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Investigating the disparities among child sexual abuse material users: Anonymous self-reports from both charged and uncharged individuals

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ABSTRACT

Background: The dark web has become a more prevalent platform for the distribution of child sexual abuse material (CSAM). Most CSAM users remain undetected by law enforcement, and little is known about the population not convicted.

Objective: The aim of the study was to contribute to the research on CSAM users by investigating the differences between CSAM users who self-report having been charged for sexual offenses against a child or an adult and those who self-report not having been charged of such offenses. **Participants and setting:** We analyzed anonymous survey data from 2384 respondents who sought CSAM on the dark web. Most of the respondents were young males (18–34-year-olds) searching for material depicting girls. The sample was divided into three groups: 1) those who admitted to having been charged for sexual offenses against children (CS offenders, $n = 474$); 2) those who admitted to having been charged for sexual offenses against adults (AS offenders, $n = 620$); and 3) those who admitted to no charges (NC group, $n = 1290$).

Methods: We used multinomial logistic regression analysis to analyze differences in self-reported behavior and motivation to access CSAM between the three groups.

Results: Those who had a previous history of violent offenses, had groomed children online, had physical contact with children, and searched for material depicting infants and toddlers were significantly more likely to belong to the CS or AS offenders group.

Conclusions: We found significant differences between the groups in their individual, motivational, and behavioral characteristics that have important implications for investigating sexual crimes and assessing and treating sexual offenders.

1. Introduction

The volume of reported child sexual abuse material (CSAM) has continued to grow globally. The US National Center for Missing and Exploited Children reported analyzing 32 million reports of CSAM in 2022, with an 87 % increase in reported CSAM since 2019 ([Global](#)

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Threat Assessment, 2023). Furthermore, according to the Internet Watch Foundation (2024), the volume of the most extreme CSAM has increased. Compared to surface websites hosting CSAM, it is estimated to be 2000 times more prevalent on the dark web (Gannon et al., 2023). However, until recently, it was unknown how common CSAM was on anonymous onion websites on Tor, and thus easily available with a well-known Tor Browser. A recent study by Nurmi et al. (2024) revealed that one-fifth of onion websites on Tor shared CSAM, which was easily accessible through 21 out of the 26 most popular Tor search engines. Additionally, despite the removal of CSAM websites from its search results and blocking of CSAM queries by the Tor search engine Ahmia.fi, 11.1 % of the search sessions sought CSAM.

Few population-based victim studies have explored the extent to which child sexual abuse (CSA) occurs online. A recent study in the US (Finkelhor et al., 2022) with a nationally representative data from an online survey for young adults (aged 18–28) demonstrated an overall prevalence of 15.6 % for online child sexual abuse and exploitation (OCSEA), and as in offline CSA, the victims were most often females aged 13–17. The addition of online abuse to the generic questions about child sexual abuse raised the overall prevalence from 13.5 % to 21.7 %. The rate for females increased from 19.8 % to 31.6 % and for males from 6.2 % to 10.8 % (Finkelhor et al., 2024).

Offline CSA is known to have severe implications for the quality of life and mental health of children (Platt et al., 2018; Quayle, 2020), significantly elevating the risk of revictimization in adulthood (Coid et al., 2001; Hailes et al., 2019). According to the latest studies (Chauviré-Geib & Fegert, 2024; Finkelhor et al., 2023; Joleby et al., 2020; Schmidt et al., 2023), the consequences of CSAM or OCSEA victimization are often even more serious compared to offline CSA, because when images of abuse are involved and shared online, they can be shared repeatedly, leading to endless re-victimization. A recent review by Schmidt et al. (2024) revealed that in addition to an association with negative mental health, non-consensual sharing of sexual images was associated with negative social repercussions. The qualitative studies reviewed highlighted a range of adverse impacts of this sharing on the social lives of young individuals, such as bullying, harassment, and victim-blaming attitudes (Schmidt et al., 2024).

Online child sexual abuse encompasses a range of offenses, including accessing, downloading, sharing, and creating images or videos of child sexual abuse, often referred to as child sexual abuse material (CSAM) (Armitage et al., 2023). From a perpetrator's perspective, the Internet provides safe and convenient opportunities to start seeking sexual contact, groom susceptible children, and abuse them (Quayle, 2020). To comprehensively grasp the patterns, characteristics, and contemporary trends of online sexual violence against children, we urgently need data from people seeking access to CSAM in less regulated environments. While online CSAM is a growing global problem, with a trend of increasingly disturbing content being shared (Seto et al., 2018; Seto & Eke, 2017), we know little about undetected online CSAM users. Child victims in the material very rarely report their experiences to authorities (Colburn et al., 2023; Gemara et al., 2023), and the offenders detected by police or those seeking help from confidential treatment services represent only a minority of the child sex offender population. Therefore, generalizing the research findings based on forensic or clinical samples to all child sex offenders is problematic (Amelung et al., 2024; Salter, Woodlock, et al., 2023). Recent studies based on representative victim data, including (Finkelhor et al., 2023; Quayle et al., 2018), have also demonstrated that there may be differences in the types of CSAM crimes reported to police compared to the types of crimes reported by victims in victim surveys. Therefore, data, including that gathered from undetected offenders, is essential for effective prevention measures.

