Lawless Space Theory for Online Child Sexual Exploitation Material Offending
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Abstract

Deterrence, treatment and legal responses to online child sexual exploitation material (CSEM) offenders is enhanced by the joint consideration of technological behaviours and cognitions. CSEM offenders choose an environment based on both psychosocial needs and utility, and in turn that environment shapes future behaviour and reinforces cognitive distortions. This paper introduces lawless space theory, which posits that offenders will primarily choose and utilize 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. The theory offers explanatory power for the lifecycle of a lawless space, the use of legacy spaces in the presence of objectively more capable options, the simultaneous use of multiple spaces to meet different psychosexual needs, and the adoption of new technologies by offenders. Additionally, the gateway choice and progression of lawless space usage informs investigations, risk assessments, and deterrence efforts and provides behavioural treatment targets.

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

The Lawless Space Theory for Online Child Sexual Exploitation Material Offending

1. Introduction

There are well established, comprehensive theories of sexual offending (Finkelhor, 1984; Hall & Hirschman, 1992; Marshall & Barbaree, 1990; T. Ward & Beech, 2006; T. Ward & Siegert, 2002) and general criminological theories that have been applied to Internet and child sexual offences (Jaishankar, 2011; Jewkes & Yar, 2013; Leukfeldt & Yar, 2016; Wortley & Smallbone, 2006) but research has identified differences between traditional contact sex offenders and Internet-only Child Sexual Exploitation Material (CSEM) offenders, who tend to be less antisocial and to have greater technology access to facilitate offending (Babchishin et al., 2015; Elliott et al., 2013; McCarthy, 2010). In an effort to reconcile these, problematic Internet use and cyber criminology have been incorporated into prior work (Beech et al., 2008; Elliott & Beech, 2009) and resulted in new theories dealing primarily with online CSEM offenders (Beech et al., 2008; Quayle & Taylor, 2003; Seto, 2019). The current theories generally address motivation, however they do not provide explanations with adequate face validity for all of the technological behaviours seen in CSEM offenders. These include offenders continuing to use outdated technologies when objectively better technologies are available (Steel et al., 2020a), their limited use of encryption and other countermeasures (Eneman, 2009), their usage of platforms that are regularly monitored by law enforcement (Liberatore et al., 2010; Wolak et al., 2014), and their utilization of high risk ecosystems. The lack of explanatory power within existing frameworks for these observed behaviours by CSEM offenders provides an opening for a new theoretical approach.

This paper introduces Lawless Space Theory (LST), a new model for understanding the technological behaviours of online child sexual exploitation material (CSEM) offenders. Understanding CSEM offenders' technological behaviours is important for deterrence efforts (Quayle & Koukopoulos, 2019; Steel, 2015), for treatment planning and implementation (Quayle & Taylor, 2002b), and to better inform the legal response (Hamilton, 2011; Jewkes & Andrews, 2005; Steel, 2014; T. Ward, 2019; Wells et al., 2007). 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. LST looks specifically at the intersection between the virtual environment created by the use of technologies (and the physical spaces where they occur) and the motivated cognitions that reflexively interact to facilitate online CSEM offending. Offenders affect their environment, but are also affected by it through mechanisms such as habituation (a decreased response to a stimulus through repeated exposure) and differential association (the learning of criminal behaviour through interaction with others). The choice of and interactions with a lawless space are summarized in Figure 1 below.

Figure 1. Lawless space interactions

This work presents LST in detail, identifying how combining the cognitions and technology choices of CSEM offenders can better explain their observed behaviours. The theoretical basis for LST based on relevant, existing sex offender and criminological theories, along with behavioural neuroscience and economic theories is then presented. The specific areas of these theories applicable to LST are highlighted, as are the gaps in current theoretical approaches. Finally, practice implications for operationalizing the theory as well as a methodology for testing LST are proposed.

2. Lawless Space Theory

The American Wild West is often held up as the canonical example of a lawless space (O’Roardon, 2004), presented through movies and literature as being rife with criminality, with limited oversight by law enforcement. 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 parts of it may be so in both perception and reality¹.

While the Internet as a whole is not a lawless space, there are virtual subsets of the Internet that are *in effect* lawless. On the dark net, 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), whereas sexual assaults, which have historical low rates of reporting, are estimated as having a reporting rate of 35% (105 out of every 300) (Langton et al., 2012). 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, the perceived lawless spaces facilitated differential association, and normalized 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 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

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

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). As an example of the cyber effects of informal capable guardianship, a warning banner (Maimon et al., 2014) was found to reduce the duration of malicious behaviour (hacking) when displayed on compromised systems.

