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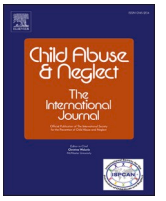

Accessing child sexual abuse material: Pathways to offending and online behaviour

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ABSTRACT

Background: Most research examining the consumption of online child sexual abuse material (CSAM) has focused on offenders' demographic and psychological characteristics. While such research may assist in the development of therapeutic interventions with known offenders, it has little to offer the development of interventions for the vast majority of offenders who are never caught.
Objective: To learn more about the offending strategies of CSAM offenders, in order to inform prevention efforts to deter, disrupt, and divert individuals from their pursuit of CSAM.
Participants & setting: Seventy-five male CSAM offenders, who were living in the community and were voluntarily participating in a treatment programme.
Methods: Participants completed a detailed self-report questionnaire focussing on their pathways to offending and their online behaviour.
Results: Most participants reported that they did not initially seek out CSAM but that they first encountered it inadvertently or became curious after viewing legal pornography. Their involvement in CSAM subsequently progressed over time and their offending generally became more serious. The most notable feature of participants' online behaviour was the relative lack of sophisticated technical expertise. Opportunity and other situational factors emerged as mediators of offending frequency. Offending patterns were affected by participants' psychological states (e.g., depression, anger, stress), offline relationships and commitments (e.g., arguments with spouse, loss of job), and online experiences (e.g., blocked sites, viruses, warning messages).
Conclusions: Findings suggest that many offenders are receptive to change and may be potentially diverted from their offending pathway.

1. Introduction

The Internet has revolutionised the way that many crimes are committed and, correspondingly, the way that we must respond to those crimes. In the case of the consumption of child sexual abuse material (CSAM), we have gone from a pre-Internet situation where a report to US Congress could confidently claim that 'the principal Federal agencies responsible for enforcing laws covering the distribution of child pornography … do not consider child pornography a high priority' (Ahart, 1982, p. 7), to one where the WeProtect Global Alliance Against Child Sexual Exploitation has described the proliferation of online CSAM as a 'tsunami' (WeProtect, 2019, p.

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2). The Internet has allowed individuals, who in pre-Internet times would not have had the wherewithal to access CSAM, to satisfy even a passing curiosity about CSAM with 'a click of a mouse' (Quayle, 2012, p, 110). Research on adult community samples has reported prevalence rates for having viewed online CSAM of between 2 % and 5 % (Brown, 2023; Dombert et al., 2016; Seigfried-Spellar & Rogers, 2013; Seto et al., 2015). While directly extrapolating from this research to the general population is problematic, these figures suggest that the number of CSAM offenders can be conservatively counted in the millions globally. The sheer volume of offenders simply overwhelms law enforcement's capacity to respond in terms of the traditional criminal justice model of detect, arrest, and prosecute (e.g., Johnson, 2017). The vast majority of offenders will never be identified much less brought to justice. The best option for law enforcement agencies is to triage cases and concentrate their resources on the most serious offenders (Franqueira et al., 2018; Giles & Alison, 2021; Wilson-Kovacs et al., 2022). In doing so, there remains an enormous pool of CSAM offenders for whom other response strategies are desperately needed.

The challenges faced by law enforcement have major implications for researchers of CSAM. To date, most research on online CSAM offenders has sought to replicate the methods typically applied to contact offenders, namely, identifying the psycho-social characteristics of offenders presumed to drive their offending (Babchishin et al., 2015; Seto & Eke, 2015). The aim of such research is to develop interventions that might by applied to tackle offending propensity via therapeutic interventions (Beier et al., 2015; Ly et al., 2018; Seto & Ahmed, 2014). While potentially useful for helping to deal with offenders who do come into the criminal justice system or who independently seek therapeutic help, this research is less useful in guiding what to do with those online offenders who will forever remain anonymous and at-large. If, as we contend, the exponential growth of CSAM in the digital age is a consequence of the easy opportunities of offending offered by the Internet, then prevention efforts need to explore ways to reduce those opportunities. We need to develop strategies that deter, disrupt, or divert potential offenders as they seek to access CSAM (Prichard, Scanlan, et al., 2022a, Prichard, Wortley, et al., 2022b; Quayle, 2020; Wortley, 2012; Wortley & Smallbone, 2006, 2012). Informing such efforts requires a shift in research focus from *who* the offenders are to *what* offenders do.

There is a small but growing body of research that is directed at understanding CSAM offenders' online behaviour. This research has been broadly directed at answering two questions. First, how do individuals first become involved in CSAM offending? Second, what strategies do they employ online to access CSAM and avoid detection?

1.1. *Offending pathways*

Every CSAM offender must have a first offence. How offending onset occurs and subsequent engagement with CSAM progresses are matters of theoretical and practical interest. This issue is significant because, to the extent that engagement with CSAM is a progressive process, attention should be given to intervening early in the pathway before an individual's offending behaviour becomes entrenched.

Self-report interview and survey studies on CSAM offenders indicate that many do not initially have a strong sexual interest in children (Bailey et al., 2022; Knack et al., 2020; Merdian et al., 2013; Morgan & Lambie, 2019; Quayle & Taylor, 2004; Seto et al., 2010). Participants often report first stumbling across CSAM on the Internet or seeking out CSAM primarily out of curiosity. The ease of accessing CSAM online is commonly raised by participants as a significant contributing factor to their offending. From initial exposure to CSAM, participants typically describe a pattern of habituation and escalation (Bailey et al., 2022; Fortin & Proulx, 2019; Merdian et al., 2018; Quayle & Taylor, 2004; Seigfried-Spellar & Rogers, 2013). As they become bored with their current diet of CSAM they seek out new experiences. The children portrayed in the CSAM may become younger and the sexual behaviours more extreme, while the time spent accessing CSAM and the amount of CSAM downloaded may increase. As they become more deeply immersed in CSAM, participants may report experiencing bouts of shame and self-estrangement, leading to periodic (though too-often short-lived) attempts at desistance.