To reach offenders outside of the criminal justice system, researchers have mostly conducted anonymous community surveys (see, e.g., Dombert et al., 2016) or investigated anonymous self-referring, help-seeking clinical samples such as the Dunkelfeld program (Amelung et al., 2024). However, these studies are nevertheless based on unrepresentative samples of child sex offenders, often providing no demographic or other contextual or biographical data that would help identify the risk factors for CSA (Salter, Woodlock, et al., 2023) or relying on information gathered from those who are seeking help and thus motivated to change their behavior. A recent nationally representative study by Salter, Whitten, and Woodlock (2023) explored the prevalence of child sexual offending behaviors and attitudes among men with samples from Australia, the UK, and the USA. In contrast to several previous studies (see, e.g., Babchishin et al., 2018) estimating a relatively low risk for contact sexual abuse, they found that men self-reporting online sexual offenses are also more likely to seek sexual contact with children if they know for sure that no one would find out. In line with Salter, Whitten, and Woodlock (2023), a study by Insoll et al. (2022), based on a large sample of CSAM users seeking material from the dark web, revealed that almost half (42 %) of respondents had sought direct contact with children through online platforms after viewing CSAM, and even more (58 %) reported feeling afraid that viewing CSAM might lead to sexual acts with a child or an adult. Furthermore, more frequent use of CSAM, an older age on first exposure to CSAM, viewing CSAM depicting toddlers and infants, and being in contact with other CSAM users were associated with the self-reported likelihood of having contacted children after viewing CSAM (Insoll et al., 2022; Napier et al., 2024; Von Franqué et al., 2023). In addition, recent studies (Napier et al., 2024; Von Franqué et al., 2023) indicate that the risk of continuing to use CSAM is significant after first exposure. Von Franqué et al. (2023) found that among a non-forensic sample (undetected/not convicted persons seeking therapy from a confidential treatment service), the CSAM recidivism rate was 39 %, 11 times higher than the expected recidivism rate based on previous publications. The risk was even higher in study by Napier et al. (2024) among anonymous Internet users in a community sample, in which almost half of the respondents continued to use CSAM after first exposure. These studies indicate that CSAM use often continues after first exposure and can create a significant risk of escalating into contact with children and putting more children at risk. This highlights the urgent need for studies analyzing the behavior of CSAM users in more detail and with larger samples of undetected CSAM users compared to previous studies.

Several factors have been linked to the behavior leading to a crime of sexual violence (see, e.g., Ward & Beech, 2006), and a comprehensive explanation of which factors distinguish child sexual abusers from non-abusing individuals is still lacking (Seto, 2019). The fact that sexual interest in children is a risk factor preceding sexual offending, but not all individuals with pedophilia commit crimes of sexual violence against children (Finkelhor, 1984; Seto, 2019), describes the complexity of the phenomenon. Similarly, several studies have found a link between pornography consumption and sexual offending, but clearly not all pornography users are

sexually aggressive, and many sexual offenders are not frequent pornography users (Kingston et al., 2008; Lehmann et al., 2024; Paquette et al., 2022). Based on evidence from community studies on self-identified sexually aggressive men, as well as clinical and forensic studies on identified sex offenders, Seto (2019) has suggested a motivation–facilitation model (MFM) for sexual offending, which includes traits of paraphilia (such as pedophilia), high sex drive, and intense mating effort as primary motivations to sexually offend against children. State factors (e.g., alcohol use) and trait factors (e.g., antisocial personality) are included in the model as facilitators, influencing the motivation to commit sexual offenses, and situational factors are described as factors that exist outside the person (such as access to potential victims and the absence of effective guardians) and that interact with personal facilitative factors, influencing the risk of a sexual offense.

A review by Broadhurst (2020) focusing on CSAM users explored factors fitting into Seto’s (2019) MFM model and summarized that the key facilitative factors for CSAM offenses include access to children, offense-supportive cognitions, and sexual arousal. Similarly, Babchishin et al. (2018) concluded that the key motivational and facilitative factors influencing CSAM offenses include problems in the sexual domain, antisocial tendencies, access to the Internet and children, sexual arousal, and distorted cognitions. However, as Seto (2019) concluded, the MFM model has limitations, such as how to address offenders who victimize both children and adults, highlighting the need for more research. More research is also needed on differences in the characteristics of those who offend against children compared to those who only offend against adults, even though there has been progress in this field (Soldino et al., 2024). Previous research with convicted offenders has identified key differences between these groups, as demonstrated by Soldino et al. (2024). For instance, those who offend against adults are more likely to use violence and/or intimidation, employ a weapon, target intimate partners, commit their offenses in public places, serve additional ongoing prison sentences, and report a history of alcohol and substance abuse.

The aim of this study was to contribute to the research on CSAM users by investigating anonymous English-speaking individuals searching for CSAM on the dark web. We examine what individual, motivational, and behavioral characteristics predict belonging to groups self-reporting charges for sexual crimes against adults or children compared to those not reporting such charges. Previous studies (e.g., Lussier et al., 2024; Seto, 2019; Soldino et al., 2024) indicate that an antisocial personality and prior offending increase the recidivism risk in crimes of sexual violence. However, considering the lack of previous studies exploring the differences between these groups in the dark web population, we chose an exploratory approach and stated no specific research hypotheses.

