Risk Factors for Child Sexual Abuse Material Users Contacting Children Online: Results of an Anonymous Multilingual Survey on the Dark Web

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Abstract. This study explores a sample of 1,546 anonymous individuals who voluntarily responded to our "Help us to help you" survey when searching for child sexual abuse material (CSAM) on the dark web. Nearly half (42%) of the respondents reported that they had sought direct contact with children through online platforms after viewing CSAM, and 58% reported feeling afraid that viewing CSAM might lead to sexual acts with a child or adult. This study analyses whether certain risk factors are linked to a higher likelihood of contacting children after viewing CSAM. It finds that certain factors are associated with a self-reported likelihood of having contacted children online after viewing CSAM, including more frequent use of CSAM, older age of first exposure to CSAM, viewing CSAM depicting toddlers and infants, having thoughts of self-expressing prior to viewing CSAM, and being in contact with other CSAM users.

1 Introduction

The prevalence of the creation, distribution, and use of child sexual abuse material (CSAM)—images and videos depicting child sexual abuse and exploitation—has dramatically increased in recent years, facilitated in part by technological developments and the ease accessing such material online (NCMEC 2021). The use of CSAM is now acknowledged as a global problem (see Wolak, Finkelhor, and Mitchell (2009); Long, Alison, and McManus (2013)). INTERPOL's Child Sexual Exploitation database currently holds over 2.7 million individual images and videos of child sexual abuse and exploitation (INTERPOL 2021), and reports of online sexual exploitation from the public doubled from 2019 to 2020 (NCMEC 2021). However, since sexual violence against children and the CSAM generated from this abuse are kept hidden, the true extent of the problem is unknown; estimates of the prevalence such materials appear to be just the tip of the iceberg (Quayle 2008). Yet it is clear that the creation, distribution, and use of CSAM is on the rise (Setter et al. 2021; Motivans and Kyckelhahn 2007; EUROPOL 2020). Children depicted in CSAM face significant lifelong negative impacts and persistent revictimization each time the material is shared and viewed (C3P 2017). In a survey of survivors of child sexual abuse, many respondents expressed that the distribution of their images

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impacted them differently than the hands-on abuse they suffered because while the former had ended, the images and recordings were a permanent record of the abuse (see C3P 2017, p. 148).

In this article, we refer to individuals who search for, view, create, and/or distribute CSAM as "CSAM users." The severity of CSAM can be categorized into one of 10 levels on the COPINE scale,[1] ranging from indicative CSAM ("pictures of children playing in normal settings, in which the context or organization of pictures by the collector indicates inappropriateness") to CSAM depicting sadistic sexual abuse or abuse involving bestiality (Taylor, Holland, and Quayle 2001, pp. 68–69). We use the term "CSAM" here instead of "child pornography" to highlight the misleading nature of the term "pornography," which implies consent and the creation of material willingly (Greijer and Doek 2016).

In this study, we analysed a sample of 1,546 anonymous individuals who voluntarily responded to our "Help us to help you" survey when searching for CSAM on the dark web,[2] where a large portion of CSAM is shared (Setter et al. 2021). The survey asked respondents to answer questions about their thoughts, feelings, and behaviours related to their use of CSAM to gather information about CSAM users to inform the development of the ReDirection Self-Help Program, an anonymous rehabilitative program for individuals who use CSAM (Insoll T and N 2021). Nearly half (42%) of the respondents reported that they had sought direct contact with children through online platforms after viewing CSAM, and 58% described feeling afraid that viewing CSAM might lead to sexual acts with a child or adult. Our research examined the link between the use of CSAM and directly contacting children online. We analysed whether certain covariates—such as age of first exposure to CSAM, frequency of use of CSAM, type of material used, and contact with other CSAM users—were associated with two outcomes: directly contacting children and fearing that the use of CSAM will lead to sexual acts with a child or adult. We conducted bivariate analysis of each covariate and outcome at a time, as well as linear regression models to analyze mutually adjusted associations between the covariates and the outcomes.

CSAM users who directly contact children online pose severe risks to children and can result in the commission of crimes of sexual violence. Those who contact children online with the intention to meet in person may be grooming them by luring or manipulating them into meeting up offline to commit contact sexual offenses. Those who have no intention to meet in person also pose a significant risk as they may be "online grooming" children, i.e. luring or manipulating them into producing sexual images or videos that may be used for sexual extortion, blackmail, and/or distributed online to other CSAM users (Greijer and Doek 2016). This may also include coercing children to livestream sexual content of themselves.

This study found that certain factors are associated with a self-reported likelihood of having contacted children online after viewing CSAM, including higher-frequency use of CSAM, older age of first exposure to CSAM, viewing CSAM depicting toddlers and infants, having thoughts of self-expressing prior to viewing CSAM, and being in contact with other CSAM users.

1. The COPINE scale is a typology of CSAM developed by the Combating Paedophile Information Networks in Europe (COPINE) project. The typology is based on analysis of publicly available images obtained from newsgroups and websites (Quayle 2008).

2. The dark web is the World Wide Web content inside encrypted overlay networks, which requires specialised software to access.

2 Prior Research

This research was undertaken to address a gap in the research on CSAM users, which has to date largely focused on convicted or known samples of offenders (Bourke and Hernandez 2009; Seto and Eke 2005). This study examines a global sample of anonymous CSAM users through a self-reported online survey. Past studies have called for developing a "non-clinical and non-correctional" sample of individuals viewing CSAM (including Ray, Kimonis, and Donoghue (2010); Eke, Seto, and Williams (2011) p. 163; Seto, Hanson, and Babchishin (2011)) to provide insight into the population of undetected CSAM users and the association between viewing CSAM and directly contacting children (Long, Alison, and McManus (2013); Ray, Kimonis, and Donoghue (2010), p. 87; Seto, Hanson, and Babchishin (2011)).

Since few previous studies have examined the link between the use of CSAM and directly contacting children online, we focus here on prior research on the link between the use of CSAM and direct contact offenses against children. We acknowledge that directly contacting children online may lead not only to direct contact offenses, but also to equally egregious online offenses such as grooming to produce further CSAM or to livestream sexual abuse, harassment, sexual extortion, etc. The association between the use of CSAM and the commission of contact offenses of sexual violence against children has received increasing academic attention in recent years. CSAM users demonstrate that they have an interest in sexualizing children, and having repeated exposure to such material reinforces that interest (Carr 2013). Thus, it is commonly assumed that CSAM users are at risk of contact offending against children (see p. 96). However, the evidence of this link in previous research has been mixed (see Carr 2013; Seto, Hanson, and Babchishin 2011), ranging from 1% (Endrass et al. 2009) to 85% (Bourke and Hernandez 2009). A meta-analysis conducted by Seto, Hanson, and Babchishin (2011) concluded that 12% of CSAM offenders had an official criminal history of a contact sexual offense against a child, while 55% of CSAM offenders admitted to contact sexual offenses in self-report studies. As Seto, Hanson, and Babchishin (2011) expected, the samples using official data had lower rates of contact sexual offenses than those using self-reported offense histories (see p. 124). This supports the claim that "official records are a conservative estimate of actual offending" (p. 135).

Research on CSAM users contact offending against children has uncovered a number of factors that may be associated with a higher risk of committing contact sexual offenses (see Faust et al. (2015); Seto, Hanson, and Babchishin (2011); McManus et al. (2015); Eke, Seto, and Williams (2011); Long, Alison, and McManus (2013); McCarthy (2010)). Such factors include socio-demographic characteristics such as age (e.g., Eke, Seto, and Williams (2011) found that younger offender age at the time of first arrest or conviction was a significant predictor of future detected offending) and gender (Faust et al. 2015; Wolak, Finkelhor, and Mitchell 2009). Other identified risk factors include antisocial behavior (Carr 2013); intimacy and social skill deficits (e.g. poor social skills, emotional identification with children, loneliness, see Carr (2013)); cognitive distortions; access to children (Long, Alison, and McManus 2013); criminal history (see McManus et al. (2015), p. 370; Seto, Hanson, and Babchishin (2011), p. 137); substance abuse (see Seto, Hanson, and Babchishin (2011), p. 137); sexual deviance (e.g. sexual interest in children, pedophilia, sexual sadism, see Seto, Hanson, and Babchishin (2011), p. 137; Eke, Seto, and Williams (2011), p. 156); contact with other CSAM users (McCarthy 2010); and stronger involvement with CSAM (McCarthy 2010).

