers to engage in CSEM may enhance the state of arousal of an individual, causing them to enter a “hot” state and exhibit impaired impulse control (Ariely & Loewenstein, 2006). Because of this, there are two separate paths for behavioural modification. The first, rational path of avoiding viewing CSEM may only be viable before the trigger

occurs through the complete avoidance of trigger conditions. The second path involves either displacing the “hot” state toward prosocial stimulation or putting sufficient barriers to offending in place to break the “hot” state.

The rational path of behavioural change is most appropriate for strong preferential and exclusive CSEM offenders who are not likely to accept a substitute activity and whose impulsivity may be impaired once in an aroused state (Turner et al., 2018). If the offender has SEM-specific (e.g., viewing particular websites with adult SEM) or environmental-specific (e.g., trading files on a peer-to-peer network) triggers, complete avoidance of those activities should be the target.

Displacement activities that provide equal stimulation for preferential CSEM offenders can be encouraged, particularly those that occur in a safe physical or virtual environment. Altering the behavioural response to a trigger to incorporate less risky but equally stimulating activities may be possible in these cases and can be enhanced through social and environmental controls. As an example, a social commitment contract and associated monitoring of activities by a willing partner (or therapist or even probation officer) provides a behavioural nudge toward acceptable activities (Elliott et al., 2010). The installation of monitoring software in an environment appropriate to the offender’s technologies of choice provides a visual reminder of capable guardianship and the psychological barriers in bypassing this control provide an immediate increased cost to re-engagement. Additionally, the social contract, either implicit or explicit, provides additional incentive to redirect energies toward acceptable stimulation (e.g., adult pornography). Secondarily, these individuals can potentially be broken out of their aroused state when provided sufficient obstacles to offending. The use of increased costs and salient reminders of social control are provided below.

In the potentially most damaging case, triggers can become part of set routines, whether rote (Wood et al., 2002) or intentional. The work of Kluge and Gronau (2018), looking at breaking routines in organizational psychology, puts forth several propositions on “forgetting” routines, three of which are relevant here.

1. The forgetting of routines is supported by eliminating all salient retrieval cues that can activate the to-be-forgotten routine and by making cues that enhance the execution of the new routine maximally salient.

2. Forgetting of routines is supported by punishing the execution of the to-be-forgotten activity while simultaneously reinforcing the execution of the new activity.

3. Forgetting of routines is supported by actively constraining the execution of the to-be-forgotten activity (Kluge & Gronau, 2018, p. 51).

The first proposition involves the elimination of cues that may cascade trigger routines that lead to CSEM consumption. For some offenders, this may be browsing adult SEM - particularly if their typical "session" starts with adult SEM and ends in CSEM. In others, it may be an encounter with a child or child imagery, either virtually or in person. Targeting the initial cues that start a routine are likely to be more valuable than targeting cues to "continue to the next step" within a routine - stopping the browsing of pornography online in the first context as opposed to avoiding the specific step in the routing that transitions from adult SEM to CSEM. The other piece relates to displacement. If a new routine is replacing the old, having positive reinforcement cues to start that routine may be helpful in "forgetting" the old routine. Since SEM browsing is self-reinforcing, redirecting positive experiences into areas of low risk may be of value. As an example, a subscription to a physical magazine containing content of interest may be a displacement behaviour for sexual arousal. The offline nature of the magazine means that it is self-constrained, and, if it satisfies the sexual desire, that becomes a new reinforced alternative with lower crossover risk.

The second proposition involves the punishment of the execution of the old routines. In practice, treatment begins with the ultimate punishment activity - an arrest or similar law enforcement engagement. Because of this, earlier engagement in treatment may have a higher degree of success. For offenders that were never caught, this may end up being an impediment to switching routines, and creative strategies to "punish" engagement in the old routine enacted. The positive reinforcement of the new routine if

it is arousal based is self-sustaining but additional positive reinforcements can be added. These can take the form of the ability to be open (elimination of the negative guilt and shame) with their activities with partners or others in a healthy context.

The final proposition, that of actively constraining the execution of the harmful CSEM routines, is addressed below.

14.4.2.2.2 Costs to Utilize a Lawless Space

The initial costs to re-engage in a particular lawless space may be driven by pre-treatment activities through law enforcement action (e.g., the seizure of digital devices). This resets decision making back to an involvement-based decision and away from event-based decisions, which can be supported by behavioural modification and monitoring. Ideally, this process can be rapidly engaged - once the offender begins acquiring the means to re-engage in a lawless space and the proximity effect of the reminder of capable guardianship diminishes, the costs to re-offend are reduced.

Behavioural treatment targets can focus on environmental factors that introduce psychological costs, or delay factors that prolong the anticipatory arousal state sufficiently for it to diminish. These need to be addressed in the triggering context of the actions (Wood et al., 2002).To use an analogy, if an individual is craving a snack, they are much less likely to resist overindulgence if there is a bowl of pretzels in front of them at home alone. In a different environment, for example another individual's home, social controls may limit overindulgence. Additionally, the presence of a visual reminder of the consequences of consumption (e.g., the bowl is sitting on a scale) may have a deterrence effect in overindulgence (Price et al., 2016). Finally, if the individual has to put on their coat, drive to the store, and purchase pretzels, the anticipated delays inherent in these barriers may make overindulgence less probable.

Using the technologies identified in the risk assessment that are associated with offending, behavioural modification approaches can evaluate the need to use those technologies in a non-criminogenic fashion. Engaging in dark web forums may have limited non-criminogenic value, and treatment can focus on complete avoidance. This includes any enabling activities (e.g., installing the Tor browser) that would facilitate

more rapid access when a triggering event occurs. At the other end of the spectrum, browsing of the open web for non-criminogenic purposes is a necessary social and economic need, and an outright restriction of web activities is not possible. In those instances, deeper analysis of specific routines that lead to CSEM offending needs to occur, and barriers that increase the costs placed at appropriate points. The increases in costs of offending can be psychosocial or non-psychosocial, and can be physical or virtual.

Psychosocial costs are those that would cause additional psychological strain or social consequences if enacted. The choice to re-engage in CSEM offending, in the case of post-law enforcement interaction, has direct personal consequences that are known to the offender. If the offender began treatment voluntarily, these costs can be presented and made more salient in group sessions with previously convicted offenders; by discussing and having the offender envision the impacts of their family and friends finding out, going to prison, and being registered as a sex offender; or by providing information such as written testimonials from other offenders. Once the initial consequences are understood and internalized, they need to be reinforced in a way that maintains their impact without either becoming attenuated due to overexposure or causing additional strain that may exacerbate other non-criminogenic treatment concerns.

One method for increasing the psychosocial costs of re-offending is through social environment engineering and monitoring. If offending behaviour principally occurred using non-portable devices (i.e., desktops or laptops that remain in one location), those devices can be placed in a common area in a shared environment to increase the risk (and therefore remind of the cost) of exposure. For mobile devices, the offender can create a virtual common area. Probation conditions may require monitoring software and a virtual common area can be created through social commitment contracts with trusted friends or relatives. Monitoring software can be installed on mobile phones or traditional computing devices and can provide routine reports to the individuals with whom a social contract is made.

Non-psychosocial costs include the time, money, and effort that need to be expended in order to re-offend. Different virtual spaces have different costs to re-engage, ranging from the purchasing of new digital devices to the downloading and installation of specific software. Purchasing new devices should be monitored and discussed with the offender, and, if possible, any devices that specifically facilitate offending should be avoided and alternatives sought.

Any monitoring software should not just detect offending behaviour, but also precursor technical behaviour and countermeasure behaviour that will increase the costs of offending earlier in the relevant technical routine. Installation of peer-to-peer clients, the use of In-Private browsing modes, the use of the Tor browser, the acquisition of disk wiping or encryption software, and similar activities can be set to alert the monitoring party. This has the benefit of introducing the cost before the offender has committed to the act (e.g., before the installation of Tor, not after installation and re-joining of previously lawless space when a keyword or hash triggers). While the offender can always bypass this monitoring (e.g., by purchasing a new mobile phone), this has an increased dollar cost in addition to an increased psychosocial cost of added strain. It also requires significant advance planning and may break a temporary hot state.

Incremental costs can be imposed in advance through the implementation of standard security controls. As an example, Windows Defender's Reputation-based Protection blocks the installation of many applications that would be associated with joining a virtual lawless space to acquire CSEM or to hide CSEM activities (*Protect Your PC from Potentially Unwanted Applications*, 2020). Additional steps, causing time delays, are put in place that include explicit warnings before installing certain software and require affirmative consent through a series of click-throughs. At the extreme, the device administrator passwords can be held by a trusted third party, limiting the installation of enabling software. Tools such as these serve a dual purpose - they provide good security hygiene, and they increase the costs of offending while providing early, immediate (at the time the individual decides to potentially re-engage) reminders of capable guardianship.

14.5 Discussion Summary

This discussion provides a set of considerations for deterrence, investigative and legal response, and treatment of CSEM offenders based on the results of this and prior research. The considerations are grounded in theory and empirically supported where noted, but should be viewed as a starting point for additional research and refinement. All three areas cannot be considered in a vacuum and must be viewed as complementary. Investigative and legal responses can establish capable guardianship, which may have an equal or greater impact on reducing recidivism as treatment efforts. Non-criminogenic treatment starts during the investigation and is ideally transitioned quickly to a mental health professional. Deterrence efforts can similarly incorporate both warning and treatment options.

Specific to treatment, CSEM offender treatments should be evaluated from both a non-criminogenic and a criminogenic perspective. Non-criminogenic treatment, including suicide prevention measures and coping skills, should be strongly considered for all offenders. Non-criminogenic treatment efforts may have positive impacts on recidivism (by reducing strain and improving general coping skills), and current evidence does not support broad criminogenic treatment. Past treatment regimens focused on offence-supportive cognitions, in particular those endorsed by contact offenders, have not shown strong efficacy overall for CSEM offenders. For those individuals who are at a high risk for recidivating or self-identify for treatment, an exemplar of a self-assessment questionnaire and structured interview questions are proposed. Finally, suggestions for incorporating these into a technology-informed, behaviourally based treatment utilizing LST concepts were provided.

14.6 Limitations

The specific limitations related to the individual analyses are discussed in their respective papers. There are several general limitations, however, related to this research.

The research used an anonymous, online survey of individuals whose names were present on two sex offender registries. Ethics restrictions and mandatory reporting

requirements within the United States prevented the collection of additional demographic data (e.g., the date of conviction) that may have been used to individually identify a respondent. Although responses were solicited only from individuals with convictions in the last 10 years, the rapid pace of technological change means that the current technological behaviours of offenders will have evolved from the responses analysed (and will continue to evolve). Additionally, two specific areas of potential bias - sampling bias and response bias - need to be considered as limitations.

14.6.1 Sampling

The offender sample had two potentially significant areas of bias. First, individuals who had recidivated following the listed offence for any reason and were currently incarcerated were excluded. Those who were recidivists, by that act alone, would have a pattern of behaviour different from that of those who were not convicted of committing another offence. Therefore, the reported recidivism statistics from the survey should be considered a lower bound. Second, the surveys were sent out during the 2020 Covid-19 partial quarantine period within the United States. While this likely drove a general increased response rate, it also created the potential for individuals who were hourly workers or furloughed to be more likely to respond given the potential financial incentive. The Covid-19 pandemic may also have changed both income and employment status - particularly for workers in the service industry.