2. Methods

2.1. Sample

The data of this study were obtained from the *Help Us to Know* survey conducted by the project “Knowledge to Prevent Online Sexual Violence Against Children” (2KNOW) (Insoll, Díaz Bethencourt, et al., 2024). We recruited participants voluntarily when searching for CSAM on the Ahmia.fi dark web search engine. Instead of the search results, they were offered the opportunity to participate in the *Help Us to Know* survey. According to Winter et al. (2018, p. 420) the three most popular ways that almost half of their survey participants discovered onion sites were via (i) social networking sites such as Twitter and Reddit (48 %), (ii) search engines such as Ahmia, (46 %) and (iii) randomly encountering links when browsing the Web (46%). CSAM websites are widely present in the dark web; the Tor search engine Ahmia.fi not only filters these websites, but it also completely blocks the searches when the user inputs

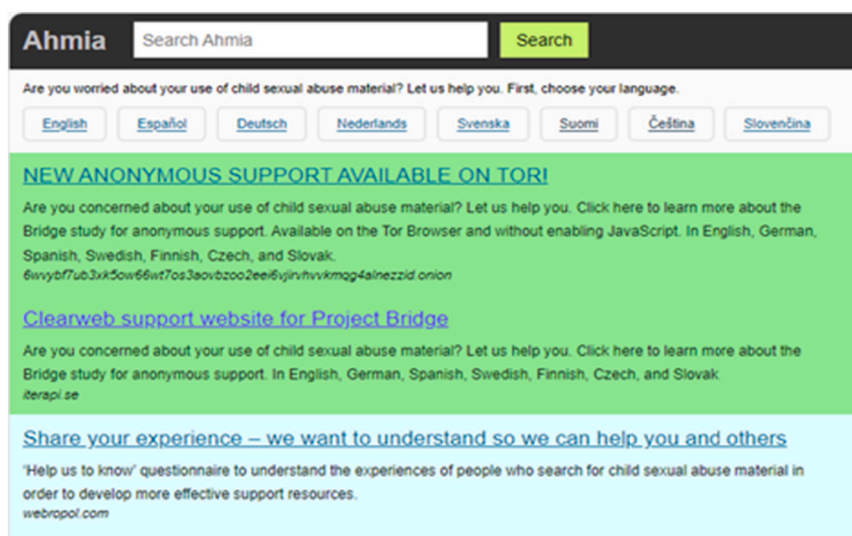


Fig. 1. Ahmia.fi not only filters CSAM websites but also completely blocks searches indicating sexual violence against children; instead, it provides research survey links and help services for those who are seeking child sexual abuse material.

CSAM terminology, instead providing research survey links and help services for those seeking CSAM (see Fig. 1).

Between July 1, 2023, and March 1, 2024, 3782 participants answered the English version of the questionnaire. We excluded participants who informed us that they had not been honest in answering the questions ($n = 627$) from the analyses and those who chose not to respond ($n = 771$) to the question inquiring about charges for sexual offenses. The final sample of respondents was 2384 (63.0 % of the total sample).

2.2. Measures

The *Help Us to Know* survey explores CSA and CSAM perpetration, sexual interest in children, offenders' preferences for victim age and gender, their behavior related to CSAM use, their motivations for searching for CSAM, use of adult pornography, and their criminal behavior (see the survey questions as supplementary material). The survey includes items measuring known risk factors for CSA and CSAM offending based on previous research. To measure the self-rated risk of committing child sexual abuse, we used the Sexual Child Molestation Risk Assessment (SCHIMRA) A and B to measure the self-reported frequency of sexually abusive behavior in the past week (Landgren et al., 2020). Demographic questions included age (18–24 years, 25–34 years, 35–44 years, 45–54 years, 55 years or older) and gender (man/woman/non-binary/prefer not to say). To explore the participants' contact seeking behavior, we inquired whether they had sought contact with children and the specifics of this contact, as well as questions about acts of sexual violence that had been committed against a child, whether through physical contact or remotely, with multiple choice survey questions. To explore the respondents' prior criminal behavior, we asked if they had ever been charged for a violent offense (e.g., assault leading to bodily injury). They were able to select their answer from four different choices ("Yes, against an adult," "Yes, against a child," "No," and "Prefer not to say"). At the end of the questionnaire, an honesty check question was added to discover how honest the participants were when answering the questions and how honest they believed others would be when answering the survey.

To investigate what individual, motivational, and behavioral characteristics predict belonging to groups self-reporting charges for sexual crimes against adults or children compared to those not reporting such charges, we formed three groups based on their response to the question: "Have you ever been charged for a sexual offense (e.g., indecent exposure, sexual coercion, rape, sexual abuse, offense related to child sexual abuse material, sexual harassment, grooming)?" The respondents were able to select their answer from four different choices ("Yes, against an adult," "Yes, against a child," "No," and "Prefer not to say"). Participants who answered "Yes, against a child" to the question ($n = 474$ (19.9 %)) were assigned to the **child sexual abuse offenders (CS)** group. Respondents who answered "Yes, against an adult" were defined as **adult sexual abuse (AS) offenders** ($n = 620$ (26.0 %)), and respondents who selected the option "No" were defined as the **No charges (NC)** group ($n = 1290$ (54.1 %)). In the sample reporting charges for sexual offenses, 87 participants reported facing charges for offenses against both children and adults. They were added to the CS group.

2.3. Ethical considerations

To avoid potential harm from identification, we wanted to minimize the risk of identifying respondents when developing the survey. In Finland, it is mandatory to report suspected crimes of sexual violence against a child to the police. Therefore, we did not ask respondents to disclose any identifiable information that would compromise participant privacy or confidentiality. We did not collect personal data from subjects, such as education, nationality, or exact age. We intentionally modified the questions to avoid inquiring about specific details of criminal behavior. We added only a few questions related to the respondents' backgrounds. To maximize the benefit to the respondents, the questionnaire included links to relevant help resources to help reduce the use of CSAM and manage sexual urges towards children. To ensure the respondents were voluntary adult participants, we asked them to confirm that they were over 18, had read the participant information sheet, and voluntarily consented to participate in the study. The respondents were required to answer all the survey questions, but they were allowed to choose the option 'Prefer not to say' to all questions. The Ethics Committee of the University of Eastern Finland granted approval for the study.