Prior research has uncovered the heterogeneity of CSAM users and the various pathways that lead to CSAM offending and to further online and offline offending (Merdian et al. 2018; Babchishin, Karl Hanson, and Hermann 2011; Henshaw, Ogloff, and Clough

2017). For example, past studies have found that some individuals may start to use CSAM after committing contact sexual offenses against children (McCarthy 2010; Elliott and Beech 2009). CSAM users have also been found to vary in terms of education, employment, and family background (Wortley and Smallbone 2012). A number of researchers have suggested that the pathways of CSAM users can be differentiated based on their motivations for using CSAM as either contact driven (i.e. they want to meet children offline) or fantasy driven (i.e. they contact children online to play out a fantasy but do not plan to meet in person) (Merdian et al. 2018; Seigfried-Spellar et al. 2019). Thus, CSAM users who seek contact with children online may pose different risks to children depending on their personal motivations. Contact-driven CSAM users may pose a higher risk of committing contact sexual offenses, such as grooming or encouraging a child to meet with them in person for the purposes of committing contact sexual abuse, whereas fantasy-driven CSAM users may pose a risk of committing further online crimes against children, such as coercing a child online to produce CSAM, or coercing a child to offend against other children.

3 Methodology

Participants were recruited to voluntarily answer the ”Help us to help you” survey after having searched for CSAM on dark web search engines using at least one of the 179 search terms explicitly used to search for CSAM that we collected from multiple national and international law enforcement agencies.[3] The search terms were selected from existing lists in English, Russian, Spanish, and Swedish based on the criteria that they are used only to search for CSAM. When an individual conducts a search containing any of these terms on one of the three dark web search engines, they are instead provided with the option to voluntarily click on the ”Help us to help you” survey or the ”No need for help” survey, which are available to answer in 12 languages. The surveys were first developed in English and translated into 11 other languages by professionals and authorities working in the field of child protection. The translations were cross-checked to ensure that the survey questions and results were comparable across languages.

The survey was conducted on the dark web, where anonymity enables individuals to engage in illegal activities, including the distribution and use of CSAM. While the majority of CSAM is accessed through the surface web, a large portion is accessed and distributed on the dark web (Setter et al. 2021). The most popular software used to access the dark web is the Tor Browser, an open source privacy network with over 2.5 million daily users, which allows users to browse the web anonymously (The Tor Project 2021b).

The Tor network traffic is encrypted and routed through the Tor network, which hides the IP address, circumvents online censorship, and offers access to onion (hidden) services hosted on the Tor network (Dingledine, Mathewson, and Syverson 2004). The onion services are domain addresses that are not connected to any IP addresses and are thus anonymous. Tor offers the ability to operate websites anonymously, so the onion services host anonymous content. Of the 750,000 existing onion services (The Tor Project 2021a), at least 30,000 host web content that can be accessed using the Tor Browser (Nurmi 2021).

Tor is mainly used to access legal clear web content, as only 6.7% of Tor users access hidden onion services (Jardine, Lindner, and Owenson 2020). Although anonymity technologies are legal and widely used for everyday web browsing purposes, a large amount of CSAM is shared and viewed on the dark web using Tor (Setter et al. 2021). The Tor network provides privacy; it is very difficult to track Tor users or reveal the real

3. To maintain confidentiality, we do not disclose the details of the sources of the search terms.

locations of onion websites hosted on the network (Nurmi 2019). Thus there are no effective ways to shut down onion websites or prevent users from accessing them (Nurmi 2019). The Tor network itself cannot filter the content transferred because it is encrypted. A significant portion (46.6%) of the onion services are estimated to share some grey area content, ranging from the discussion of illegal activities (i.e., how to order illegal drugs) to providing illegal services (i.e., marketplaces for illegal drugs) (see Broadhurst (2021)). As of 2014, an estimated 17% of the onion services provided ”adult content,” about half of which was classified as CSAM (Spitters, Verbruggen, and Van Staalduinen 2014). For example, The Welcome to Video onion service (Broadhurst 2021), a forum that traded CSAM between July 2015 and March 2018, offered over 250,000 CSAM files (eight terabytes) and had 4,000 customers who paid with cryptocurrencies.

The surveys were shared on at least three popular dark web search engines: Ahmia.fi, OnionLand, and Onion Search Engine, which are used to search for content in the Tor network.[4] Winter et al. (2018) conducted interviews and an online survey to investigate how users find onion services. They found that ”[t]he three most popular ways that almost half of our survey participants discovered onion sites by were via (i) social networking sites such as Twitter and Reddit (48 percent), (ii) search engines such as Ahmia, (46 percent) and (iii) randomly encountering links when browsing the Web (46 percent).” Since dark web search engines (such as Ahmia) act as common entry points for Tor, we placed the surveys directly in the search engines to recruit individuals accessing CSAM on Tor. As a number of dark web search engines were contacted, it is possible that the surveys were shared on search engines in addition to the three mentioned above.

Figure 1 on the following page, a screenshot from the Ahmia search engine, depicts the results that appear when an individual tries to search for CSAM on Ahmia using one of the search terms. The individual is not shown any search results but is instead presented with links to answer the ”Help us to help you” or ”No need for help” surveys, as well as the link to the ReDirection Self-Help Program, which can be accessed through Tor.

Clicking on the ”Help us to help you” survey redirected the individual to a Webropol webpage stating that the survey is anonymous and will not collect any identifiable information from the respondents. By voluntarily clicking on the survey and answering the questions, the respondents provided implied consent to participate in the study. The respondents were not required to answer any questions in the survey and could skip any question. The survey contains 32 questions and takes approximately 15–20 minutes to complete and provides no compensation to participants. The surveys did not ask respondents to disclose any identifiable information, such as their age, nationality, or gender that would compromise participant privacy or confidentiality. Questions were intentionally phrased to avoid inquiring about specific details of criminal behavior (e.g., time, date, place, victim details). The survey asked respondents about their thoughts, feelings, and behaviors related to their use of CSAM to gather information to develop the ReDirection Self-Help Program, an anonymous rehabilitative program for CSAM users based on cognitive behavioral therapy (“International Child Sexual Exploitation database.” 2018). This program is available on the surface web and dark web in English and Spanish and appears alongside the surveys when individuals search for CSAM on dark web search engines (see Figure 1 on the next page). The program is currently being translated into additional languages to reach more individuals.

4. Ahmia.fi search is available on juhanurmihxlp77nkq76byazcldy2hlmovfu2epvl5ankdibsot4csyd.onion, OnionLand search is available on 3bbad7fauom4d6sgppalyqddsqbf5u5p56b5k5uk2zxsy3d6ey2jobad.onion, and Onion Search Engine is available on kn3hl4xwon63tc6hpjrwza2npb7d4w5yhbzq7jjewpfzyhsd65tm6dad.onion.

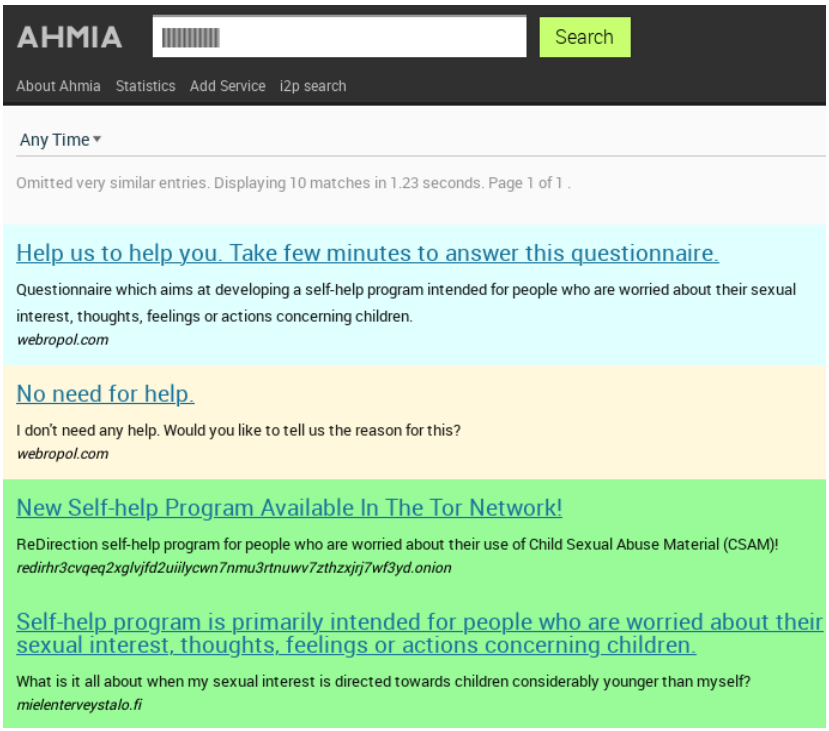

Figure 1: Screenshot of search results on Ahmia with search terms only used in the context of CSAM.