The number of previously convicted CSEM offenders who responded to the survey was low, though not unexpected given the sensitivities of the questions asked and previously research using sex offender registries (Tewksbury, 2006).

The sample is likely also skewed in terms of age of interest and possession of content. Individuals possessing solely hebephilic content are less likely to be prosecuted due to the difficulties in age identification and general practice within the United States legal system.

The research in Chapters 6 through 13 was conducted using samples derived from adults within the United States. It is not necessarily generalizable beyond that

population, and additional research is required to determine if the results are consistent in other populations.

14.6.2 Response Bias

Self-report survey data is subject to social desirability bias. Several of the questions in this research were tailored to reduce social desirability that might be present in strict Likert-based questions, and other work using similar questions showed minimal impact of social desirability (M. D. O'Brien & Webster, 2007), but further research can be done to determine the efficacy of that reduction. Specifically, a control study where both the Likert and non-Likert questions are asked of the same participants would provide empirical data on any differences.

The variables collected related to profession and income are additionally potentially influenced by the prior conviction and subsequent registration of the offenders. The profession recorded by offenders in the survey was post-conviction and provided a picture of their income at the time of the survey. The data cannot be used to draw inferences about profession or socioeconomic status pre-conviction.

Multiple questions were asked retrospectively and required the offender to recall state of mind at salient moments in the past. Some of these, such as suicidal ideation, may be skewed by recall issues or through subsequent activities (e.g., mental health treatment) that changed the offender's perceptions. Others may be limited by the memory of the offender (e.g., how they initially got involved in CSEM viewing).

There is the possibility that a small subset of individuals within the public cadre had interests in CSEM or committed undocumented CSEM offences. For ethics reasons and mandatory reporting requirements, no question about criminal activity was asked of the public sample.

14.7 Conclusions

This thesis presented Lawless Space Theory (LST), which provides explanatory power for the technological behaviours of CSEM offenders, and proposed an instrument for measuring perceived lawlessness. Preliminary validation of the instrument confirmed

that both the public and the offender populations perceived the Internet as generally lawless, and additional studies in the thesis showed technological behaviours consistent with the theory. In particular, CSEM offenders chose technologies based on both psychosexual needs and utility, showed habituation to both the technologies and the risk associated with offending, and utilized countermeasures to reduce psychological strain.

This research systematically reviewed the prior work on the endorsement of traditional sex offender cognitive distortions by CSEM offenders, finding that overall endorsement was low. Additionally, the use of technology by CSEM offenders was integratively reviewed, showing an evolving technological landscape with continued usage of legacy technologies by CSEM offenders well beyond their normative lifecycles and limited employment of countermeasures.

Looking at public perceptions of CSEM offending, the public generally overestimated the risks related to recidivism, contact offending, and paedophilia, while offenders more accurately estimated those risks. Additionally, the public rated the severity of child pornography possession as higher than all crimes except rape and criminal homicide, while offenders rated it as less severe than all crimes-against-persons.

The respondents from the CSEM offender group were found to have high suicidal ideation, and a significant minority reported at least one suicide attempt. CSEM offenders had slightly lower sociability than non-offenders, though not at a level of clinical interest, and reported a lower adoption rate for new technologies. Additionally, CSEM offenders were found to be similar in terms of technical ability to the reference group.

Technology-wise, CSEM offenders chose technologies based on a mix of utility and perceived risk. Peer-to-peer software and open web browsing were the most common gateway technologies used, and countermeasure usage focused on less sophisticated methods (e.g., using In-Private browsing). The majority of the offenders deleted their content on at least one occasion, primarily as part of a periodic guilt/shame cycle. None of the offenders viewed CSEM exclusively, and most viewed more adult SEM than

CSEM. Offenders viewed broader categories of SEM material than the reference population and tended to view content across multiple age ranges.

Many of the findings presented in this thesis should be considered preliminary and provide a starting point for future research. In addition to repeating the work with different populations and at a larger scale, several other areas arose that warrant research attention.

For technological behaviours, the constant improvements in connectivity, increased integration of encryption into digital technologies by default, and availability of new applications and devices necessitates periodic research updates. To have the most up-to-date data, interviews with offenders immediately post-arrest could be analysed in combination with the results of digital forensics to paint a more contemporary and fulsome picture.

Specific to suicidality, a cohort of CSEM offenders could be tracked longitudinally starting with their initial interaction with law enforcement to identify the proportion of individuals who attempt suicide or take their own life, and at what point in the process. Additionally, CSEM offenders could be provided an ideation measure immediately following their interaction with law enforcement, and the changes in ideation measured over time.

LST provided a new approach to cybercriminality, building on existing criminological theories and incorporating technology-specific cognitions and behaviours. Because LST is presented as a microtheory on how individuals engage in criminal behaviour and the reciprocal impact of technology on continuing that behaviour, it enhances rather than seeks to supplant current macrotheories of criminology. Rational choice theory was incorporated into LST, with the inclusion of psychological costs (e.g., strain related to the risk of discovery, tempered by the use of technical countermeasures) in the choice of how to engage in criminal behaviour. Routine activity theory was likewise enhanced through the inclusion of LST, by extending the concept of location to include virtual environments and the presence of victims to include secondary victims (CSEM content).

In addition to enhancing key macro theories, LST furthered the incorporation of criminological concepts from the physical world such as differential association, social control and capable guardianship to virtual environments. Differential association, including vicarious learning of criminally facilitative skills through observation and the presence of large amounts of criminal content serving as visible proxies for the behaviour of other offenders, is present in many lawless spaces. Social control, particularly informal social control, is weakened in perceived lawless spaces, through observation of perverted in-group standards and norms. Formal social control, through a lack of capable guardianship (both perceived and actual due to a lack of adequate enforcement) is likewise lacking. LST incorporates these concepts into a new theory of behaviour for why criminals choose a particular technological ecosystem amongst numerous alternatives; how they interact with that environment and how that environment influences their future criminal behaviour; and why and how they continue to use that environment.

While LST has been proposed in relation to CSEM offending, the theory has broader applicability to general cybercrime. Identity theft forums and marketplaces on the dark web, malware exchanges, and software/music/movie piracy groups all have similar digital ecosystems to which LST could be applied. Future research is needed in analysing these and other types of cybercriminality in the context of LST to validate its full applicability.

This thesis proposed deterrence, investigative, and treatment actions. While based on sound theory, the proposed actions must be empirically tested for efficacy. Additionally, preliminary self-assessment and structured interview questions eliciting clinically relevant information on technical behaviours were proposed. Testing and refinement in a clinical setting are needed to validate the utility of the questionnaire.

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Appendix A - Public Consent

You are being invited to participate in a research study titled Digital Behaviors and Cognitions of Individuals Convicted of Online Child Pornography Offenses. The purpose of this research study is to identify the public's beliefs in the United States about those convicted of child pornography offenses. Specifically, you will be asked to respond to a series of questions about your personal online behaviors and your agreement or disagreement with statements about online child pornography and those that view it. To maintain confidentiality, please do not enter any personally identifiable information into any open text questions. Your participation in this study is entirely voluntary and you can withdraw at any time prior to the final submission by exiting the survey.

Detailed project information is below, or can be downloaded here.

Research project title: Digital Behaviors and Cognitions of Individuals Convicted of Online Child Pornography Offences
Research investigator: Chad M.S. Steel
Address & contact details of research investigator: Chad M.S. Steel (% Dr. Emily Newman), Postgraduate Researcher in Clinical Psychology, Teviot Place, University of Edinburgh, Edinburgh.
Other Researchers involved in this project: Dr. Emily Newman - Lecturer and Psychology of Mental Health Director , Dr. Suzanne O'Rourke - Senior Lecturer in Forensic Clinical Psychology , Dr. Ethel Quayle - Professor and Chair, Clinical Psychology

About the Project

The project Digital Behaviors and Cognitions of Individuals Convicted of Online Child Pornography Offenses looks to identify the thoughts, beliefs, and behaviors of

individuals convicted of child pornography offenses on the Internet and how they differ from those who have not offended. The research may be used to perform better investigations, stop future offending earlier, and better treat offenders, with the ultimate goal of reducing the overall victimization of children.

The data collected consists of two online surveys. The first survey collects responses from those who have not offended and contains basic demographic questions as well as questions on digital behaviors and beliefs about child pornography. The second survey collects responses from individuals previously convicted of child pornography offenses and includes additional behavioral questions on their past actions.

What does participation involve?

Individuals who have not offended will be asked to fill out a brief online survey that collects demographic information and asks questions about digital behaviors and about their beliefs and understanding of child pornography offenses. The survey is anonymous (your name and IP address will not be collected and won't be connected to the survey data) and consists of primarily multiple choice questions, and should take approximately 15-20 minutes to complete. There is no follow-up contact or other action required of participants after completing the survey. Participants can abandon the survey and withdraw from the study at any point up until clicking the final submission by simply choosing not to continue.

Who is responsible for the data collected in this study?

This research is part of the doctoral research performed by Chad M.S. Steel in the Clinical Psychology program at the University of Edinburgh School of Health in Social Science, supervised by Dr. Emily Newman, Dr. Suzanne O'Rourke, and Dr. Ethel Quayle.

All of the data collected by both surveys is anonymous. No identifying questions are asked, and no logging of network traffic is performed. While it is understood that no

computer transmission can be perfectly secure, reasonable efforts will be made to protect the confidentiality of your transmission. The data will be maintained at the University of Edinburgh and made available permanently as part of their data archives for other researchers to use. Select questions that may contain responses that would provide details that would assist individuals searching for child pornography will be removed and available only upon request.

The research was approved by the School of Health in Social Science Research Ethics Committee on 15 May 2020.

Are there any risks involved in this study?

All of the information provided in this study is anonymous. The survey has been constructed to involve minimal psychological risk. If you are experiencing distress or would like to speak to a local psychologist about any past or current behaviors, the American Psychological Association's locator service (https://locator.apa.org/) can help you identify a treatment provider near you. If you are having any immediate distress, you can call the toll-free National Helpline at 1-800-662-HELP (4357) to talk with a mental health professional. If at any point you feel a question is upsetting and you do not wish to answer, you can close the survey and your responses will not be kept.

What are the benefits for taking part in this study?

There are no direct benefits to participants. Your participation may help researchers better understand online child pornography consumption. By providing information on your beliefs and behaviors, we may be able to better understand how the behaviors of convicted child pornography offenders differ. Ultimately, this information may be used for investigative, deterrence, and treatment purposes. The overall goal is to reduce the victimization of children via child pornography.

What are your rights as a participant?

Taking part in the study is voluntary. You may choose not to take part at any point prior to final submission.

The raw results of the survey will be available through the Edinburgh Data Archive. Published results and analyses may be available through multiple psychology journals. The publications will be made available to the degree allowed by journal policy in an openly searchable form in multiple locations, including the primary research investigator's page located at https://www.ed.ac.uk/profile/chad-m-s-steel.