2.4. Data analysis

First, we investigated potential differences between groups by using the χ^2 test for categorical variables. Next, we used multinomial logistic regression analysis to examine which of the variables predicted belonging to the CS or AS group compared to the NC group when the influence of other variables was controlled. We selected the covariates a priori based on their known associations with the predictors and the outcome. We calculated the effect sizes for categorical tests using Cramer's V , interpreting them as small for $V = 0.1$, medium for $V = 0.21$, and large for $V = 0.35$. In all analyses, $p < 0.05$ was considered statistically significant. We conducted all two-tailed statistical tests using SPSS (IBM® SPSS® Statistics version 27.0).

3. Results

3.1. Characteristics of the sample

Among the final sample of participants ($n = 2384$), 77.5 % ($n = 1847$) identified themselves as men, 10.4 % ($n = 247$) as women, 4.6 % ($n = 110$) as non-binary, and 7.6 % ($n = 180$) preferred not to disclose their gender (see Table 1). A little over half (55.8 %) of the men reported no charges for sexual offenses (NC group), 13.9 % reported charges for crimes against children (CS group), 26.6 % reported charges for crimes against adults (AS group), and 3.7 % reported charges for both crime types. Of the women, 47 % belonged

to the NC group, 20.6 % to the CS group, and 32.4 % to the AS group. Among the non-binary group, 57.3 % belonged to the NC group, 18.2 % to the CS group, and 24.5 % to the AS group. The corresponding percentages for the 'prefer not to say' participants were 72.3 %, 18.3 %, and 9.4 %, respectively. While no statistically significant differences were observed between genders in charges related to sexual offenses against children, women were more frequently represented in the group charged with offenses against adults ($\chi^2 = 24.88$, $df = 3$, $p < 0.001$). Most of the participants fell within the age range of 18–24 years (50.8 %); 25.2 % were in the age range of 25–34 and 10.4 % ($n = 249$) reported being in the age range of 35–44. A minority of the participants (7.9 % ($n = 190$)) were over 45 years old or preferred not to define their age group (see details in Table 1). In addition, Table 1 describes the prevalence of reported prior charges for violent offenses (e.g., assault leading to bodily injury). Over 67 % of CS offenders reported having charges for a violent offense against a child and over 80 % of AS offenders reported having charges for a violent offense against an adult.

3.2. Victim preferences

Almost half of the respondents (49.4 %) were sexually interested in children. As summarized in Table 2, there were statistically significant differences in victim preferences between the groups. Over 40 % of AS offenders had sexual interest in infants and toddlers, whereas CS offenders reported having a similar level of interest in all underage victim categories. In the NC group, 20.4 % reported having sexual interest in pubescent children and almost 30 % reported that they did not feel any sexual interest in children under the age of 18. Most respondents searched for material depicting girls. However, one-third of both AS and CS offenders reported preferring to search for material depicting boys.

3.3. Motivations for using CSAM and behavior related to CSAM use

Both CS (52.5 %) and AS (78.9 %) offenders more frequently reported sexual interest in children as their motivation for using CSAM compared to the NC group (34.1 %) (Table 3). Those belonging to the NC group more often reported looking for more extreme or violent material because they had become desensitized to adult pornography (20.2 %) compared to other groups, and 24 % preferred not to disclose their preferences. A large majority of AS (81.1 %) and CS (70.0 %) offenders reported habitually viewing adult pornography before starting to search for CSAM in the first place, whereas 50.2 % of the NC group reported similar behavior. Furthermore, both AS and CS offenders more frequently reported watching pornography every day or most days than respondents reporting no prior charges (Table 4).

3.4. Multivariate prediction of having charges for sexual crimes

Multinomial logistic regression analyses were performed for the factors associated with CS or AS offending in the previous tests to examine whether they uniquely predicted the likelihood of belonging to AS or CS offender groups compared to the NC group when the influence of other variables was controlled. Multivariate analyses revealed that having charges for other violent offenses (such as assault leading to bodily injury) against a child/adult, grooming (talking to, chatting online, or texting children for sexual arousal, or in hopes it may later lead to something more) nearly every day, seeking physical contact with children, and searching for material depicting sexual violence against infants and toddlers significantly increased the likelihood of belonging to the AS and CS groups

Table 1
The age, gender, and charges for violent offenses of the respondents.

Category	CS offenders ^a <i>n</i> = 474	AS offenders ^a <i>n</i> = 620	NC group ^a <i>n</i> = 1290	All (<i>N</i> = 2384)
Gender: man	370 (78.1 %)	496 (80 %)	981 (76 %)	1847 (77.5 %)
Woman	51 (10.8 %)	80 (12.9 %)	116 (9.0 %)	247 (10.4 %)
Non-binary	20 (4.2 %)	27 (4.4 %)	63 (4.9 %)	110 (4.6 %)
Prefer not to say	33 (7.0 %)	17 (2.7 %)	130 (10.1 %)	180 (7.6 %)
Age 18–24 years	260 (54.9 %)	331 (53.4 %)	619 (48 %)	1210 (50.8 %)
Age 25–34 years	105 (22.2 %)	172 (27.7 %)	323 (25 %)	600 (25.2 %)
Age 35–44 years	55 (11.6 %)	66 (10.6 %)	128 (9.9 %)	249 (10.4 %)
Age 45–54 years	23 (4.9 %)	29 (4.7 %)	73 (5.7 %)	125 (5.2 %)
Age over 55 years	12 (2.5 %)	11 (1.8 %)	42 (3.3 %)	65 (2.7 %)
Age: Prefer not to say	19 (4.4 %)	11 (1.8 %)	105 (8.1 %)	135 (5.7 %)
Reported charges for a violent offense against				
An adult; yes	74 (15.6 %)	493 (79.5 %)	48 (3.7 %)	615 (25.8 %)
Against a child; yes	298 (62.9 %)	73 (11.7 %)	41 (3.1 %)	412 (17.3 %)
no	102 (21.5 %)	54 (8.7 %)	1200 (93 %)	1356 (56.9 %)