3.1 Hypotheses

The current study explores characteristics of CSAM users in order to identify potential correlations between CSAM users who self-report having feared that their use of child sexual abuse material will lead to sexual acts against children, and those who report having directly contacted children through online platforms after viewing CSAM. It tests the following hypotheses.

We expect that:

1. First exposure to CSAM at an early age will be correlated with a self-reported likelihood of contacting children after viewing CSAM.
2. Frequent and long duration of use of CSAM will be correlated with a self-reported likelihood of contacting children after viewing CSAM.
3. Use of CSAM depicting infants and toddlers aged 0–3 years will be correlated with a self-reported likelihood of contacting children after viewing CSAM.
4. The presence of predominantly sexual thoughts and sexual thoughts about children prior to searching for and viewing CSAM will be correlated with a self-reported likelihood of contacting children after viewing CSAM.
5. Experiencing negative feelings prior to using CSAM will be correlated with a self-reported likelihood of fearing that the use of CSAM will lead to sexual acts with a child.
6. Being in contact with other CSAM users will be correlated with a self-reported likelihood of contacting children after viewing CSAM.

4 Data and Methods

4.1 Sample

This paper analyses a sample of 1,546 individuals who voluntarily responded to the ”Help us to help you” survey after searching for CSAM on a dark web search engine from May, 5 2021 to October 25, 2021. The respondents answered the survey in 12 languages.[5] The majority answered in English or Spanish.

The sample for analysis was extracted from the full sample of 9,282 respondents who started answering the survey during the data collection period. From this set, we included only those who completed the survey and submitted their response (4,044) and used list-wise deletion for missing values and included only respondents with complete data on all covariates and outcomes (2,233). Additionally, we included only respondents who self-reported watching CSAM (”CSAM related to boys aged 4–13 years,” ”CSAM related to girls aged 4–13 years,” or ”CSAM related to infants and toddlers aged 0-3 years”), and excluded those who self-reported watching other material (images and videos ”related to violent or sadistic and brutal material” and ”other violent material”).[6] The final sample thus only includes individuals who explicitly self-reported using CSAM (see Table 1).

Table 1: Survey answers and individuals who explicitly self-reported using CSAM.

Opened the ”Help us to help you” survey	108,330
Started answering the ”Help us to help you” survey	9,282
Completed the ”Help us to help you” survey and submitted response	4,044
Complete data on all covariates and outcomes	2,233
Use images and videos depicting CSAM	1,546
Final Analytical Sample	1,546

4.2 Outcomes

We use two outcomes to measure the respondents’ contact seeking with children. The first is based on answers to the question ”How often after viewing CSAM/illegal material have you sought direct contact with children through online platforms?” and the second outcome on answers to the question ”I feel afraid that viewing CSAM/illegal violent material might lead to sexual acts against a child or another human.” Answers to both were scored on a five-point scale ranging from ”1 Not at all” and ”Never” to ”5 Nearly every time.” These variables are used as outcomes in linear regression models. For our bivariate analysis we recoded the variables into binary measures: 0 = those who reported never seeking contact or fearing sexual acts, 1= all others.

5. During the data collection period, the survey was available in 12 languages: Dutch, English, Estonian, Finnish, French, German, Italian, Japanese, Norwegian, Russian, Spanish, and Swedish. The survey is currently still running, now in 17 languages (additionally Arabic, Polish, Portuguese, Tagalog, and Thai).

6. Question 5 of the ”Help us to help you” survey asked the respondents what type of material they use: ”5. I use images and videos - Related to violent or sadistic and brutal material - CSAM related to boys aged 4-13 years - CSAM related to girls aged 4-13 years - CSAM related to infants and toddlers aged 0-3 years - Other violent material, what?.” Only respondents who self-reported using CSAM were included in the final analytical sample.

4.3 Covariates

Table 2 on the next page reports the distributions of all covariates used in the analysis. The first variables measure the onset, duration, and frequency of CSAM use. Onset refers to the age at which the respondent was first exposed to CSAM and is measured with a five-category scale ranging from ”13 years or under” to ”over 35 years old.” Duration of use of CSAM is scaled from ”1-4 weeks” to ”5 years or more.” Frequency is also measured with a five-category scale, ranging from ”Occasionally” to ”Daily.” The next covariates measure the type of material the respondents use and their thoughts/feelings prior to doing so. The questions distinguish between ”CSAM related to girls aged 4–13 years,” ”CSAM related to boys aged 4–13 years,” and ”CSAM relating to infants and toddlers aged 0–3 years.” Thoughts before CSAM use include five categories (”Sexual thoughts/thoughts about arousal,” ”Sexual thoughts about children/illegal material,” ”Thoughts about self-expressing,” ”Other thoughts,” and ”I have no specific thoughts”). Feelings before using CSAM use are also scored on five categories (”I feel optimistic and good about myself,” ”I feel sexually aroused/agitated,” ”I feel guilt and shame,” ”I feel depressed or anxious,” and ”Other feelings”). The final set contains two variables indicating whether the respondent has told somebody about their CSAM use, and whether/how frequently they are in contact with other CSAM users. The initial five-category variables are simplified for the regression models by combining answer categories ”Yes.”

Nearly two-thirds (65%) of respondents were first exposed to CSAM/illegal violent material when they were under the age of 18: 32% were under 13 years old, and 33% were 14–17. Approximately 22% reported that they first saw CSAM by intentionally searching for it, while 43% reported first seeing the material by accident. Almost half of the respondents reported that they have been searching for CSAM for over 1 year, and 23% view this material weekly or more often. Most respondents report searching for material depicting young girls, while 9% report searching for material depicting toddlers and very young children. Most respondents report that they usually have sexual thoughts/thoughts about sexual arousal (44%) or sexual thoughts about children/illegal material (32%) before searching for and viewing CSAM. In addition, the respondents predominantly report feeling sexually aroused/agitated before using CSAM (43%), but many report feeling optimistic (21%). Most respondents (70%) reported that they have never told anyone about their use of CSAM. A large portion (42%) of respondents said they had at least sometimes been in contact with other users of CSAM/illegal violent materials.

Table 2: Descriptive statistics.

Question	n	%
When I first saw CSAM/illegal violent material I was		
13 years old or under	492	31.8
14–17 years old	502	32.5
18–25 years old	333	21.5
26–35 years old	119	7.7
over 35 years old	100	6.5
When I first saw CSAM/illegal violent material, it was		
Accidentally	668	43.2
Through my social connections	219	14.2
After searching actively for other hard-core material	294	19.0
After searching actively for sexual CSAM / illegal material	337	21.8
Other occasion, what?	28	1.8
I have actively searched and viewed CSAM/illegal violent material for		
1–4 weeks	536	34.7
1–6 months	267	17.3
1 year	236	15.3
2 years	175	11.3
5 years or more	332	21.5
I search and view illegal violent material		
Occasionally	712	46.1
Once a month	239	15.5
Several times a month	253	16.4
Weekly	182	11.8
Daily	160	10.3
I use images and videos		
CSAM related to boys aged 4–13 years	395	25.5
CSAM related to girls aged 4–13 years	1022	66.1
CSAM related to infants and toddlers aged 0-3 years	129	8.3
What are your thoughts before you search or view CSAM/illegal violent material?		
Sexual thoughts/thoughts about sexual arousal	683	44.2
Sexual thoughts about children/illegal material	487	31.5
Thoughts about self expressing	151	9.8
Other thoughts	37	2.4
I have no specific thoughts	188	12.2
How are you feeling before you think, search or view CSAM/illegal violent material?		
I feel optimistic and good about myself	328	21.2
I feel sexually aroused/agitated	667	43.1
I feel guilt and shame	303	19.6
I feel depressed or anxious	210	13.6
Other feelings	38	2.5
Have you told anyone about your use of CSAM/illegal violent material?		
No, never	851	55.0
I have thought about telling someone	232	15.0
Yes, to a person close to me	281	18.2
Yes, anonymously	149	9.6
Yes, to whom?	33	2.1
Have you been in contact with other CSAM/illegal violent material users?		
Yes, weekly	198	12.8
Yes, monthly	172	11.1
Yes, sometimes	287	18.6
No, never	498	32.2
I do not want to be in contact with other users	391	25.3

4.4 Methods

We employ both bivariate and multivariate methods in the analysis. We start by providing descriptive statistics on the distributions of the two outcome variables. In the bivariate analysis, given that the covariates are categorical, we calculate the means of both continuous outcomes in each variable category and provide cross tabulations with the dichotomized versions of the outcomes. In a last step, we regress the two outcomes on all the chosen covariates simultaneously to see which associations persist after mutually adjusting for all covariates. The results of the linear regression models are presented with unstandardized regression coefficients, standard errors, and 95% confidence intervals.

