Aggression and Violent Behavior 51 (2020) 101375

Contents lists available at ScienceDirect

Aggression and Violent Behavior

journal homepage: www.elsevier.com/locate/aggviobeh

A systematic review of cognitive distortions in online child sexual exploitation material offenders☆

Chad M.S. Steel[a,b,*], Emily Newman[a], Suzanne O'Rourke[a], Ethel Quayle[a]

[a] University of Edinburgh, Teviot Place, EH8 9AG, UK
[b] George Mason University, Fairfax, VA, USA

ARTICLE INFO

Keywords:
Child pornography
Online offender
Child sexual exploitation material
Cognitive distortion

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 largely 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.

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, Johansson, Lardén, & Dernevik, 2011) to drug use (Kirisci, Tarter, Vanyukov, Reynolds, & Habeych, 2004) and to sexual offenses (Pornari, Dixon, & Humphreys, 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, Becker, & Cunningham-Rathner, 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, Sijtsema, & Bogaerts, 2014), in investigative efforts (Steel, 2014), in risk assessments (Garrington, Chamberlain, Rickwood, & Boer, 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

☆ This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.
* Corresponding author at: MS 2B5, George Mason University, Fairfax, VA 22030, USA.
E-mail address: c.m.s.steel@sms.ed.ac.uk (C.M.S. Steel).

https://doi.org/10.1016/j.avb.2020.101375
Received 29 September 2019; Received in revised form 10 January 2020; Accepted 13 January 2020
Available online 23 January 2020
1359-1789/ Published by Elsevier Ltd.

their behaviour before, during, and after committing an offense (Szumski, Bartels, Beech, & Fisher, 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, Reid, Buckley, & Jayne, 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 Jr. & Ennis, 2004), offense supportive beliefs (Mann, Webster, Wakeling, & Marshall, 2007) and attitudes (Helmus, Hanson, Babchishin, & Mann, 2013), implicit theories (Bartels & Merdian, 2016; Bartels, Rowland, Merdian, & Perkins, 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 et al. (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 and 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, Ward, Beech, & Pattison, 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 offenses. Their proposed conceptualization included:

- *Unhappy World*. Unhappy world cognitions are related to the physical world and are similar to Dangerous World cognitions, 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, Curtis, Thakker, Wilson, & Boer, 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, Gough, & Seymour-Smith, 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, Craissati, & Keen, 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.* cOffending 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, Holland, Linehan, & Taylor, 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, Gudjonsson, & Burns, 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 Loewenstein'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. 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