Note: the gender distribution of the CS group: 370 (78.1 %) men, 51 (10.8 %) women, 20 (4.2 %) non-binary, 33 (7.0 %) prefer not to say, the gender distribution of the AS group: 496 (80 %) men, 80 (12.9 %) women, 27 (4.4 %) non-binary, 17 (2.7 %) prefer not to say, the gender distribution of the NC group: 981 (76 %) men, 116 (9.0 %) women, 63 (4.9 %) non-binary, 130 (10.1 %) prefer not to say.

^a CS offenders = self-reported charges for sexual offenses against a child. AS offenders = self-reported charges for sexual offenses against a child. NC group = had no charges according to self-reports.

Table 2
Victim preferences related to age and gender.

Sexual interest towards individuals under the age of 18	CS offenders ^a n = 474	AS offenders ^a n = 620	NC group ^a n = 1290	χ^2 , (df = 2), p, V
Infants and toddlers (age 0–3)	122 (25.7 %)	265 (42.7 %)	88 (6.8 %)	351.18, <0.001, 0.384
Prepubescent children (age 4–10)	111 (23.4 %)	100 (16.1 %)	150 (11.6 %)	38.13, <0.001, 0.126
Pubescent children (age 11–14)	143 (30.2 %)	147 (23.7 %)	263 (20.4 %)	18.74, <0.001, 0.09,
Postpubescent adolescents (age 15–17)	117 (24.7 %)	124 (20.0 %)	327 (25.3 %)	6.84, <0.05, 0.54
Uncertain if interested	18 (3.8 %)	25 (4.0 %)	67 (5.2 %)	ns.
No sexual interest in people under the age of 18	33 (7.0 %)	36 (5.8 %)	373 (28.9 %)	200.57, <0.001, 0.29
Prefer not to say	19 (4.0 %)	25 (4.0 %)	135 (10.5 %)	35.39, <0.001, 0.122
Gender of the children depicted in the material				
Boys	136 (28.7 %)	183 (29.5 %)	222 (17.2 %)	48.29, <0.001, 0.142,
Girls	345 (72.8 %)	461 (74.4 %)	872 (67.6 %)	10.82, <0.001, 0.07
No preference	25 (5.3 %)	25 (4.0 %)	142 (11.0 %)	33.69, <0.001, 0.119
Prefer not to say	22 (4.6 %)	19 (3.1 %)	166 (12.9 %)	63.95, <0.001, 0.162

Note: each respondent could choose multiple answer options.

^a CS offenders = self-reported charges for sexual offenses against a child. AS offenders = self-reported charges for sexual offenses against a child. NC group = had no charges according to self-reports.

Table 3
Self-evaluated motivation to search for CSAM.^a

Motivation	CS offenders ^b (n = 474)	AS offenders ^b (n = 620)	NC group ^b (n = 1290)	χ^2 (df = 2), p, V
Sexually interested in children	249 (52.5 %)	489 (78.9 %)	440 (34.1 %)	265.73, <0.001, 0.33
Looking for a way to control my emotions	76 (16.0 %)	136 (21.9 %)	281 (21.8 %)	ns.
Want to understand my own experience of sexual abuse	57 (12.0 %)	88 (14.2 %)	175 (13.6 %)	ns.
Desensitized to adult pornography, and I am looking for more extreme or violent material	40 (8.4 %)	78 (12.6 %)	260 (20.2 %)	39.04, <0.001, 0.13
Searching for material that depicts my own abuse	28 (5.9 %)	63 (10.2 %)	97 (7.5 %)	ns.
Prefer not to say	52 (11.0 %)	86 (18.4 %)	310 (24 %)	50.83, <0.01, 0.15

^a We asked: “There are number of reasons why people search for child sexual abuse material; which reasons do you relate to most?”

^b CS offenders = self-reported charges for sexual offenses against a child. AS offenders = self-reported charges for sexual offenses against a child. NC group = had no charges according to self-reports.

compared to the NC group (see Table 5). Moreover, searching for material depicting boys significantly increased the likelihood of belonging to the CS group and habitually viewing adult pornography before starting to search for child sexual abuse material significantly increased the likelihood of belonging to the AS group (Table 5). The model explained 69 % of the variance.

4. Discussion

The present study investigated differences between CSAM users who admitted being charged for a crime of sexual violence against a child or an adult and those who asserted no such charges among English-speaking respondents searching for CSAM on the dark web. We found significant differences between the groups in their individual, motivational, and behavioral characteristics. Having charges for a violent offense against a child or an adult, searching for material depicting the sexual abuse of infants and toddlers, grooming children, and having physical contact with children significantly increased the risk of belonging to the AS or CS group compared to the group that reported no charges. These findings align with Seto’s (2019) MFM model of sexual offending and previous research exploring the key factors explaining CSAM offending (Babchishin et al., 2015).

