


Correspondence of Child Age and Gender Distribution in Child Sexual Exploitation Material and Other Child Content With Age and Gender of Child Sexual Assault Victims

Sexual Abuse
2022, Vol. 0(0) 1–23
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DOI: 10.1177/10790632221108951
journals.sagepub.com/home/sax


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Abstract

Accessing child sexual exploitation material (CSEM; *child pornography* in legal statutes) can indicate sexual interest in children. It logically follows then that the age and gender of the depicted children may reflect specific interests in those age/gender groups, and if so, may correspond to age and gender of any known contact offending victims. We had data on CSEM characteristics and child victims for 71 men convicted of CSEM offenses who also had contact sexual offenses against children; some had also sexually solicited children online. Sixty-four men had 134 prior or concurrent child victims, and 14 men reoffended directly against 17 children during follow-up. There were significant, positive associations (with moderate to large effect sizes) between age and gender of children depicted in CSEM and age and gender of child contact or solicitation victims. Examining future offending, though with only 14 recidivists, all men who sexually reoffended against a girl had more girl CSEM content, and all men who sexually reoffended against a boy had more boy CSEM content. Our results suggest that CSEM characteristics can reflect child preferences. This information can be relevant in clinical

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settings, police investigations, and community risk management, though it does not rule out interest in, or offending against, victims of other ages or gender. We discuss these findings in the context of other evidence regarding victim cross-over, and suggest future research.

Keywords

child sexual exploitation material, child pornography, contact victims, gender, age

People tend to seek out content that is sexually interesting to them in terms of gender, age category, and activity, and this includes child sexual exploitation material (CSEM) (see [Bártová et al., 2021](#); [Glasgow, 2010](#); [Vogels & Sullivan, 2019](#)). Up to half of CSEM perpetrators admit they are sexually aroused by CSEM and/or sexually interested in children ([Seto & Eke, 2015](#); [Seto et al., 2010](#)), though CSEM use does not automatically mean sexual interest ([Quayle, 2020](#)) as some users state different motivations such as curiosity or novelty-seeking ([Seto et al., 2010](#); [Steel et al., 2021](#)). Individuals who use CSEM often report attitudes that support the sexualisation of children (see [Paquette & Cortoni, 2020](#)). Research has demonstrated that a majority of CSEM perpetrators show greater genital sexual arousal to children than to adults in the laboratory, and this is a higher proportion than individuals who have committed contact sexual offenses against children without any known CSEM offending ([Seto et al., 2006](#)). Building on this, those with both CSEM and contact sexual offenses against children demonstrate the highest rates of pedophilia (sexual interest in prepubescent children) and are identified as a subgroup that differ from non-contact CSEM users (see [Babchishin et al., 2015](#); [Dombert et al., 2016](#)).

There is some research indicating that characteristics of individuals' CSEM collections can suggest sexual interest in children. For example, the Correlates of Admission of Sexual Interest in Children (CASIC) scale includes items relating to breadth and extent of interest in CSEM (evidence of interest spanning two or more years; accessing CSEM video; accessing CSEM text, such as stories) and has been shown to be a helpful proxy measure for admission or diagnosis of pedophilia and/or hebephilia (sexual interest in pubescent children) ([Seto & Eke, 2017](#)). While helpful in assessing overall sexual interest, CASIC does not indicate whether the ages or genders of children in CSEM content align with age or gender preferences. Intuitively, one would expect CSEM content to reflect specific interests in age category or gender; for example, we would expect men who are sexually interested in boys to preferentially seek CSEM content depicting boys, and to offend against boys, if they commit contact offenses. We are aware of only one study that has examined this correspondence. [Owens et al. \(2016\)](#) examined police data available for 59 men who had committed both CSEM and contact offenses. In their analysis, all of the 18 men who had CSEM exclusively depicting boys had directly offended against boys exclusively, and 28 of the 30 men who had CSEM exclusively depicting girls had directly offended against girls exclusively; the other 2

offended against both girls and boys. The associations were not as strong for age category but also held, for example, 21 of the 29 men who exclusively had CSEM depicting prepubescent children had offended against a prepubescent child.

Some individuals who access CSEM also engage in online sexual solicitation of children, sometimes referred to as “luring.” Currently, there is limited information in the literature about this overlap. In a sample of individuals with online sexual solicitation offenses, [Wolak and Finkelhor \(2013\)](#) reported over half produced CSEM as part of their solicitation offending (e.g., asked youth to share images); when examining CSEM downloaded from the internet, approximately 20% had accessed this material. [Seto and Eke \(2015\)](#) found 10% of individuals in a sample of CSEM offenders also engaged in online sexual solicitation of youth. It is not yet known if characteristics of luring targets correspond with the characteristics of children represented in the CSEM these individuals access.

There are practical benefits of this knowledge. If CSEM and other child content is indicative of the likely victims this person would target if they were to directly offend against children, then it is helpful as a starting point in investigating possible prior offending and in considerations for risk management to prevent future victims. This logic underpins [Seto’s \(2019\)](#) motivation-facilitation model, which posits that sexual offenses are more likely to occur if someone is sexually motivated to commit the offense (and trait or state factors facilitate acting on that motivation). Thus, individuals who have pedophilia or hebephilia are at greater risk of sexual offenses involving children ([Seto, 2019](#)). It follows that individuals who are attracted to a specific gender, for example boys, would pose a relatively greater risk to boys than girls; similarly, those who are attracted to prepubescent children might pose a relatively greater risk to prepubescent children than to infants or to older adolescents. Understanding correspondence also has practical benefits within clinical practice; significant associations between CSEM characteristics and child victim characteristics support the use of CSEM as an additional source of clinical data for understanding a person’s sexual interests.