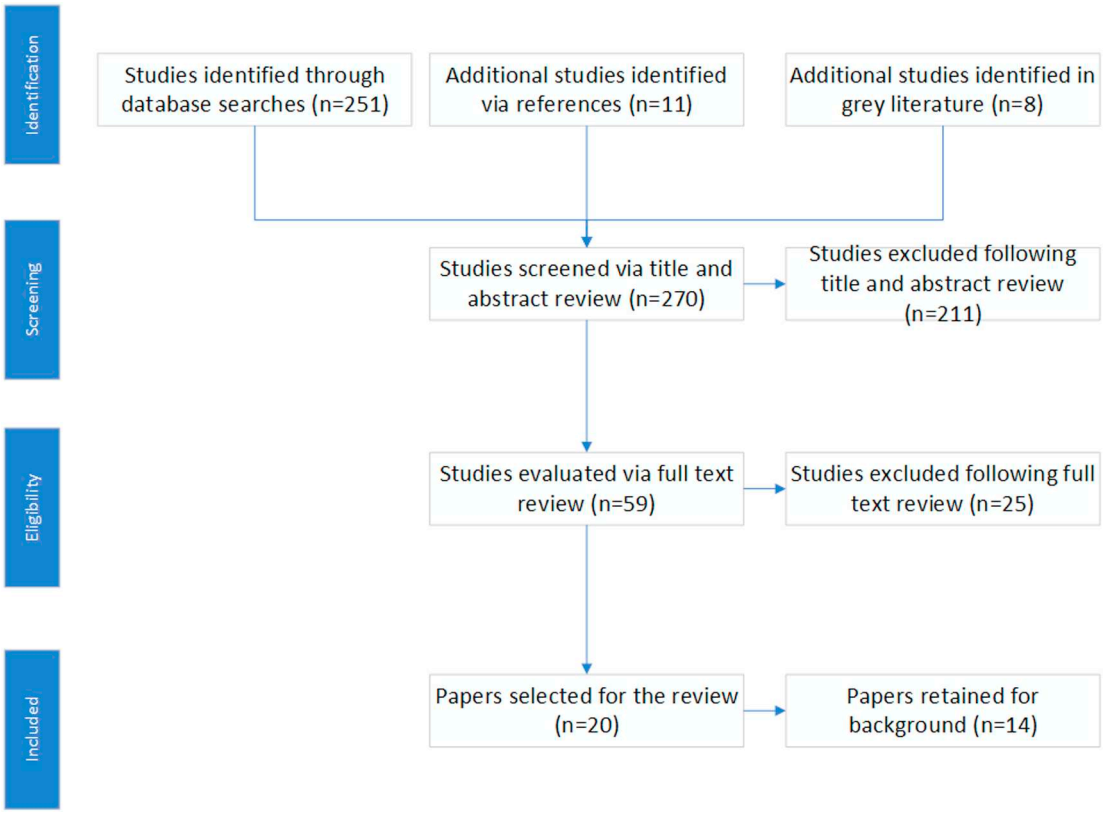

Fig. 1. Review methodology and selection summary.

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 Fig. 1 utilizing the SPIDER methodology (Cooke, Smith, & Booth, 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, Finkelhor, Mitchell, & Jones, 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, Nunes, & Kessous, 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

Table 1
- Study composition and endorsement levels.

Study	n	Population	Internet/ contact/ mixed	Type of study	Instruments	Type of reporting	Control group	Key findings
(Bailey, Bernhard, & Hsu, 2016)	1102	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, Beech, Mandeville-Norden, & Hayes, 2009)	1031	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 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, Beech, & Mandeville-Norden, 2013)	1128	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, Mandeville-Norden, Hayes, & Egan, 2010)	422	Adult male offenders post-conviction pre-treatment	Internet	Survey	VEDS, CSCQ (modified)	Self w/Deception Check	Internal Clusters	Moderate endorsement (subgroup). Three clusters of offenders were identified. The "deviant" 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 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, 2012)	68	Adult male offenders from both treatment centres and prisons	Internet/ Contact/ Mixed	Survey	C&SA	Self	Contact/Mixed	Low endorsement. No 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, Wilson, & Thakker, 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 centres and prisons	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.
(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[a]	Low endorsement. Significantly lower justification-related distortions compared to contact-driven offenders. Internet-only offenders had moderate endorsement of not being sex offenders.
(Neutze, Grundmann, Scherner, & Beier, 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-voluntary treatment	Internet	Interviews	Custom	Thematically coded qualitative responses	N/A	High endorsement. Cognitive distortions on nature of harm were 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/Deception 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.[b]

(*continued on next page*)

Table 1 (*continued*)

Study	n	Population	Internet/ contact/ mixed	Type of study	Instruments	Type of reporting	Control group	Key findings
(Rimer, 2017)[e]	81	Adult male offenders in group and individual sessions as part of a treatment programme	Internet	Interviews and Observations	N/A	Thematically coded qualitative responses	N/A	Moderate endorsement. Participant endorsement of online offenses being different from offline (compartmentalization); Most justification was related to environment and lack of boundaries online as opposed to direct distortion.
(Seto, Reeves, & Jung, 2010)	50/34[c]	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 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.[d]

[a] (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".

[b] (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.

[c] (Seto et al., 2010) included two samples - the first were police interviews and the second clinical interviews.

[d] (Winder et al., 2015; Winder & Gough, 2010) both used the same dataset, but a different analysis, and are included for comparison purposes.

[e] (Rimer, 2019) is part of the same study and contains additional details of relevance, but was not counted separately.

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 Fig. 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 0.25, moderate distortions having a rate between 0.25 and 0.5, and strong endorsements having a rate above 0.5 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.

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 0.89 and test-retest reliability of 0.95 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 0.90 and a test-retest reliability of 0.77 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 0.97 and a test-rest reliability of 0.84, and the RAPE scale had an alpha of 0.96 and a test-retest reliability of 0.86 (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 0.7 and the overall test-retest reliability was measured as 0.76.

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 (0.88) with all subscales above 0.80.

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 (0.96).

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 (0.93) (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 (0.90) (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.

