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Digital Shadows: Analyzing Factors Influencing Sentencing in Child Sexual Abuse Material (CSAM) Cases

Abstract

Exhibiting an unprecedented rate of advancement, technology's progression over the past two decades has regrettably led to a disturbing increase in the distribution of child sexual abuse materials (CSAM) online. Compounded by the emergence of an underground cryptocurrency market, which serves as a primary distribution channel for these materials, the investigation and sanctioning of CSAM present a complex and unique set of challenges. The study collected and analyzed case details regarding CSAM sanctions in a database sourced from the US Department of Justice for 2020. Various factors were analyzed such as the victim's age, offender typology, and previous conviction, accompanied by an analysis of how these factors affect the sentence length. The purpose of the study is to accurately diagnose the CSAM sentencing landscape and build a more comprehensive, evidence-based legal framework in penology. The study found that the hierarchical agency-level interactions give insight into resource allocation prioritization, as well as confirming a close relationship between prior conviction history and sentence length, with the victim's age inversely related to sentence length. Leveraging data-driven insights, the study paves the way for more targeted and effective sanctions, ultimately contributing to the broader goal of safeguarding children from online sexual exploitation.

Keywords: Online Child Exploitation, CSAM Distribution Networks, Judicial Sentencing in CSAM , Digital Platforms and CSAM , Cybercrime and Child Protection

Introduction

The pervasive adoption of information technology has greatly enhanced everyday convenience, but this has also led to a significant increase in risks, especially a notable rise in online sexual crimes. Efforts to prevent and prosecute these crimes have been a consistent focus for law enforcement. Yet, the escalating severity, complexity, and difficulty in prosecuting online cybercrimes continue to present substantial challenges. Among these crimes is Child Sexual Abuse Material (CSAM), defined as the creation, distribution, sale, receipt, and possession of sexual content depicting minors (RAINN, 2022). The burgeoning CSAM market fuels the demand for new content, leading to the evolution of various CSAM categories. Perpetrators, skilled in evading law enforcement, disseminate these materials across a multitude of platforms. These include file-sharing P2P websites, online forums, social networks, and even gaming applications. Notably, over 89 percent of these cases begin with the perpetrator contacting victims via instant messaging (US Department of Justice, 2023).

The internet remains a perilous environment for children, evidenced by the Child Victim Identification Program reviewing over 371 million potential CSAM images and videos since 2002. Children are at risk of encountering sexual content, minor enticement, sex trafficking, sexting, and sextortion – the coercion to produce sexual images (National Center for Missing & Exploited Children, 2023). Law enforcement identified over 19,100 child victims of online sexual exploitation, yet challenges in cybercrime investigation led to the perpetual circulation of their images online (National Center for Missing & Exploited Children, 2023). Approximately 80% of CSAM offenders are linked to pedophilia forums, using these platforms for the trade and dissemination of such content (Schulz et al., 2016).

Despite the dismantling of infamous darknet CSAM marketplaces like Playpen and Welcome to Video, similar forums persistently operate in the darknet. Playpen, before its FBI-led closure, had over 215,000 accounts and hosted more than 50,000 images. Its founder, Steven Chase, along with two accomplices, faced substantial prison sentences (30 years) and lifelong supervision in 2017 (Office of Public Affairs, 2017).

The recent closure of BoysTown, a clandestine forum with over 400,000 members, marked a significant law enforcement achievement. One user alone had posted 3,500 times. Authorities uncovered 2.7 million CSAM files, implicating 23,500 international victims. The forum, categorized with sections like “Spycam Pics”, “Kindergarten”, and “Toddlers”, also featured a “Photo Requests” area. To evade detection, the administrators facilitated encrypted communications through “Loli Pub”. Four key members, aged between 40 and 64, were apprehended. In Germany, two received prison sentences of 13.5 and 14.5 years, respectively (Gannon et al., 2023).

The urgency of addressing CSAM offenses necessitates an examination of the sanctioning processes and factors determining the severity of penalties. Variables like offense recurrence, direct involvement level, crime severity, and the number of affected children play a role in sanction duration. Despite historically shorter sanction periods for CSAM offenses, there is a trend towards tougher penalties. Notable legislative efforts include the Sexual Exploitation of Children Act (1977) and the Child Pornography Prevention Act (1996), aiming to shield minors from sexual exploitation. Yet, there's a pressing need for stronger legal protections and stiffer penalties for CSAM-related crimes.