As stated, these associations are relative as it is known that some individuals demonstrate cross-over in relationship type (i.e., intra vs. extra-familial offending) as well as the age and gender of the children they sexually abuse and therefore present a differential risk to children with different characteristics. Among individuals with multiple child victims, cross-over of victim age may be more common than cross-over with gender (e.g., up to half of individuals reported cross-over for age and a fifth for cross-over for gender; see [Abel et al., 1988](#); [Saramago et al., 2020](#); [Sim & Proeve, 2010](#)). Looking at this more specifically, cross-over with gender may be more common among individuals targeting younger children ([Levenson et al., 2008](#)), a finding supported in a large sample of men recruited on the internet who self-reported pedophilic/hebephilic preferences (see [Bailey et al., 2016](#)). The percentages of cross-over can differ based on sampling and research methods, including the source for data collection. Higher percentages of cross-over may be more commonly reported in studies involving self-report ([Abel et al., 1988](#); [Heil et al., 2003](#); [Sim & Proeve, 2010](#))

including the use of polygraph (e.g., [English et al., 2003](#)). Greater stability of victim type may be more commonly reported in studies involving official data such as investigative and criminal records (e.g., [Cann et al., 2007](#)). [Scurich and Gongola \(2021\)](#) conducted a meta-analysis of 47 studies examining contact offending (total $N = 35,572$ perpetrators) and found 19% of perpetrators had both child and adult victims ($k = 43$), 15% had both male and female victims ($k = 20$) and 20% had both related and unrelated victims ($k = 21$). In addition, there is some long-standing evidence that cross-over may reflect opportunities to offend (e.g., a lack of access to a preferred target; [Freund et al., 1972](#)). Knowledge regarding the correspondence between an individuals' CSEM and the characteristics of their actual child victims is an important contribution to these discussions.

Current Study

The current study examined the correspondence between the age and gender of children in CSEM content and contact child victims among a sample of individuals who have directly offended against children. Some CSEM offending individuals also had known prior luring offenses in which they engaged in the online sexual solicitation of youth and/or undercover police officers posing as youth. Applying similar logic as used in discussing the feasibility of overlap between CSEM and contact victims, we included a specific hypothesis relating to correspondence between CSEM characteristics and luring victims.

We separated our analyses based on two time frames. The first time frame relates to child contact or luring perpetration that occurred at the same time or prior to a CSEM offense (we will define this CSEM offense as the *index* offense in the Methods). Although this information will provide evidence of the correspondence between CSEM and child victims, it does not reveal the direction of this association; specifically, does CSEM predict contact victim characteristics or do the characteristics of contact victims predict CSEM content? To better understand this relationship, we also examine perpetration that occurred after the index CSEM offending, to assess whether CSEM content is associated with the characteristics of future child victims. In line with the motivation-facilitation model, we predicted: (1) CSEM content as well as other child content¹ will be significantly associated with the age and gender of known child victims up to and including contact offending at the index charges (*past* contact sexual offending); (2) CSEM content as well as other child content will be significantly associated with the age and gender of luring victims and/or minor personas adopted by undercover officers posing as children, up to and including luring offenses at the index charges (*past* luring offending) and, (3) CSEM content as well as other child content will predict age and gender of child victims in post-index cases (*future* contact sexual offending).

Method

Sample

The initial sample consisted of 372 adult men convicted of one or more CSEM offenses. The investigation case files were from the samples reported in [Seto and Eke \(2015\)](#) and [Eke et al., \(2019\)](#); these were sourced from a group of 10 police services from a large province within Canada, covering a wide geography from rural towns to urban centers. The index offenses in these samples ranged from 1993 to 2010 (with convictions up to 2011), with the majority (93% occurring post-2000) and the recidivism follow-up for these cases extending through to the end of 2015. The original research focused on assessing risk for recidivism and, as part of this research, extensive coding was completed for each case including data relating to prior, index, and post-index (i.e., future) contact sexual offending against children, along with the characteristics of the sexual material accessed by individuals and nature and content of online communications with other adults, or with youth, or undercover police officers posing as youth. Data relating to the characteristics of contact victims in these samples are the focus for the current work and have not been reported in previous papers.

Of the 372 offenders, 81 (22%) had at least one known contact sexual offense against a child (defined as under the age of 18)² involving a criminal charge or conviction. We did not have information about self-reported contact sexual offending, although there was indication that some self-reported behavior (e.g., online) led to police investigations and charges for contact offenses. We did not include information about suspected prior contact sexual offenses as we had little information about these potential offenses in the absence of associated occurrence or arrest reports; these reports detail age and gender of alleged victims. Of these 81 offenders, 2 (2%) also had a known contact sexual offense involving an adult victim.

We excluded 9 of the 81 cases (11%) where all of the CSEM was of the contact victim of that same individual (i.e., images or videos of the child, text detailing the sexual assault) because such cases would necessarily have an exact correspondence between child characteristics and the CSEM. Including them would inflate the correspondence between CSEM content and child victim characteristics. Three other cases (4%) where an individual had some CSEM of a contact victim in their CSEM remained in the sample because the majority of their CSEM involved other children. We removed one additional case where we had little information about gender and age in the CSEM, leading to a final sample of 71 cases where there were child victims and sufficient information about CSEM: 64 men had 134 prior or index child victims; 14 men re-offended directly against 17 children; and 20 men were also known to be involved in luring (see the Procedure for additional information about the breakdown of cases).

At the time of the CSEM investigation, the average age for individuals in our sample was 40 years ($SD = 12.63$, range 18–65). We did not systematically know the age of the individuals when they committed their first contact sexual offense against a child; some

of our coding notes indicate some individuals were involved in contact sexual offenses against children when they themselves were juveniles.

Procedure

Ethics approval was provided by the institutional review board of the second author. In this section, we report how we determined our sample size, all data exclusions, all manipulations, and all measures in the study. Most data were coded directly from investigation case files. The information in each file was extensive and included perpetrator characteristics, information about prior offending, police occurrence reports, officer notes, forensic computer analysis reports, and transcripts or videos of interviews (suspect, other witnesses, family members). We had information regarding the CSEM and other child content, including content that did not meet the legal definition of CSEM. Additional details regarding criminal history and post-index offending were obtained from other record checks, including national criminal records.