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 Keenan (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, Hanson, & VanZuylen, 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 et al., 2015; Winder & Gough, 2010). 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 amongst 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, Keown, & Polaschek, 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, Marshall, & Kingston, 2011). Others have noted that understanding cognitive distortions is essential for treatment (Ward, Hudson, Johnston, & Marshall, 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 and Merdian (2017) used the existing framework from Ward and Keenan (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 and Merdian (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 et al., 2015; Winder & Gough, 2010), 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, Di Bella, & Purver, 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, Mandeville-Norden, & Hayes, 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 $n = 1128$ (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, Alison, & McManus, 2013; Seto, Hanson, & Babchishin, 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 Loewenstein (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., 2011; Evers, de Ridder, & Adriaanse, 2009), 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.

References

Abel, G. G., Becker, J. V., & Cunningham-Rathner, J. (1984). Complications, consent, and cognitions in sex between children and adults. *International Journal of Law and Psychiatry, 7*(1), 89–103.

Abel, G. G., Gore, D. K., Holland, C. L., Camps, N., Becker, J. V., & Rathner, J. (1989). The measurement of the cognitive distortions of child molesters. *Annals of Sex Research, 2*(2), 135–152.

Ariely, D., & Loewenstein, G. (2006). The heat of the moment: The effect of sexual arousal on sexual decision making. *Journal of Behavioral Decision Making, 19*(2), 87–98.

Babchishin, K. M., Hanson, R. K., & VanZuylen, H. (2015). Online child pornography offenders are different: A meta-analysis of the characteristics of online and offline sex offenders against children. *Archives of Sexual Behavior, 44*(1), 45–66.

Babchishin, K. M., Nunes, K. L., & Kessous, N. (2014). A multimodal examination of sexual interest in children: A comparison of sex offenders and nonsex offenders. *Sexual Abuse: A Journal of Research and Treatment, 26*(4), 343–374.

Bailey, J. M., Bernhard, P. ., & Hsu, K. J. (2016). An internet study of men sexually attracted to children: Correlates of sexual offending against children. *Journal of Abnormal Psychology, 125*(7), 989–1000.

Bartels, R. M., & Merdian, H. L. (2016). The implicit theories of child sexual exploitation material users: An initial conceptualization. *Aggression and Violent Behavior, 26*, 16–25.

Bartels, R. M., Rowland, R., Merdian, H. L., & Perkins, D. (2016, September 7). *Identifying the implicit theories of child sexual exploitation material users: findings from interview data.* Bi-annual conference of the International Association for the Treatment of sexual offenders, Rigshospitalet, University Hospital of Copenhagen. http://eprints.lincoln.ac.uk/24671.

Beck, A. T. (1963). Thinking and depression. *Idiosyncratic content and cognitive distortions. Archives of General Psychiatry, 9*, 324–333.

Beckett, R. C. (1987). *The children and sex questionnaire.* (In Unpublished manuscript).

Beckett, R. C., & Fisher, D. (1994). Assessing victim empathy: A new measure. *13th Annual Conference of the Association for the Treatment of Sexual Abusers, San Francisco*.

Beech, A. R. (1998). A psychometric typology of child abusers. *International Journal of Offender Therapy and Comparative Criminology, 42*(4), 319–339.

Beier, K. M., Grundmann, D., Kuhle, L. F., Scherner, G., Konrad, A., & Amelung, T. (2015). The German Dunkelfeld project: A pilot study to prevent child sexual abuse and the use of child abusive images. *The Journal of Sexual Medicine, 12*(2), 529–542.

Blumenthal, S., Gudjonsson, G., & Burns, J. (1999). Cognitive distortions and blame attribution in sex offenders against adults and children. *Child Abuse & Neglect, 23*(2), 129–143.

Bourke, M. L., & Hernandez, A. E. (2009). The "Butner study"redux: A report of the incidence of hands-on child victimization by child pornography offenders. *Journal of Family Violence, 24*(3), 183.

Bumby, K. M. (1996). Assessing the cognitive distortions of child molesters and rapists: Development and validation of the MOLEST and RAPE scales. *Sexual Abuse: A Journal of Research and Treatment, 8*(1), 37–54.

Carr, A. (2006). *Internet censorship offending: A preliminary analysis of the social and behavioural patterns of offenders.* Bond University.