4.5 Limitations

We acknowledge that this study suffers from at least four limitations.

1. Inevitable biases in anonymous self-report studies

The nature of an anonymous self-report survey inevitably calls the reliability of the responses into question. We must bear in mind when analyzing the results that respondents may exhibit a variety of biases. For example, there may be a downward bias on the question asking whether the respondent has ever directly contacted a child after using CSAM, as many may be unwilling to admit to illicit behavior due to the fear of discovery. Thus, the true prevalence of contacting children among CSAM users may be even higher than 42%. Seto, Hanson, and Babchishin (2011) also point out that some self-reported offenses may be false confessions. Nonetheless, the results provide valuable insights into undetected CSAM users, who may otherwise never be known or convicted.

2. Respondents' sociodemographic characteristics are unknown

Given the novelty of the research methodology, at the start of the project it was uncertain whether individuals seeking CSAM on the Tor Browser would be willing to answer a survey of this kind, due to fear of discovery (Seto, Hanson, and Babchishin 2011). Although it is possible to access the survey on Webropol anonymously using the Tor Browser, individuals may not want to visit webropol.com as it is a clear web website and requires enabled JavaScript. The survey was designed to minimize the collection of any kind of personal or demographic information that might deter users from answering due to privacy concerns. While our findings could have been more precise if we were able to control for respondents' age and sex, we did not know how the response rate would change if the survey included more detailed questions. Future methodological research should examine this tradeoff.

3. Representativeness of sample group

The sample of CSAM users reached by this survey may not accurately represent the broader population of CSAM users. The survey reached only those who searched for CSAM on certain popular Tor search engines, using search terms known to law enforcement, and thus did not reach individuals who search for and access CSAM on the surface web, or people who access CSAM through inside forums and other peer-to-peer systems rather than through dark web search engines. Additionally, as the list of search terms we used were only in four languages (English, Russian, Spanish, and Swedish), the surveys may not have reached other language areas.

4. Limitations in survey questions

As with any survey, the survey questions we analyze may be subjective; each respondent may have interpreted them differently. For example, question 17 asked respondents how

often they ”feel afraid that viewing CSAM/illegal violent material might lead to sexual acts against a child or another human”. ”Sexual acts” is not defined and thus leaves significant room for interpretation. This may affect the results, as respondents may define sexual acts differently, for example as contact vs. virtual sexual acts.

The survey results indicate that many CSAM users self-report having directly contacted children online after viewing CSAM, however we do not know the motivation behind such contact, including whether respondents intend to meet up with children when seeking contact online. This information would be important to assess the proportion of CSAM users at risk of committing contact sexual offenses in person, and those at risk of committing further sexual offenses against children online. While this information would be significant, asking the respondents to give detailed responses regarding their motivations for contacting children may dissuade them from submitting their survey responses. Further research should examine the motivations for CSAM users seeking direct contact with children online.

5 Results

5.1 Outcome Distributions

Table 3 presents the full distributions of the two outcome variables. The first outcome distribution shows that 58% of respondents self-reported that they at least rarely (i.e. ”rarely,” ”monthly,” ”weekly,” or ”nearly every time”) feel afraid that their CSAM use may lead to sexual acts, and 24% feel this way weekly or nearly every time they use CSAM. Similarly, the second outcome distribution shows that 42% of respondents self-reported that they have sought direct contact with children online after viewing CSAM/illegal violent material at least rarely (i.e. ”rarely,” ”monthly,” ”weekly,” or ”nearly every time”); 10% of respondents said they have sought direct contact with children online weekly or nearly every time after viewing CSAM/illegal violent material. The means of the outcomes (range 1–5) are 2.34 (fear sexual acts) and 1.80 (sought contact online).

The outcome distributions indicate that many online CSAM users directly approach children online after viewing CSAM/illegal violent material. An even larger share of CSAM users self-report that they are afraid that their use of CSAM may lead to sexual acts with a child or adult.

Table 3: Outcome distributions.

Question	n	%
I feel afraid that viewing CSAM/illegal violent material might lead to sexual acts against a child or another human		
Not at all	651	42.1
Rarely	327	21.2
Monthly	200	12.9
Weekly	128	8.3
Nearly every time	240	15.5
How often after viewing CSAM/illegal violent material have you sought direct contact with children online		
Never	899	58.2
Rarely	297	19.2
Monthly	191	12.4
Weekly	78	5.0
Nearly every time	81	5.2

5.2 Bivariate Associations

Table 4 on the next page presents the bivariate analyses, examining the associations between each covariate and the two outcomes one at a time. For seeking contact online after viewing CSAM/illegal violent material, all covariates except feelings before use ($p=0.842$) are associated with the outcome in a statistically significant ($p<0.05$) way based on one-way ANOVA tests. For fearing that using CSAM/illegal violent material will lead to sexual acts, onset age ($p=0.575$) and the length of CSAM use ($p=0.126$) are not significantly associated with the outcome, but all other covariates are. This suggests that the covariates are useful for distinguishing the likelihood of self-reporting seeking direct contact with children and fearing sexual acts in this group of respondents. The directions of the associations are examined further in the regression models that follow.

Table 4: Bivariate associations.

	Sought contact online		Fear sexual acts	
Question	% ever	Mean	% ever	Mean
When I first saw CSAM/illegal violent material I was				
13 years old or under	43.1	1.84	57.7	2.31
14–17 years old	32.1	1.59	55.6	2.36
18–25 years old	45.3	1.84	57.1	2.27
26–35 years old	53.8	2.03	70.6	2.50
over 35 years old	59.0	2.26	58.0	2.43
I have actively searched and viewed CSAM/illegal violent material for				
1–4 weeks	29.1	1.54	52.2	2.22
1–6 months	51.7	1.93	68.9	2.49
1 year	53.4	1.91	61.9	2.38
2 years	41.1	1.81	59.4	2.43
5 years or more	46.7	2.03	54.5	2.33
I search and view illegal violent material				
Occasionally	23.2	1.42	45.9	2.08
Once a month	57.7	1.99	67.8	2.41
Several times a month	57.3	2.05	73.1	2.60
Weekly	56.0	2.07	69.2	2.63
Daily	60.6	2.49	59.4	2.62
I use images and videos				
CSAM related to boys aged 4–13 years	51.4	1.91	60.0	2.31
CSAM related to girls aged 4–13 years	34.7	1.65	54.8	2.27
CSAM related to infants and toddlers aged 0–3 years	69.0	2.63	76.0	2.94
What are your thoughts before you search or view CSAM/illegal violent material?				
Sexual thoughts/thoughts about sexual arousal	32.4	1.60	51.1	2.17
Sexual thoughts about children/illegal material	56.1	2.04	65.1	2.46
Thoughts about self expressing	66.9	2.37	80.8	2.86
Other thoughts	45.9	2.00	59.5	2.51
I have no specific thoughts	18.6	1.40	45.2	2.21
How are you feeling before you think, search or view CSAM/illegal violent material?				
I feel optimistic and good about myself	43.3	1.82	44.8	1.93
I feel sexually aroused/agitated	41.8	1.78	58.8	2.33
I feel guilt and shame	45.5	1.80	67.0	2.58
I feel depressed or anxious	35.2	1.80	64.3	2.65
Other feelings	36.8	2.00	47.4	2.42
Have you told anyone about your use of CSAM/illegal violent material?				
No, never	23.7	1.44	43.5	2.07
I have thought about telling someone	65.9	2.15	75.9	2.53
Yes, to a person close to me	60.1	2.12	74.4	2.62
Yes, anonymously	67.1	2.48	77.9	2.91
Yes, to whom?	69.7	2.85	72.7	2.94
Have you been in contact with other CSAM/illegal violent material users?				
Yes, weekly	46.0	1.92	46.0	2.00
Yes, monthly	72.1	2.25	76.7	2.49
Yes, sometimes	63.4	2.16	70.7	2.51
No, never	34.1	1.67	51.6	2.20
I do not want to be in contact with other users	20.5	1.44	54.2	2.49