Will I receive any payment or monetary benefits?

There are no monetary benefits for your participation in this survey outside of any financial arrangement with Qualtrics as a member of their panel.
The data will not be used by any member of the project team for commercial purposes. Therefore you should not expect any royalties or payments from the research project in the future.

For more information

This research has been reviewed and approved by the Edinburgh University Research Ethics Board. If you have any further questions or concerns about this study, please contact:
Name of researcher: Chad M.S. Steel
Full address: Chad M.S. Steel (% Dr. Emily Newman), Teviot Place, University of Edinburgh, Edinburgh
E-mail:

You can also contact Chad M.S. Steel's supervisor:
Name of researcher: Dr. Emily Newman
Full address: Teviot Place, University of Edinburgh, Edinburgh

Tel: +44 (0) 131 651 3945
E-mail:

What if I have concerns about this research?

If you are worried about this research, or if you are concerned about how it is being conducted, you can contact the University of Edinburgh School of Health in Social Science ethics committee at CAHSS.res.ethics@ed.ac.uk. Additionally, if you have any complaints regarding the research you may contact the Head of School, Professor Matthias Schwannauer, at hos.health@ed.ac.uk.

Do you Consent?

Yes/No

Appendix B - Offender Consent

You are being invited to participate in a research study titled Digital Behaviors and Cognitions of Individuals Convicted of Online Child Pornography Offenses. The purpose of this research study is identify the behaviors and beliefs of those convicted of child pornography offenses. Specifically, you will be asked to respond to a series of questions about your personal online behaviors, including your past behaviors related to child pornography and your agreement or disagreement with statements about online child pornography. To maintain confidentiality, please do not enter any personally identifiable information into any open text questions. Your participation in this study is entirely voluntary and you can withdraw at any time prior to the final submission by exiting the survey.

Detailed project information is below, or can be downloaded here.

Research project title: Digital Behaviors and Cognitions of Individuals Convicted of Online Child Pornography Offences

Research investigator: Chad M.S. Steel

Address & contact details of research investigator: Chad M.S. Steel (% Dr. Emily Newman), Postgraduate Researcher in Clinical Psychology, Teviot Place, University of Edinburgh, Edinburgh.

Other Researchers involved in this project: Dr. Emily Newman - Lecturer and Psychology of Mental Health Director , Dr. Suzanne O'Rourke - Senior Lecturer in Forensic Clinical Psychology , Dr. Ethel Quayle - Professor and Chair, Clinical Psychology

About the Project

The project Digital Behaviors and Cognitions of Individuals Convicted of Online Child Pornography Offenses looks to understand the thoughts, beliefs, and behaviors of individuals convicted of child pornography offenses on the Internet and how they differ from those who have not offended. The research may be used to better understand the motivations and actions of individuals who have previously viewed online child pornography. Understanding the beliefs and behaviors of those who view child pornography may allow for more useful and compassionate interactions with mental health workers, investigators, and others who work with future offenders. Additionally, the research may clarify any public myths about those who view child pornography, and include the views of offenders on areas such as sex offender registries that may help shape future public policy. The data collected consists of two online surveys. The first survey collects responses from those who have not offended and contains basic demographic questions as well as questions on digital behaviors and beliefs about child pornography. The second survey collects responses from individuals previously convicted of child pornography offenses and includes additional behavioral questions on their past actions.

What does participation involve?

Individuals who have been previously convicted of child pornography offenses will be asked to fill out a brief online survey that collects demographic information and asks questions about digital behaviors and about their beliefs and understanding of child pornography offenses as well as their prior use of technology related to child pornography and opinions about the investigative process. The survey is anonymous (your name and IP address will not be collected and won't be connected to the survey data) and consists of primarily multiple choice questions and a few short text questions, and should take approximately 25-30 minutes to complete. There is no follow-up contact or other action required of participants after completing the survey. Participants can abandon the survey and withdraw from the study at any point up until clicking the final submission by simply choosing not to continue. Individuals choosing to participate

in the drawing for a gift card will only be contacted by sending the gift card information to a voluntarily provided email address.

Who is responsible for the data collected in this study?

This research is part of the doctoral research performed by Chad M.S. Steel in the Clinical Psychology program at the University of Edinburgh School of Health in Social Science, supervised by Dr. Emily Newman, Dr. Suzanne O'Rourke, and Dr. Ethel Quayle. All of the data collected by both surveys is anonymous. No identifying questions are asked, and no logging of network traffic is performed. While it is understood that no computer transmission can be perfectly secure, reasonable efforts will be made to protect the confidentiality of your transmission. The data will be maintained at the University of Edinburgh and made available permanently as part of their data archives for other researchers to use. Select questions that may contain responses that would provide details that would assist individuals searching for child pornography will be removed and available only upon request.
The research was approved by the School of Health in Social Science Research Ethics Committee on 15 May 2020.

Are there any risks involved in this study?

All of the information provided in this study is anonymous. The survey has been built to involve minimal psychological risk. If you are experiencing distress or would like to speak to a local psychologist about any past or current behaviors, the American Psychological Association's locator service (https://locator.apa.org/) can help you identify a treatment provider near you. If you are having any immediate distress, you can call the toll-free National Helpline at 1-800-662-HELP (4357) to talk with a mental health professional. If at any point you feel a question is upsetting and you do not wish to answer, you can close the survey and your responses will not be kept.

What are the benefits for taking part in this study?

There are no direct benefits to participants. Your participation may help researchers better understand online child pornography consumption. This is done by looking at your previous behavior for the purposes of treatment and deterrence, and may allow for more understanding-based investigations of future offenders. The overall goal is to reduce the victimization of children via child pornography.

What are your rights as a participant?

Taking part in the study is voluntary. You may choose not to take part at any point prior to final submission. The raw results of the survey will be available through the Edinburgh Data Archive. Published results and analyses may be available through multiple psychology journals. The publications will be made available to the degree permitted by journal policy in an openly searchable form in multiple locations, including the primary research investigator's page located at https://www.ed.ac.uk/profile/chad-m-s-steel.

Will I receive any payment or monetary benefits?

Participants will be provided the chance to win one of two $150 Amazon gift cards. The winners will be chosen randomly from all participants that choose to provide an email address through a separate, post-survey option. Providing an email address is voluntary and considered confidential, and is not linked to your survey responses in any way. Participant email addresses will only be stored until winners are selected, at which point they will be permanently deleted. The data will not be used by any member of the project team for commercial purposes. Therefore you should not expect any royalties or payments from the research project in the future.

For more information

This research has been reviewed and approved by the Edinburgh University Research Ethics Board. If you have any further questions or concerns about this study, please contact:

Name of researcher: Chad M.S. Steel

Full address: Chad M.S. Steel (% Dr. Emily Newman)Teviot Place, University of Edinburgh, Edinburgh

E-mail:

You can also contact Chad M.S. Steel's supervisor:
Name of researcher: Dr. Emily Newman
Full address: Teviot Place, University of Edinburgh, Edinburgh
Tel: +44 (0) 131 651 3945
E-mail:

What if I have concerns about this research?

If you are worried about this research, or if you are concerned about how it is being conducted, you can contact the University of Edinburgh School of Health in Social Science ethics committee at CAHSS.res.ethics@ed.ac.uk. Additionally, if you have any complaints regarding the research you may contact the Head of School, Professor Matthias Schwannauer, at hos.health@ed.ac.uk.

Do you consent to these terms?

Yes/No

Appendix C - Solicitation Letter

THE UNIVERSITY *of* EDINBURGH
School of Health in Social Science

Dear <First Name>:

I am writing to ask for your help in protecting children online. The University of Edinburgh in Scotland is looking to obtain the insights of people who have been previously convicted of viewing child pornography. The survey should only take a few moments of your time, and your unique views will be captured to help you and others in several ways:

- Your opinions on sex offender registries and sentencing guidelines may be published and may impact policy decisions about who is required to register and for how long.
- The information you provide may help law enforcement and the general public better understand the thoughts and actions of people who view child pornography.
- Treatment efforts to help child pornography viewers may be informed by your input.
- Your answers may help to reduce the availability of online child pornography and the sexual victimization of children.

Your participation in this survey is completely voluntary and all of your responses are anonymous. None of the responses will be connected to any identifying information, and none will be collected. The survey will take approximately 25-30 minutes to complete.

To participate, please visit the following link:

http://csemsurvey.co.uk

If you complete the survey, **you will have the option of providing your email address to be entered into a drawing to win one of two $150 Amazon gift cards.**

If you have any questions about this survey, or difficulty in accessing the site or completing the survey, please contact Chad M.S. Steel at

Thank you in advance for providing this important feedback.

Note: This survey has been approved by the University of Edinburgh Research Ethics Committee. More information can be found on the Project Information Sheet at the survey link above. The survey is being conducted using Qualtrics, a cloud based software that stores data on secure servers in Scotland.

Sincerely,

Appendix D - Public Survey

Start of Block: Consent - Public

You are being invited to participate in a research study titled Digital Behaviors and Cognitions of Individuals Convicted of Online Child Pornography Offenses. The purpose of this research study is to identify the public's beliefs in the United States about those convicted of child pornography offenses. Specifically, you will be asked to respond to a series of questions about your personal online behaviors and your agreement or disagreement with statements about online child pornography and those that view it. To maintain confidentiality, please do not enter any personally identifiable information into any open text questions. Your participation in this study is entirely voluntary and you can withdraw at any time prior to the final submission by exiting the survey.
Detailed project information is below, or can be downloaded here:

Research project title: Digital Behaviors and Cognitions of Individuals Convicted of Online Child Pornography Offences
Research investigator: Chad M.S. Steel
Address & contact details of research investigator: Chad M.S. Steel (% Dr. Emily Newman), Postgraduate Researcher in Clinical Psychology, Teviot Place, University of Edinburgh, Edinburgh.
Other Researchers involved in this project: Dr. Emily Newman - Lecturer and Psychology of Mental Health Director Dr. Suzanne O'Rourke - Senior Lecturer in Forensic Clinical Psychology , Dr. Ethel Quayle - Professor and Chair, Clinical Psychology

About the Project

The project Digital Behaviors and Cognitions of Individuals Convicted of Online Child Pornography Offenses looks to identify the thoughts, beliefs, and behaviors of individuals convicted of child pornography offenses on the Internet and how they differ from those who have not offended. The research may be used to perform better investigations, stop future offending earlier, and better treat offenders, with the ultimate goal of reducing the overall victimization of children.

The data collected consists of two online surveys. The first survey collects responses from those who have not offended and contains basic demographic questions as well as questions on digital behaviors and beliefs about child pornography. The second survey collects responses from individuals previously convicted of child pornography offenses and includes additional behavioral questions on their past actions.

What does participation involve?

Individuals who have not offended will be asked to fill out a brief online survey that collects demographic information and asks questions about digital behaviors and about their beliefs and understanding of child pornography offenses. The survey is anonymous (your name and IP address will not be collected and won't be connected to the survey data) and consists of primarily multiple choice questions, and should take approximately 15-20 minutes to complete. There is no follow-up contact or other action required of participants after completing the survey. Participants can abandon the survey and withdraw from the study at any point up until clicking the final submission by simply choosing not to continue.