The coding domains were: (1) demographic information, including age at index CSEM offense(s) and marital status; (2) contact child victim characteristics including date of offense, age and gender; (3) CSEM content, grouped by age (i.e., infant, prepubescent, pubescent) which was documented based on developmental stage or previously identified victims and the gender of children; (4) CSEM format (images, movie/video, text); and, (5) other offender online behavior including sexual solicitation of a child.

Categorizing the Characteristics of CSEM and Other Child Content

We assessed CSEM and other child content using estimated percentages across age and gender categories in 53 cases (75% of the sample). These estimated percentages were aided further with information from counts by investigators as well as the use of categorization software—specifically, previously identified child pornography images are uploaded to a database and the categorization software recognizes these images and provides output data for individual collections. Images that are not recognized by the software are reviewed by investigators for court purposes and categorized manually.

In the 53 cases with estimated percentages, CSEM made up half, on average, of these individuals' child content ($M = 49.43$, $SD = 26.97$, range 5–95%) with most (96%) individuals having some material categorized as other child content and a quarter (26%) having mainly other child content (ranging from 75 to 95%).

All children within the material were counted. That is, an image with both a boy and a girl counted towards both genders; adults in the images were not included in the gender count.

Contact Sexual Offenses Involving a Child

Contact sexual offenses were documented in police records or other records obtained during a police investigation (e.g., child services report) and were counted regardless of legal outcome. The number of contact sexual child victims was very likely an underestimation of actual offending. As stated earlier, we did not include potential victims (no charges) since we had no details on age or gender. Also, individuals may have had additional victims of which we were unaware (e.g., in prior CSEM research over half self-report sexual contact with children, see Bourke et al., 2015; Seto et al., 2011). In addition, one individual in our sample had multiple contact sexual assault charges and convictions against children, however the exact number of victims and ages were not specified in the data available.

Most (67 of the 71 cases, 94%) contact victims were 15 years of age or younger. Two contact sexual assault victims were known to be 17 years old; in one case, the female victim was described as functioning at a younger age level and the second involved an individual who sexually assaulted three prepubescent boys (approximately 8 years of age) prior to their index CSEM, and then reoffended against a 17 year old male. Age of a contact victim was based on their age at the time of offense, as reported in the police file. In some cases, a child may have been abused over a period of time and in these cases we took the average age of the child at offense (maximum time period was 2 years).

We grouped child victims based on the time frame relevant to each offender's CSEM offense. Offenses were grouped as *prior* if: (1) there were prior charges for sexual offenses against children; (2) the contact sexual offenses became known as part of the index police investigation (e.g., the CSEM was discovered during an investigation into a reported contact sexual offense against a child); or, (3) the CSEM investigation led to additional discovery of contact sexual offending against children (e.g., offender investigated after he admitted he was sexually abusing friends' daughters). We included as prior offenses those that had taken place prior to the index CSEM investigation but were unknown/not documented until the CSEM offense (9 cases, 13%). That is, there were no prior charges and police had no knowledge of the offense prior to the investigation into the index CSEM offense. These are often referred to as historical offenses. An example of an historical case is an individual who is charged or convicted for CSEM offenses and then a contact sexual assault victim comes forward to report past offending (e.g., contact sexual offenses that occurred years back, when the offender was a leader in a youth club).

Offenses were grouped as *future* if they occurred after the CSEM charges/conviction (recidivism). These offenses involved true recidivism, rather than cases that were historical in nature and would count as pseudo-recidivism (e.g., a past contact victim comes forward after the CSEM conviction and this results in a new contact offending conviction).

Figure 1 provides the breakdown of contact sexual offenses relative to the original CSEM index offense. The majority of offenders had contact sexual offenses known

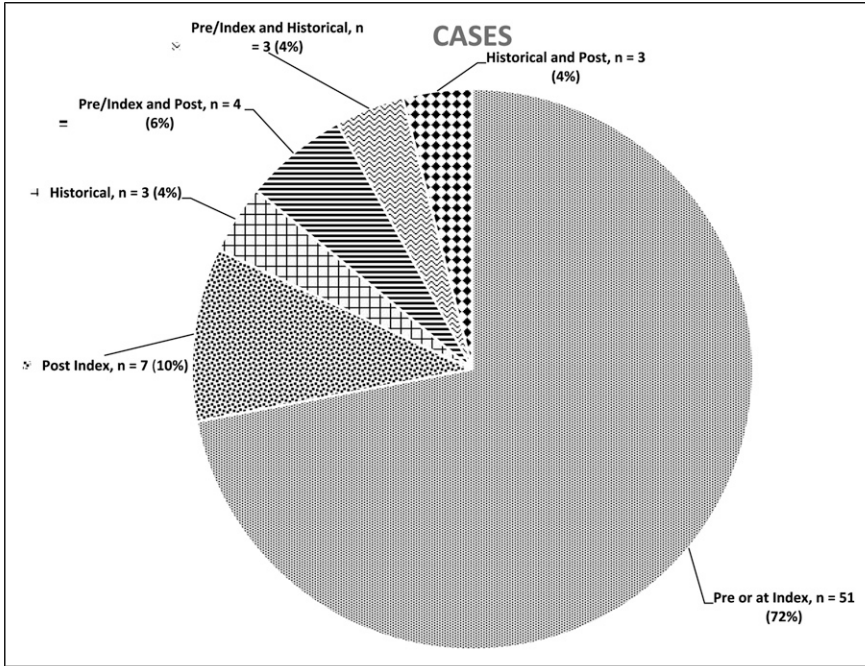


Figure 1. Timing of contact sexual offenses relative to the index child sexual exploitation material charge.

prior to, or detected as part of, the index CSEM offense (58 cases; 82%). There were also 14 (20%) cases of post-index contact sexual offending. There were 64 pre-index and/or historical cases grouped for analysis relating to prior victimization (*Prior Contact Sexual Abuse Victimization Group*) and 14 post-CSEM index contact sexual offending (*Future Contact Sexual Abuse Victimization Group*) cases available for analysis.