This study aims to explore the influence of offender demographics, prior convictions, offense types, and law enforcement involvement on the sanctions imposed for online child

exploitation crimes. Focusing on prosecuted cases in the United States, it will specifically examine the possession, production, and distribution of CSAM. The study will also initiate a dialogue on the need for and development of standardized sanction guidelines in the legal framework. This is particularly crucial for addressing emerging forms of CSAM, including those involving artificial intelligence, ensuring a comprehensive and effective legal response.

Literature Review

The discussion around the issue of child online sexual abuse necessitates an analysis of statistical data and perpetrator typology in regard to different types of CSAM which crimes offenders engage in. Regarding online child sexual exploitation and abuse (hereinafter referred to as OCSEA), the National Center for Missing and Exploited Children (NCMEC) provides valuable insights into the increasing severity and complexity of these illicit activities. In 2019, NCMEC's CyberTipline recorded a substantial volume of nearly 17 million reports related to instances of online sexual abuse involving children, delineating the magnitude of the issue (National Center for Missing & Exploited Children, 2020). It was aggravated in the following year when the number of reports surged to 21.6 million, which was an alarming 28% increase from the previous year. Within these tips, the majority of them involved the illegal possession or distribution of CSAM (National Center for Missing & Exploited Children, 2021). Additionally, this report indicated that those involved in these activities often employ various methods to compile such content. These findings are important to address as previous research shows that individuals who receive explicit images and videos of children often go beyond simply viewing and acquiring this material, as many develop habits resembling the act of collecting or abusing a child in the physical world (Choi and Lee, 2023).

The Role of Technology in Enhancing the Spread of CSAM

Internet and online communication networks are the means through which CSAM (Child Sexual Abuse Material) has been extensively spread. Criminals on the internet employ the internet tools of social networks, file-sharing systems, and, most importantly, secret messengers to spread and exchange their illegal materials. In contrast to traditional printed images, CSAM in the digital world is a rapidly emerging threat, and there are problems fighting its distribution. Better reality, virtual reality, and live streaming techniques have developed and function as a digital space for cybercriminals to operate and distribute CSAM beyond its limits. Second, anonymously exchanging cryptocurrencies and using blockchain technology facilitate the processing of such transactions, thus creating a financial structure to support the continued growth of CSAM black markets.

Certainly, P2P networks and dark web sites are common, but surface websites are still the audience's favorite media for CSAM. In 2004, Carr highlighted the popularity of websites as the second most famous channel, after which newsgroups were the third most popular. Recently, O'Halloran and Quayle performed a qualitative study of boy love support groups and discovered that although public platforms are "old technology," they are widely discussed and used. Another study conducted by Tremblay (2006) included boy love public forums to report cases of CSAM spread. Research on publicly accessible websites, such as Blogger, LiveJournal, and Tumblr, has proven to be a strong prerequisite for blog-hosting service providers (Westlake and Bouchard, 2016; Westlake BG and Frank R, 2017) .

According to the IWF (2017), image-hosting websites on which pictures can be embedded onto another webpage through URLs are the primary hosting platforms (69%), followed by crypto

lockers and third-party services such as cloud services (Technopedia, 2018), which facilitate the storage and distribution of files (14%). Ninety-two percent of CSAM hosting domains need to be more attainable in paid services.

Just as CSAM is being sent to multiple destinations, criminals can use this material in numerous channels. As criminals always quickly adapt to the new, we understand why the rates of CSAM distribution through mobile devices closely follow. By analyzing instruments for seeking CSA submarines, Steel (2015) discovered that 34% of distributions involved the use of mobile phones and tablets. Although not as high (32% of mobile device audience) as the CSAM results seen for adult pornography, this rate will probably continue to rise and approach the rates for adult content. This can be an advantage if the CSAM is used for surveillance because, in our society, we highly value the protection of people's computers.