Who is responsible for the data collected in this study?

This research is part of the doctoral research performed by Chad M.S. Steel in the Clinical Psychology program at the University of Edinburgh School of Health in Social Science, supervised by Dr. Emily Newman, Dr. Suzanne O'Rourke, and Dr. Ethel Quayle.

All of the data collected by both surveys is anonymous. No identifying questions are asked, and no logging of network traffic is performed. While it is understood that no computer transmission can be perfectly secure, reasonable efforts will be made to protect the confidentiality of your transmission. The data will be maintained at the University of Edinburgh and made available permanently as part of their data archives for other researchers to use. Select questions that may contain responses that would provide details that would assist individuals searching for child pornography will be removed and available only upon request.

The research was approved by the School of Health in Social Science Research Ethics Committee on 15 May 2020.

Are there any risks involved in this study?

All of the information provided in this study is anonymous. The survey has been constructed to involve minimal psychological risk. If you are experiencing distress or would like to speak to a local psychologist about any past or current behaviors, the American Psychological Association's locator service (https://locator.apa.org/) can help you identify a treatment provider near you. If you are having any immediate distress, you can call the toll-free National Helpline at 1-800-662-HELP (4357) to talk with a mental health professional. If at any point you feel a question is upsetting and you do not wish to answer, you can close the survey and your responses will not be kept.

What are the benefits for taking part in this study?

There are no direct benefits to participants. Your participation may help researchers better understand online child pornography consumption. By providing information on your beliefs and behaviors, we may be able to better understand how the behaviors of convicted child

pornography offenders differ. Ultimately, this information may be used for investigative, deterrence, and treatment purposes. The overall goal is to reduce the victimization of children via child pornography.

What are your rights as a participant?

Taking part in the study is voluntary. You may choose not to take part at any point prior to final submission.

The raw results of the survey will be available through the Edinburgh Data Archive. Published results and analyses may be available through multiple psychology journals. The publications will be made available to the degree allowed by journal policy in an openly searchable form in multiple locations, including the primary research investigator's page located at https://www.ed.ac.uk/profile/chad-m-s-steel.

Will I receive any payment or monetary benefits?

There are no monetary benefits for your participation in this survey outside of any financial arrangement with Qualtrics as a member of their panel.
The data will not be used by any member of the project team for commercial purposes. Therefore you should not expect any royalties or payments from the research project in the future.

For more information

This research has been reviewed and approved by the Edinburgh University Research Ethics Board. If you have any further questions or concerns about this study, please contact:
Name of researcher: Chad M.S. Steel
Full address: Chad M.S. Steel (% Dr. Emily Newman), Teviot Place, University of Edinburgh, Edinburgh

You can also contact Chad M.S. Steel's supervisor:
Name of researcher: Dr. Emily Newman
Full address: Teviot Place, University of Edinburgh, Edinburgh
Tel: +44 (0) 131 651 3945

What if I have concerns about this research?

If you are worried about this research, or if you are concerned about how it is being conducted, you can contact the University of Edinburgh School of Health in Social Science ethics committee at CAHSS.res.ethics@ed.ac.uk. Additionally, if you have any complaints regarding

the research you may contact the Head of School, Professor Matthias Schwannauer, at hos.health@ed.ac.uk.
Do you Consent?

O Yes

O No

End of Block: Consent - Public

Start of Block: Demographics Basics/Universal

What is your sex?

O Male

O Female

Which of the following best describes your sexual orientation?

O Heterosexual (straight)

O Homosexual (gay)

O Bisexual

O Other

O Prefer not to say

What is your age?

- O Under 18
- O 18 - 24
- O 25 - 34
- O 35 - 44
- O 45 - 54
- O 55 - 64
- O 65 - 74
- O 75 - 84
- O 85 or older

To which gender identity do you most identify?

- O Female
- O Male
- O Transgender Female
- O Transgender Male
- O Gender Variant/Non-Conforming
- O Prefer Not to Answer
- O Not Listed

At the present time, are you:

O Married

O Widowed

O Divorced

O Separated

O In a Domestic Partnership or Civil Union

O Single, but Cohabiting with a Significant Other

O Single, Never Married

O Other _____

What racial categories do you most identify with (please select one or more)?

☐ White or Caucasian

☐ Hispanic or Latino

☐ Black or African American

☐ American Indian or Alaska Native

☐ Asian

☐ Native Hawaiian or Pacific Islander

☐ Other _____

Which statement best describes your current employment status?

O Working (paid employee)

O Working (self-employed)

O Not working (temporary layoff from a job)

O Not working (looking for work)

O Not working (retired)

O Not working (disabled)

O Not working (other)

What is the highest level of schooling you have achieved?

O Less than high school diploma

O High school graduate (high school diploma or equivalent including GED)

O Some college but no degree

O Associate degree in college (2-year)

O Bachelor's degree in college (4-year)

O Master's degree

O Doctoral degree

O Professional degree (JD, MD)

Which of the following best describes the field in which you received your highest degree?

O Business

O Computer Science

O Education

O Engineering

O Government/Political Science

O Liberal Arts

O Nursing

O Physical Science

O Psychology

O Social Sciences

O Other _____

Please indicate your current occupation:

- O Management, Business, and Financial
- O Computer, Engineering, and Science
- O Education, Legal, Community Service, Arts, and Media
- O Healthcare Practitioners and Technical
- O Service
- O Sales and Related
- O Office and Administrative Support
- O Farming, Fishing, and Forestry
- O Installation, Maintenance, and Repair
- O Construction and Extraction
- O Production
- O Transportation and Material Moving
- O Military
- O Retired
- O Unemployed

What is your total annual household income (in US Dollars - please enter only numbers)?

_____

End of Block: Demographics Basics/Universal

Start of Block: Technology Usage and Behaviors

Which technologies do you *currently* own (Select all that apply)?

- [ ] Apple iPad
- [ ] iMac
- [ ] MacBook/MacBook Pro/MacBook Air
- [ ] Apple iPhone 11 or Later
- [ ] Apple iPhone X or Earlier
- [ ] Apple Watch
- [ ] Apple HomePod
- [ ] Amazon Echo
- [ ] Amazon Kindle
- [ ] Android Smartphone
- [ ] Android Tablet
- [ ] Google Chromebook
- [ ] Microsoft Laptop
- [ ] Microsoft Desktop
- [ ] Linux Desktop/Laptop/Tablet
- [ ] Nintendo Switch
- [ ] Playstation 4 (original)
- [ ] Playstation 4 Pro
- [ ] XBox One (original or S)
- [ ] XBox One X

- [ ] Other eReader
- [ ] Other Smart Watch
- [ ] Google Home
- [ ] Cyberlocker (e.g. Microsoft OneDrive, DropBox, Google Drive)
- [ ] I own none of the above items

In a typical day, about how many personal emails do you send?

- O 0-10
- O 11-20
- O 21-30
- O 31-40
- O More than 40

On average, how quickly do you respond to emails from friends and relatives?

- O Within a few minutes
- O Within a few hours
- O Within a day
- O More than a day

What social media sites/apps have you used (Select all that apply)?

- [ ] Facebook
- [ ] Instagram
- [ ] Facebook Messenger
- [ ] Twitter
- [ ] Pinterest
- [ ] Reddit
- [ ] SnapChat
- [ ] WhatsApp
- [ ] Google Messenger
- [ ] Tumblr
- [ ] Discord
- [ ] Google Hangouts
- [ ] GroupMe
- [ ] Kik
- [ ] TikTok
- [ ] Telegram
- [ ] LINE
- [ ] WeChat

In a typical day, about how many instant messages (including text messages) do you send?

O 0-10

O 11-20

O 21-30

O 31-40

O More than 40

Please select your level of agreement with the following statements:

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I like to be with people	O	O	O	O	O
I welcome the opportunity to mix socially with people	O	O	O	O	O
I prefer working with others rather than alone	O	O	O	O	O
I find people more stimulating then anything else	O	O	O	O	O
I'd be unhappy if I were prevented from making many social contacts	O	O	O	O	O

How would you rate your adoption of new computing technology (smartphones, ereaders, tablets, laptops, home automation)?

- O Very High - you are an early adopter and own computing devices in all of the major areas (smartphones, ereaders, tablets, laptops, home automation)
- O High - you keep up with technology and own computing devices in all of the major technology areas. Some of the devices may be last year's model, but you stay within one generation of the current release.
- O Average - you own computing devices in most of the major technology areas, but hold off on purchases until technologies are mature and in widespread usage. You only upgrade devices when major new functionality is available.
- O Low - you own computing devices in several of the major technology areas, but are frequently the last of your friends to start using a new technology.
- O Very Low - you own very few computing devices. You upgrade only when the existing device breaks or is no longer supported.

How would others rate your computing ability?

- O Novice - little to no technical ability.
- O Casual User - ability to use most computer services and technologies without assistance.
- O Power User - you frequently use most computing technologies; Others consult you for computing advice.
- O IT/Computing Professional - your career is focused on configuring, managing, or maintaining networks, hardware, or software.
- O Computer Scientist - you develop new computing technologies or conduct peer-reviewed research into computing.

Which of the following actions have you ever taken (Select all that apply)?

- [ ] I have used whole disk encryption on my laptop or desktop
- [ ] I have encrypted individual files on one of my storage devices
- [ ] I have used a VPN service to hide my web activity
- [ ] I have used TOR to access content on the dark web
- [ ] I have used peer-to-peer software to download movies, images, or music
- [ ] I have formatted my hard drive or another storage device to delete content
- [ ] I have used secure wiping software to erase my hard drive or another storage device
- [ ] I have deleted my web browsing activity
- [ ] I have used In-Private or other browsing modes to hide my browsing activity
- [ ] I have created a social media account using a fake name
- [ ] I have created an email account using a fake name
- [ ] I have used steganography to hide content
- [ ] I have deleted or altered log files to hide my activity
- [ ] I have mislabeled a directory or a storage device to hide its contents
- [ ] I have used a cryptocurrency (e.g. Bitlocker, Etherium, Monero)
- [ ] I have used a virtual machine to hide my activities
- [ ] I have read message boards or forums on hiding my activities
- [ ] I have downloaded a guide on hiding my activities
- [ ] I have never taken any of these actions

In the past 12 months, which of the following have you experienced to the best of your knowledge (Select all that apply)?

- [ ] Malware was detected on my computer
- [ ] I have had one of my email accounts compromised
- [ ] I have had one of my social media accounts compromised
- [ ] I have been the victim of identity theft
- [ ] None of the above have occurred

Please select your level of agreement with the following statements:

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
The rules of behavior on the Internet are different from the physical world	O	O	O	O	O	O	O
There is more criminal behavior on the Internet than in the physical world	O	O	O	O	O	O	O
You can get away with behavior on the Internet that would be unacceptable in the physical world	O	O	O	O	O	O	O
It is easier to find illegal goods and services on the Internet than in the physical world	O	O	O	O	O	O	O
Most activity on the Internet is not monitored by law enforcement	O	O	O	O	O	O	O

Law enforcement cares less about Internet crimes than crimes in the physical world	O	O	O	O	O	O	O

End of Block: Technology Usage and Behaviors

Start of Block: Child Pornography Beliefs

Why do you think an individual would view child pornography?