Table 5 on page 16 displays the results of the linear regression models. Starting with the results related to fearing that CSAM use may lead to sexual acts with a child or adult, higher-intensity CSAM use (i.e. searching for CSAM ”daily,” ”weekly,” ”several times a month,” or ”once a month”) is associated with a higher risk. Onset age and duration of use, however, are not associated with a higher risk. The type of CSAM used is associated with an increased fear of sexual acts after even after covariate adjustment, as those who report seeking the most extreme material (material depicting infants and toddlers) report the highest levels of fear. In line with the bivariate results, those who report having thoughts about self-expression most often fear that their use of CSAM may lead to sexual acts. Those who feel depressed or anxious, or feel guilt and shame, also have higher rates of fear. Respondents who have told somebody or thought about telling someone about their use of CSAM fear more; contact with other CSAM users is not significantly related to the outcome, while not wanting contact with online users does exhibit a significant association.

The results for the second outcome, seeking contact with children online, are mostly in line with those for the first outcome. Regarding the variables measuring CSAM use, frequency of use is the best predictor of seeking contact online. However, high onset age and long-term CSAM use are also associated with seeking contact online after mutual adjustment, but these associations are weaker than that for intensity. Seeking material depicting infants and toddlers is also associated with seeking contact online, as are thoughts about self-expressing and having sexual thoughts about children. Feelings before CSAM use are not systematically associated with seeking contact online. Those who have told somebody about their CSAM use are more likely to seek contact online. Compared to those who do not have contact with other CSAM users, individuals who do not want contact with other users report lower likelihoods of seeking contact, while those who have contact with other CSAM users also seek contact with children more often.

5.3 Hypothesis 1: First exposure to CSAM at an early age will be correlated with the self-reported likelihood of contacting children after viewing CSAM.

A majority of survey respondents reported that they were under the age of 18 when they were first exposed to CSAM (65%). Many were under 13 (32%). We hypothesized that exposure to CSAM at an early age would be associated with a higher likelihood that the CSAM user would report having directly sought contact with children online after viewing CSAM. The results do not directly support this hypothesis, as a higher onset age (i.e. ”26–35 years old” or ”over 35 years old”) is associated (after mutual adjustment) with an increased likelihood of reporting having sought direct contact with children online after viewing CSAM. The respondents mostly likely to report having sought direct contact were those who reported having first seen CSAM/illegal violent material at 26–35 years old.

5.4 Hypothesis 2: Frequent and long-term use of CSAM will be correlated with the self-reported likelihood of contacting children after viewing CSAM.

We analysed whether frequent or long-term use of CSAM correlated with self-reported likelihood of contacting children after viewing CSAM. We found that, in line with our hypothesis, higher-frequency CSAM use was associated with a greater self-reported likelihood of contacting children after viewing CSAM. We found frequency of CSAM use to be the best predictor of seeking contact online in this data.

We tested whether using CSAM for a long period of time (≥ 2 years, rather than ≤ 6 months) was associated with reports of having contacted children online. Our results indicate

that after controlling for the frequency of use, long-term CSAM use is not associated with a higher likelihood of reporting having contacted children. However, the results could differ significantly if the survey targeted CSAM users who have used such material for a longer period of time.

5.5 Hypothesis 3: Use of CSAM depicting infants and toddlers aged 0–3 will be correlated with the self-reported likelihood of contacting children after viewing CSAM.

The results support our hypothesis that the use of CSAM depicting infants and toddlers aged 0–3 years is associated with a greater likelihood of reporting having contacted children online after viewing CSAM/illegal violent material. Respondents who report using CSAM depicting infants and toddlers were the most likely to report contacting children online. The results indicate a slight difference between individuals who access CSAM depicting girls and those who use CSAM depicting boys: users viewing boys appear to be at a slightly higher risk of contacting children after viewing CSAM in the bivariate analysis. However, this difference is not significant in the fully adjusted models.

5.6 Hypothesis 4: The presence of predominantly sexual thoughts and sexual thoughts about children prior to searching for and viewing CSAM will be correlated with the self-reported likelihood of contacting children after viewing CSAM.

Our results indicate that the existence of predominantly sexual thoughts, including thoughts about children, prior to searching for and viewing CSAM is associated with self-reporting fear that the use of CSAM may lead to sexual acts, however it is not associated with contacting children after viewing CSAM/illegal violent material. Having thoughts of self-expressing had a much higher association with both outcomes.

5.7 Hypothesis 5: Experiencing negative feelings prior to using CSAM will be correlated with the self-reported likelihood of fearing that its use will lead to sexual acts against a child.

We hypothesised that experiencing negative feelings before using CSAM would be correlated with fearing that the use of CSAM/illegal violent material might lead to sexual acts with a child or adult. Respondents who felt depressed or anxious, or guilt and shame, are more likely to fear that their use of CSAM will lead them to commit sexual acts with a child or adult, which supports our hypothesis.

5.8 Hypothesis 6: Being in contact with other CSAM users will be correlated with the self-reported likelihood of contacting children after viewing CSAM.

A large portion of respondents stated that they have at least sometimes had contact with other users (42%). We hypothesised that being in contact with other CSAM users would be associated with contacting children online after viewing CSAM/illegal violent material. Respondents who reported that they had, at least occasionally, been in contact with other users were indeed at a higher risk of reporting having sought contact with children than those who reported not having been in contact with other users. However, contact with other users did not predict fearing sexual acts.

Table 5: Linear regression models.

	Fear sexual acts				Sought contact online			
Variable	b	SE	CI	Sig.	b	SE	CI	Sig.
Intercept	1.46	0.13	1.20-1.73	*	1.15	0.10	0.96-1.34	*
Onset age (ref: -13)								
14–17 years old	0.11	0.09	-0.07-0.29		-0.03	0.07	-0.16-0.10	
18–25 years old	-0.07	0.10	-0.27-0.13		0.08	0.07	-0.06-0.22	
26–35 years old	0.08	0.15	-0.20-0.37		0.12	0.11	-0.08-0.33	
over 35 years old	0.04	0.16	-0.27-0.34		0.33	0.11	0.11-0.55	*
Length of use (ref: 1-4 weeks)								
1–6 months	0.05	0.11	-0.17-0.26		0.11	0.08	-0.05-0.26	
1 year	-0.13	0.11	-0.36-0.09		0.04	0.08	-0.12-0.20	
2 years	-0.11	0.13	-0.36-0.14		-0.06	0.09	-0.24-0.12	
5 years or more	-0.18	0.10	-0.38-0.02		0.16	0.07	0.01-0.30	*
Intensity of use (ref: occasionally)								
Once a month	0.25	0.11	0.04-0.47	*	0.30	0.08	0.14-0.46	*
Several times a month	0.34	0.11	0.13-0.56	*	0.31	0.08	0.15-0.46	*
Weekly	0.44	0.12	0.19-0.68	*	0.30	0.09	0.12-0.47	*
Daily	0.51	0.13	0.26-0.76	*	0.78	0.09	0.60-0.96	*
CSAM type (ref: boys aged 4–13)								
Related to girls aged 4–13 years	-0.03	0.09	-0.20-0.14		-0.12	0.06	-0.24-0.01	
Infants and toddlers aged 0–3 years	0.32	0.15	0.03-0.61	*	0.30	0.11	0.09-0.51	*
Thoughts before use (ref: sexual thoughts about arousal)								
Sexual thoughts about children	0.16	0.09	-0.01-0.33		0.21	0.06	0.09-0.33	*
Thoughts about self expressing	0.43	0.13	0.17-0.69	*	0.43	0.10	0.24-0.62	*
Other thoughts	0.10	0.25	-0.39-0.58		0.19	0.18	-0.17-0.54	
I have no specific thoughts	-0.02	0.12	-0.26-0.22		-0.05	0.09	-0.22-0.13	
Feelings before use (ref: I feel optimistic/good)								
I feel sexually aroused/agitated	0.35	0.10	0.16-0.54	*	0.02	0.07	-0.12-0.15	
I feel guilt and shame	0.50	0.12	0.27-0.73	*	-0.01	0.08	-0.18-0.15	
I feel depressed or anxious	0.64	0.13	0.38-0.90	*	0.10	0.10	-0.09-0.29	
Other feelings	0.38	0.25	-0.12-0.88		0.27	0.18	-0.09-0.63	
Told anyone about CSAM use (ref: no)								
I have thought about telling someone	0.36	0.11	0.14-0.58	*	0.43	0.08	0.27-0.58	*
Yes	0.50	0.09	0.33-0.68	*	0.53	0.06	0.41-0.66	*
Contact with other CSAM users (ref: no)								
I do not want to contact other users	0.28	0.10	0.09-0.47	*	-0.14	0.07	-0.28-0.00	*
Yes	-0.03	0.09	-0.20-0.15		0.18	0.06	0.06-0.31	*