Two main Internet 'gateways' to CSAM have been proposed – 'barely legal' pornography and embedded CSAM in legal adult pornography sites. Barely legal pornography involves the use of actresses who are legally over 18 years but may look younger. Dines (2009) refers to barely legal pornography as 'pseudo-child pornography' (p. 124). Actresses typically have small physiques, assume child-like behaviours, present as sexual-inexperienced, fake vaginal bleeding, and dress in child-oriented costumes (Peters et al., 2014). Barely legal and other youth-themed pornography (typically tagged as 'teen', 'young', '18' etc) are ubiquitous and popular on legal pornography sites. In addition, genuine CSAM can find its way onto legal sites (Iati, 2021). Major pornography companies such as Pornhub do not produce pornography, but rather they host videos and photos uploaded by 'content creators'. This provides opportunities for individuals to embed CSAM among legal pornography and this puts the onus on the site owners to identify and take down illegal content. Pornhub (2021) reported that they had identified more than twenty-thousand videos and photos as potential CSAM in one year, representing 0.6 % of the total site content, and that they were taking additional steps to cleanse their site of CSAM (see Scanlan et al., 2024).

1.2. *Online behaviour*

Research on online offending behaviour seeks to uncover the strategies that offenders use to access CSAM and to avoid detection. Understanding offending strategies and patterns of behaviour may provide clues on what countermeasure can be put in place to thwart individuals in their pursuit of CSAM.

Merdian et al. (2018) surveyed 39 convicted CSAM offenders recruited from sex offender treatment programmes in New Zealand. The survey included questions on the participants' Internet behaviour and the content of CSAM accessed. The preferred CSAM media were digital images (82 %), followed by digital videos (59 %), and digital texts (46 %). Two-thirds of participants preferred female victims, while around a quarter of participants had a preference for young children and infants. Most participants (62 %) accessed

CSAM because they found the material sexually arousing, while other reasons included to relieve stress (28 %) and out of curiosity (26 %). Surprisingly, only around one-third of participants said that they had a sexual interest in children. Most CSAM was accessed on the open web (62 %), followed by file-sharing (36 %), and newsgroups (26 %). Less than a quarter of participants paid for CSAM and around a third were in contact with other offenders. Just under half of participants said that they spent in excess of 10 h per week accessing CSAM.

Steel et al. (2021, 2022a, 2023) reported the findings from an online survey of 78 adults convicted of CSAM offences in the US. Steel et al. (2021) examined collecting behaviour of participants. They found that most participants maintained collections, although the majority (78 %) did not organise their downloads in any systematic way. Three-quarters of participants had deleted their entire collection at least once in an attempt to quit. Steel et al. (2022a) examined the technical behaviours of offenders. They found that peer-to-peer (P2P) (46 %), the open web (30 %) and the dark web (7 %) were the most common platforms for accessing CSAM, while desktop computers (59 %), laptops (58 %), and smartphones (27 %) were the most common devices employed. The most common security strategies were deleting browsing history (86 %), erasing the hard drive or storage device (26 %), using a VPN (26 %), creating accounts with a fake name (26 %) and encrypting files (18 %). Finally, Steel et al. (2023) examined participants' technical abilities. The largest group of participants (44%) rated themselves as 'casual users', defined as the 'ability to use most computer services and technologies without assistance', while around a third rated themselves as 'power users' who 'frequently use most computing technologies'. The computer skill profile of the offender sample was broadly similar to that of a non-offender comparison group, challenging the perception that CSAM offenders as especially technically savvy.

Bailey et al. (2022) conducted semi-structured interviews with 20 men attending a community-based treatment programme for CSAM offenders in the UK. In addition to offending onset and progression covered in the previous section, the interviews explored methods used for accessing CSAM, factors that triggered or otherwise facilitated participants' illegal online behaviour, and factors that discouraged them from offending. The most common search strategy was to use standard search engines, followed by file sharing, and progressively clicking links. Their choice of site was determined by how risky the site was judged to be, and how easy it was to access. Most avoided pay sites, not just because of the expense and extra effort involved, but because these sites were thought to be riskier. Situational triggers for accessing CSAM (i.e., once an offending pattern had become established) included feeling bored or stressed, having relational problems, viewing legal pornography, and in some cases, just being online. A number of distorted perceptions and thinking patterns appeared to sustain offending. While all participants understood accessing graphic CSAM was illegal, some expressed uncertainly about the legal status of 'lower level' images (e.g., nudist). A quarter of participants comforted themselves with the belief that CSAM is a victimless crime. And while participants were aware that their offending attracted legal sanctions, some were naive about how severe these were (e.g., being placed on a sex offender register), or the impact of their arrest on their family. Finally, participants were asked about preventing CSAM (re-)offending. Suggestions included: support from loved ones, including keeping the offender accountable; controlling Internet access, for example, installing monitoring software; pop-up warning messages when someone is about to enter an illegal site; greater efforts by ISPs and other agencies in blocking access to CSAM; physical environmental barriers to offending, for example, having people around when accessing the computer; and providing more information on where to seek help.

Most recently, Nurmi et al. (2024) examined the online behaviour and self-reported experiences of CSAM users on dark web's Tor network. Arguably, Tor is utilised by the most determined and technically sophisticated CSAM offenders. Examining more that 110 million search sessions, the researchers found that around 11 % of searches were for CSAM, while around 20 % of Tor websites share CSAM. Searches for girls outnumbered searches for boys by a ratio of 7:3, while more than half of searches targeted 12- to 16-year-olds, with the percentage of searches decreasing as the child's age decreased. The most popular age-related search term was 'Lolita', accounting for nearly a third of searches, followed by 'teen' and 'preteen'. A self-report survey distributed on the Tor network received over eleven thousand responses. Nearly two thirds of respondents reported that they we first exposed to CSAM before the age of 18 years. Around half said that their initial exposure was accidental and only 16 % reported that they had actively sought CSAM. Nearly two-thirds of respondents had tried to stop using CSAM, although just 14 % reported having sought help to stop.