Almost half of all the respondents (46 %) reported charges for sexual offenses, which was more than expected based on prior research estimating that most CSAM-related offenses are not reported to or detected by police (Colburn et al., 2023; Schuler et al., 2021; Seto et al., 2011). The large number of CSAM users admitting charges for crimes of sexual violence may be a special feature of the population searching for CSAM on the dark web (Chopin et al., 2023). They may use Tor to search for the material anonymously, and especially to avoid incurring additional charges. In line with previous research utilizing criminal justice or treatment samples and some recent studies with community samples of CSAM offenders (see e.g., Babchishin et al., 2015, 2011; Seigfried-Spellar & Rogers, 2013), we discovered that a large majority of the respondents were males under the age of 35.

A significant proportion of the CSAM users who reported charges for sexual offenses also reported having charges for violent

Table 4
Self-reported CSAM-related behavior.

	CS ^a % (n = 474)	AS ^a % (n = 620)	NC ^a % (n = 1290)	χ^2 (df), p, V
Habitual viewing of adult pornography				
Yes	332 (70.0 %)	505 (81.5 %)	647 (50.2 %)	190.99, (4), <0.001, 0.20
Habitual viewing of pornography per week				
Every day	147 (31.1 %)	364 (58.7 %)	47 (3.6 %)	153.78, (6), <0.001, 0.23
Most days	60 (12.7 %)	67 (10.8 %)	48 (3.7 %)	
One or two days	37 (7.8 %)	47 (9.9 %)	76 (5.9 %)	
Prefer not to say	21 (4.4 %)	27 (5.7 %)	990 (76.7 %)	
Watching CSAM for sexual arousal in the last 7 days				
Nearly every day	32 (6.8 %)	28 (1.3 %)	70 (5.4 %)	153.35 (8), <0.001, 0.18
More than half of the days	69 (14.6 %)	65 (10.5 %)	63 (4.9 %)	
A few days	158 (33.3 %)	136 (12.9 %)	208 (16.3 %)	
Not at all	164 (34.6 %)	349 (56.3 %)	791 (61.3 %)	
Prefer not to say	51 (10.8 %)	42 (6.6 %)	158 (12.2 %)	
Grooming children in the last 7 days				
Nearly every day	44 (9.3 %)	29 (4.7 %)	47 (3.6 %)	322.42, (8), <0.001, 0.26
More than half of days	62 (13.1 %)	67 (10.8 %)	48 (3.7 %)	
A few days	138 (29.1 %)	135 (21.8 %)	76 (5.9 %)	
Not at all	185 (39.0 %)	343 (55.3 %)	990 (76.7 %)	
Prefer not to say	45 (9.5 %)	46 (7.4 %)	129 (10.0 %)	
Physical contact/direct remote contact with a child in the last seven days				
Nearly every day	34 (7.2 %)	43 (6.9 %)	32 (2.5 %)	413.11, (8), <0.001, 0.29
More than half of the days	85 (17.9 %)	46 (7.4 %)	38 (2.9 %)	
A few days	138 (29.1 %)	136 (21.9 %)	70 (5.4 %)	
Not at all	172 (36.3 %)	345 (55.6 %)	1013 (78.5 %)	
Prefer not to say	45 (9.5 %)	50 (8.1 %)	137 (10.6 %)	
Nearly every day	34 (7.2 %)	43 (6.9 %)	32 (2.5 %)	
Platform used for seeking contact with a child				
In person	128 (27.0 %)	138 (22.3 %)	74 (5.7 %)	10.69, (2), <0.01, V = 0.13
Social media platform	50 (10.5 %)	43 (6.9 %)	25 (1.9 %)	
Online gaming platform	43 (9.1 %)	29 (4.7 %)	24 (1.9 %)	
				ns.
				ns.

^a CS offenders = self-reported charges for sexual offenses against a child. AS offenders = self-reported charges for sexual offenses against a child. NC group = had no charges according to self-reports.

Table 5
Factors predicting charges for sexual offenses against a child or an adult compared to the NC group.

Variable	CS vs. NC group ^a OR (95 % CI), p-value	AS vs. NC group ^a OR (95 % CI), p-value
Gender (male)	1.17 (0.76–1.80), ns.	1.03 (0.66–1.60), ns.
Age (under 25 years, yes)	1.22 (0.86–1.73), ns.	1.02 (0.72–1.46), ns.
Habitually viewing adult pornography (yes)	1.44 (0.96–2.10), ns.	2.24 (1.49–3.37), <0.001
How often you watched child sexual material (weekly)	1.49 (0.99–2.23), ns.	0.89 (0.58–1.36), ns.
Grooming children nearly every day	2.32 (1.48–3.64), < 0.01	2.09 (1.30–3.32), <0.01
Physical contact children for pleasure (yes)	4.38 (2.83–6.79), < 0.001	2.62 (1.66–4.14) <0.001
Sexually interested in children (yes)	1.41 (0.96–2.06), ns.	1.29 (0.88–1.91), ns.
Victim gender preference: boys (yes)	1.50 (1.01–2.23), < 0.05	1.37 (0.96–2.06), ns.
Victim age preference:		
infants and toddlers (age 0–3) (yes),	2.11 (1.29–3.46), < 0.01	3.69 (2.25–6.00), <0.001
prepubescent children (age 4–10) (yes),	1.06 (0.66–1.68), ns.	0.67 (0.42–1.08), ns.
pubescent children (age 11–14) (yes),	1.24 (0.79–1.96), ns.	1.05 (0.66–1.68), ns.
pubescent children (15–17) (yes)	1.14 (0.71–1.85), ns.	0.90 (0.55–1.43), ns.
Had charges for a violent offense against an adult/child	43.71 (29.73–64.25), < 0.001	119.64 (78.77–181.71), <0.001