Cooke, A., Smith, D., & Booth, A. (2012). Beyond PICO: The SPIDER tool for qualitative evidence synthesis. *Qualitative Health Research, 22*(10), 1435–1443.

Cortoni, F., & Marshall, W. L. (2001). Sex as a coping strategy and its relationship to juvenile sexual history and intimacy in sexual offenders. *Sexual Abuse: A Journal of Research and Treatment, 13*(1), 27–43.

Crowne, D. P., & Marlowe, D. (1960). A new scale of social desirability independent of psychopathology. *Journal of Consulting Psychology, 24*, 349–354.

Elliott, I. A. (2012). *Psychological characteristics of users of child pornography on the internet D_ph.* University of Birmingham http://etheses.bham.ac.uk/id/eprint/2822/.

Elliott, I. A., Beech, A. R., & Mandeville-Norden, R. (2013). The psychological profiles of internet, contact, and mixed internet/contact sex offenders. *Sexual Abuse: A Journal of Research and Treatment, 25*(1), 3–20.

Elliott, I. A., Beech, A. R., Mandeville-Norden, R., & Hayes, E. (2009). Psychological profiles of internet sexual offenders: Comparisons with contact sexual offenders. *Sexual Abuse: A Journal of Research and Treatment, 21*(1), 76–92.

Evers, C., de Ridder, D. T. D., & Adriaanse, M. A. (2009). Assessing yourself as an emotional eater: Mission impossible? *Health Psychology: Official Journal of the Division of Health Psychology. American Psychological Association, 28*(6), 717–725.

Evers, C., Stok, F. M., Danner, U. N., Salmon, S. J., de Ridder, D. T. D., & Adriaanse, M. A. (2011). The shaping role of hunger on self-reported external eating status. *Appetite, 57*(2), 318–320.

Gannon, T. A., Keown, K., & Polaschek, D. L. L. (2007). Increasing honest responding on cognitive distortions in child molesters: The bogus pipeline revisited. *Sexual Abuse: A Journal of Research and Treatment, 19*(1), 5–22.

Gannon, T. A., & Polaschek, D. L. L. (2005). Do child molesters deliberately fake good on cognitive distortion questionnaires? An information processing-based investigation. *Sexual Abuse: A Journal of Research and Treatment, 17*(2), 183–200.

Gannon, T. A., & Polaschek, D. L. L. (2006). Cognitive distortions in child molesters: A re-examination of key theories and research. *Clinical Psychology Review, 26*(8), 1000–1019.

Gannon, T. A., & Ward, T. (2009). Cognitive distortions "debate": Introductory note. *Journal of Sexual Aggression, 15*(3), 223–224.

Garrington, C., Chamberlain, P., Rickwood, D., & Boer, D. P. (2018). Risk assessment of online child abuse material (CAM) offenders: A review of existing tools. *Journal of Criminal Psychology, 8*(2), 150–161.

Hammond, S. (2004). The challenge of sex offender assessment: The case of internet offenders. *Child Sexual Abuse and the Internet: Tackling the New Frontier,* 85–97.

Helmus, L., Hanson, R. K., Babchishin, K. M., & Mann, R. E. (2013). Attitudes supportive of sexual offending predict recidivism: A meta-analysis. *Trauma, Violence & Abuse, 14*(1), 34–53.

Henry, O., Mandeville-Norden, R., Hayes, E., & Egan, V. (2010). Do internet-based sexual offenders reduce to normal, inadequate and deviant groups? *Journal of Sexual Aggression, 16*(1), 33–46.

Hong, Q. N., Pluye, P., Fàbregues, S., Bartlett, G., Boardman, F., Cargo, M., … Others (2018). *Mixed methods appraisal tool (MMAT).* version 2018. Industry Canada: IC Canadian Intellectual Property Office http://mixedmethodsappraisaltoolpublic.pbworks.com/w/file/fetch/127916259/MMAT_2018_criteria-manual_2018-08-01_ENG.pdf.

Houtepen, J. A. B. M., Sijtsema, J. J., & Bogaerts, S. (2014). From child pornography offending to child sexual abuse: A review of child pornography offender characteristics and risks for cross-over. *Aggression and Violent Behavior, 19*(5), 466–473.