1.3. CSAM, routine activities, and situational prevention

Two perspectives from environmental criminology – routine activities approach (RAA) (Cohen & Felson, 1979) and situational crime prevention (SCP) (Clarke, 2017; Cornish & Clarke, 2003) – are useful for understanding the online behaviour of CSAM offenders and how to respond to it. RAA and SCP are examples of opportunity theories. They are based on the principle that all behaviour is the result of a person-situation interaction; the immediate environment in which crime occurs plays an active role in the performance of that crime. Where RAA is concerned with how, when, and where crime opportunities arise, SCP is concerned with what to do to reduce those opportunities once they have been identified.

According to RAA, criminal behaviour requires three minimal elements – a likely offender, a suitable target, and a location characterised by a lack of guardianship. Further, the coincidence of these three elements in time and space is dictated by the rhythms of everyday life. For example, youth-on-youth victimisation tends to peak after schools close in the afternoon as large numbers of potential victims and aggressors spill onto the streets (Snyder et al., 1996). RAA portrays the Internet as a 'lawless space' lacking in effective guardianship (Steel et al., 2023), and predicts that CSAM offending will be fitted around the opportunities that arise in the course of the offender's daily routines (McMahan et al., 2023; Navarro & Jasinski, 2015; Steel et al., 2023). For example, we would expect offending to peak at times when an individual finds themself at home alone. To date, there has been little empirical research on the routine activities of CSAM offenders. However, the increase in CSAM offending during COVID lockdowns in 2020–21 as general Internet use increased (Parks et al., 2020; Salter et al., 2023), is an example of offending patterns following routine activities.

Efforts to thwart individuals attempting to access CSAM can be organised within the situational crime prevention (SCP) framework (Clarke, 2017; Cornish & Clarke, 2003). SCP aims to 'alter the situational determinants of crime to make crime less likely to happen (Clarke, 2017, p. 286). SCP interventions operate at the very time an individual may be contemplating offending. There are five basic SCP strategies: increasing the perceived risk by making it more likely the potential offender will be detected; increasing the effort by making the crime more difficult to commit; reducing the rewards by denying the potential offender of the benefits they are seeking; removing excuses by challenging attempts by the potential offender to minimise the criminality of their behaviour; and reducing provocations that might trigger offending. Wortley and Smallbone (Smallbone & Wortley, 2017; Wortley, 2012; Wortley & Smallbone, 2006, 2012) argued that situational principles could be applied to CSAM offences. Many strategies employed to prevent CSAM can be categorised as situational. Police sting operations – such as fake CSAM websites designed to capture IP addresses or credit card details of visitors – are examples of increasing the perceived risk (Krone, 2005). Blocking credit card transactions for CSAM, necessitating more complicated offline payment arrangements, is an example of increasing the effort (International Center for Missing and Exploited Children, n.d.). Blocking CSAM search terms is an example of reducing the rewards (Internet Watch Foundation, 2023). Automatic pop-up messages warning those seeking CSAM that it is harmful and illegal are examples of removing excuses (Prichard, Scanlan, et al., 2022a; Prichard, Wortley, et al., 2022b). And removing CSAM from legal pornography sites, where viewers are already primed for sexual arousal, is an example of reducing provocations (Pornhub, 2021).

It is important to note that SCP does not assume that CSAM offenders are hapless victims of circumstance and that propensity does not matter. Some offenders will be more difficult to deter than others. It is likely that SCP will be most effective with occasional offenders or those in the early stages of their CSAM 'career'. That said, no behaviour can occur without opportunity, and even the most

Table 1
Sociodemographic characteristics of the sample at the time of the offence.

Response	N	%
Sexual orientation:		
Heterosexual	56	76
Homosexual	12	16
Bisexual	6	8
Relationship status:		
Married	32	43
Single	27	37
Cohabitating	10	14
Divorced/separated/widowed	5	6
Living arrangements:		
With partner	31	41
With family	25	34
Alone	14	19
Share house	5	6
Living with children <18 years old		
No	59	79
Yes	16	21
Education:		
University – undergraduate	21	29
Secondary school	20	28
Senior secondary school ('college')	15	21
University – postgraduate	16	22
Occupation		
Professional	20	27
Skilled	13	17
Administration	13	17
Education	6	8
Employment status:		
Employed	48	64
Self-employed	17	23
Retired	10	13
Previous criminal justice involvement:		
No	64	87
Yes – for other offences	6	8
Yes – for sex offences	4	5

seasoned and determined CSAM offenders may be slowed down by opportunity-reduction strategies.

1.4. Summary and aims

There has been limited research on CSAM *offending* (as distinct from CSAM *offenders*). At this point, we have an emerging but patchy picture of offending onset and progression, and the strategies employed by offenders once their behaviour has become established. Existing research suggests: many offenders may not have a pre-existing sexual attraction to children; youth-oriented legal pornography may be a significant gateway to CSAM; offending tends to become progressively more frequent and serious over time; most offending occurs on the open web, although file sharing and the dark web are also major sources; various situational triggers, such as viewing legal pornography, can prompt offending; many offenders are not especially technically savvy and do not routinely employ sophisticated security measures; and many offenders try periodically to desist. Research on CSAM offending provides a starting point for the development of prevention measures aimed at deterring, disrupting, or diverting offenders online.

The aim of the current study is to contribute to this research base of CSAM offending, adding to the scope and detail provided by previous research. We include examination of the routine activities influencing day-to-day offending patterns, an issue generally overlooked in previous research but one that has direct implications for the development of disruptive countermeasures. This study is a companion to Bailey et al. (2022). That study reported qualitative analysis of interviews with a subsample of the participants used in this study. Here we report quantitative findings from the full sample, allowing us to include more targeted questions and to present statistical summaries of the findings.

2. Method

2.1. Participants

Participants were individuals who were currently undertaking or had recently completed the Inform Plus Programme offered by the Lucy Faithful Foundation, a UK-based child protection charity. The programme is a voluntary ten-week course comprising two-and-a-half-hours per week for individuals 'who have been arrested, cautioned or convicted for internet offences involving indecent images of children or sexual communications with children to help them stop their behaviour' (Lucy Faithful Foundation, n.d.). One-hundred-and-twenty course participants in the last twelve months were invited to participate in the study, 75 of whom agreed to take part and returned completed self-report surveys.