_____

_____

_____

_____

Please indicate your agreement with the following statements:

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
Viewing child pornography is no different than viewing adult pornography	O	O	O	O	O	O	O
Viewing images of naked children where there is no display of the genitals should be illegal	O	O	O	O	O	O	O
The severity of the acts depicted in child pornography images should be taken into consideration in sentencing decisions	O	O	O	O	O	O	O
Viewing naked pictures of children for artistic (non-sexual) purposes is acceptable	O	O	O	O	O	O	O
Please select Somewhat Agree for this option!	O	O	O	O	O	O	O
Individuals that possess more images and videos should receive longer sentences than individuals with a few images and videos	O	O	O	O	O	O	O

Sentencing of child pornographers should be based on the age of the individuals depicted	O	O	O	O	O	O	O
Individuals who view child pornography should be registered as sex offenders	O	O	O	O	O	O	O
Viewing virtual images (lifelike animations and drawings) of children engaged in sexual activity should be illegal	O	O	O	O	O	O	O
Viewing child pornography online is not as bad as downloading and saving child pornography	O	O	O	O	O	O	O
Individuals who view child pornography are mentally ill and should be treated and not put into prison	O	O	O	O	O	O	O

Why would an individual who is interested in child pornography also view adult pornography (select all that apply)?

- [ ] They accidentally come across it while searching for child pornography
- [ ] They have a sexual interest in both adults and children
- [ ] They do not want to admit to an interest in children
- [ ] Adult pornography is more readily available
- [ ] Other _____

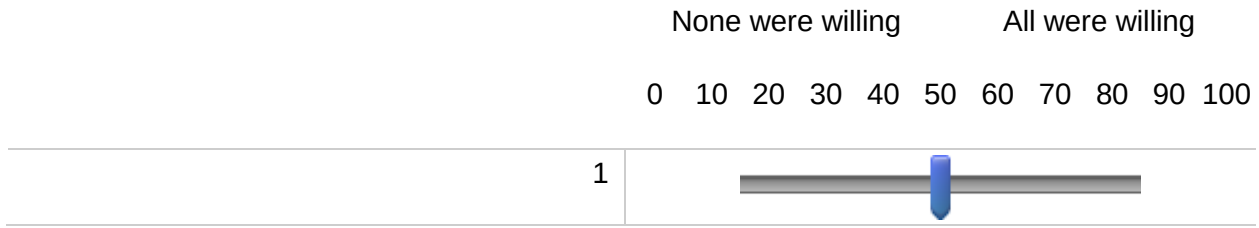
What percentage of individuals that view child pornography will have sexual contact with a child at some point?

	None will have sexual contact with a child										All will have sexual contact with a child
	0	10	20	30	40	50	60	70	80	90	100
1											

Which of the following statements do you most agree with about accidentally viewing images of child pornography?

- O Anyone can accidentally come across child pornography while browsing the web.
- O Individuals visiting mainstream adult websites may accidentally come across child pornography.
- O Individuals visiting less mainstream adult websites may accidentally come across child pornography.
- O Only individuals that actively seek out child pornography will find child pornography.

What percentage of children depicted in child pornographic images do you believe were willing participants in the activity pictured?



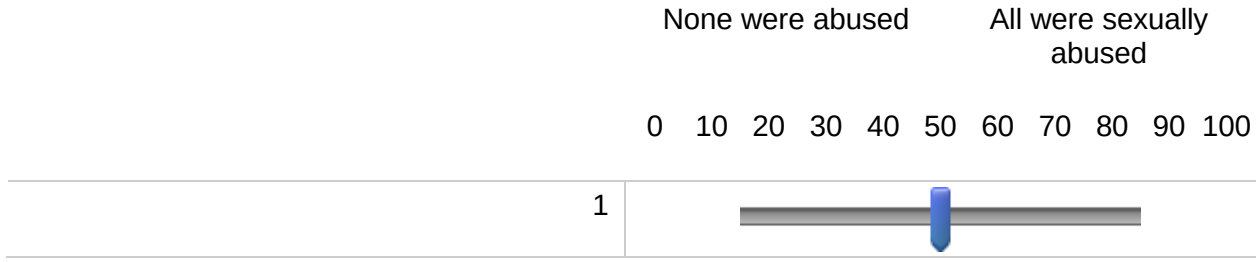
Which of the following statements do you most agree with?

O Viewing child pornography is directly responsible for creating child victims.

O Viewing child pornography is indirectly responsible for creating child victims.

O Viewing child pornography does not contribute to child victimization.

What percentage of individuals who view child pornography do you believe were sexually abused as children?



How difficult is it for individuals that view child pornography to stop?

O Extremely easy

O Moderately easy

O Slightly easy

O Neither easy nor difficult

O Slightly difficult

O Moderately difficult

O Extremely difficult

What percentage of individuals who view child pornography do you believe are pedophiles?

None are pedophiles All are pedophiles

0 10 20 30 40 50 60 70 80 90 100

1 

Please rank the following crimes from most severe to least severe (with 1 being the most severe and 9
being the least severe) [Items can be reordered by dragging them]:

_____ Aggravated Assault
_____ Arson
_____ Burglary (breaking and entering)
_____ Child pornography possession
_____ Criminal homicide
_____ Larceny/Theft (except auto)
_____ Motor vehicle theft
_____ Rape
_____ Robbery

What percentage of individuals convicted of child pornography offenses will go on to commit another child pornography offense after serving their sentence?

	None will re-offend 0 10 20 30 40 50 60 70 80 90 100 All will re-offend
1	

End of Block: Child Pornography Beliefs

Start of Block: Adult Pornography

For the questions below, sexually explicit material (SEM) is considered to be any pornographic and/or erotic images or movies depicting nude or semi-nude individuals, or individuals engaged in sexual activity, viewed for arousal purposes. Child SEM is considered to be any SEM containing at least one individual believed to be under the age of 18.

Which of the following categories of adult SEM have you viewed on at least one occasion (please select all that apply)?

- [ ] Japanese
- [ ] Lesbian
- [ ] Amateur
- [ ] Hentai
- [ ] MILF
- [ ] Ebony
- [ ] Anal
- [ ] Teen
- [ ] Bestiality
- [ ] Nudist/Naturist Images
- [ ] Teen
- [ ] Rape/Forced Sex
- [ ] I have never viewed pornography in any of the above categories

---

Have you ever paid for adult SEM?

- O Yes
- O No

Please select Somewhat Agree as your answer choice.

- O Strongly disagree
- O Disagree
- O Somewhat disagree
- O Neither agree nor disagree
- O Somewhat agree
- O Agree
- O Strongly agree

---

*

How many years old were you when you first viewed adult SEM?

_____

End of Block: Adult Pornography

Appendix E - Offender Survey

Start of Block: Consent

You are being invited to participate in a research study titled Digital Behaviors and Cognitions of Individuals Convicted of Online Child Pornography Offenses. The purpose of this research study is identify the behaviors and beliefs of those convicted of child pornography offenses. Specifically, you will be asked to respond to a series of questions about your personal online behaviors, including your past behaviors related to child pornography and your agreement or disagreement with statements about online child pornography. To maintain confidentiality, please do not enter any personally identifiable information into any open text questions. Your participation in this study is entirely voluntary and you can withdraw at any time prior to the final submission by exiting the survey. Detailed project information is below, or can be downloaded here:

Research project title: Digital Behaviors and Cognitions of Individuals Convicted of Online Child Pornography Offences
Research investigator: Chad M.S. Steel
Address & contact details of research investigator: Chad M.S. Steel (% Dr. Emily Newman), Postgraduate Researcher in Clinical Psychology, Teviot Place, University of Edinburgh, Edinburgh. C.M.S.Steel@sms.ed.ac.uk
Other Researchers involved in this project: Dr. Emily Newman - Lecturer and Psychology of Mental Health Director (Emily.Newman@ed.ac.uk), Dr. Suzanne O'Rourke - Senior Lecturer in Forensic Clinical Psychology (Suzanne.O'Rourke@ed.ac.uk), Dr. Ethel Quayle - Professor and Chair, Clinical Psychology (Ethel.Quayle@ed.ac.uk).

About the Project

The project Digital Behaviors and Cognitions of Individuals Convicted of Online Child Pornography Offenses looks to understand the thoughts, beliefs, and behaviors of individuals convicted of child pornography offenses on the Internet and how they differ from those who have not offended. The research may be used to better understand the motivations and actions of individuals who have previously viewed online child pornography. Understanding the beliefs and behaviors of those who view child pornography may allow for more useful and compassionate interactions with mental health workers, investigators, and others who work with future offenders. Additionally, the research may clarify any public myths about those who view child pornography, and include the views of offenders on areas such as sex offender registries that may help shape future public policy. The data collected consists of two online surveys. The first survey collects responses from those who have not offended and contains basic demographic questions as well as questions on digital behaviors and beliefs about child

pornography. The second survey collects responses from individuals previously convicted of child pornography offenses and includes additional behavioral questions on their past actions.

What does participation involve?

Individuals who have been previously convicted of child pornography offenses will be asked to fill out a brief online survey that collects demographic information and asks questions about digital behaviors and about their beliefs and understanding of child pornography offenses as well as their prior use of technology related to child pornography and opinions about the investigative process. The survey is anonymous (your name and IP address will not be collected and won't be connected to the survey data) and consists of primarily multiple choice questions and a few short text questions, and should take approximately 25-30 minutes to complete. There is no follow-up contact or other action required of participants after completing the survey. Participants can abandon the survey and withdraw from the study at any point up until clicking the final submission by simply choosing not to continue. Individuals choosing to participate in the drawing for a gift card will only be contacted by sending the gift card information to a voluntarily provided email address.

Who is responsible for the data collected in this study?

This research is part of the doctoral research performed by Chad M.S. Steel in the Clinical Psychology program at the University of Edinburgh School of Health in Social Science, supervised by Dr. Emily Newman, Dr. Suzanne O'Rourke, and Dr. Ethel Quayle. All of the data collected by both surveys is anonymous. No identifying questions are asked, and no logging of network traffic is performed. While it is understood that no computer transmission can be perfectly secure, reasonable efforts will be made to protect the confidentiality of your transmission. The data will be maintained at the University of Edinburgh and made available permanently as part of their data archives for other researchers to use. Select questions that may contain responses that would provide details that would assist individuals searching for child pornography will be removed and available only upon request. The research was approved by the School of Health in Social Science Research Ethics Committee on 15 May 2020.

Are there any risks involved in this study?

All of the information provided in this study is anonymous. The survey has been built to involve minimal psychological risk. If you are experiencing distress or would like to speak to a local psychologist about any past or current behaviors, the American Psychological Association's locator service (https://locator.apa.org/) can help you identify a treatment provider near you. If you are having any immediate distress, you can call the toll-free National Helpline at 1-800-662-HELP (4357) to talk with a mental health professional. If at any point you feel a question is

upsetting and you do not wish to answer, you can close the survey and your responses will not be kept.

What are the benefits for taking part in this study?