Howell, M. J. (2018). Implicit theories of child sexual exploitation material users: can they differentiate those also at risk of contact offending? [ir.canterbury.ac.nz] https://ir.canterbury.ac.nz/handle/10092/16354.

Howitt, D., & Sheldon, K. (2007). The role of cognitive distortions in paedophilic offending: Internet and contact offenders compared. *Psychology, Crime & Law: PC & L, 13*(5), 469–486.

Inbau, F., Reid, J., Buckley, J., & Jayne, B. (2011). *Criminal interrogation and confessions.* Jones & Bartlett Publishers.

Jerde, R. D. (2017). Follow the silk road: How internet affordances influence and transform crime and law enforcement. Naval Postgraduate School Monterey United States https://apps.dtic.mil/docs/citations/AD1053310.

Kettleborough, D. G., & Merdian, H. (2013). *The development of the children, internet, and sex cognitions scale (CISC): Understanding the cognitions of child pornography offenders. Presentation at the NOTA Conference.* September: Cardiff.

Kettleborough, D. G., & Merdian, H. L. (2017). Gateway to offending behaviour: Permission-giving thoughts of online users of child sexual exploitation material. *Journal of Sexual Aggression., 23*(1), 19–32. https://www.tandfonline.com/doi/abs/

10.1080/13552600.2016.1231852.
Khanna, R. (2013). *The interaction of cognitive distortions and substance abuse on internet contact child sex offenders and internet non-contact child sex offender*Long Island University https://search-proquest-com.ezproxy.is.ed.ac.uk/pqdtglobal/docview/1517857739/C262039552CD4CC3PQ/6?accountid=10673.
Kirisci, L., Tarter, R. E., Vanyukov, M., Reynolds, M., & Habeych, M. (2004). Relation between cognitive distortions and neurobehavior disinhibition on the development of substance use during adolescence and substance use disorder by young adulthood: A prospective study. *Drug and Alcohol Dependence, 76*(2), 125–133.
Lanning, K. V. (1987). *Child molesters: A behavioral analysis. ERIC: For Law-Enforcement Officers Investigating Cases of Child Sexual Exploitation.* https://eric.ed.gov/?id=ED307532.
Long, M. L., Alison, L. A., & McManus, M. A. (2013). Child pornography and likelihood of contact abuse: A comparison between contact child sexual offenders and noncontact offenders. *Sexual Abuse: A Journal of Research and Treatment* https://journals.sagepub.com/doi/abs/10.1177/1079063212464398.
Malesky, L. A., Jr., & Ennis, L. (2004). Supportive distortions: An analysis of posts on a pedophile internet message board. *Journal of Addictions & Offender Counseling, 24*(2), 92–100.
Mann, R. E., & Beech, A. R. (2003). *Cognitive distortions, schemas, and implicit theories.* Issues and Controversies: Sexual Deviance135–153.
Mann, R. E., Webster, S., Wakeling, H., & Marshall, W. (2007). The measurement and influence of child sexual abuse supportive beliefs. *Psychology, Crime & Law: PC & L, 13*(5), 443–458.
Marshall, W. L., Marshall, L. E., & Kingston, D. A. (2011). Are the cognitive distortions of child molesters in need of treatment? *Journal of Sexual Aggression, 17*(2), 118–129.
Maruna, S., & Mann, R. E. (2006). A fundamental attribution error? Rethinking cognitive distortions. *Legal and Criminological Psychology, 11*(2), 155–177.
Marziano, V., Ward, T., Beech, A. R., & Pattison, P. (2006). Identification of five fundamental implicit theories underlying cognitive distortions in child abusers: A preliminary study. *Psychology, Crime & Law: PC & L, 12*(1), 97–105.
McCarthy, J. A. (2010). *The relationship between possessing child pornography and child molestation.* [City University of New York] http://search.proquest.com/openview/b99912bcf12a4c291c1cb5cebfb39d20/1?pq-origsite=gscholar&cbl=18750&diss=y.
McWhaw, A. (2011). *Online child pornography offenders and risk assessment: How online offenders compare to contact offenders using common risk assessment variables.* [ruor.uottawa.ca] https://www.ruor.uottawa.ca/handle/10393/20193.