All participants in the study were male and all were living in the community. Most participants (93 %) were made aware of the Inform Plus Programme via information provided by the law enforcement agency investigating their offence. The age of participants ranged from 25 to 76 years and the mean age was 48.53 years (SD = 11.84). All participants acknowledged they had committed the offence in question. Other demographic features of the participants at the time of their offence are shown in Table 1. Most participants identified as heterosexual. More than half were in a relationship and three-quarters were living with their partner or family, with one-in-five cohabitating with children. More than half had tertiary qualifications and, with the exception of those who were retired, all were employed. The majority had no previous criminal justice involvement and in those cases where they did, it was slightly more likely to be for non-sexual offences than sexual offences.

While the precise details of the sample characteristics vary across CSAM studies (e.g., see Babchishin et al., 2015; Merdian et al., 2018; Navarro & Jasinski, 2015; Seigfried et al., 2008; Shelton et al., 2016; Wolak et al., 2011), a consistent feature, shared by this study, has been the apparent normality of the offender socio-demographic profile. The most distinguishing feature of socio-demographic profiles of CSAM offenders is the lack of any distinguishing features. Indeed, in the current case, if anything, participants have particularly high levels of education, occupational status, and rates of employment. By way of comparison, while 51 % of participants had a bachelor's or post graduate qualifications, 33.8 % of residents in England and Wales 16 years and over have post-secondary qualifications (Office of National Statistics, 2023). The implications of the sample profile are taken up in the Discussion.

2.2. Materials

A self-report survey instrument was constructed covering four areas (in addition to the previously reported socio-demographic information) – the participants' pathways to offending, their online modus operandi, the factors encouraging and discouraging their offending, and possible prevention strategies. Writing of the items was guided by the theoretical assumptions underpinning RAA and SCP. Pathway questions asked: the age when they first encountered CSAM; the age when they began actively seeking CSAM; how and where they first encountered CSAM; and whether there were changes over time in their interest in CSAM, their frequency of viewing CSAM, the age of the child depicted in CSAM, the graphic level of CSAM viewed, the quantity of CSAM viewed in a session, and their collection of CSAM. Modus operandi questions asked: how many hours a day were devoted to CSAM and to legal adult pornography; patterns of accessing CSAM; their initial and subsequent sources of CSAM; the devices used to access CSAM; websites and software used in accessing CSAM; whether they had contact with other offenders, and if so, for what purpose; and steps taken to avoid detection. Questions about factors influencing their offending asked: where and when they accessed CSAM; factors that triggered and discouraged them accessing CSAM; and technical and social impediments encountered while accessing CSAM. Most questions were 'tick-a-box' style, with the option to add alternative answers or other comments. The final question gave participants the opportunity to give a free-text response suggesting things that could be done to prevent viewing/accessing/sharing of indecent images of children.

2.3. Procedure

Potential participants were posted a letter and information sheet inviting them to participate in this study. Those agreeing to participate returned a signed informed consent form. Participants were given the option of receiving and returning the survey by post or email. The survey took approximately 25 min to complete, and participants had two weeks to send the completed questionnaires back to the LFF.

2.4. Ethics

Participants were informed of the nature of the research, that their responses were anonymous and confidential, and that they could withdraw from the study at any time. The consent form explicitly authorised publication of the research. Participants were assigned a personal identification number and the researchers had no access to any identifying information about them. The study received ethical approval from University College London.

3. Results

The results are presented in four sections: pathways to offending, online behaviour, factors influencing offending, and suggestions for prevention.

3.1. Pathways to offending

The age of participants when they first encountered CSAM ranged from 10 to 67 years and the mean age was 38.11 years (SD = 14.75). On average, the gap between first encountering CSAM and actively seeking it was 2.03 years (SD = 5.96), and the period of involvement with CSAM (current age – age of actively seeking CSAM) was 10.46 years (SD = 9.19).

The progression of CSAM engagement is summarised in Table 2. Most participants (92 %) reported that they did not seek CSAM from the start, but that they progressed from adult or barely legal pornography, or that they were inadvertently exposed to CSAM on other sites. Almost half of initial encounters with CSAM were on the open web, with around a quarter in chatrooms or newsgroup, and a fifth on peer-to-peer networks; just one participant nominated the dark web. A minority of participants (9 %) reported having a sexual interest in children from the start, while more than half said their sexual interest in children increased over time. Nearly a third reported that they do not have, or have ever had, a sexual interest in children, despite acknowledging by their participation in the LFF treatment programme that they had offended.

Fisher's exact tests were performed to examine the relationship between participants' pathways to offending (sexually interested from the start, became more sexually interested, became less sexually interested, and not sexually interested), and their age of onset

Table 2
Progression of CSAM engagement.

Engagement	N	%
How CSAM first encountered:		
Curious after viewing adult legal pornography	38	51
Curious after viewing barely legal pornography	32	43
Accidentally encountered on another site	30	40
Followed a pop-up link	9	12
Sought it out from the start	6	8
Received images sent by acquaintance	3	4
Initial sources of CSAM:		
Online	68	90
Magazines/hardcopy	6	9
Removable drives	1	1
Initial online sources of CSAM:		
Open websites	36	48
Peer-to-peer file sharing	15	19
Chatrooms	9	12
Newsgroups	9	12
Dark web	1	1
How did interest in CSAM develop?		
I became more sexually interested in children	41	55
I do not/have never had a sexual interest in children	21	28
I was sexually interested in children from the start	7	9
I became less sexually interested in children	6	8

(37 years or less/38 years or more) and period of involvement with CSAM (8 years or less / 9 years or more). The dichotomisation of the continuous variables was determined by median split. For the age of onset, Fishers exact $p = .007$ (two-tailed). The standardised residuals indicate that the cell most responsible for the effect was the tendency for older onset to be associated with no sexual interest in children (standardised residual = 1.6). For the period of viewing CSAM, Fisher's exact $p = .001$ (two tailed). The standardised residuals indicate that the longer the period of involvement with CSAM, the less likely for participants to report no sexual interest in children (standardised residual = −2). In sum, to the extent that there were differences in offending pathways by age of onset and length of engagement with CSAM, these differences were largely driven by participants who professed no sexual interest in children.