CSAM Offender Typology

In order to appropriately address and prevent such offenders, it is important to identify and analyze the behaviors exhibited by offenders involved in the handling of CSAM. Choi and Lee (2023) have delineated four distinct offender typologies of such offenders, which can be categorized as: closet, isolated, cottage, and commercial collectors. In more detail, the Closet Collectors comprises individuals who primarily view CSAM, but do not engage in direct sexual contact with children. Isolated Collectors are characterized by their consumption of CSAM along with their active involvement in sexually abusing children. Similar to isolated collectors, Cottage Collectors view CSAM and engage in sexual abuse of minors; however, they take it a step further by disseminating this material to others or involving others in the sexual exploitation of children. Lastly, the category of Commercial Collectors encompasses individuals who seek to generate

profit or monetary gain from producing and distributing CSAM, making it a lucrative criminal business (Boal et al., 2022; Choi and Lee, 2023). As a showcase, this classification is useful for understanding the sentencing guideline and sanctions outline by the United States Sentencing Commission (USSC). The USSC provides statistics according to the classification above: 45% of CSAM offenders were sentenced for possessing CSAM; 43.9% were sentenced for trafficking CSAM; and 11.1% were sentenced for receiving CSAM (United States Sentencing Commission, 2023).

Gender, Age, Typology, and Previous Criminal Records in Sentencing

Previous research, conducted over the past two decades, across a wide range of jurisdictions, sentencing structures, and defendant characteristics, has revealed that offenders are punished differently based on their gender, age, and previous criminal records (e.g., Baumer, 2012; Christensen and Tsagaris, 2020; Franklin, 2018; Lehmann, 2023; Lehmann and Gomez, 2022; Mitchell, 2005; Shields and Cochran, 2019; Spohn, 2000; Starr and Rehavi, 2013; Ulmer, 2012). For example, studies examining gender differences across crime types showed females were less likely to be incarcerated than males for property and drug crimes (Cassidy and Rydberg, 2019; Rodriguez et al., 2006). Similarly, Shields and Cochran (2019) concluded that gender disparities in sex offender sentencing exist and are pervasive across sex offense types. Specifically, male sex offenders are more likely to be sentenced to prison, and given longer terms, than female sex offenders.

Although there is an expansive literature examining the gaps in sentencing according to defendants' characteristics, relatively few studies have investigated the extent to which these patterns vary according to CSAM offenses, characteristics of offenders, and the different judicial

systems. Within this limited body of work, Tsagaris et al. (2017) analyzed 24 court documents and law enforcement reports of CSAM offenders and pointed out that there was diversity across age, education and occupation. Jung and Stein (2012) found that CSAM offenders were more likely to be single, unemployed and older. Additionally, they emphasized that a sentencing disparity between the two offending groups: non-custodial sentences were favored for CSAM offenders compared with custodial sentences for contact offenders.

To explore the messages disseminated by judges on the wrongs of viewing CSAM, Hunn et al. (2018) reviewed 57 sentencing remarks for CSAM cases. They found that the explanations provided by judges on the wrongfulness of viewing CSAM aligned with the four overarching themes in the literature around the effects on: the victim; other offenders; the viewer; and society.

Christensen and Tsagaris (2020) examined characteristics of offenders and an exploration of judicial censure through an exploratory content analysis. Specifically, their study conducted on sentencing remarks of 29 offenders across a 10-year period in Australia, found all offenders were male, mostly middle-aged, with diverse employment and education, with the majority possessing or accessing CSAM.

In line with Christensen et al. (2017), this study also found diversity across occupation and education of the offenders. Similar to the findings of Jung and Stein (2012), the results of their study indicate that offenders had been sentenced, on average, to multiple counts, predominantly counts of possession. Further consistent with Jung and Stein (2012), Christensen and Tsagaris (2020) found that 93% of offenders pleaded guilty, and 62% received a custodial sentence. Few of their offenders had a criminal history, which is consistent with previous research (e.g., Babchishin et al., 2010; McCarthy, 2010).

This latter finding contrasts with previous research, which has found that only a minority of cases involve infants and toddlers (Wolak et al., 2006). While the study of Christensen and Tsagaris (2020) is valuable for law, psychology, and social work discipline across Australia and internationally, its has limitations in relation to our current study on the associations between characteristics of offenders, victims, judicial systems, and sentence lengths in the United States. Its' small sample size also makes difficult to apply to a larger population with relative confidence. As a result, the findings of their study cannot be generalized as the CSAM sentencing remarks in literature. To that end, it is important for future research to identify the reasons and factors behind the severity of CSAM sentencing.