We had information on a total of 151 child victims; the average number of victims per case was 2.16 ($SD = 1.44$, range 1–8 children) with under half (39%) with one victim and a third (32%) known to have two victims. When separated by time frames, there were 134 prior CSEM child victims (in the 64 cases in the *Prior Contact Sexual Abuse Victimization Group*) and 17 child victims post CSEM (in the 14 cases in the *Future Contact Sexual Abuse Victimization Group*). Age data were missing in 4 of the 58 prior cases and data were necessarily missing in the age-related analyses. We kept these cases in the sample because they had other information relevant to the study (e.g., future offending or a luring offense with known victim characteristics).

Online Luring Offenses

In approximately a quarter (28%, 20/71) of the sample, individuals were known at the index CSEM to have also been involved in online sexual communication with a child (luring; 12 cases, 60%), with an undercover officer posing as a child (6 cases, 30%), or with both (1 case, 5%). In one case (5%) the information regarding who the individual was chatting with (real child or undercover officer) was not available. In one of the cases included in the child group, an undercover officer took over the child's account after the offense was reported, leading to arrest; this case was counted as real child as that was the original offense. Of note, there were two cases where the individual was chatting online with other adults about their sexual interest in children, and this included online conversations with undercover officers; these cases were also excluded as this was not online sexual communication (luring) with a child, rather the chat focused on speaking with another adult about sex with children.

We assessed correspondence between CSEM content and *Prior Online Luring Victimization*. In one case we had no information about the children targeted in the online luring (age, gender) and we therefore excluded it from further analysis. We had only one case involving online luring that occurred post CSEM index offense (i.e., grouped as *future*)—in this case the offender's CSEM was of both prepubescent and pubescent girls, and his online luring victim involved a 15-year old girl (luring victims tend to be adolescents, in part because they are more often online than younger children, for example see [Wolak et al., 2009](#)). In order to be homogenous for the time period in relation to the CSEM charges, we excluded it. This left 18 cases involving both real children and/or undercover officers where we could compare the characteristics of Prior Online Luring Victimization to the individual's CSEM content. Again, as with the contact sexual victims, the CSEM material was not based on these luring victims.

Of the 13 cases involving real children, two included contact sexual assaults; in one case the individual met and sexually assaulted one of his three luring victims. This case remained in the sample for luring. The other case was already excluded from the luring analysis as it was the only one involving a luring offense post-CSEM index.

Overview of Analyses

Data were entered and analyzed in SPSS 20.0. Prior to running specific statistical tests, we ensured assumptions for those tests were met, which included minimum cell sizes for chi-square analyses, the normal distribution of variables and equality of variances. We start by describing the child contact sexual abuse cases, the online luring cases and we provide an overview of the CSEM content. From there, we provide planned comparisons for the two time frames: Prior Contact Sexual Abuse Victimization and Prior Online Luring Victimization as well as Future Contact Sexual Abuse Victimization.

For the Prior groups (contact and luring), we focus on the correspondence between age and gender preferences in CSEM and child other material; specifically, we examine the age and gender of child victims using correlation for continuous data, reporting Pearson Correlation Coefficients. We report χ^2 analysis for categorical comparisons of association and *t*-tests to compare age data by gender. We chose to calculate and report Cohen's *d* as the effect size for all the group comparisons, using equations reported in Rosenthal (1991) for *t*, and in Cohen (1988) for *r*. Cohen (1988) provided guidelines for group comparisons with *d* values of 0.20, 0.50, and 0.80 corresponding to small, moderate and large effect sizes.

Next, to assess the predictive nature of the CSEM content in relation to the age and gender of children in the Future Contact Sexual Abuse Victimization group, we used Area Under the Curve (AUC) from Receiver Operating Characteristics (ROC) analyses. AUC values can range from 0 to 1 with scores closer to 1 indicating better positive predictive accuracy. As per calculations by Rice and Harris (2005) and the AUC conversion table by Salgado (2018), AUC values of 0.56, 0.64, and 0.71 were considered small, moderate and large effect sizes as they roughly translate to Cohen's *d* values of 0.20, 0.50, and 0.80.

Interrater Reliability

Interrater reliabilities were examined in the original research and involved 17–21% of cases, assessed at the beginning, middle, and then end of coding. There were a minimum of two coders for each comparison and future offending (referred to as recidivism in other reports) was masked from the coders (for additional information see Eke et al., 2019; Seto & Eke, 2015). The interrater reliability testing included gender and age variables in CSEM, child contact, and luring victims. Interrater reliability was strong and no variable was excluded due to unacceptable interrater reliability (Cicchetti, 1994; Landis & Koch, 1977): (1) intraclass correlation coefficients (two-way random model, absolute agreement) for all reported continuous variables were a minimum of 0.70 for single measures, up to 1.00 for some variables and, (2) kappas were 0.75 or higher for categorical variables. Any disagreements were resolved by consensus between the coders.

Results

Overview of CSEM: Descriptive Findings

Table 1 provides information on the breakdown of CSEM content based on developmental stage and gender of the children depicted. Infant material was less common than prepubescent and pubescent material in both CSEM content and child other content; overall, it was significantly more common for individuals to have any prepubescent material and for half the sample (52%) the majority of their material was

Table 1. CSEM Based on Age Category and Gender of the Children Depicted.