Changes in CSAM behaviours over time are unpacked in Fig. 1. The frequency of viewing CSAM, the graphic nature of the content, and the amount of CSAM viewed per session typically either increased or fluctuated over time. The age of the child most commonly did not change or it fluctuated, though a fifth of participants reported that it had decreased. The size of participants' collection of images most often fluctuated or increased, while 24 % of participants viewed images but did not collect them.

3.2. Online behaviour

Participants reported that, when their viewing was at its peak, they spent on average 2.7 h (SD = 2.3) per day watching CSAM and 2.0 h (SD = 2.4) per day watching adult pornography. The correlation between the two viewing times was not significant ($r = -0.048$) indicating that current legal pornography viewing does not predict CSAM viewing. The age at which participants actively sought CSAM and the length of time they have been viewing CSAM both correlated with the hours per day watching CSAM ($r = -0.313$, $p = .008$ and $r = .301$, $p = .011$, respectively); the younger the viewing onset and the longer the period of involvement, the more time spent per day watching CSAM.

A MANOVA was carried out to examine whether socio-demographic factors predicted CSAM use. The dependent variables were age of onset, period of involvement, and time spent per day watching CSAM. The independent variables were sexual orientation, education level, employment status, relationship status, living arrangements, and living with children. To consolidate cell sizes, education level was recoded to secondary/tertiary, relationship status to partner/no partner, and living arrangement to alone/with others. Participants' current age was entered as a covariate. The only significant finding was for participant age; unsurprising, the older the participant, the older they were when they first sought CSAM ($F = 31.614$, $p < .001$).

Table 3 summarises the online behaviour of participants. The most common time for accessing CSAM was in the evening, although the same number of participants had no particular time. Most accessed CSAM at home in a separate room of the house, and most used desktops or laptops, with mobile devices seldom used.

In comparison to the initial sources of CSAM shown in Table 2, over time they accessed a wider range of sources, with P2P file sharing used by almost half of the participants and a significant minority now reporting that they went on the dark web. Even so, nearly half of participants still accessed CSAM on the open web. Participants provided a long list of search terms that they used, with the most common being variations of Lolita and teen. Asked which websites they visited, there was little agreement among participants; the only consistently mentioned website was a Russian-based anonymised image board, mentioned by 27 % of participants. Likewise, participants showed individual preferences for the P2P file software they used, with the most common being LimeWare, Emule, and FrostWire.

Just over a third of participants networked with other offenders. The main reasons for contacting other offenders were instrumental – exchanging images and getting advice – but a significant minority also sought social support.

Most participants took some steps to avoid detection but there was a general lack of technical sophistication in the strategies employed. Simply deleting images and search histories were the most common strategies, neither of which protects against being identified online or a forensic examination of their computers. Only around a quarter of participants used anonymising strategies and fewer still encrypted their files.

3.3. Factors influencing offending

Psychological, social, and technical factors that encouraged or discouraged offending are shown in Table 4. Consistent with RAA, daily patterns of offending were influenced by participants' work, family, and social commitments. Triggers can be grouped into four

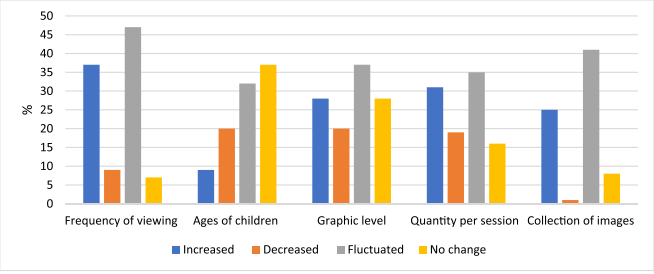

Fig. 1. Changes in CSAM viewing behaviour over time (%).

Table 3
Offending behaviour.

Behaviour	N	%
When accessed:		
No particular time	29	39
6.00 pm–midnight	29	39
Midnight–6.00 am	11	15
6.00 am–noon	11	15
Noon–6.00 pm	4	5
Where accessed:		
At home – separate room	66	88
At home – same room	6	8
At work	6	8
Hotel room	5	7
In car	1	1
Internet café	1	1
Bathroom	1	1
Devices used:		
Desktop PC	48	64
Laptop	43	57
Shared desktop PC	6	8
Shared laptop	5	7
Smartphone	4	5
Game console	1	1
Sources of CSAM:		
Peer-to-peer file sharing	36	48
Open websites	32	43
Chatrooms	19	25
Email attachments	10	13
Dark web	9	12
Online stories	9	12
Newsgroups	2	3
Ten most common search terms:		
Loli/Lolly/Lolita	23	31
PTHC (pre-teen hardcore)	19	25
Pre teen	16	21
Teen sex/teens/teenager	12	16
Underage (sex)	12	16
Young	12	16
CP/child porn	11	15
PTSC (pre-teen softcore)	7	9
School girl (naked/nudist)	6	8
Naked/nudism/nudist	5	7
Ten most common P2P software:		
Limewire	7	9
Emule	6	8
Frostwire	5	7
Shareaza	4	5
eDonkey	3	4
Amule	2	3
Bearshare	2	3
BitTorrent	2	3
TorChat	2	3
Pirate Bay	2	3
Contact with other offenders:		
No	47	63
Yes	28	37
Purpose of contacting other offenders:		
Exchange CSAM	23	31
Advice on where to obtain CSAM	10	13

(*continued on next page*)

Table 3 (*continued*)

Behaviour	N	%
Support, encouragement, community	9	12
Advice on avoiding detection	5	7
Steps to avoid detection:		
Deleting files	43	57
Deleting Internet history	38	51
Wiping computer	24	32
Anonymising identity	20	27
Hidden folders	15	20
Remote storage	13	17
Password protection	12	16
Encrypting files	8	11
Renaming files	2	3
Proxy servers, PAYG SIM	1	1
Anonymous remailers	1	1

main categories – opportunity (being alone, surfing the net); feeling aroused (viewing adult/barely legal pornography, seeing attractive child); negative emotional states (lonely, upset, angry, depressed); and life stresses (financial trouble, divorce, loss of job, work stress). Most participants listed multiple triggers. Citing the effects of drugs or alcohol was relatively uncommon, and just a handful of participants described their behaviour as compulsive and not influenced by situational factors.