There are no direct benefits to participants. Your participation may help researchers better understand online child pornography consumption. This is done by looking at your previous behavior for the purposes of treatment and deterrence, and may allow for more understanding-based investigations of future offenders. The overall goal is to reduce the victimization of children via child pornography.

What are your rights as a participant?

Taking part in the study is voluntary. You may choose not to take part at any point prior to final submission. The raw results of the survey will be available through the Edinburgh Data Archive. Published results and analyses may be available through multiple psychology journals. The publications will be made available to the degree permitted by journal policy in an openly searchable form in multiple locations, including the primary research investigator's page located at https://www.ed.ac.uk/profile/chad-m-s-steel.

Will I receive any payment or monetary benefits?

Participants will be provided the chance to win one of two $150 Amazon gift cards. The winners will be chosen randomly from all participants that choose to provide an email address through a separate, post-survey option. Providing an email address is voluntary and considered confidential, and is not linked to your survey responses in any way. Participant email addresses will only be stored until winners are selected, at which point they will be permanently deleted. The data will not be used by any member of the project team for commercial purposes. Therefore you should not expect any royalties or payments from the research project in the future.

For more information

This research has been reviewed and approved by the Edinburgh University Research Ethics Board. If you have any further questions or concerns about this study, please contact:

Name of researcher: Chad M.S. Steel

Full address: Chad M.S. Steel (% Dr. Emily Newman)Teviot Place, University of Edinburgh, Edinburgh

You can also contact Chad M.S. Steel's supervisor:

Name of researcher: Dr. Emily Newman

Full address: Teviot Place, University of Edinburgh, Edinburgh

Tel: +44 (0) 131 651 3945

What if I have concerns about this research?

If you are worried about this research, or if you are concerned about how it is being conducted, you can contact the University of Edinburgh School of Health in Social Science ethics committee at CAHSS.res.ethics@ed.ac.uk. Additionally, if you have any complaints regarding the research you may contact the Head of School, Professor Matthias Schwannauer, at hos.health@ed.ac.uk.

Do you consent to these terms?

O Yes

O No

End of Block: Consent

Start of Block: Demographics Basics/Universal

Which of the following best describes your sexual orientation?

O Heterosexual (straight)

O Homosexual (gay)

O Bisexual

O Other

O Prefer not to say

What is your age?

- O Under 18
- O 18 - 24
- O 25 - 34
- O 35 - 44
- O 45 - 54
- O 55 - 64
- O 65 or older

To which gender identity do you most identify?

- O Female
- O Male
- O Transgender Female
- O Transgender Male
- O Gender Variant/Non-Conforming
- O Prefer Not to Answer
- O Not Listed

At the present time, are you:

O Married

O Widowed

O Divorced

O Separated

O In a Domestic Partnership or Civil Union

O Single, but Cohabiting with a Significant Other

O Single, Never Married

O Other _____

What racial categories do you most identify with (please select one or more)?

☐ White or Caucasian

☐ Hispanic or Latino

☐ Black or African American

☐ American Indian or Alaska Native

☐ Asian

☐ Native Hawaiian or Pacific Islander

☐ Other _____

Which statement best describes your current employment status?

O Working (paid employee)

O Working (self-employed)

O Not working (temporary layoff from a job)

O Not working (looking for work)

O Not working (retired)

O Not working (disabled)

O Not working (other)

What is the highest level of schooling you have achieved?

O Less than high school diploma

O High school graduate (high school diploma or equivalent including GED)

O Some college but no degree

O Associate degree in college (2-year)

O Bachelor's degree in college (4-year)

O Master's degree

O Doctoral degree

O Professional degree (JD, MD)

Which of the following best describes the field in which you received your highest degree?

O Business

O Computer Science

O Education

O Engineering

O Government/Political Science

O Liberal Arts

O Nursing

O Physical Science

O Psychology

O Social Sciences

O Other _____

Please indicate your current occupation:

O Management, Business, and Financial

O Computer, Engineering, and Science

O Education, Legal, Community Service, Arts, and Media

O Healthcare Practitioners and Technical

O Service

O Sales and Related

O Office and Administrative Support

O Farming, Fishing, and Forestry

O Installation, Maintenance, and Repair

O Construction and Extraction

O Production

O Transportation and Material Moving

O Military

O Retired

O Unemployed

What is your total annual household income (in US Dollars - please enter only numbers)?

_____

End of Block: Demographics Basics/Universal

Start of Block: Technology Usage and Behaviors

Which technologies do you *currently* own (Select all that apply)?

- [ ] Apple iPad
- [ ] iMac
- [ ] MacBook/MacBook Pro/MacBook Air
- [ ] Apple iPhone 11 or Later
- [ ] Apple iPhone X or Earlier
- [ ] Apple Watch
- [ ] Apple HomePod
- [ ] Amazon Echo
- [ ] Amazon Kindle
- [ ] Android Smartphone
- [ ] Android Tablet
- [ ] Google Chromebook
- [ ] Microsoft Laptop
- [ ] Microsoft Desktop
- [ ] Linux Desktop/Laptop/Tablet
- [ ] Nintendo Switch
- [ ] Playstation 4 (original)
- [ ] Playstation 4 Pro
- [ ] XBox One (original or S)
- [ ] XBox One X

- [ ] Other eReader
- [ ] Other Smart Watch
- [ ] Google Home
- [ ] Cyberlocker (e.g. Microsoft OneDrive, DropBox, Google Drive)
- [ ] I own none of the above items

In a typical day, about how many personal emails do you send?

- O 0-10
- O 11-20
- O 21-30
- O 31-40
- O More than 40

On average, how quickly do you respond to emails from friends and relatives?

- O Within a few minutes
- O Within a few hours
- O Within a day
- O More than a day

What social media sites/apps have you used (Select all that apply)?

- [ ] Facebook
- [ ] Instagram
- [ ] Facebook Messenger
- [ ] Twitter
- [ ] Pinterest
- [ ] Reddit
- [ ] SnapChat
- [ ] WhatsApp
- [ ] Google Messenger
- [ ] Tumblr
- [ ] Discord
- [ ] Google Hangouts
- [ ] GroupMe
- [ ] Kik
- [ ] TikTok
- [ ] Telegram
- [ ] LINE
- [ ] WeChat

In a typical day, about how many instant messages (including text messages) do you send?

O 0-10

O 11-20

O 21-30

O 31-40

O More than 40

Please select your level of agreement with the following statements:

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I like to be with people	O	O	O	O	O
I welcome the opportunity to mix socially with people	O	O	O	O	O
I prefer working with others rather than alone	O	O	O	O	O
I find people more stimulating then anything else	O	O	O	O	O
I'd be unhappy if I were prevented from making many social contacts	O	O	O	O	O

How would you rate your adoption of new computing technology (smartphones, ereaders, tablets, laptops, home automation)?

- O Very High - you are an early adopter and own computing devices in all of the major areas (smartphones, ereaders, tablets, laptops, home automation)
- O High - you keep up with technology and own computing devices in all of the major technology areas. Some of the devices may be last year's model, but you stay within one generation of the current release.
- O Average - you own computing devices in most of the major technology areas, but hold off on purchases until technologies are mature and in widespread usage. You only upgrade devices when major new functionality is available.
- O Low - you own computing devices in several of the major technology areas, but are frequently the last of your friends to start using a new technology.
- O Very Low - you own very few computing devices. You upgrade only when the existing device breaks or is no longer supported.

How would others rate your computing ability?

- O Novice - little to no technical ability.
- O Casual User - ability to use most computer services and technologies without assistance.
- O Power User - you frequently use most computing technologies; Others consult you for computing advice.
- O IT/Computing Professional - your career is focused on configuring, managing, or maintaining networks, hardware, or software.
- O Computer Scientist - you develop new computing technologies or conduct peer-reviewed research into computing.

Which of the following actions have you ever taken (Select all that apply)?

- [ ] I have used whole disk encryption on my laptop or desktop
- [ ] I have encrypted individual files on one of my storage devices
- [ ] I have used a VPN service to hide my web activity
- [ ] I have used TOR to access content on the dark web
- [ ] I have used peer-to-peer software to download movies, images, or music
- [ ] I have formatted my hard drive or another storage device to delete content
- [ ] I have used secure wiping software to erase my hard drive or another storage device
- [ ] I have deleted my web browsing activity
- [ ] I have used In-Private or other browsing modes to hide my browsing activity
- [ ] I have created a social media account using a fake name
- [ ] I have created an email account using a fake name
- [ ] I have used steganography to hide content
- [ ] I have deleted or altered log files to hide my activity
- [ ] I have mislabeled a directory or a storage device to hide its contents
- [ ] I have used a cryptocurrency (e.g. Bitlocker, Etherium, Monero)
- [ ] I have used a virtual machine to hide my activities
- [ ] I have read message boards or forums on hiding my activities
- [ ] I have downloaded a guide on hiding my activities
- [ ] I have never taken any of these actions

In the past 12 months, which of the following have you experienced to the best of your knowledge (Select all that apply)?

- [ ] Malware was detected on my computer
- [ ] I have had one of my email accounts compromised
- [ ] I have had one of my social media accounts compromised
- [ ] I have been the victim of identity theft
- [ ] None of the above have occurred

Please select your level of agreement with the following statements:

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
The rules of behavior on the Internet are different from the physical world	O	O	O	O	O	O	O
There is more criminal behavior on the Internet than in the physical world	O	O	O	O	O	O	O
You can get away with behavior on the Internet that would be unacceptable in the physical world	O	O	O	O	O	O	O
It is easier to find illegal goods and services on the Internet than in the physical world	O	O	O	O	O	O	O
Most activity on the Internet is not monitored by law enforcement	O	O	O	O	O	O	O

Law enforcement cares less about Internet crimes than crimes in the physical world	O	O	O	O	O	O	O

End of Block: Technology Usage and Behaviors

Start of Block: Child Pornography Beliefs

Why do you think an individual would view child pornography?

_____

_____

_____

_____

Please indicate your agreement with the following statements:

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
Viewing child pornography is no different than viewing adult pornography	O	O	O	O	O	O	O
Viewing images of naked children where there is no display of the genitals should be illegal	O	O	O	O	O	O	O
The severity of the acts depicted in child pornography images should be taken into consideration in sentencing decisions	O	O	O	O	O	O	O
Viewing naked pictures of children for artistic (non-sexual) purposes is acceptable	O	O	O	O	O	O	O
Please select Somewhat Agree for this option!	O	O	O	O	O	O	O
Individuals that possess more images and videos should receive longer sentences than individuals with a few images and videos	O	O	O	O	O	O	O

Sentencing of child pornographers should be based on the age of the individuals depicted	O	O	O	O	O	O	O
Individuals who view child pornography should be registered as sex offenders	O	O	O	O	O	O	O
Viewing virtual images (lifelike animations and drawings) of children engaged in sexual activity should be illegal	O	O	O	O	O	O	O
Viewing child pornography online is not as bad as downloading and saving child pornography	O	O	O	O	O	O	O
Individuals who view child pornography are mentally ill and should be treated and not put into prison	O	O	O	O	O	O	O

Why would an individual who is interested in child pornography also view adult pornography (select all that apply)?