CSEM Characteristics	Child sexual exploitation material	Other child material (nudity, semi-clothed)
	<i>M</i> (<i>SD</i>), 95% CI and range	<i>M</i> (<i>SD</i>), 95% CI and range
Developmental range		
Infant	1.32 (3.82), [0.27, 2.37], 0–20%, <i>n</i> = 53	1.41 (4.31), [0.23, 2.60], 0–25%, <i>n</i> = 53
Prepubescent	31.42 (23.62), [24.90, 37.93], 0–85%, <i>n</i> = 53	31.89 (25.23), [24.93, 38.84], 0–95%, <i>n</i> = 53
Pubescent	16.60 (16.78), [11.98, 21.23], 0–75%, <i>n</i> = 53	17.26 (15.94), [12.87, 21.66], 0–75%, <i>n</i> = 53
Gender		
Girls	31.70 (27.05), [24.24, 39.15], 0–85%, <i>n</i> = 53	35.19 (31.59), [26.48, 43.90], 0–95%, <i>n</i> = 53
Boys	17.74 (26.45), [10.45, 25.03], 0–95%, <i>n</i> = 53	18.02 (26.75), [10.64, 25.39], 0–95%, <i>n</i> = 53
More boy than girl material	22 of 71 cases (31%)	22 of 69 cases (32%) ^a

Note. Based on non-overlapping 95% CIs, the majority of CSEM and child other material falls within the prepubescent age category, followed by pubescent, and then infant. As well, there was meaningfully less boy child other than girl child other material.

^aAlthough the numbers are the same (22 in each group) a crosstab of the more boy than girl material indicates one case where an individual had more boy CSEM but did not have more boy child other and vice versa.

prepubescent. None of the cases in this sample had a majority of material involving infants, and 16% had more pubescent than infant or prepubescent material.

For all 71 cases we knew if the majority (>50%) of CSEM and other child content was of boys or girls (two cases had equal amounts). Within the current sample of individuals with contact sexual offenses against children, there were higher averages for girl CSEM than boy CSEM and overall, it was more common (66% of the sample) for individuals to have more girl than boy material. When individuals had more boy CSEM (*n* = 22), they were significantly more likely to also have more boy other child content as well, $\chi^2(1) = 60.10$, $p < 0.001$, $n = 69$, $d = 5.20$.

Child Contact Cases: Descriptive Findings

We use the terms *girl* victim and *boy* victim to be clear we are talking about children. Overall, there were more cases involving girl than boy victims; 38 cases (54%) had only girl victims and 23 cases (32%) only boy victims, leaving 7 cases (10%) who had both boy and girl victims and three cases missing information on gender (4%).

We had specific age data for most cases (58; 82%) with an average age across child victims of 8.90 years ($SD = 3.36$, 95% CI [8.01, 9.79], range 3–17). Comparing cases collapsed across time frames with age data for either all girls (*n* = 32) or all boys (*n* =

20), their ages were similar, $t(50) = 0.15$, $p = .884$, $d = 0.04$, with the average age for boy victims at 9.16 years ($SD = 2.91$, 95% CI [7.79, 10.52], range 4–14 years) and girls victims at 9.01 years ($SD = 3.78$, 95% CI [7.64, 10.37], range 3–17).

Of the 7 cases (10%) known to have both girl and boy victims, the number of victims in these cases ranged from two to five and the average age of victims (for the 6 cases with age data) was 7.42 ($SD = 2.27$, 95% CI [5.04, 9.80], range 6–12 years).

Luring Cases: Descriptive Findings

In the luring cases involving undercover officers posing as children, there was one “victim,” although one case involved both an undercover officer and a real child. When examining the cases involving real child victims, half of individuals with luring offenses had one known victim (7, 58%). Overall, the average number of victims per case described/known in the current sample was 1.9 ($SD = 1.1$, 95% CI [1.11, 2.69], range 1–4). This number excludes one case in which the offender was known to have in excess of 100 online girl victims internationally, all described as approximately 11–13 years of age. This individual was charged in multiple countries; we had information on one local victim. Indication of possible multiple victims in these luring cases was not unusual. In some cases, including those involving undercover officers posing as children, the individual was known to have information relating to other children such as multiple online addresses for children, but the extent of additional victimization was unknown (e.g., had a list of online accounts belonging to children but known specifically for communicating sexually with two of them). Overall, in the current 18 cases involving online luring that took place prior to the CSEM charges there were 27 known victims.

The average age across online luring child victims was 13.04 years ($SD = 1.60$, 95% CI [12.37, 13.72], range 8–15 years of age, $N = 24$) and age was similar between real child victims ($M = 13.24$, $SD = 1.35$, $n = 17$) and those created by undercover officers ($M = 12.57$, $SD = 2.15$, $n = 7$), $t(22) = 0.92$, $p = 0.366$, $d = 0.41$. Overall, girls ($M = 12.38$, $SD = 1.81$, 95% CI [11.29, 13.48], $n = 13$) were significantly younger than boys ($M = 13.82$, $SD = .87$, 95% CI [13.23, 14.41], $n = 11$), $t(22) = 2.40$, $p = 0.025$, $d = 0.98$.

Victim gender in the online luring sample were almost evenly split with 13 girls (48%) and 11 boys (41%) with three unknown (11%). There were no apparent gender differences (cell counts were low for meaningful analysis) between cases with real children (nine girls and eight boys) and those with undercover officers posing as children (four as girls and three as boys).

Comparing Child Content and Prior Contact Sexual Abuse Victimization

As indicated, there were 64 cases involving prior contact sexual victimization of children. In total, there were 134 known victims with data available for analysis. We had information on both age and age category (infant, pubescent and prepubescent) in child content for 39 cases. As stated earlier, there were no cases with a majority of material depicting infants. Overall, average age of victims corresponded with the age

distributions evident in the CSEM; specifically, if individuals preferred prepubescent children, the mean age of their child victims was 7.67 years ($SD = 2.69$, 95% CI [6.66, 8.68], range 3–13 years, $n = 30$) and if they preferred pubescent children, the mean age of child victims was 11.06 years ($SD = 3.54$, 95% CI [9.33, 13.78], range 5–17 years, $n = 9$). This finding was significant, $t(37) = 3.07$, $p = 0.004$ with a Cohen's d of 1.17.