Different lawless spaces have different barriers to entry, both technological and social. At one end of the spectrum, an individual using a peer-to-peer application for other purposes (e.g. downloading music) can easily search for CSEM using lay terms (e.g. “young boy sex”) without needing any specific skills or prior associations. At the other extreme, closed dark net forums may require the installation and use of more complex technologies (e.g. Tor and Bitcoin), and may require the submission of illegal content obtained a priori (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 provides explanatory power for the initial choice of and continued usage of a particular lawless space. Specifically, LST 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 factors that are involved in the choice of and usage of lawless spaces are detailed below.

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 (Brown et al., 2018; McManus et al., 2011) and in understanding 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 (e.g. an individual may avoid live streaming to facilitate a Virtual is Not Real distortion) and interacting in that space may enhance future offense supportive cognitions (e.g. supporting

minimization beliefs by comparing their behaviour to that of others). 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 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 based on the options that they have knowledge of (which may evolve over time, both through learning about existing options and through the advancement of new technologies). 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. Additionally, the persistence of illegal content, both CSEM and non-CSEM (e.g. illicit drug marketplaces, pirated content, stolen identities, etc.), can serve as a signalling 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 and may be reinforcing of their specific cognitive distortions. 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 1 below.

Financial Costs	
<i>Direct</i>	<i>Indirect</i>
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	
<i>Direct</i>	<i>Indirect</i>
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	
<i>Direct</i>	<i>Indirect</i>
Habituation to viewed content	Discrepancies between self-identity and conduct
	Discrepancies between societal expectations and conduct
	Anxiety over detection

Table 1. Example friction costs of CSEM transactions

When choosing an ecosystem, offenders will seek to minimize friction costs. This can be done by utilizing easier-to-use software with a quick 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). The friction costs are not

necessarily the same for all offenders, and understanding the friction costs is important for deterrence in that they provide both a mechanism and a framework for interventions.

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 child pornography, 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, 2002a), 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 is different from extinction (which is the disappearance of a behaviour due to a lack of reinforcement) in that it is a change in emotional

state and perception that 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. The ambiguity around the perceived likelihood of being caught may also have an effect - Loughran et al. found that “ambiguity had an independent deterrent effect in the lower ranges of detection risk but encouraged offending for higher perceived detection probabilities” (T. A. Loughran et al., 2011, p. 1054) in non-victim contact crimes. This may have implications for specific lawless spaces and individual offenders’ perceptions of using that space related to their differing levels of perceived ambiguity of detection.

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). On 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 there is younger or more extreme content available - 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 proximal thoughts that allow justification immediately prior to an offence for the current browsing session but also reinforces post-hoc thoughts that justify past behaviours from prior offences (Szumski et al., 2018).

CSEM offenders may 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, and Dalins et al. (2018) found that 2% of dark net CSEM sites were education and training related. Outside of direct learning, vicarious learning through observing others can occur. Learning the terminology associated with content of interest can happen 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.

2.3 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.

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 another 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). TAM provides a theoretical basis for users' adoption (or non-adoption) of technologies, and has been one of the most widely influential models in understanding information systems usage (Lee et al., 2003). 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 the 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).

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 net forums and message groups in encrypted mobile applications like WhatsApp provide more modern interfaces and advanced functionality, including better anonymity controls, yet Usenet persists as a CSEM distribution mechanism (A. Carr, 2004; IWF, 2018). Longitudinal studies have not been performed tracking individual CSEM offender technology usage (only aggregate usage), but LST 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, non-offending usage.

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 (e.g. using encrypted storage) (Turvey, 2014). Many countermeasures, including encryption and onion routing can be implemented at zero financial cost. 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 (Balfe et al., 2015). 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. Preliminary research by Fortin and Proulx (2019) looked at four pathways of changes over time in the viewing behaviour of offenders and found de-escalation to be a viable, though infrequently taken, pathway. Alternatively, it can occur through normalization of activities (as noted above) or through the use of countermeasures. LST posits that as dissonance decreases over time, the need for (and value of) countermeasures are reduced, helping to 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).

TAM, noted above, provides a further potential explanation for the limited usage of countermeasures (Balfe et al., 2015), as well as the low recidivism rates of CSEM offenders. Individuals in other online domains who have had negative experience with cybercrime have been shown to adopt an avoidance strategy rather than a protectionist strategy (Riek et al., 2017). By comparison, CSEM offenders who are caught may be more likely to avoid future offending than to deploy countermeasures, and current offender research looking at countermeasure usage may show a two-factor survivor bias - potential offenders who are concerned about risk may avoid offending to begin with instead of attempting to mitigate risk through technical means, and those that implement extreme countermeasures may never be caught and counted.