Merdian, H. L. (2012). *Offenders who use child sexual exploitation material: Development of an integrated model for their classification, assessment, and treatment.* University of Waikato https://researchcommons.waikato.ac.nz/handle/10289/6566.
Merdian, H. L., Curtis, C., Thakker, J., Wilson, N., & Boer, D. P. (2014). The endorsement of cognitive distortions: Comparing child pornography offenders and contact sex offenders. *Psychology, Crime & Law: PC & L, 20*(10), 971–993.
Merdian, H. L., Moghaddam, N., Boer, D. P., Wilson, N., Thakker, J., Curtis, C., & Dawson, D. (2018). Fantasy-driven versus contact-driven users of child sexual exploitation material: Offender classification and implications for their risk assessment. *Sexual Abuse: A Journal of Research and Treatment, 30*(3), 230–253.
Merdian, H. L., Wilson, N., & Thakker, J. (2013). So why did you do it?": Explanations provided by Child Pornography Offenders. *Sexual Offender, 8*(1), 1–9 http://eprints.lincoln.ac.uk/11331/1/Explanations2013.pdf.
Mews, A., Di Bella, L., & Purver, M. (2017). *Impact evaluation of the prison-based core sex offender treatment programme.* (Ministry of Justice London).
Middleton, D., Mandeville-Norden, R., & Hayes, E. (2009). Does treatment work with internet sex offenders? Emerging findings from the internet sex offender treatment Programme (i-SOTP). *Journal of Sexual Aggression, 15*(1), 5–19.
Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., & PRISMA Group (2010). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *International Journal of Surgery, 8*(5), 336–341.
Neutze, J., Grundmann, D., Scherner, G., & Beier, K. M. (2012). Undetected and detected child sexual abuse and child pornography offenders. *International Journal of Law and Psychiatry, 35*(3), 168–175.
Nilsson, M. (2009). *Perceptions of a sample of convicted offenders of child pornography receiving treatment at a community-based therapeutic programme in Cape Town.* South Africa: Western Cape. http://muep.mau.se/handle/2043/8481.
Nunes, K. L., & Jung, S. (2013). Are cognitive distortions associated with denial and minimization amongst sex offenders? *Sexual Abuse: A Journal of Research and Treatment, 25*(2), 166–188.
Ó Ciardha, C., & Ward, T. (2013). Theories of cognitive distortions in sexual offending: What the current research tells us. *Trauma, Violence & Abuse, 14*(1), 5–21.
O'Brien, M. D., & Webster, S. D. (2007). The construction and preliminary validation of the internet Behaviours and attitudes questionnaire (IBAQ). *Sexual Abuse: A Journal of Research and Treatment, 19*(3), 237–256.
O'Halloran, E., & Quayle, E. (2010). A content analysis of a "boy love" support forum: Revisiting Durkin and Bryant. *Journal of Sexual Aggression, 16*(1), 71–85.
Paquette, S. (2018). Les cognitions soutenant la cyberdélinquance sexuelle commise envers les enfants leur rôle. https://papyrus.bib.umontreal.ca/xmlui/bitstream/handle/1866/21602/Paquette_Sarah_2018_these.pdf?sequence=3&isAllowed=y.
Paulhus, D. L. (1998). *Paulhus deception scales (PDS): The balanced inventory of desirable responding-7: user's manual.* NY: Multi-Health Systems North Tanawanda.
Pornari, C. D., Dixon, L., & Humphreys, G. W. (2018). A preliminary investigation into a range of implicit and explicit offense supportive cognitions in perpetrators of physical intimate partner violence. *Journal of Interpersonal Violence, 886260518755487.*
Quayle, E., Holland, G., Linehan, C., & Taylor, M. (2000). The internet and offending behaviour: A case study. *Journal of Sexual Aggression, 6*(1–2), 78–96.
Quayle, E., & Taylor, M. (2001). Child seduction and self-representation on the internet. *Cyberpsychology & Behavior: The Impact of the Internet, Multimedia and Virtual Reality on Behavior and Society, 4*(5), 597–608.
Quayle, E., & Taylor, M. (2002). Child pornography and the internet: Perpetuating a cycle of abuse. *Deviant Behavior, 23*(4), 331–361.
Quayle, E., & Taylor, M. (2003). Model of problematic internet use in people with a sexual interest in children. *Cyberpsychology & Behavior: The Impact of the Internet, Multimedia and Virtual Reality on Behavior and Society, 6*(1), 93–106.