b = Unstandardized regression coefficient, SE = Standard error, CI = 95% Confidence interval, Sig. = p-value<0.05

6 Discussion

The results of our study are relatively consistent with those of previous research, as we found that 42% of respondents (within a sample of individuals searching for CSAM on the dark web) admitted to having directly contacted a child online. This is similar to Seto, Hanson, and Babchishin (2011)'s meta-analysis, which found that 55% of CSAM offenders admitted to contact sexual offense in self-report studies.

We hypothesized that individuals who had first been exposed to CSAM at a young age would be more likely to report having contacted children online. This hypothesis was theoretically motivated by previous research (see Burgess et al. (1986); Eke, Seto, and Williams (2011)) suggesting that early exposure to CSAM or a first conviction at a young age may be correlated with the likelihood of committing contact sexual offenses against children in the future. Eke, Seto, and Williams (2011)) found that "younger offender age at the time of first arrest or conviction" was a significant predictor of future detected offending (Eke, Seto, and Williams (2011), p. 156). Such research suggests that viewing CSAM at a young age places individuals on a behavioral pathway towards more extreme offending, including contacting children and potentially committing hands-on contact offenses. Exposure to CSAM at a young age can be defined as an adverse childhood experience that has a potentially far-reaching negative and harmful impact on wellbeing and development. The onset of mental health disorders often occurs in early childhood and adolescence (Kessler et al. 2007), and as all childhood abuse (physical, emotional, and sexual) is associated with at least one dimension of psychopathology, early exposure to CSAM is likely to lead to trauma-related mental disorders (e.g., acute stress disorder, post-traumatic stress disorder) (Keyes et al. 2012), which in adolescence have been found to increase the likelihood of violent offending (Peltonen et al. 2020).

Alternatively, early exposure to CSAM may act as an *indicator* for future offending rather than a causal factor. Previous research on the etiology of CSAM offenders suggests that early CSAM use may act as a risk factor for future offending for individuals who meet the criteria of pedophilia, but not for those whose onset resulted from reckless or impulsive behaviour (Seto and Ahmed 2014). While our results did not directly support this hypothesis, as discussed in the limitations, this finding might be different if we could control for respondents' age and sex. Future research should address the complexity of this question.

We hypothesized that being in contact with other CSAM users would be associated with a higher likelihood of reporting having contacted children directly online. We examined whether being in contact with other users acts as a causal risk factor and/or a correlational indicator for CSAM users directly contacting children online. Being in contact with other CSAM users may reinforce the cognitive distortions surrounding the viewing, distribution, and creation of CSAM as well as contacting children for sexual purposes (see the findings of McCarthy (2010)), and could indicate a deeper involvement with CSAM that may be linked to a higher risk of contacting children. The results indicate that respondents who said they had, at least occasionally, been in contact with other users were at a higher risk of reporting having contacted children online after viewing CSAM/illegal violent material. This finding may be theoretically explained in part by traditional social psychology research on social identity and intergroup behavior (see Tayfel and Turner (1986); Milgram (1965)), which when applied to this issue suggests that CSAM users who satisfy their need for social connection and belonging in communities and forums of other like-minded individuals are at greater risk of aggressive behavior and committing crimes of sexual violence against children, as their peers normalize and strongly accept their pro-offending behavior (O'Halloran and Quayle 2010; Holt, Blevins, and Burkert 2010). Thus, the desensitization and normalization that comes from groups of CSAM

users may increase the risk that these individuals will commit further sexual offenses against children (Quayle and Taylor (2003), p. 104). Reinforcing the cognitive distortions and receiving support from like-minded individuals may in turn encourage CSAM users to contact children directly. Thus, we highlight the danger of groups of CSAM users joining communities and encouraging and endorsing each other's illicit behavior.

7 Conclusion

The creation, use, and distribution of CSAM is an urgent public health and human rights crisis. Not only do individuals using CSAM harm children depicted in the material; they are also at risk of directly contacting children and committing further sexual violence against them online and offline. Nearly half (42%) of respondents to the "Help us to help you" survey reported that they had sought direct contact with children through online platforms after viewing CSAM, and 23% said they seek contact with children at least monthly. Additionally, 58% reported feeling afraid that viewing CSAM might lead to sexual acts with a child or adult; 37% felt that way monthly, weekly, or daily.

We found that higher-frequency CSAM users, those with a higher onset age, users who view CSAM depicting toddlers and infants, those who have thoughts of self-expressing, and users in contact with other CSAM users were all more likely to self-report that they had attempted to contact children online after viewing CSAM/illegal violent material. These factors are largely consistent with prior research on the relationship between CSAM use and contact offending against children (see Seto, Hanson, and Babchishin (2011); Eke, Seto, and Williams (2011); McCarthy (2010)), indicating that the factors associated with CSAM users contacting children online are similar to the those for contact offending against children. These results provide significant insights into the link between CSAM use and directly contacting children online, which are valuable for the protection of children from abhorrent crimes of sexual violence.

References

Babchishin, Kelly M, R Karl Hanson, and Chantal A Hermann. 2011. "The characteristics of online sex offenders: A meta-analysis." *Sexual Abuse* 23 (1): 92–123. https://doi.org/10.1177/1079063210370708.

Bourke, Michael L, and Andres E Hernandez. 2009. "The 'Butner Study'redux: A report of the incidence of hands-on child victimization by child pornography offenders." *Journal of Family Violence* 24 (3): 183–91. https://doi.org/10.1007/s10896-008-9219-y.

Broadhurst, Roderic. 2021. "Submission to the Parliamentary Joint Committee on Law Enforcement Inquiry into Criminal Activity and Law Enforcement during the COVID-19 Pandemic." *Australian Parliamentary Joint Commission on Law Enforcement: submissions on crime during the Covid-19 pandemic,* https://doi.org/10.2139/ssrn.3939974.

Burgess, Ann W, Carol R Hartman, Robert K Ressler, John E Douglas, and Arlene McCormack. 1986. "Sexual homicide: A motivational model." *Journal of Interpersonal Violence* 1 (3): 251–72. https://doi.org/10.1177/088626086001003001.

Canadian Centre for Child Protection. 2017. "Survivors' Survey Full Report 2017." Accessed October 11, 2021. https://www.protectchildren.ca/pdfs/C3P_SurvivorsSurveyExecutiveSummary2017_en.pdf.

Carr, Angela. 2013. "The social dimension of the online trade of child sexual exploitation material." In *Understanding and preventing online sexual exploitation of children,* 112–31. Routledge.

Dingledine, Roger, Nick Mathewson, and Paul F Syverson. 2004. "Tor: The Second-Generation Onion Router." In *Proceedings of the 13th USENIX Security Symposium,* 303–20.

Eke, Angela W, Michael C Seto, and Jennette Williams. 2011. "Examining the criminal history and future offending of child pornography offenders: An extended prospective follow-up study." *Law and human behavior* 35 (6): 466. https://doi.org/10.1007/s10979-010-9252-2.