In 7 cases (10%) the individual offended against both boys and girls; we had age data for 6 cases with the average age younger ($M = 7.63$, $SD = 2.28$, 95% CI [5.24, 10.02], range 6–12 years) than those without known cross-over ($M = 8.81$, $SD = 3.43$, 95% CI [7.84, 9.79], range 3–17 years, $n = 50$) albeit not significantly, $t(54) = 0.82$, $p = 0.418$, $d = 0.35$. Qualitatively, there were meaningful differences in age in some cases, for example an individual who sexually offended against his sisters in youth, his wife, and his son (he indicated incest was his sexual preference).

We examined gender bluntly; did the person have “more” (more than 50%) of one gender than another. Overall, those with more boy CSEM sexually assaulted boys, $\chi^2(1) = 29.61$, $p < 0.001$, $n = 62$, $d = 1.91$; on average, individuals with boy victims had 66% of their material relating to boys (mean average of CSEM was 33% and other child material was 34%). Similarly, for those with more girl related CSEM the majority had girl victims, $\chi^2(1) = 26.01$, $p < 0.001$, $n = 62$, and Cohen's $d = 1.70$; on average, individuals with girl victims had 89% of their material including girls (mean average for CSEM was 42% and other child material was 47%).

For those cases with available data, we also examined percentages of material along with the number of victims: total percent of boy CSEM was significantly correlated with number of boy victims ($r = 0.41$, $n = 49$, $p = 0.003$, $d = 0.90$) as was the percent of other boy child material ($r = 0.53$, $n = 49$, $p < 0.001$, $d = 0.45$). There was also a significant correlation between number of girl victims and the estimated percent of girl CSEM, $r = 0.54$, $n = 49$, $p < 0.001$, but not between the percent of girl material in other child, $r = 0.22$, $n = 49$, $p = 0.138$, although Cohen's d was 0.45. Qualitative notes provide some insight into non-congruent findings: one individual sexually assaulted a girl decades prior to his CSEM arrest, however, his CSEM material focused on boys and he indicated in an interview his prior sexual assault was an opportunistic experiment rather than a preference.

Statistical comparisons based on cases with victims of both genders were not possible due to low cell sizes; across the 7 cases, four were considered to have more girl material, two had more boy CSEM and in one case the material was approximately equal for gender preference.

Comparing CSEM Content and Prior Luring Victimization

Age and gender of the children in the CSEM material also corresponded to online luring victims. With low cell counts in chi-square analyses, meaningful statistical comparisons are not available; however, we describe basic percentages. Those individuals with more (>50%) girl CSEM had more girl victims (10 of 11 cases, 91%) and those with

more (>50%) boy CSEM had more boy victims (100%) as did those with more (>50%) boy other material (88%). We did not have gender cross-over among luring victims.

Luring offenders most commonly had prepubescent CSEM (7/11 = 64%). In the 11 cases where comparisons were possible, age of the victims (which ranged from 10 to 15 years) related to the three age groups for the CSEM content, albeit not always significantly. Specifically, luring victim age was negatively associated with total infant CSEM percentage ($r = -0.81, p = 0.002, d = -2.80, n = 11$) while positively related to prepubescent CSEM percentage ($r = 0.07, ns, d = 0.15$) and pubescent CSEM percentage ($r = 0.20, ns, d = 0.40, n = 11$).

Comparing Child Content and Future Contact Sexual Abuse Victimization

There were 14 cases involving contact sexual offenses against 17 children that occurred after the individual was charged/convicted for their CSEM offense(s). In these future contact offenses, none involved both boy and girl victims; 10 cases involved girl victims, 3 cases involved boy victims, and one case had missing information about victim gender.

Having more CSEM material (greater than 50%) focused on girls or other child material were both strong predictors of future girl contact victims (for both the AUC = 1.00, $n = 13$ and 95% CI [1.00, 1.00], $d = 4.37$); everyone who reoffended against a girl had a higher ratio of girl to boy CSEM or other child material. It is important to note that the predictor variable in this case (a two point scale) has restricted variance, therefore the finding of an AUC and 95% CI of 1, what appears as statistically a perfect prediction, is to be expected. We provide context and caution to the meaning of this in our discussion. There were three cases involving future contact sexual offenses involving a boy victim. Similar to the finding with girl victims, all three who reoffended against a boy had more boy than girl CSEM (we do not report AUC for such small sample sizes). More boy other child material was also related to boy contact victims in two of the three cases. For the two cases where we had the percentage breakdown of the material, one individual had no CSEM focused on girls (and no other child material) and the other had 25% of their CSEM focused on girls (along with 5% of other child material focused on girls).

We had information regarding breakdown of CSEM and other child material into three developmental stages (infant, prepubescent and pubescent) as well as average age for future victims in just 7 cases. Overall, prepubescent material was most common (range 60–100%) in all of those cases and the age ranges for the future victims were 5 years of age to 17 years of age; so while prepubescent material is commonly collected and may be a majority of what an individual accesses, this does not mean victims will necessarily only be prepubescent. For example, in the case of two 5 year-old victims, 95% and 100% of the offenders' material was prepubescent; in the case of a 15 year old victim it was 70% prepubescent (25% infant and 10% pubescent); and in the case of a 17 year old victim the offender's material was 100% prepubescent (and this individual had three prior prepubescent victims, approximately 8 years of age).

Discussion

This is the second study we are aware of that supports the intuitive hypothesis that age and gender preferences would be reflected in both CSEM and other child content and in child victims, among those who have committed contact sexual offenses. We replicated the results of Owens et al. (2016) examining correspondence of CSEM and contact victim characteristics in past or concurrent offending, and we extended their study by also examining correspondence (in a limited way, due to low base rates) in terms of CSEM characteristics and future contact victims. This correspondence between victim characteristics and material was also found for other child content, such as images depicting clothed or semi-clothed children. Although we had fewer luring cases, a similar pattern was observed when examining these online victims, where CSEM content was positively related to the gender of luring victims; the relationship was less clear for age. Luring offenders in our study commonly had prepubescent CSEM, perhaps suggesting some may prefer younger children; however, those children are not necessarily as accessible online.