Deterrents to accessing CSAM can also be grouped into four main categories – moral concerns (feelings of guilt and shame, thinking of the victim, desire for self-improvement, feeling religious); concerns about others finding out (caught by police, what others would say, being caught by family); logistical difficulties (working patterns, partner at home, social plans and commitments, taking care of children); and positive emotional states/relationships (feeling happy, healthy relationship, recent sexual activity, sobriety). Again, participants tended to cite multiple deterrents. Impediments to viewing CSAM that may occur while online are of two main sorts – offline interruptions (someone walking in, engaging in social interaction), and online disruptions (e.g., blocked sites, viruses, slow internet, warning messages).

3.4. Suggestions for prevention

Sixty-three participants offered free-text suggestions for how to prevent CSAM, in many cases going into considerable detail (several hundred words). Suggestions were classified into four broad categories: providing therapeutic help (33 %), blocking/removing CSAM (31 %), warning of the consequences of using CSAM (29 %), and enhanced policing of CSAM (24 %). (Some minor corrections to spelling have been made to the quotes included below.)

Perhaps unsurprisingly given that the current study utilised a treatment sample, calls for more therapeutic help was the most common recommendation. Participants emphasised the need for early intervention: "Those with an attraction to children sexually need to seek help before offending." Several participants called for more information about where to find help: "More awareness/publicity of programmes and helplines such as LFF… I had not heard of them until after arrest." The risks of seeking help and thus identifying oneself as an offender was raised by several participants: "Allowing people that may think about accessing indecent image to seek professional help without fear of having to sign the register or disclose to anyone"; and "Have an amnesty for people who have viewed (but only viewed) indecent materials so they can receive the help they need without the fear of legal reprisals." A few participants described what it was about therapeutic programmes they found the most useful: "The concepts and terms that had the most impact on me were Victim Empathy and Cognitive Dissonance – very powerful ways for me to avoid offending and to understand what was happening to me then … I wish that I had become familiar with this before offending."

The next most common suggestion was to block or remove CSAM from the Internet. Most in this category felt that the Internet industry bore responsibility for the availability of CSAM and should be forced to do more: "I feel very bitter that my spiral into extreme child pornography was driven by the ease with which the material was available simply by logging on to Google for example"; and "Make it illegal and introduce massive fines/penalties for internet services providers, social media sites and all computer companies who facilitate this and putting the responsibility on the provider of the website or data not just the viewer". Newsgroups and peer to peer networks were singled out by some: "Ensure newsgroup providers promptly remove newsgroups found to contain illegal images …. The newsgroups I accessed have been available for many years by several different newsgroup providers"; and "Much more vigorous closure of sites such as P2P … Just make it harder to find so that only really hardened pedos will take time and trouble to find it."

Warning of the consequences of using CSAM was also a common theme. In most cases, participants suggested the warning should be delivered via online pop-up messages: "Pop-ups explicitly explaining what will happen if you get caught – figures of how many got caught in the last year". Warnings would be most effective if they were targeted: "I never felt that being caught was somehow a 'real' possibility and therefore somehow personalising it – perhaps by it coming straight from one's own ISP would I think have a stronger effect". But the messages should do more than just try to frighten people. They could be used to humanise victims: "Talk more about the victims how they are abused how accessing images makes us de facto abusers … By making the victims humans not just an image on

Table 4
Factors influencing offending.

Factor	N	%
Social factors influencing viewing patterns:		
Work commitments	49	65
Partners being at home	36	48
Social plans	32	43
Taking care of children	10	13
Having meals with the family	9	12
Triggers:		
Alone at home	46	61
Viewing barely legal pornography	32	43
Feeling upset, angry	28	37
Surfing the Internet	17	23
Argument with spouse or partner	11	15
Financial trouble	10	13
Depressed, low self esteem	10	13
Alcohol, drugs	8	11
Loss of job, retirement	8	11
Divorce, separation	8	11
Seeing an attractive child	6	8
Seeing a legal picture of an attractive child	6	8
Work, home stress	6	8
No trigger – compulsive, addictive	4	5
Deterrents:		
Feeling guilty, ashamed	55	73
Worry about being caught by police	50	67
Thinking what others would say	45	60
Worry about being caught by family	43	57
Feeling happy	41	55
Healthy relationship	33	44
Thinking of the victim	33	44
Worry about being caught by others	26	35
Desire for self- improvement	24	32
Recent sexual activity	23	31
No Internet access	22	29
Having children	8	11
Feeling religious	6	8
Sobriety	5	7
Online disruptions accessing CSAM:		
Blocked sites	28	37
Virus alert	27	36
Slow internet speed	25	33
No Internet access	22	29
Warning messages from law enforcement	17	23
POP ups	13	17
Hackers demanding money	5	7
Offline disruptions accessing CSAM:		
Partner, family walking in	44	59
Social interactions	37	49

screen". They could also talk about "the devastating consequences of being charged and convicted on you, your family, your friends and your future." And they could tell people where to get help: "I think pop-up warnings would be a good idea - but they should include details of how to get help, rather than just saying not to do it." Several respondents wanted more information about what constitutes CSAM: "I always thought that indecent involved naked or semi-naked … I know that there are legalistic interpretations but it would be really helpful if there was a site where you could get a clear definition of the various levels"; and "Publicise the fact that 'images' includes cartoons and drawings". Apart from pop-ups, warnings could also be delivered in schools: "As a child, the police came in to talk to us about the dangers of going off with strangers – why not other dangers in life, such as obsessive use of pornography, taking nude selfies, and the internet in general?".