Elliott, Ian A, and Anthony R Beech. 2009. "Understanding online child pornography use: Applying sexual offense theory to internet offenders." *Aggression and Violent Behavior* 14 (3): 180–93. https://doi.org/10.1016/j.avb.2009.03.002.

Endrass, Jérôme, Frank Urbaniok, Lea C Hammermeister, Christian Benz, Thomas Elbert, Arja Laubacher, and Astrid Rossegger. 2009. "The consumption of Internet child pornography and violent and sex offending." *BmC Psychiatry* 9 (1): 1–7. https://doi.org/10.1186/1471-244X-9-43.

EUROPOL. 2020. "Internet Organized Crime Threat Assessment (IOCTA)." Accessed November 1, 2021. https://www.europol.europa.eu/activities-services/main-reports/internet-organised-crime-threat-assessment-iocta-2020.

Faust, Erik, William Bickart, Cheryl Renaud, and Scott Camp. 2015. "Child pornography possessors and child contact sex offenders: A multilevel comparison of demographic characteristics and rates of recidivism." *Sexual Abuse* 27 (5): 460–78. https://doi.org/10.1177/1079063214521469.

Greijer, Susanna, and Jaap Doek. 2016. "Terminology guidelines for the protection of children from sexual exploitation and sexual abuse." *Bangkok: ECPAT International,* 150. Accessed November 1, 2021. https://www.unicef.org/media/66731/file/Terminology-guidelines.pdf.

Henshaw, Marie, James RP Ogloff, and Jonathan A Clough. 2017. "Looking beyond the screen: A critical review of the literature on the online child pornography offender." *Sexual Abuse* 29 (5): 416–45. https://doi.org/10.1177/1079063215603690.

Holt, Thomas J, Kristie R Blevins, and Natasha Burkert. 2010. "Considering the pedophile subculture online." *Sexual Abuse* 22 (1): 3–24. https://doi.org/10.1177/1079063209344979.

Insoll T, Ovaska AK, and Vaaranen-Valkonen N. 2021. "CSAM Users in the Dark Web: Protecting Children Through Prevention." Accessed November 1, 2021. https://perma.cc/M7E7-9YBS.

"International Child Sexual Exploitation database." 2018. Accessed November 1, 2021. https://www.mielenterveystalo.fi/aikuiset/itsehoito-ja-oppaat/itsehoito/redirection/Pages/default.aspx.

INTERPOL. 2021. "International Child Sexual Exploitation database." Accessed November 1, 2021. https://www.interpol.int/Crimes/Crimes-against-children/International-Child-Sexual-Exploitation-database.

Jardine, Eric, Andrew M Lindner, and Gareth Owenson. 2020. "The potential harms of the Tor anonymity network cluster disproportionately in free countries." *Proceedings of the National Academy of Sciences* 117 (50): 31716–21. Accessed October 18, 2021. https://doi.org/10.1073/pnas.2011893117.

Kessler, Ronald C, Matthias Angermeyer, James C Anthony, RON De Graaf, Koen Demyttenaere, Isabelle Gasquet, Giovanni De Girolamo, Semyon Gluzman, OYE Gureje, Josep Maria Haro, et al. 2007. "Lifetime prevalence and age-of-onset distributions of mental disorders in the World Health Organization's World Mental Health Survey Initiative." *World psychiatry* 6 (3): 168.

Keyes, Katherine M, Nicholas R Eaton, Robert F Krueger, Katie A McLaughlin, Melanie M Wall, Bridget F Grant, and Deborah S Hasin. 2012. "Childhood maltreatment and the structure of common psychiatric disorders." *The British Journal of Psychiatry* 200 (2): 107–15. https://doi.org/10.1192/bjp.bp.111.093062.

Long, Matthew L, Laurence A Alison, and Michelle A McManus. 2013. "Child pornography and likelihood of contact abuse: A comparison between contact child sexual offenders and noncontact offenders." *Sexual Abuse* 25 (4): 370–95. https://doi.org/10.1177/1079063212464398.

McCarthy, Jennifer A. 2010. "Internet sexual activity: A comparison between contact and non-contact child pornography offenders." *Journal of sexual aggression* 16 (2): 181–95. https://doi.org/10.1080/13552601003760006.

McManus, Michelle Ann, Matthew L Long, Laurence Alison, and Louise Almond. 2015. "Factors associated with contact child sexual abuse in a sample of indecent image offenders." *Journal of Sexual Aggression* 21 (3): 368–84. https://doi.org/10.1080/13552600.2014.927009.

Merdian, Hannah L, Nima Moghaddam, Douglas P Boer, Nick Wilson, Jo Thakker, Cate Curtis, and Dave Dawson. 2018. "Fantasy-driven versus contact-driven users of child sexual exploitation material: Offender classification and implications for their risk assessment." *Sexual Abuse* 30 (3): 230–53. https://doi.org/10.1177/1079063216641109.

Milgram, Stanley. 1965. "Some conditions of obedience and disobedience to authority." *Human relations* 18 (1): 57–76. https://doi.org/10.1177/001872676501800105.

Missing, National Center for, and Exploited Children. 2021. "NCMEC. CyberTipline." Accessed November 1, 2021. https://www.missingkids.org/gethelpnow/cybertipline.

Motivans, Mark, and Tracey Kyckelhahn. 2007. *Federal prosecution of child sex exploitation offenders, 2006.* US Department of Justice, Office of Justice Programs, Bureau of JusticeS tatistics. Accessed November 1, 2021. https://bjs.ojp.gov/library/publications/federal-prosecution-child-sex-exploitation-offenders-2006.

Nurmi, Juha. 2019. "Understanding the Usage of Anonymous Onion Services: Empirical Experiments to Study Criminal Activities in the Tor Network."

———. 2021. Accessed October 11, 2021. https://ahmia.fi/onions/.

O'Halloran, Elaine, and Ethel Quayle. 2010. "A content analysis of a "boy love" support forum: Revisiting Durkin and Bryant." *Journal of Sexual Aggression* 16 (1): 71–85. https://doi.org/10.1080/13552600903395319.

Peltonen, Kirsi, Noora Ellonen, Joonas Pitkänen, Mikko Aaltonen, and Pekka Martikainen. 2020. "Trauma and violent offending among adolescents: a birth cohort study." *J Epidemiol Community Health* 74 (10): 845–50. https://doi.org/10.1136/jech-2020-214188.

Quayle, Ethel. 2008. "The COPINE project." *Irish Probation Journal* 5 (9): 65–83.

Quayle, Ethel, and Max Taylor. 2003. "Model of problematic Internet use in people with a sexual interest in children." *CyberPsychology & Behavior* 6 (1): 93–106. https://doi.org/10.1089/109493103321168009.

Ray, James V, Eva R Kimonis, and Christine Donoghue. 2010. "Legal, ethical, and methodological considerations in the Internet-based study of child pornography offenders." *Behavioral sciences & the law* 28 (1): 84–105. https://doi.org/10.1002/bsl.906.

Seigfried-Spellar, Kathryn C, Marcus K Rogers, Julia T Rayz, Shih-Feng Yang, Kanishka Misra, and Tatiana Ringenberg. 2019. "Chat Analysis Triage Tool: Differentiating contact-driven vs. fantasy-driven child sex offenders." *Forensic science international* 297:e8–e10. https://doi.org/10.1016/j.forsciint.2019.02.028.

Seto, Michael C, and Adekunle G Ahmed. 2014. "Treatment and management of child pornography use." *Psychiatric Clinics of North America* 37 (2): 207–14. https://doi.org/10.1016/j.psc.2014.03.004.

Seto, Michael C, and Angela W Eke. 2005. "The criminal histories and later offending of child pornography offenders." *Sexual abuse: a journal of research and treatment* 17 (2): 201–10. https://doi.org/10.1007/s11194-005-4605-y.

Seto, Michael C, Karl R Hanson, and Kelly M Babchishin. 2011. "Contact sexual offending by men with online sexual offenses." *Sexual Abuse* (Los Angeles, CA) 23 (1): 124–45. https://doi.org/10.1177/1079063210369013.

Setter, Chloe, Natalia Greene, Nick Newman, and Jack Perry. 2021. "Global Threat Assessment." Accessed December 21, 2021. https://www.weprotect.org/global-threat-assessment-21/.