This study extends previous work showing that pornography use can correspond to sexual interests (Bártová et al., 2021) and more specifically, that CSEM use can reflect sexual preferences relating to children among individuals known to the criminal justice system (e.g., Babchishin et al., 2015; Seto et al., 2006). Though CSEM use can also reflect curiosity, novelty-seeking, and other motivations (Seto et al., 2010; Steel et al., 2021), in aggregate, age and gender distributions of CSEM content are associated with contact victim age category and gender. For age, this was true using the most common age category and for gender, this was true when the data were analyzed simply in terms of whether a majority of CSEM or other child content depicted boys or girls. This has practical relevance because determining predominant age and gender is easier to code in the field than estimating proportions or counting.

The most common images in this sample were of prepubescent girls. This is consistent with studies of large databases maintained by organizations such as Interpol (<https://www.interpol.int/en/Crimes/Crimes-against-children/International-Child-Sexual-Exploitation-database>) and the National Center for Missing and Exploited Children (see Seto et al., 2018) and with past research examining CSEM collections (e.g., Quayle & Jones, 2011) and examining the terms used to describe material available (most relates to underage females; Steel, 2009). Infant material is rarer and might be more difficult to obtain, but beyond it being a question about supply and demand it is also likely that overall, fewer individuals have this age specific interest (see Seto, 2017; nepiophilia is rarer than pedophilia, which in turn is rarer than hebephilia).

Cross-Over in Offending

The correspondence between the age and gender in CSEM and that of contact victims is substantial across our analyses, but as expected, is not perfect. Age and gender preferences suggested in an individual's CSEM content does not rule out sexual interest

in, or potential offending against, victims of other ages or gender. In 10% of our CSEM cases, individuals were known to have committed *prior* contact sexual assaults on both boy and girl victims; four had more girl CSEM, two had more boy CSEM and in one case the material was approximately equal for gender preference. There was no cross-over in our luring cases, although this group were known to have many other victims for which we had little to no gender and age details (e.g., one individual was described as having over 100 victims). Although we examined contact offending across time, past/current and future, our findings do not rule out cross-over, and should be considered in the context of emerging evidence relating to contact victim cross-over. As mentioned in the Introduction, [Scurich and Gongola \(2021\)](#) conducted a meta-analysis of 47 studies examining contact offending and found that 19% of individuals in these studies had both child and adult victims (age cross-over) and 15% had both male and female victims (gender cross-over). Age group cross-over may be particularly high for men with sexual interest in older youth (considered to be hebephilic) who have sexually offended, given the onset of puberty is quite varied and so pubescent children could include children under age 10 and teens age 15 or older (e.g., see [Stephens et al., 2017](#); [Stephens et al., 2018](#)). Gender cross-over may be more common for pedophilic men given young boys and girls are more physically similar due to the absence of secondary sexual characteristics (see [Seto, 2018](#)).

This work also raises questions about other indicators of sexual interest in children. For example, it is well established that phallometrically-assessed sexual arousal to children is a strong predictor of sexual recidivism ([Hanson & Bussière, 1998](#); [Hanson & Morton-Bourgon, 2005](#)) with a sexual interest specific to boys also being a particularly strong predictor of contact sexual offending; however, we do not currently know whether among these individuals, their new sexual offenses are much more likely to involve boys. Future research could test the hypothesis that sexual interest in boys—whether self-reported or identified through phallometric assessment or indirect measures such as viewing time—would be significantly associated with offending against boys, and also more strongly related to offending against boys than any offending against girls.

Strengths and Limitations

A strength of our study is that we included both CSEM and other child material. This is important because most collections contain both; for example, within the larger study that this sample was drawn from, most of the individuals (86%) also had other child content in the materials seized by police, and in a third of cases (31%) individuals had more other child material than CSEM ([Seto & Eke, 2015](#)). This suggests that having information about an individual's child content, regardless of whether the material is illegal, is informative. In addition, some individuals continue to collect other child content after a CSEM conviction, precisely because the material is legal.

Though we did find that men with more girl than boy CSEM offended against girls and men with more boy than girl content offended against boys, this was based on a

small number of cases that should be replicated in larger or multiple samples. In addition, although we had some cross-over cases in relation to victim age category and gender, these sub-samples were again quite small and we were only able to describe these cases. It is important to acknowledge that our analysis of correspondence between CSEM and contact victim characteristics was based on an analysis of individuals who were known to have committed both kinds of offenses, and predominantly driven by those with past or concurrent contact offenses. It does not necessarily follow that this correspondence would be found in prospectively following individuals who have exclusively committed CSEM offenses, where one might hypothesize, for example, that those who prefer boys in CSEM and other child content are more likely to commit contact offenses against boys in the future (or to commit new CSEM offenses where the content is again predominantly of boys). Our sample was selective in other ways; individuals were all detected and convicted for their CSEM offenses and our information was based on what was available in police investigation files and other criminal justice databases.

Our sample is based on older cases (the most recent cases were prosecuted in 2011). However, the information is still relevant; while technology may change the mechanics of offending, the psychology of CSEM offending is likely to be robust. This is supported in part by prior research examining justifications and pro-offending beliefs in online pedophilia communities; despite changes in technology over time, the behavior of individuals in online pedophilia forums remained consistent over time (e.g., O'Halloran & Quayle, 2010).

It is possible that the CSEM that was seized at the time of arrest may not reflect all CSEM that an individual has accessed. Someone who has a lot of boy content (e.g., 45%) might actually have a majority of boy content if we were aware of prior content that was permanently deleted or on storage media that were not seized by police. The number of contact sexual child victims in our sample will be an underestimation of actual offending. In part, we did not include potential victims (where no charges were laid) because we had few/no details on age or gender. Also, there will be additional victims of which we were unaware; among individuals involved with CSEM, self-reported contact offending is known to be meaningfully higher than victimization known to police (e.g., in prior research over half self-report sexual contact with children, see Bourke et al., 2015 and Seto et al., 2011; also see results about reporting in the survivorship survey by the Canadian Centre for Child Protection, 2017). The correspondence between CSEM and contact victim characteristics might be affected if we were to have information about self-reported CSEM use and contact victims as well. For example, some of the individuals who were determined to have a preference for girl content might actually have shown a preference for boy content if the totality of their CSEM use were known (e.g., they collected boy content earlier in their offending but were able to destroy all such evidence at the time they were arrested). Similarly, the associations between child content and contact victims would be influenced if those who had known boy victims had undetected girl victims or those who had known girl victims had undetected boy victims. We also cannot determine if the results obtained in

this study would be found in a study that asked participants about all CSEM and contact offending, including individuals who were not known to the criminal justice system.