3. Theoretical Basis for Lawless Space Theory

Relevant, current child sex offender and criminological theories that underpin LST (or are complementary to it) 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). In addition to the child sex offender and criminological theories, there has been recent interest in both the neuroeconomic and the biological basis for CSEM offending (and general paedophilic sexual offending) (Babchishin et al., 2019). The relevant portions of neuroscience and economics that underpin LST are presented as a basis for the theory.

2.1 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).

Ward and Siegert's (2002) pathways model is a level 1 theory, the most comprehensive under Ward and Hudson's framework (1998). The pathways model seeks to identify all primary pathways for offending behaviour, both proximal and distal, and provides a more macro-level view of that behaviour, while incorporating causal factors. Two specific concepts from the pathways model are particularly relevant to Internet CSEM offenders: situational factors and

cognitive distortions. The pathways model focuses primarily on state-based situational factors (such as proximal substance abuse) and cues or triggers. Similar script-based models have been applied to the move from online to contact offending (Fortin et al., 2018), but to apply the concepts to Internet-based CSEM 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).

Middleton et al. (2006), in one of the few studies to apply pathways to Internet child sex offences, found that 60% of Internet child sex offenders had dysfunctional psychological mechanisms, with emotional dysregulation (35%) being the most common pathway. Individuals associated with that pathway “evidenced high levels of emotional loneliness. None reported high levels of difficulty controlling negative emotions and none reported high levels of cognitive distortions about children and sex” (Middleton et al., 2006, p. 597).

The ITSO offers potentially greater explanatory power than prior theories by incorporating neurobiological factors, and has been reviewed in the context of Internet 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). ITSO further expands on prior theories by incorporating 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 are 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 (T. Ward & Beech, 2006). Proximal environmental factors include physical environmental influences, and Ward and Beech (2006) argue that, if strong enough, environment can lead to offending even without the presence of other psychological factors. Their work has been applied to online sexual offenders (Beech & Elliott, 2012; Elliott & Beech, 2009), with the proximal ecological niche evaluated in the context of problematic Internet usage.

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. Additionally, they note that acquisition of CSEM provides immediate stimulus-response based reinforcement, which is facilitated by perceptions of anonymity and ease of content acquisition. This has been applied to other Internet-based sexual offenses as well. 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 also 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 with routine interactions with like-minded individuals through 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 and the improvement of content acquisition skills (Quayle & Taylor, 2003). Cognitive distortions, or implicit theories, 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).

The Internet as a whole is too broad to be viewed as a monolithic 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 psychosexual needs), as is presented in LST. Each particular ecosystem functions similarly to the global microstructures proposed for terrorist cells by Knorr-Cetina (2005), exhibiting emergent order that evolves over time. Some of those virtual ecosystems can display criminogenic qualities (Taylor, 2015; Taylor & Quayle, 2008), facilitating the transacting of CSEM and making them perceived lawless spaces. These lawless spaces can differ greatly - 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 within the CSEM offender population, and LST provides a basis for those interactions and a proposed method to test their validity.

2.2 Internet and General Criminological Theories

General criminological theories that have been applied to Internet criminality more widely (Jaishankar, 2011; Jewkes & Yar, 2013) can specifically be applied to online CSEM activity. Rational choice theory (Becker, 1968), routine activity theory (Cohen & Felson, 1979), situational crime prevention (R. V. G. Clarke, 1997), and social learning theory (Bandura &

Walters, 1977) are all consistent with LST, and provide a contextual and motivational grounding for criminological behaviours explained by LST.

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 preferences, with criminal behaviour being consistent with rational decision making in specific contexts (Thomas A. Loughran et al., 2016; Taylor & Quayle, 2006). In CSEM offenses, the positive value of their actions, i.e. the benefits, can be viewed as the use of pornography to activate the reward mechanisms in the brain (Hilton & Watts, 2011; K. K. Pitchers et al., 2010; Kyle K. 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 amongst offenders (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 endorsement 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). Under LST, this can include benefits

such as the speed of content acquisition, the amount of content available, the ease of use, and familiarity, and can 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). Although traditional post-hoc cognitive distortions associated with general sex offenders show low endorsement (Steel et al., 2020b), the cognitive state of offenders when actively engaged in a lawless space and in a state of arousal may differ (Van Gelder, 2013). Ariely and Lowenstein (2006), for example, found that individuals who were in an aroused state reported higher potential attraction to a hypothetical pre-teen.