^a CS offenders = self-reported charges for sexual offenses against a child. AS offenders = self-reported charges for sexual offenses against a child. NC group = had no charges according to self-reports.

offenses, and of the individual variables, this was the strongest predictor of having charges for sexual offenses. Up to 80 % of the group reporting charges for sexual offenses against an adult also reported charges for violent offenses. The finding is in line with earlier studies (Seto, 2019; Soldino et al., 2024) demonstrating that a previous criminal history is a significant facilitator influencing the motivation to commit sexual offenses. In Seto's (2019) MFM model, a criminal history is considered as an indicator of antisociality and classified as a trait factor, a facilitator influencing the motivation to commit sexual crimes. Grooming children online for sexual arousal and physically contacting children for pleasure, despite already having charges for sexual offenses, can also be considered as indicators of antisociality. Thus, our findings support the significance of antisociality as a facilitator influencing the motivation to commit sexual crimes.

However, it is important to note that seeking contact with children has also been linked to help-seeking behavior among a dark web sample of CSAM users (Insoll, Soloveva, et al., 2024). This reflects the complex nature of the phenomenon. Furthermore, the findings that majority of the NC group (79 %) reported that they neither groomed nor physically contacted children are in line with the meta-analysis of Babchishin et al. (2015) showing that non-contact CSAM offenders are lower in antisociality indicators (such as criminal history) than contact offenders and differ from those also offending offline in many ways (e.g., having greater victim empathy as a barrier to offending). They concluded that mixed offenders (with a history of both non-contact and contact offenses) were a particularly high-risk group. In the present study, the NC group most often reported desensitization to adult pornography as their motivation to search for CSAM (20 %) or preferred not to say (24 %) instead of seeking contact with children. However, less than half of the respondents answered the question about being desensitized, which may indicate that the question being too difficult to understand.

One of the most significant individual factors predicting charges for sexual offenses in the present study was searching for CSAM depicting infants and toddlers. Although it does not automatically reflect sexual interest in children, the use of CSAM has been seen as a valid diagnostic indicator of pedophilia, or more specifically nepiophilia (sexual interest in infants and toddlers) (Quayle, 2020; Seto et al., 2006). Considering that nepiophilia is rarer than pedophilia (Seto, 2017), the percentage of participants searching for CSAM on infants and toddlers was surprisingly high in the present study (26 % among the CS group, 43 % among the AS group, and 7 % among the NC group). According to Quayle (2020), possession and trading of CSAM may provide evidence of specific sexual interests, and Seto et al. (2006) found that CSAM offending was a stronger indicator of pedophilia than contact sexual offending against children. Pedophilia is classified as paraphilia by the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) (Eke & Seto, 2023; Quayle, 2020). According to the Seto's (2019) MFM model, paraphilia is one of the primary motivational factors for sexual offending. However, in the present study, the finding may be related to antisocial tendencies, which were rather common in the sample, particularly among the AS group. As Quayle (2020) suggests, some non-pedophilic men sexually offend against children because of antisocial tendencies, whereby pubescent females are used for sexual gratification.

In line with Soldino et al. (2024), we also found differences between the groups sexually offending against adults compared to the groups offending against children. First, as mentioned previously, the percentage of sexual interest in infants and toddlers was highest among the AS group. The proportion is unexpectedly high, even compared to previous findings from the dark web sample of Nurmi et al. (2024), revealing that over half (54.5 %) of the CSAM search sessions mentioning age on the Tor search engine were looking for material depicting 12- to 16-year-olds. However, in line with Nurmi et al. (2024), we found that those belonging to the CS or NC group were mostly interested in material depicting 11- to 14-year-olds and/or 15- to 17-year-olds. Second, the AS group also significantly differed from the other groups in having the highest prevalence (79 %) of sexual interest in children as their motivation for searching for CSAM. The prevalence of sexual interest in children was unexpectedly high compared to the CS group. In line with Seto's (2008) estimate that 50–60 % of sex offenders against children are pedophilic, we found that 53 % of those who self-reported having been charged for offenses against children were sexually interested in children and reported interest in children under the age of 11. Third, participants in the AS group significantly differed from the other groups in their CSAM-related behavior. In line with Salter, Woodlock, et al. (2023), a large proportion of them (82 %) habitually viewed adult pornography before searching for CSAM, and more than half of them viewed adult pornography every day, which is a potential indicator of high sex drive, one of the primary motivational factors in Seto's (2019) model for sexual offending.

Habitual viewing of adult pornography was also very common (70 %) among the CS group. Prior research on the link between pornography consumption and sexually aggressive behavior, deviant sexual arousal, and inappropriate attitudes has revealed that several factors moderate the effect (Kingston et al., 2008). For example, in a study by Kingston et al. (2008), frequent pornography use (irrespective of content) was a significant risk factor for recidivism for the higher risk individuals only in a sample of child molesters, whereas the effect of using deviant pornography was negative for all individuals, regardless of the risk level. Researchers have suggested various theories that could explain the role of individual differences in the tendency to seek out certain types of pornography and the influence on aggressive behavior, such as sexual scripting theory (Osuna & Holt, 2024). However, as Osuna and Holt (2024) point out, more research is still needed to better understand the factors moderating the association between pornography use and sexual offenses.