Finally, around a quarter of participants called for more effective policing. The need for more resources and international co-operation was highlighted: "Larger budgets – more officers + forensic teams. Improve international co-operation with law enforcement/ tech companies." Many were in favour of granting police much more power to intervene: "They should be allowed to have links that can literally crash a computer when it shows that a person is actively following a link or specific search terms that suggest sexual

interest." Focussing on the source of CSAM was a common theme: "They should focus on a worldwide effort to find the source, the highest priority being the creators but also the distributors." Again, peer to peer networks were singled out: "Target the peer-to-peer file sharing sites – this is the only place I am aware of that it exists and it is easily available it can be found by accident which in my case was the beginning!"

4. Discussion

In common with previous research, the current study found that most participants reported that they did not initially seek out CSAM but that they first encountered it inadvertently or became curious after viewing legal pornography (Bailey et al., 2022; Knack et al., 2020; Merdian et al., 2013; Morgan & Lambie, 2019; Quayle & Taylor, 2004; Seto et al., 2010). Their involvement with CSAM subsequently progressed over time and their offending generally became more serious (Bailey et al., 2022; Fortin & Proulx, 2019; Merdian et al., 2018; Quayle & Taylor, 2004; Seigfried-Spellar & Rogers, 2013). Two variations on this onset and progression narrative are worthy of note.

First, nearly a third of participants claimed not to have, nor ever to have had, a sexual interest in children, even though they do not deny offending. Recall that a similar finding was reported by Merdian et al. (2018). There are a number of possible explanations. It is possible that participants are not sexually attracted to children. Seto et al. (2006) found that 40 % of individuals referred for assessment because of their interest in CSAM did not show phallometrically measured arousal to children, while Seto et al. (2010) found individuals may access CSAM out curiosity, Internet addiction, as one manifestation of collecting behaviour, or as part of a broader spectrum of sexual interests. A further possibility is that how participants answered this question depended on how they have interpreted it. For example, participants may make a distinction between a sexual interest in children and an interest in CSAM; that is, they may claim that their interest is at the level of fantasy and does not involve 'real children'. Similarly, participants who view CSAM involving pubescent adolescents may comfort themselves that these are 'not really' children. Recall that Nurmi et al. (2024) found that more than half of CSAM offences involved child victims 12–16-years-old. Finally, participants may be minimising or denying sexual attraction to children as a self-protective strategy or to cast themselves to others in a more favourable light. If this is the case, we are not able to determine from our data whether these cognitions precede and facilitate CSAM offending or are after-the-fact rationalisations, or whether they occur both before and after in a process of progressive desensitisation (e.g., see Bandura et al., 1996).

Second, for all dimensions of offending seriousness (frequency of viewing, ages of children, graphic level of images, amount of CSAM accessed, and size of collections), a fluctuating pattern over time was more commonly reported than a straight linear increase. This finding is consistent with research showing a cycle of escalating CSAM use followed by efforts to stop, including deleting their CSAM collection (Bailey et al., 2022; Fortin, et al., 2019; Steel et al., 2021). Although these efforts at desistance are typically short-lived, they do indicate that many participants find their behaviour to be self-estranging and are motivated to change.

The most notable feature of participants' online behaviour is the general lack of sophisticated technical expertise revealed. The findings are consistent with those of Steel et al. (2023) which describe most CSAM offenders as 'casual users' of the Internet with a skill level commensurate with that of the general population. Relatively few participants sought CSAM on the dark web, which offers far greater levels on anonymity than that provided by P2P and the open web. Most security efforts involved deleting files and search histories on the participants' computers. These strategies offer little protection from forensic scrutiny of the computer, and do not affect the logs kept on other servers, for example, by Internet service providers (ISPs). Just a handful of participants encrypted files or used proxy servers. Again, these findings offer encouragement that efforts to tackle online CSAM are not necessarily up against highly skilled offenders.

There were three broad categories of factors that influenced offending – psychological states, offline relationships and commitments, and online experiences. The effect of psychological states could be positive or negative; depression, anger, and stress could prompt offending while happiness, feelings of guilt, worry about being caught, and desire for self-improvement acted as deterrents. In common with previous research, participants reported that their offending rates were related to the health of their domestic relationships (Knack et al., 2020; Morgan & Lambie, 2019; Rimer, 2021), while offending patterns were fitted around the participants' routine activities such as family, social, and work commitments (McMahan et al., 2023; Navarro & Jasinski, 2015; Steel et al., 2023). Online impediments to offending were related to the ease of locating CSAM (blocked sites, viruses, Internet quality) or perceived riskiness of offending (warning messages from law enforcement). Across the three domains, opportunity and other situational factors emerged as overarching mediators of offending frequency.

4.1. Implications for prevention

There is a widely accepted stereotype in the media and the general community of CSAM offenders as highly technically skilled and remorseless, sexually deviant individuals who have a high probability of reoffending and deserve severe legal punishments (Steel et al., 2022b). Our argument is not that such offenders do not exist, but we suggest that this stereotype represents the extreme pole of a continuum. Rather than see CSAM offending in binary terms – offenders and non-offenders – it is more accurate and fruitful to consider offenders as falling on a spectrum comprising variations in technical proficiency, strength of sexual attraction to children, and capacity for remorse. We recognise that the most serious offenders will be difficult to deter and should be the prime target of law enforcement efforts to arrest and convict. We are not saying that less serious offenders do no harm, but on pragmatic grounds we argue that alternative responses to them need to be found.

That participants described their engagement with CSAM as something that progressed over time suggests that there is particular value in intervening early in the offending pathway. But even after their offending had become more entrenched, participants'

engagement with CSAM typically fluctuated, and many reported feelings of guilt and shame about their behaviour. Our findings suggest many offenders are receptive to change, and that situational interventions have the potential to play a role in assisting their desistance.