Spitters, Martijn, Stefan Verbruggen, and Mark Van Staalduinen. 2014. "Towards a comprehensive insight into the thematic organization of the tor hidden services." In *2014 IEEE Joint Intelligence and Security Informatics Conference,* 220–23. IEEE. https://doi.org/10.1109/JISIC.2014.40.

Tayfel, Henri, and John Christopher Turner. 1986. "The social identity theory of intergroup behaviour." *Psychology of intergroup relations,* 7–24.

Taylor, Max, Gemma Holland, and Ethel Quayle. 2001. "Typology of paedophile picture collections." *The Police Journal* 74 (2): 97–107. https://doi.org/10.1177/0032258X0107400202.

The Tor Project. 2021a. "Onions, Tor Project Metrics." Accessed October 11, 2021. https://metrics.torproject.org/hidserv-dir-onions-seen.html.

———. 2021b. "Users, Tor Project Metrics." Accessed October 11, 2021. https://metrics.torproject.org/userstats-relay-country.html.

Winter, Philipp, Anne Edmundson, Laura M Roberts, Agnieszka Dutkowska-Żuk, Marshini Chetty, and Nick Feamster. 2018. "How do Tor users interact with onion services?" In *27th {USENIX} Security Symposium ({USENIX} Security 18),* 411–28.

Wolak, Janis, David Finkelhor, and Kimberly J Mitchell. 2009. "Trends in Arrests of Online Predators," accessed November 1, 2021. https://scholars.unh.edu/ccrc/52/.

Wortley, Richard, and Stephen Smallbone. 2012. *Internet child pornography: Causes, investigation, and prevention.* Santa Barbara, CA: Praeger, an imprint of ABC-CLIO, LLC.

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Ethical Standards

We do not collect data that would permit the identification of a survey respondent.

Keywords

child sexual abuse material; CSAM; child sexual exploitation; CSE; child sexual abuse; CSA; OCSEA; Tor; anonymity networks.

Appendices

Appendix A: Survey Questions



1. When I first saw CSAM/illegal violent material I was
- 13 years old or under
- 14-17 years old
- 18-25 years old
- 26-35 years old
- over 35 years old

2. When I first saw CSAM/illegal violent material, it was
- Accidentally
- Through my social connections
- After searching actively for other hard-core material
- After searching actively for sexual CSAM / illegal material
- Other occasion, what?

3. I have actively searched and viewed CSAM/illegal violent material for
- 1-4 weeks
- 1-6 months
- 1 year
- 2 years
- 5 years or more

4. I search and view illegal violent material
- Occasionally
- Once a month
- Several times a month
- Weekly
- Daily

5. I use images and videos
- Related to violent or sadistic and brutal material
- CSAM related to boys aged 4-13 years
- CSAM related to girls aged 4-13 years
- CSAM related to infants and toddlers aged 0-3 years
- Other violent material, what?

6. The time I usually search and view illegal violent material
- 7 am - 12 pm
- 1 pm - 3 pm
- 4 pm - 8 pm
- 9 pm - 12 am
- 01 am - 6 am

7. I would like to stop searching and viewing CSAM/illegal violent material
- Not at all
- I have not thought about it
- Weekly
- Monthly
- Nearly every time

8. I have tried to stop searching and viewing CSAM/illegal violent material
- Not at all
- Daily
- Weekly
- Monthly
- Nearly every time

9. When thinking of searching for CSAM/illegal violent material, is there something that stopped you from doing it?
- Negative feelings (guilt and shame)
- Negative thoughts
- Self control
- Unfavourable situation
- Other, what?

10. When actively viewing CSAM/illegal violent material, is there something that has made you stop?
- No, I have not been able to stop
- Negative thoughts and feelings
- Self control
- Unfavourable situation
- Other, what?

11. I watch livestreamed CSAM (multiple choices possible)
- No
- Yes, livestreaming of boys aged 4-13 years
- Yes, livestreaming of girls aged 4-13 years
- Yes, livestreaming of infants and toddlers aged 0-3 years
- Yes, livestreaming of other violent material, what?

Over the past 4 weeks how often have you been bothered by any of the following problems you have when thinking, searching or using CSAM/illegal violent material?

12. What are your thoughts before you search or view CSAM/illegal violent material?
- Sexual thoughts/thoughts about sexual arousal
- Sexual thoughts about children/illegal material
- Thoughts about self expressing
- Other thoughts, what?
- I have no specific thoughts

13. How are you feeling before you think, search or view CSAM/illegal violent material?
- I feel optimistic and good about myself
- I feel sexually aroused/agitated
- I feel guilt and shame
- I feel depressed or anxious
- Other feelings, what?

14. What are you usually doing before you think, search or view CSAM/illegal violent material?
- I usually drink or use drugs
- I masturbate or stimulate myself in other ways
- I am in direct contact with children through an online platform chat or otherwise
- I engage socially with like minded individuals or use other hard core material
- I usually...

15. In what situations do you usually think, search for or view CSAM/illegal violent material?
- At home
- At work
- When I am alone
- When I am in social interaction through online platforms (chat or other)?
- Other situations, what?

16. I feel that I am not able to stop or control my behavior in searching/viewing CSAM/illegal violent material
- Never
- Rarely
- Monthly
- Weekly
- Nearly every time

17. I feel afraid that viewing CSAM/illegal violent material might lead to sexual acts against a child or another human
- Not at all
- Rarely
- Monthly
- Weekly
- Nearly every time

18. How often has viewing CSAM/illegal violent material made you think about seeking direct contact with children through online platforms (chat or other)?
- Never
- Rarely
- Monthly
- Weekly
- Nearly every time

19. How often after viewing CSAM/illegal violent material have you sought direct contact with children through online platforms (chat or other)?
- Never
- Rarely
- Monthly
- Weekly
- Nearly every time

20. Have you had any self-harming thoughts or suicide attempts?
- Never
- Sometimes
- Regularly
- All the time
- I have tried to harm/kill myself

21. Have you told anyone about your use of CSAM/illegal violent material?
- No never
- I have thought about telling someone
- Yes, to a person close to me
- Yes, anonymously
- Yes, to whom?

22. Have you experienced any difficulties related to your use of CSAM/illegal violent material?
- Not at all
- Yes, difficulties in close relationships
- Yes, difficulties with substance abuse
- Yes, difficulties with my mental health
- Yes, other difficulties, what?

23. Have you experienced difficulties in coping with your stress and emotions after viewing the CSAM/illegal violent material?
- Not at all
- Rarely
- Monthly
- Weekly
- Nearly every time

24. Have you experienced difficulties in carrying out your ordinary daily routine and activities?
- Not at all
- Yes, sometimes
- Yes, monthly
- Yes, weekly
- Yes, daily

25. Have you experienced desires to withdraw socially, for example through avoidance of social situations, feeling better in solitude?
- Not at all
- Yes, sometimes
- Monthly
- Weekly
- Nearly every day

26. Have you been in contact with other CSAM/illegal violent material users?
- Yes, weekly
- Yes, monthly
- Yes, sometimes
- No, never
- I do not want to be in contact with other users

27. Have you been affected by the feelings, thoughts, or behaviors of other CSAM/illegal violent material users?
- Not at all
- Yes, it has had a slight effect on my feelings, thoughts, and behavior
- Yes, it has had a moderate effect on my feelings, thoughts, and behavior
- Yes, it has had a strong effect on my feelings, thoughts, and behavior
- I am not in contact with other users

28. Have you sought help to stop searching, using or sharing CSAM/illegal violent material?
- No never
- I have thought about getting help
- I am afraid to seek help
- I have, but did not get any help
- I have and I got help. What kind of help?

29. How would you describe yourself?
- I am...

30. How do you see your future?
- I am full of hope about my future
- I am not particularly pessimistic or discouraged about the future
- I feel discouraged about the future
- I feel that I have nothing to look forward to
- I feel that the future is hopeless and that things cannot improve

31. Help us to help you?
If you have tried to stop using and sharing CSAM/illegal violent material and got back to using it, could you tell us 3 reasons why you have not succeeded?
What would help you to stop using and sharing CSAM/illegal violent material?

32. How are you feeling after answering this survey?
- I have no specific feelings
- I feel nervous/anxious
- I feel worried/irritated
- I have feelings of guilt and shame
- I have other feelings, what?

Figure 2: Compressed overview of the online questionnaire.