- [ ] They accidentally come across it while searching for child pornography
- [ ] They have a sexual interest in both adults and children
- [ ] They do not want to admit to an interest in children
- [ ] Adult pornography is more readily available
- [ ] Other _____

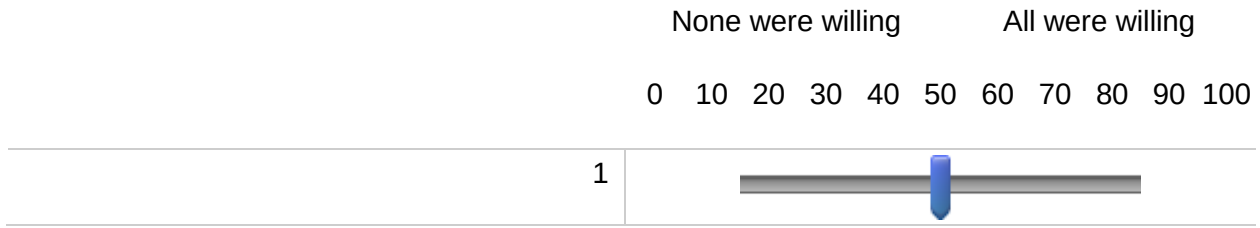
What percentage of individuals that view child pornography will have sexual contact with a child at some point?

	None will have sexual contact with a child										All will have sexual contact with a child
	0	10	20	30	40	50	60	70	80	90	100
1											

Which of the following statements do you most agree with about accidentally viewing images of child pornography?

- O Anyone can accidentally come across child pornography while browsing the web.
- O Individuals visiting mainstream adult websites may accidentally come across child pornography.
- O Individuals visiting less mainstream adult websites may accidentally come across child pornography.
- O Only individuals that actively seek out child pornography will find child pornography.

What percentage of children depicted in child pornographic images do you believe were willing participants in the activity pictured?



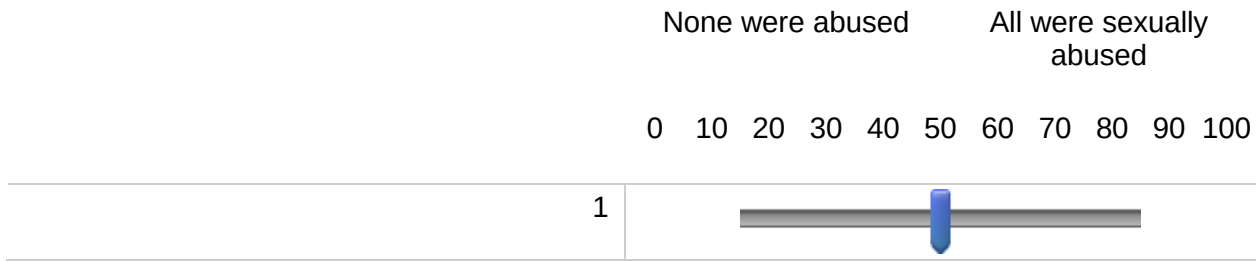
Which of the following statements do you most agree with?

O Viewing child pornography is directly responsible for creating child victims.

O Viewing child pornography is indirectly responsible for creating child victims.

O Viewing child pornography does not contribute to child victimization.

What percentage of individuals who view child pornography do you believe were sexually abused as children?



How difficult is it for individuals that view child pornography to stop?

O Extremely easy

O Moderately easy

O Slightly easy

O Neither easy nor difficult

O Slightly difficult

O Moderately difficult

O Extremely difficult

What percentage of individuals who view child pornography do you believe are pedophiles?

None are pedophiles All are pedophiles

0 10 20 30 40 50 60 70 80 90 100

1 

Please rank the following crimes from most severe to least severe (with 1 being the most severe and 9
being the least severe) [Items can be reordered by dragging them]:

_____ Aggravated Assault
_____ Arson
_____ Burglary (breaking and entering)
_____ Child pornography possession
_____ Criminal homicide
_____ Larceny/Theft (except auto)
_____ Motor vehicle theft
_____ Rape
_____ Robbery

What percentage of individuals convicted of child pornography offenses will go on to commit another child pornography offense after serving their sentence?

	None will re-offend 0 10 20 30 40 50 60 70 80 90 100 All will re-offend
1	

End of Block: Child Pornography Beliefs

Start of Block: Adult Pornography

For the questions below, sexually explicit material (SEM) is considered to be any pornographic and/or erotic images or movies depicting nude or semi-nude individuals, or individuals engaged in sexual activity, viewed for arousal purposes. Child SEM is considered to be any SEM containing at least one individual believed to be under the age of 18.

Which of the following categories of adult SEM have you viewed on at least one occasion (please select all that apply)?

- [ ] Japanese
- [ ] Lesbian
- [ ] Amateur
- [ ] Hentai
- [ ] MILF
- [ ] Ebony
- [ ] Anal
- [ ] Teen
- [ ] Bestiality
- [ ] Nudist/Naturist Images
- [ ] Teen
- [ ] Rape/Forced Sex
- [ ] I have never viewed pornography in any of the above categories

---

Have you ever paid for adult SEM?

- O Yes
- O No

Please select Somewhat Agree as your answer choice.

O Strongly disagree

O Disagree

O Somewhat disagree

O Neither agree nor disagree

O Somewhat agree

O Agree

O Strongly agree

---

*

How many years old were you when you first viewed adult SEM?

_____

End of Block: Adult Pornography

Start of Block: Investigative Efforts

Did you admit to your child pornography usage when confronted by investigators?

O Yes

O No

O I partially admitted my child pornography usage

What did the investigators do or say that caused you to admit your child pornography usage?

_____

_____

_____

_____

_____

What could investigators have done to make you more likely to have admitted your child pornography use?

_____

_____

_____

_____

_____

When thinking about your interaction with investigators, please rate your agreement with the following statements:

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
The investigators treated me fairly	O	O	O	O	O	O	O
The investigators showed an understanding of my child pornography viewing	O	O	O	O	O	O	O
The investigators were compassionate	O	O	O	O	O	O	O

Have you ever attended counseling or treatment as a result of your child SEM activities?

O Yes

O No

End of Block: Investigative Efforts

Start of Block: Child SEM Technical Behaviors

For the questions below, sexually explicit material (SEM) is considered to be any pornographic and/or erotic images or movies depicting nude or semi-nude individuals, or individuals engaged in sexual activity, viewed for arousal purposes. Child SEM is considered to be any SEM containing at least one individual believed to be under the age of 18.

Which of the following categories of child SEM have you viewed on at least one occasion (please select all that apply)?

- [ ] Japanese
- [ ] Lesbian
- [ ] Amateur
- [ ] Hentai
- [ ] MILF
- [ ] Ebony
- [ ] Anal
- [ ] Teen
- [ ] Bestiality
- [ ] Nudist/Naturist Images
- [ ] Teen
- [ ] Rape/Forced Sex
- [ ] I have never viewed child SEM in any of the above categories

---

Have you ever paid for digital child SEM?

- O Yes
- O No

Have you ever traded digital child SEM with others?

O Yes

O No

Have you ever taken pictures or videos of others that would be considered child SEM?

O Yes

O No

What devices have you used to ***store*** child SEM at any point in the past (check all that apply)?

- ☐ Cloud storage services (e.g. Google Drive, Dropbox)
- ☐ External USB thumb drives
- ☐ External USB hard drives
- ☐ CD/DVDs
- ☐ Smartphones
- ☐ Game consoles
- ☐ Tablets
- ☐ None of the above
- ☐ Other (please specify) _____

Why did you store child SEM on those devices?

_____

_____

_____

_____

_____

What devices have you used to ***access*** child SEM at any point in the past (check all that apply)?

- [ ] Smartphones
- [ ] Game consoles
- [ ] Tablets
- [ ] Laptop Computers
- [ ] Desktop Computers
- [ ] Other (please specify) _____
- [ ] None of the above

What is the most frequent website you visited related to child SEM?

_____

What is the name of the application you used most frequently to obtain child SEM?

_____

What are the three most common terms you have used to search for child SEM?

- [ ] Term 1 _____
- [ ] Term 2 _____
- [ ] Term 3 _____

---

*

How many years old were you when you first viewed child SEM?

_____

How many years old were you when you had your first sexual contact of any nature?

- O Age: _____
- O I have never had sexual contact with anyone

Did you ever consider yourself addicted to viewing child SEM?

- O Yes
- O No

Which technology did you use for your first exposure to CSEM?

O Traditional websites

O Dark web (using TOR)

O Peer-to-Peer software (BitTorrent, Shareaza, Ares, Kazaa)

O IRC (Internet Relay Chat)

O eMail

O Non-electronic (magazine, photograph, etc.)

O Other (please specify) _____

Thinking of all of the child SEM that you have ever viewed, what percentage was the child male/female?

	All Male / All Female
	0 50 100
1	

What percentage of the child SEM that you ever viewed was obtained using each the following technologies
(must equal 100)
eMail : _____
Internet Relay Chat : _____
Peer-to-Peer (e.g. BitTorrent, Shareaza, Ares, Kazaa) : _____
TOR-based services (e.g. Darknet websites) : _____
Traditional websites : _____
Instant messaging (WhatsApp, Text Messages, Facebook Messenger, etc.) : _____
Other : _____
Total : _____

When choosing a technology to obtain child SEM, how important were the following features?

	Not at all important	Slightly important	Moderately important	Very important	Extremely important
Anonymity	O	O	O	O	O
Ability to chat with others interested in child SEM	O	O	O	O	O
Ability to chat with children	O	O	O	O	O
Diversity of content available	O	O	O	O	O
Ease of use	O	O	O	O	O
Encryption	O	O	O	O	O
Familiarity based on past usage	O	O	O	O	O
Lack of Law Enforcement Presence	O	O	O	O	O
Message boards where I could post questions	O	O	O	O	O
Message boards where I could find links to child SEM	O	O	O	O	O
Previews for images/movies	O	O	O	O	O
Quantity of content available	O	O	O	O	O
Recommendations from child SEM forums	O	O	O	O	O
Search functionality	O	O	O	O	O
Speed	O	O	O	O	O

How did you generally go about finding child SEM?

_____

_____

_____

_____

_____

Did you ever delete your entire child SEM collection?

O Yes

O No

Why did you delete your child SEM collection?

_____

_____

_____

_____

_____

At your highest, approximately how many hours per week did you spend viewing child SEM?

O

O 1 - 3 Hours

O 4 - 6 Hours

O 7 - 9 Hours

O 10 or More Hours

At what locations have you ever viewed child SEM (Select all that apply)?

- [ ] Home
- [ ] Hotel/Motel
- [ ] Vehicle
- [ ] Work
- [ ] Other (Please list all) _____

Thinking of all the child SEM you have ever viewed, what percentage were images rather than videos?

	All Images 0	50	All Videos 100
1			

*

What is the maximum number of child SEM **videos** you possessed at any one time?

_____

*

What is the maximum number of child SEM **images** you possessed at any one time?

_____

How did you organize child SEM on your computer [please select all that apply]?