As an illustration of the impact of a lawless space, 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 more risky, with tools such as CPS and RoundUp actively used by law enforcement to monitor activity, and peer-to-peer arrests are frequently featured in the media, though high profile arrests have not been shown to have a deterrence effect in other online crimes such as virtual drug marketplaces (Ladegaard, 2018). 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, however, 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 that increase the amount of time needed to search for and download content (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. Looking at the psychological factors, perceived anonymity is important in reducing stress (Eneman, 2009), and frequency of exposure leads to normalization (Popham, 2018) and a decrease in learned fear (Feather, 1963). There has, however, been minimal research 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 (Cohen & Felson, 1979). Rational actors (offenders) choose to be in a particular place and 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 consumers, 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 (i.e. capable guardian) 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. 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 primarily 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). Cohen-Almagor (2013), however, applied it convincingly to CSEM offending, highlighting the concept of virtual communities and focusing on deterrence strategies.

Routine activity theory incorporates timing as well - the environment outside a pub at 2 AM has a different potential for criminality than 2 PM. The timing aspect for CSEM offenses is equally relevant, though 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 choice of that particular pathway for offending. Under LST, prior users of IRC may continue to use that channel, but new users are less likely to adopt it as their primary lawless space.

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), and situational crime prevention has been applied to crimes against children focusing on deterrence. 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), and its five core principles, “Increase the effort, Increase the Risks, Reduce the Rewards, Reduce Provocations, and Remove Excuses” (Freilich & Newman, 2015, p. 214) are directly applicable to CSEM offending. Wortley and Smallbone (2006) identified four environmental factors that can facilitate CSEM 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)

Wortley (2012) further expanded on this concept, emphasizing environmental conditions that may cause opportunistic consumption. 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. More recently, situational crime prevention has been suggested as an approach for physical spaces that may be high risk related to CSEM (Krone et al., 2020).

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”. 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 technological constraints 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. LST provides a basis for the explanation of these environment choices, consistent with the extant criminological theories noted above.

2.3 Neurological and Behavioural Economics Theories

Neuroeconomics looks at offending from a behavioural economics viewpoint and incorporates the neuroscience of learning. The incorporation of biomarkers as a predictive or diagnostic tool are beyond the scope of this research, 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).

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, ranging from alterations of the dopaminergic response in the reward systems to neuroanatomical changes in the prefrontal cortex. In another review, Chamberlain et al. (2016) looked at behavioural addiction in general, as well as hypersexual behaviour and Internet addiction in particular. While there were similar dopaminergic responses to reward in these behavioural addictions when compared to substance addictions, there were also differences noted, in particular with the lack of withdrawal and tolerance effects.

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). Perry et al. (2014) identified reward seeking behaviour, including that in hypersexual behaviour related to adult sexual exploitation material, as 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).

Of particular interest to searching behaviour, the *anticipation* of a reward 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 (such as an orgasm), with the level of activation related to the potential value placed on the reward (Kirsch et al., 2003). Additionally, 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).

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, a sexual attraction limited to individuals of specific age ranges, 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 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) nor the trajectories of offending as LST does, 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 “behavioural 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). CSEM offenders’ continued use of risky or outdated technologies when objectively more capable options are available is consistent with Thaler’s work.

Within the CSEM environment, finding content that drives the reward system and encourages normalization contributes further toward reinforcing the status quo. The economic concept of friction costs is applicable to CSEM offender behaviour in LST and 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.

4. Discussion

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.

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 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). No similar mechanisms are present on peer-to-peer systems, 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, 2018) commensurate with the drop in web search activity noted above (Steel, 2015).

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 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. (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 (Steel et al., 2020b). 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 the technological behaviours through 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).

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 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 content from the offender, as well as disrupting their electronic ecosystem may reduce the risk of re-offending. 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 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 lawless space theory, 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.

4.4 Test Methodology

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.

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 (2019) 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 (Steel et al., 2020a), 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 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.

5. Conclusions

Current theories of online CSEM offending are a subset of sex offender, criminological, neuroeconomic, and behavioural theories. This work introduced LST, which is consistent with earlier macro theories but provides a focused lens on the technology choices and behaviours of online CSEM offenders. Specifically, LST 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 to 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.

While the basis for the general theory has been established based on existing work, additional research is needed to quantify areas of LST. The specific psychosocial needs of offenders and how those map to the choice of lawless spaces should be further explored. Additionally, longitudinal studies on the changes in technology usage by individual CSEM offenders, as opposed to population changes, would provide additional clarity on the criteria and direction of changes. Although the theory is proposed for CSEM offences, it is potentially

generalizable to other online activities such as digital piracy and digital identity theft as future work.

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