Some situational mediators of offending relate to offline factors and may inform traditional therapeutic interventions with offenders or individuals at risk of offending. For example, findings highlight the benefits in therapy of focusing on healthy family relationships and positive psychological states as protective factors against offending. The results also suggest that offenders be taught relapse prevention strategies to manage their own behaviour by identifying and avoiding the situations that trigger their offending (e.g., being alone at home). Interestingly, greater access to therapeutic help was the most common prevention intervention mentioned by participants. The therapeutic implications of a deeper understanding of the factors that encourage and discourage offending are discussed more fully by Bailey et al. (2022).

Other situational factors relate to the facilitating features of the online environment and have implications for the development of online SCP interventions. An advantage of online interventions is that they can be scaled up and targeted at many potential offenders at once. Two online situational strategies were suggested by our participants – blocking access to CSAM and Internet warning messages. There are, of course, already concerted efforts by law enforcement and other concerned agencies to remove CSAM from the Internet (e.g., Internet Watch Foundation, 2023). Our findings suggest that embedded CSAM in legal pornography sites may be particularly problematic as a gateway to offending. It is gratifying to see that some companies (e.g., Pornhub, 2021; Scanlan et al., 2024) are making efforts to screen site content for CSAM, but undoubtedly more could be done across the pornography industry in this regard.

In addition to simply removing CSAM, automated warning messages that pop up when an Internet user attempts to reach a prohibited site, or uses a search terms related to CSAM, show promise as an CSAM prevention strategy (Hunn et al., 2023; Prichard, et al., 2022a, b; Scanlan et al., 2024). Message content can be varied to address issues raised by participants in the current study. For example, deterrence-focused messages can warn users that they are potentially about to commit a criminal offence and thus increase their perceptions of risk. Harm-focussed messages can challenge the excuses users may have about CSAM being a victimless crime. And therapeutic-focussed messages can direct users to services that may assist them to stop using CSAM. Warning messages against CSAM use are becoming more widely used by online companies, including Google (Essers, 2013), Facebook (Wong, 2021), and Pornhub (Grant, 2022; Scanlan et al., 2024). With some exceptions (e.g., see Picarelli, 2009), there has been a reluctance by law enforcement agencies to adopt strategies for CSAM other than arrest, in part for fear of being seen to be 'soft' on offenders (Scott, 2017). We believe that this reluctance needs to change if we are serious about reducing the volume of CSAM offenders.

4.2. Strengths and limitations

The current study joins a relatively small pool of research examining the online behaviours of CSAM offenders. The strengths of the study include its explicit theoretical foundation in RAA and SCP, its relatively large participant sample, and the quantitative analyses of responses. We acknowledge three main limitations.

First, the study shares the limitation of all self-report research in that it relies on the memory and honesty of participants. Respondents may be answering to the best of their ability but not accurately recall events that may have happened years earlier. Responses may also be affected by self-serving bias. CSAM is a sensitive issue and participants may have been concerned to create a good impression, or to assuage their own feelings of guilt. One possible example of bias was the denial by nearly a third of participants that they had a sexual attraction to children. We attempted to minimise response bias by assuring participants that their responses were anonymous, but we caution that findings need to be interpreted with the possibility in mind that some responses may be self-serving.

Second, the study utilised a treatment sample and therefore cannot be considered representative of CSAM offenders. In the first place, all participants had come to the attention of law enforcement. They may, therefore, be particularly inept at implementing effective security strategies and avoiding detection. Additionally, that they had volunteered to participate in a treatment programme may indicate that they are unusually motivated to change. At the same time, participants were not neophytes; on average they had been offending for >10 years. Moreover, the value of the findings does not depend upon the sample being representative. We acknowledge that there may well be more serious CSAM offenders than our participants. Our aim was to demonstrate that a non-trivial portion of the offender population may be amenable to preventative interventions.

Third, in common with virtually all previous studies, the current research examined male CSAM offenders. CSAM offending – and indeed child sex offending more broadly – has typically been viewed as a largely a male problem (e.g., see Christensen & Woods, 2024). A meta-analysis by Babchishin et al. (2011), reviewing research on arrested or convicted CSAM offenders, found that <3 % of identified offenders were women. However, research on community samples suggests the number of female CSAM offenders may be higher than generally assumed. Seigfried et al. (2008) found that 5 % of females in their community example viewed CSAM, compared with 15 % of men, while Seigfried-Spellar and Rogers (2013) found 3.4 % female and 12.5 % male. While these studies did not employ representative samples, both suggest that the prevalence rate for males is just three times that for females. Clearly, further research on female CSAM offenders is warranted.

5. Conclusion

CSAM offending presents new challenges for law enforcement and researchers who are engaged in tackling the problem. The vast majority of offenders will never be brought to justice, and while therapeutic help ought to be made available to those who seek it, individualised prevention will not make a dent in the overall offence rate. The exponential growth of CSAM over the past 25 years or so is a direct consequence of the emergence of an online environment that is ideal for the production, distribution, and consumption of

CSAM. We need to know more about how offenders become involved in CSAM and their subsequent online modus operandi in order to devise strategies that can be implemented at scale to deter, disrupt and divert them.

Borrowed from environmental criminology, RAA and SCP provide models for examining patterns of CSAM engagement and designing strategies to reduce offending opportunities. Our findings indicate that many offenders do not initially seek CSAM but come across it in the course of other Internet activities and their involvement with CSAM progressed from there. This suggests that situational prevention strategies will be most effective at the early stages of CSAM engagement, for example, targeting CSAM embedded in legal pornography sites. But even experienced CSAM offenders, as many in our sample were, may be receptive to change and potentially diverted from their offending pathway.

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CRediT authorship contribution statement

Richard Wortley: Writing – original draft, Visualization, Methodology, Formal analysis. **Donald Findlater:** Writing – review & editing, Resources, Methodology, Conceptualization. **Alexandra Bailey:** Supervision, Investigation, Data curation, Conceptualization. **Dana Zuhair:** Methodology, Formal analysis, Data curation.

Declaration of competing interest

The authors declare that there are no competing interests.

Data availability

Due to the sensitive nature of the survey, participants were assured that raw data would remain confidential and would not be shared.

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