CSAM and Law Enforcement

Law enforcement agencies are instrumental in punishing CSAM offenders yet face numerous challenges. In doing so, law enforcement agencies have created task forces to address and prevent cybercrimes. Police and other law enforcement officers have many obligations in locating distributors and tracing the ways in which abusive images are reproduced and distributed in several parts of the world. This applies to the sexual exploitation and sexual abuse of children because governments do not tend to cooperate on this matter; they have few resources and limited authority (Wortley and Smallbone, 2012). Previously, the method of distributing CSAM was connected to the surface web and the Tor starting system. IT, regulators, and legislators are making significant progress by sweeping through barriers. The type of environment in which CSAM is still distributed has been shifting to more E2EE services due to their anonymity and lack of law enforcement surveillance. Notably, the execution costs of these networks are minimal; hence, they are easy to set up. Therefore, anyone can set up these networks. Cryptography and anonymous

tools sometimes complicate investigations of how widely CSAM images are circulated. Criminals employ cryptographic technology to commit crimes, as camouflage for their operations, and to evade being tracked by law enforcers. In addition to what can be interpreted as other mechanisms embedded in the dark web and VPNs, such as anonymity, the designers of CSAM can produce their content anywhere in the world and make it available to the world over the dark web, which thus significantly compromises investigations to trace this material from source to destination.

On the one hand, the rise and development of new technologies not only offer people absolute anonymity and competent defense against the manifestation of sexual exploitation of children or CSAM on the internet but also create new opportunities for criminals to share those materials through the network, which is also associated with new problems in enforcing content regulation, particularly in the digital world of interconnectedness (Akshata et al., 2020)Scholars stated that anonymity on the internet and free access might engrain a perception among the public that viewing, sharing, and collecting child sexual abuse material is not a vice and does not harm anyone. In this regard, we can apply CSAM-connected rules and programs to create awareness and discourage harmful behavior related to these topics (ibid)

One of the recent developments in prompt messaging services is end-to-end encryption (E2EE), which has become the most widely used technology for secure communication services., i.e., by default. End-to-end encryption allows a message to be seen only by the person who has the 'key' to decrypt the information depending on the situation (Schiemer, 2018), and in most cases, this is either the sender or the recipient of a message. Furthermore, the privacy of sensitive and personal information, among other things, such as messages and activities (eSafety Commission, 2020), is secured, and users are safeguarded against cybercrime and other harmful digital activities. . The data traces back to apps with safety options with more devoted users (Stevens, 2020),

working in stark contrast to the culture of urging people to keep rowdy talks for themselves. However, once-off encryption makes it difficult for law enforcement agencies to investigate CSAM offenders (Netclean, 2019) and prevents platforms from detecting and reporting CSAMs.

Surveillance authorities have become somewhat dysfunctional in the fight against organized crime, terrorism, and child sexual abuse material because of the anonymity that network encryption offers (Endeley, 2018). This system's security and privacy provide such internet trust as a general truth. Nevertheless, we have seen some media stories, reports, and white papers sharing the same cases of CSAM transmission on end-to-end encrypted communication platforms such as WhatsApp and Telegram. The reports argue about whether the platforms' policies have gaps or weak enforcement. This also brings another perspective that with such a reach of 2 billion and 400 million users, CSAM on these messaging platforms must be investigated (Banerjee, 2020).

In 2008, the FBI established the National Cyber Investigative Joint Task Force (NCIJTF) which mainly aims "to coordinate, integrate, and share information to support cyber threat investigations, supply and support intelligence analysis for community decision-makers, and provide value to other ongoing efforts in the fight against the cyber threat to the nation" (Federal Bureau of Investigation [FBI], n.d.). Furthermore, in June 2022, The White House released a memorandum establishing a White House Task Force to Address Online Harassment and Abuse (Biden, 2022). The memorandum addresses the prevalence and harmful effects of online victimization and asserts its dedication to tackling the issue of online harassment (Biden, 2022). Evidently, there has been an effort by the federal government to combat deviant Internet behavior.

State and local law enforcement agencies play a significant role in dealing with online child sexual crimes. Many large metropolitan areas have units dedicated to CSAM investigations. For example, the New York State Police Department has a Computer Crime Unit whose role includes

supporting federal, state, and local agencies in preserving digital evidence, communicating awareness and education on cybercrime, and investigating child exploitation through the Internet (New York State Police, n.d.). Some local law enforcement agencies also have distinguished units. For example, the Los Angeles County District Attorney's Office has a Stalking and Threat Assessment Team comprised of investigators, prosecutors, and victim services representatives specially trained and equipped with adequate resources to deal with these types of crimes (Los Angeles County District Attorney's Office, n.d.).