In line with recent research on CSAM offenders on the dark web (Insoll et al., 2022; Nurmi et al., 2024), the respondents in our sample primarily searched for content that featured girls. Searching for material depicting boys significantly increased the likelihood of belonging to the CS group, indicating that those sexually interested in boys were more likely to have been charged for sexual offenses against children. This is consistent with previous studies showing that phallometrically-assessed sexual arousal towards children and specific sexual interest in boys is a particularly strong predictor of contact sexual offending (Eke & Seto, 2023).

Although we were unable to fully test a theoretical model or explore all relevant factors related to sexual offending with the survey, our findings contribute to the field of CSAM offender research by highlighting some relevant ideas for further studies. For example, the finding that there seems to exist a group of adult sexual offenders who have sexual interest in children and who also seek sexual contact with children calls for more research on the scale of the problem among adult sexual offenders and on identifying the key factors

facilitating their CSAM offending and recidivism risk.

4.1. Strengths and limitations

By using data from the dark web, we had the advantage of exploring the little-researched population of undetected CSAM users, whereas most previous studies have focused on offenders detected by the police and convicted in criminal proceedings. Detected cases represent only a minority of the child sex offender population, limiting the generalizability of the findings (Salter, Woodlock, et al., 2023). To reach the undetected CSAM users and to minimize the risk of identification and prevent potential harm, we collected the data anonymously on the dark web, where tracking of the respondents is impossible. We also avoided questions that could compromise anonymity. The disadvantage of this choice was that opportunities to examine the potential effects of demographic factors were limited.

To maximize the benefit for the participants, we shared links to relevant resources for help in reducing the use of CSAM and managing sexual urges towards children. These measures may have encouraged CSAM users to participate in the study, leading to thousands of responses in a relatively short time. However, many respondents selected “prefer not to say” to many of the questions in the survey; thus, it is possible that many respondents chose not to disclose their motivations. In addition, it is a well-known limitation in studies based on self-reporting that participants typically tend to present themselves in a positive light. Even though there was an honesty check at the end of the survey, it is possible that some of the respondents were dishonest in their responses or embellished them. Moreover, we wanted to keep the survey as short as possible to ensure that the respondents completed it. However, the disadvantage of this solution was that studying a large variety of relevant factors related to sexual crimes or systematically testing theories fell outside this study’s scope. For example, the survey lacked detailed questions on what type of adult pornography the participants viewed, whether they had been convicted of the offenses they were charged with, or on state factors possibly facilitating sexual offending, such as alcohol use. A conviction does not always follow a charge for an offense. Therefore, caution is needed when comparing the findings with previous studies on samples of convicted individuals, and further research is essential to form an overall picture of the categories of CSAM offenders, as well as the motivations, facilitators, and situational factors underlying CSAM use.

4.2. Conclusions and practical implications

The current study contributes to research on CSAM users by utilizing anonymous survey data from the little-researched population of undetected CSAM users. The findings that a significant proportion of CSAM users continued searching for CSAM, grooming children online, and contacting children for sexual pleasure even after being charged with sexual offenses have practical implications. The findings support Seto and Eke’s (2024) suggestion to search for CSAM during other police investigations (especially those involving crimes of sexual violence against children), as in their study, the riskiest individuals were often identified through reports of others or during other police investigations. Our findings highlight a group of adult sexual offenders who were sexually interested in children; many of them were searching for CSAM depicting infants and toddlers, and some of them were grooming online and/or contacting children for sexual pleasure. Most of them had charges for violent offenses that could be considered as an alarming sign, calling for a further search for CSAM-related offenses and evidence of other sexual offenses against children during the investigation of an adult sexual crime.

The present study also has important implications for the assessment, treatment, and risk management of individuals who commit sexual offenses. We demonstrated significant differences between the CSAM user groups in their individual, motivational, and behavioral characteristics. The findings indicate that adult sexual offenders who have an antisocial background combined with sexual interest in CSAM depicting infants and toddlers and who regularly consume adult pornography probably need very different interventions compared to offenders committing sexual violence against children. Furthermore, the need for assessing their recidivism risk, sexual interests, and risk of also committing sexual crimes against children is obvious.

Considering the findings of our study, the availability of CSAM, and the scale of the problem, it is necessary to further develop interventions for CSAM use and examine their effectiveness as a preventive measure. Preventive measures are also important from the point of view that the consequences of CSAM use for users are often serious. Key et al. (2021) reported that the risk of suicide in perpetrators of child sexual abuse and accessing indecent images of children might be >100 times higher than that in the general population. The present study suggests that although we found a population of CSAM users on the dark web with strong antisocial tendencies who might be resistant to preventive measures, there was a larger population not having such tendencies and thus more receptive to preventive measures.

CRediT authorship contribution statement

Hanna-Mari Lahtinen: Writing – review & editing, Writing – original draft, Methodology, Investigation, Conceptualization. **Kirsi Honkalampi:** Writing – original draft, Supervision, Formal analysis, Conceptualization. **Tegan Insoll:** Writing – review & editing, Methodology, Investigation, Funding acquisition, Conceptualization. **Juha Nurmi:** Writing – review & editing, Resources, Methodology. **Ethel Quayle:** Writing – review & editing. **Anna Katariina Ovaska:** Writing – review & editing, Project administration, Methodology, Investigation, Funding acquisition, Conceptualization. **Nina Vaaranen-Valkonen:** Writing – review & editing, Supervision, Methodology, Funding acquisition, Conceptualization.

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Declaration of competing interest

No conflict of interest.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.chiabu.2025.107299>.

Data availability

The authors do not have permission to share data.

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