Quayle, E., & Taylor, M. (2004). *Child pornography: An internet crime.* Routledge.
Rimer, J. R. (2017). Internet sexual offending from an anthropological perspective: Analysing offender perceptions of online spaces. *Journal of Sexual Aggression, 23*(1), 33–45.
Rimer, J. R. (2019). "In the street they're real, in a picture they're not": Constructions of children and childhood amongst users of online child sexual exploitation material. *Child Abuse & Neglect, 90*, 160–173.
Schaefer, G. A., & Feelgood, S. (2011). *Empathy for children scale. In The handbook of sexuality related measures (pp. 7–12)*London: Routledge.
Seto, M. C., & Eke, A. W. (2015). Predicting recidivism amongst adult male child pornography offenders: Development of the child pornography offender risk tool (CPORT). *Law and Human Behavior, 39*(4), 416–429.
Seto, M. C., Hanson, R. K., & Babchishin, K. M. (2011). Contact sexual offending by men with online sexual offenses. *Sexual Abuse: A Journal of Research and Treatment, 23*(1), 124–145.
Seto, M. C., Reeves, L., & Jung, S. (2010). Explanations given by child pornography offenders for their crimes. *Journal of Sexual Aggression, 16*(2), 169–180.
Steel, C. (2014). *Digital child pornography: A practical guide for investigators.* Lily Shiba Press.
Steel, C. (2015). Web-based child pornography: The global impact of deterrence efforts and its consumption on mobile platforms. *Child Abuse & Neglect, 44*, 150–158.
Szumski, F., Bartels, R. M., Beech, A. R., & Fisher, D. (2018). Distorted cognition related to male sexual offending: The multi-mechanism theory of cognitive distortions (MMT-CD). *Aggression and Violent Behavior, 39*, 139–151.
Taylor, M. (1999). The nature and dimensions of child pornography on the internet. *Combating Child Pornography on the Internet, Vienna, 29.*
Taylor, M., & Quayle, E. (2003). *Child pornography: An internet crime.* Psychology Press.
Van Boven, L., & Loewenstein, G. (2003). Social projection of transient visceral feelings. *Personality & Social Psychology Bulletin. 9*, 1159–1168.
Wallinius, M., Johansson, P., Lardén, M., & Dernevik, M. (2011). Self-serving cognitive distortions and antisocial behavior amongst adults and adolescents. *Criminal Justice and Behavior, 38*(3), 286–301.
Ward, T., Hudson, S. M., Johnston, L., & Marshall, W. L. (1997). Cognitive distortions in sex offenders: An integrative review. *Clinical Psychology Review, 17*(5), 479–507.
Ward, T., & Keenan, T. (1999). Child molesters' implicit theories. *Journal of Interpersonal Violence, 14*(8), 821–838.
Webb, L., Craissati, J., & Keen, S. (2007). Characteristics of internet child pornography offenders: A comparison with child molesters. *Sexual Abuse: A Journal of Research and Treatment, 19*(4), 449–465.
Winder, B., & Gough, B. (2010). "I never touched anybody—that's my defence": A qualitative analysis of internet sex offender accounts. *Journal of Sexual Aggression, 16*(2), 125–141.
Winder, B., Gough, B., & Seymour-Smith, S. (2015). Stumbling into sexual crime: The passive perpetrator in accounts by male internet sex offenders. *Archives of Sexual Behavior, 44*(1), 167–180.
Wolak, J., Finkelhor, D., Mitchell, K. J., & Jones, L. M. (2011). Arrests for child pornography production: Data at two time points from a national sample of US law enforcement agencies. *Child Maltreatment, 16*(3), 184–195.
Wood, E., & Riggs, S. (2009). Adult attachment, cognitive distortions, and views of self, others, and the future amongst child molesters. *Sexual Abuse: A Journal of Research and Treatment, 21*(3), 375–390.
Young, K. S. (2007). Cognitive behavior therapy with internet addicts: Treatment outcomes and implications. *Cyberpsychology & Behavior: The Impact of the Internet, Multimedia and Virtual Reality on Behavior and Society, 10*(5), 671–679.
Yurica, C. L., & DiTomasso, R. A. (2005). Cognitive distortions. In A. Freeman, S. H. Felgoise, C. M. Nezu, A. M. Nezu, & M. A. Reinecke (Eds.). *Encyclopedia of Cognitive Behavior Therapy* (pp. 117–122). US: Springer.