- ☐ All in the same directory
- ☐ By the age of the individual portrayed
- ☐ By the acts performed
- ☐ By how much I like the content
- ☐ I only viewed content, I didn't download it
- ☐ Other (please specify) _____

In total, what percentage of the SEM content you have ever viewed was child SEM and what percentage was adult SEM?

	All child SEM 0 50 100 All adult SEM
1	

---

*

What percentage of the child SEM that you have viewed was in each age range below (must equal 100)?
0 - 2 years of age : _____
3 - 5 : _____
6 - 8 : _____
9 - 11 : _____
12 - 14 : _____
15 - 17 : _____
Total : _____

Did you start viewing adult SEM or child SEM first?

O I started viewing adult SEM first

O I started viewing child SEM first

O I viewed both adult and child SEM starting at approximately the same time

---

Did you ever try and collect all of the images in a given series/for a given individual pictured?

O Yes

O No

Which of the following actions have you taken *specifically related to child SEM* (Select all that apply)?

- [ ] I have used whole disk encryption on my laptop or desktop
- [ ] I have encrypted individual files on one of my storage devices
- [ ] I have used a VPN service to hide my web activity
- [ ] I have used TOR to access content on the dark web
- [ ] I have used peer-to-peer software to download movies, images, or music
- [ ] I have formatted my hard drive or another storage device to delete content
- [ ] I have used secure wiping software to erase my hard drive or another storage device
- [ ] I have deleted my web browsing activity
- [ ] I have used In-Private or other browsing modes to hide my browsing activity
- [ ] I have created a social media account using a fake name
- [ ] I have created an email account using a fake name
- [ ] I have used steganography to hide content
- [ ] I have deleted or altered log files to hide my activity
- [ ] I have mislabeled a directory or a storage device to hide its contents
- [ ] I have used a cryptocurrency (e.g. Bitlocker, Etherium, Monero)
- [ ] I have used a virtual machine to hide my activities
- [ ] I have never taken any of these actions

Please indicate your agreement with each of the statements below as to why you took the actions above:

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
To reduce my anxiety about getting caught	O	O	O	O	O	O	O
To remain anonymous	O	O	O	O	O	O	O
To hide my activities from a spouse or significant other	O	O	O	O	O	O	O
To hide my activities from law enforcement if caught	O	O	O	O	O	O	O
To hide my activities from other individuals	O	O	O	O	O	O	O
To reduce my risk of getting caught	O	O	O	O	O	O	O

Before you were approached by investigators, how likely did you believe it was that you would be caught?

O Extremely unlikely

O Moderately unlikely

O Slightly unlikely

O Neither likely nor unlikely

O Slightly likely

O Moderately likely

O Extremely likely

Did you ever have sexual contact with an adult when you were younger than 16?

O Yes

O No

Since turning 18, how old is the youngest individual you have had any sexual contact with?

_____

If the opportunity presented itself, how likely would you be to have sexual contact with someone

under
the age of 18?

O Extremely unlikely

O Moderately unlikely

O Slightly unlikely

O Neither likely nor unlikely

O Slightly likely

O Moderately likely

O Extremely likely

Have you ever viewed child SEM in non-digital form (e.g. magazines, photos)?

O Yes

O No

Since your conviction, which best describes your viewing of child SEM?

O I only viewed it once or twice but did not continue doing so

O I have viewed it very infrequently

O I have viewed it frequently

O I have viewed it on a regular basis

O I have not viewed any since my conviction

End of Block: Child SEM Technical Behaviors

Start of Block: Suicidal Thoughts and Behaviors

Please rate your feelings immediately after you found out you were under investigation for child pornography offenses:

	Rarely or none of the time	Some or a little of the time	Occasionally or a moderate amount of the time	Most or all of the time
I thought about killing myself	O	O	O	O
I had thoughts about death	O	O	O	O
I thought my family and friends would be better off if I were dead	O	O	O	O
I felt that I would kill myself if I knew a way	O	O	O	O

Did you attempt suicide at any point after you found out you were under investigation for child pornography offenses?

O Yes

O No

What could investigators have said to you to reduce your thoughts of suicide?

_____

_____

_____

_____

_____

Please rank your concerns at your time of arrest in order from most concerning to least concerning (with 1 being the most concerning and 7 being the least concerning) [Items can be reordered by dragging them]:

_____ Being registered as a sex offender
_____ Going to prison
_____ Losing my collection of child SEM
_____ Losing my job
_____ My family finding out what I did
_____ My friends finding out what I did
_____ The public finding out what I did

If investigators provided you with a contact point to talk to a medical professional about suicide, how
likely is it that you would have contacted that individual or organization?

O Extremely unlikely

O Moderately unlikely

O Slightly unlikely

O Neither likely nor unlikely

O Slightly likely

O Moderately likely

O Extremely likely

End of Block: Suicidal Thoughts and Behaviors

Start of Block: Gift Card Drawing

Would you like to enter the drawing for a chance to win one of two $150 Amazon gift cards?

O Yes

O No

End of Block: Gift Card Drawing

Appendix F - Ethics Approval

SCHOOL *of* HEALTH IN SOCIAL SCIENCE

The University of Edinburgh
Medical School
Doorway 6, Teviot Place
Edinburgh EH8 9AG

Telephone 0131 651 3969
Fax 0131 650 3891

Dear Chad Steel,

Application for Ethical Approval
Reference: CLIN701
Project Title: Digital Behaviours and Cognitions of Individuals Convicted of Online Child Pornography Offenses

Thank you for submitting the above research project for review by the School of Health in Social Science Research Ethics Committee (REC). I can confirm that the submission has been independently reviewed and was approved on 15th May 2020.

The standard conditions of this approval are:
I. Conduct the project strictly in accordance with the proposal submitted and granted ethics approval, including any amendments made to the proposal required by the REC.
II. Advise the REC (by email to ethics.hiss@ed.ac.uk) of any complaints or other issues in relation to the project which may warrant review of the ethical approval of the project.
III. Make submission for approval of amendments to the approved project before implementing such changes.
IV. Advise in writing if the project has been discontinued.

The School's Research Ethics Policy and further information and resources are available on the School's website.

You may now commence your project; we wish you the best of luck.

Yours sincerely,

Sanni Ahonen

Administrative Secretary
School of Health in Social Science

Appendix G - CSEM Technology Behaviours Self-Assessment and Structured Interview Questionnaire

For the questions below, sexually explicit material (SEM) is considered to be any pornographic and/or erotic images or movies depicting nude or semi-nude individuals, or individuals engaged in sexual activity, viewed for arousal purposes. Child SEM is considered to be any SEM containing at least one individual believed to be under the age of 18.

Self-Assessment Questionnaire

Developmental

1. Have you ever had sexual contact?
    a. How old were you when you had your first sexual contact?
2. Did you ever have sexual contact with an adult when you were younger than 16?
3. How old were you when you first viewed any SEM?
4. How old were you when you first viewed any CSEM?

Breadth of Consumption

1. Which categories of SEM have you ever viewed?
    a. Amateur
    b. Anal
    c. Bestiality
    d. Ebony
    e. Hentai
    f. Japanese
    g. Lesbian
    h. MILF
    i. Nudist/Naturist Images
    j. Pre-teen
    k. Rape/Forced Sex
    l. Teen

2. Please rank your level of stimulation for each category from 1 to X (with 1 being the most stimulating):
    a. Amateur
    b. Anal
    c. Bestiality
    d. Ebony
    e. Hentai
    f. Japanese
    g. Lesbian
    h. MILF
    i. Nudist/Naturist Images
    j. Pre-teen
    k. Rape/Forced Sex
    l. Teen

3. What percentage of the child SEM that you have viewed was in each age range below (must equal 100)?
    a. 0 - 2
    b. 3 - 5
    c. 6 - 8
    d. 9 - 11
    e. 12 - 14
    f. 15 - 17

4. What percentage of the CSEM that you ever viewed was in each of the following formats (must equal 100):
    a. Text-based stories
    b. Still images
    c. Movies

Technological Behaviours

1. Which primary virtual space did you use to access CSEM?
    a. Traditional websites
    b. Dark web (using TOR)
    c. Peer-to-Peer software (BitTorrent, Shareaza, Ares, Kazaa)
    d. IRC (Internet Relay Chat)
    e. eMail
    f. Instant Messaging/Chat Clients
    g. Non-electronic (magazine, photograph, etc.)
    h. Other (please specify)

2. Which other virtual spaces have you used to access CSEM (select all that apply)?
    a. Traditional websites
    b. Dark web (using TOR)
    c. Peer-to-Peer software (BitTorrent, Shareaza, Ares, Kazaa)
    d. IRC (Internet Relay Chat)
    e. eMail
    f. Instant Messaging/Chat Clients
    g. Non-electronic (magazine, photograph, etc.)
    h. Other (please specify)

3. What devices did you use to access child SEM at any point in the past (check all that apply)?
    a. Smartphones
    b. Game consoles
    c. Tablets
    d. Laptop Computers
    e. Desktop Computers
    f. Other (please specify)

4. What devices did you use to store child SEM at any point in the past (check all that apply)?
    a. Cloud storage services (e.g. Google Drive, Dropbox)
    b. External USB thumb drives/hard drives
    c. CD/DVDs
    d. Smartphones
    e. Game consoles
    f. Tablets
    g. None of the above
    h. Other (please specify)

5. At what locations have you ever viewed child SEM (Select all that apply)?
    a. Home
    b. Hotel/Motel
    c. Vehicle
    d. Work

6. How often did you view CSEM?
    a. Daily
    b. Weekly
    c. Monthly
    d. Less frequently than Monthly

Structured Interview

Developmental

1. [If the individual indicated they had a sexual contact] Tell me about your first sexual contact.
2. Were you ever physically abused while growing up?
3. Were you ever sexually abused while growing up?

4. Tell me about your first experience with SEM.
    a. What made you seek out the SEM?
    b. How did you go about accessing that SEM?
5. Tell me about your first experience with CSEM.
    a. What made you seek out the CSEM?
    b. How did you go about accessing that CSEM?

Breadth of Consumption

1. What categories of CSEM content did you generally exclude from your viewing?
    a. Why?
2. What age ranges did you generally exclude from your viewing?
    a. Why?
3. [If a mix of different media was indicated] What made stories/videos/images preferable over stories/videos/images for you?
4. Do you more frequently return to known CSEM for stimulation or seek out new CSEM?

Technological Behaviours

1. Did you generally view CSEM as part of an existing routine or in response to triggers?
    a. What triggers you to start viewing CSEM?
    b. How have you resisted each of these triggers in the past?
2. How did you go about finding CSEM as part of these routines?
    a. Did you generally start with adult SEM or go directly to CSEM?
    b. How did you transition from adult SEM to CSEM?
3. [For each of the virtual spaces] How did you start using that virtual space?
    a. Why did you choose that virtual space?
    b. What devices did you use to access that space?
    c. Where did you use those devices?
    d. When did you use those devices?
    e. What applications did you use to enter those virtual spaces?

f. How did you protect your identity in those virtual spaces?

4. [For each storage device] What CSEM did you choose to store on that device?
    a. Did you store any of the CSEM that you viewed?
    b. Where did you keep that device?
    c. How did you hide your CSEM activities on that device?