We excluded cases where the CSEM was exclusively based on contact sexual assault victims, as those instances would necessarily have perfect correlation, increasing the estimated correspondence between CSEM and contact victim gender and age categories. However, these individuals may be different to individuals who obtain CSEM created by others. For example, men who only had CSEM of their contact victims may not be interested in CSEM generally but were specifically interested in documenting their offending or perhaps kept this material to blackmail their victims. We did, however, include in our sample those who had images of their contact victims but also had other CSEM.

Implications for Policy and Practice and Future Directions

Our results suggest that CSEM characteristics highlight a differential in likelihood in past offending, which can be considered in risk management as well as investigations. For example, someone who has a much greater focus on boy than girl CSEM might initially be investigated based on their opportunities to act on their apparent preferences, while still being mindful of the potential for cross-over in interests and offending.

Beyond images, video, and stories, sexual interests among CSEM users may be evident in other ways. Additional forensic evidence such as online chat available in investigative files may be indicative of sexual preferences, providing insight specific to that individual. This would be helpful across all CSEM users, not only those with child contact victims. We would also expect correspondence between CSEM characteristics and other indicators of sexual interest in children. For example, assessing whether CSEM age and gender preferences also correlate with individuals' admission of interest in age/gender groups or online activities, such as spending time on forums or websites relevant to a particular age/gender group (e.g., time on a forum for a video game that is much more popular with boys than with girls). Questions for future research could include whether more boy content is associated with admission of interest in boys, greater arousal to boy stimuli in a phallometric lab, or relatively longer viewing times for images of boys in viewing time tasks (see [Schmidt et al., 2017](#)).

Forensic evidence is a source of information that provides additional avenues of inquiry for those working in criminal justice as well as clinicians. For example, a person may indicate in a chatroom they have assaulted a child known to them, or indicate sexual interests (e.g., "I've loved boys since I was a boy"). Additionally, how they identify themselves (e.g., "BoyLover69") or their search criteria (e.g., "girls only! Aged 5-12 only! no adult!") may be helpful. This forensic information could also be useful for case management as specific triggers relating to poor coping or factors associated with stress may be evident online. It would also be of clinical and investigative interest to know if other CSEM characteristics are relevant. We had too few cases to examine

this, but we have wondered whether CSEM content depicting violence is related to more violent contact sexual offending.

Finally, do CSEM content characteristics remain stable over time? A recent study by [Fortin and Proulx \(2019\)](#) suggests there can be changes over time within CSEM perpetrators. In their study, they examined the mean age and severity of content seized by police from 40 CSEM perpetrators. Over a minimum 6-month period, 38% of these men showed an escalation pattern where the mean age decreased and the mean severity rating increased over time. However, other patterns, including increasing mean age and decreasing mean severity, were observed. We are not aware, however, of any research that shows that CSEM characteristics in terms of gender and age categories predict CSEM characteristics if the person were to commit new CSEM offenses.

Conclusion

In this study, we found a strong correlation between CSEM content (age and gender) with child victim age and gender, both historically (prior/concurrent) and longitudinally (recidivism). We encourage the sharing and reporting of CSEM content characteristics across stakeholders, even though there may not be legal distinctions based on age category or gender and the prosecution may not require it. First, gender ratio is related to risk of recidivism among CSEM offenders ([Eke et al., 2019](#); [Seto & Eke, 2015](#)) however probation officers or treatment providers often cannot consider CSEM gender preferences as the information is not documented in police and/or court reports. Second, other characteristics (duration, text or video) are related to interest in children (see [Seto & Eke, 2017](#)), which is of value clinically and for police and clinical risk assessment and management. Finally, CSEM content may help police investigators and risk managers prioritize their efforts with regards to potential child victims, although it does not rule out cross-over in interest or the relevance of opportunity to offend. Information can be shared through police threat and risk assessments and content information included in linkage databases or sex offender registries; other options may include standardized guides created to share case information across stakeholders.

Acknowledgments

We thank the police officers who assisted with the original project and who investigate these offenses and we appreciate the research support and assistance of members of the Child Sexual Exploitation Unit and Criminal Behaviour Analysis Section of the Ontario Provincial Police. We thank Linda Farnus for review of our analyses and draft manuscript as well as Shelby Scott for research assistance and manuscript review. We further thank Bill Gofton, Kristina Truax and Tanya Sampson for feedback on earlier drafts of this manuscript. This study was assisted by the Ontario Mental Health Foundation, with funding from the Ontario Ministry of Health and Long Term Care. The authors do not receive specific financial compensation relating to the publication of this work. The authors take responsibility for the integrity of the data, the accuracy of the data analyses, and have made every effort to avoid inflating statistically significant results.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This work was supported by the Ontario Mental Health Foundation.

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Notes

1. *Other child material* included children without clothing or partially clothed as well as material where children were fully clothed; the material did not meet the Canadian legal definition/categorization of child pornography. These images included those obtained from public websites, catalogues and pictures of children taken in public spaces. It should be noted, individuals may be using this material for such purposes as sexual fantasy and masturbation.
2. We defined a child as under the age of 18 consistent with the Canadian definition for child pornography offenses. Also relevant is that there can be polymorphism in sexual interest across age categories. We describe the age range of contact sexual offense victims in our Procedure; some offenders have more than one contact sexual child victim.

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