Ethical and Privacy Considerations in Investigating CSAM

To investigate child sexual abuse material (CSAM), the moral obligation to protect children and consider privacy rights must be balanced. Online observation and data collection tools are vital to unveiling CSAM. However, using them can raise serious privacy concerns. Law enforcement bodies must work based on legal frameworks that ensure that any surveillance actions are correct, needed, and accompanied by adequate oversight. This work outlines the harmful impacts of CSAM offenses on victims. A large raid for CSAM on great platforms will lead to increased harm to children. However, there is still an argument on the relevance of protecting children versus keeping people's secrets (Allen, 2021). Although robust investigative strategies can help combat CSAM, care should be taken to avoid infringing on innocent people's privacy rights. This entails being cautious in collecting and handling personal data and ensuring that it is used within the boundaries of an investigation. Additionally, being open to the public about the methods and degree of surveillance can help to maintain trust in the balance of privacy and safety. Technologies and encryption that facilitate privacy also play dual roles in the cases of CSAM. They simultaneously protect people's privacy and shield offenders. It is morally demanded that avoiding such

protections by law enforcement be a last option and subject to severe legal processes so that power is not abused.

It is ethically mandatory to reduce harm by ensuring that the methods used to prevent CSAM do not accidentally violate the privacy rights of innocent people. The methods must be applied well to promote social trust and respect people's dignity based on the law. This demand strikes a sensitive equilibrium between the need for law enforcement agencies to protect society and people's privacy rights. The Five Eyes and European nations need to create laws requiring communication networks/channels to always report CSAM and employ detections with proofs and prevention actions (Teunissen and Napier, 2022).

It is essential to consider the long-term effects of surveillance methods in CSAM investigations. Although these methods can be used to effectively catch criminals and prevent more danger, they might stigmatize, discriminate, and erode civil freedom. Thus, law enforcement agencies must always examine the effectiveness and effect of their surveillance methods and adjust them as needed. This may include integrating privacy by designing principles into developing and employing these measures, regularly conducting reviews and audits, and seeking input from important stakeholders such as privacy promoters and community members.

In addition, addressing the root causes of CSAM, such as offering better education on digital security and encouraging healthy attitudes toward sexuality, can minimize the occurrence of these crimes and reduce the need for intrusive surveillance measures. Investments in prevention and intervention programs can be inexpensive and protect individual privacy rights.

Legal Literature on CSAM Sanctioning

The legal literature on sentencing and penal regulations across nations, specifically in the European Union (EU), the United States (US), and South Korea, reveals varying legal frameworks and approaches to combatting the dissemination and possession of CSAM. This provides a regulatory scope into analyzing online CSAM sanctions internationally.

Looking specifically at the legal acts within of the United States legal system, federal statute (18 U.S.C § 225) prohibit a variety of acts related to the production, advertisement, distribution, transportation, importation, receipt, solicitation, and possession of CSAM (United States Sentencing Commission, 2021a). In terms of sanctions, CSAM production offenses carry a mandatory minimum term of 15 years of imprisonment and a maximum term of 30 years. If a CSAM production offender has a prior federal or state conviction for one qualifying sex offense, the penalty range increases to a mandatory minimum term of 25 years of imprisonment and a maximum term of 50 years. Offenders convicted of production of CSAM with more than one prior federal or state conviction for a qualifying sex offense are subject to a statutory imprisonment range of 35 years to life (18 U.S.C § 225). Additionally, the PROTECT Act (2003), created in 2002, imposes a mandatory minimum term of supervised release of five years and increased the maximum statutory term of supervised release from three years to a lifetime term for all CSAM offenders.

Additionally, in the PROTECT Act, Congress created new mandatory minimum penalties for receipt and distribution offenses and increased the statutory maximum penalties for all non-production-CSAM offenses (United States Sentencing Commission, 2021b). The primary types of non-production offenses are distribution, receipt, and possession of CSAM. Distribution and receipt offenses each carry a mandatory minimum term of five years of imprisonment and a

maximum term of 20 years. If a defendant has a prior federal or state conviction for one or more qualifying sex offenses, the penalty range for distribution and receipt offenses increases to a mandatory minimum term of 15 years of imprisonment and a maximum term of 40 years. Possession, by contrast, has no mandatory minimum, carrying a statutory range of zero to ten years of imprisonment (or zero to 20 years of imprisonment if the offender possessed CSAM depicting a prepubescent minor or a minor under the age of 12). Offenders convicted of possession of CSAM with a prior federal or state conviction for a qualifying sex offense face a statutory imprisonment range of ten to 20 years. The PROTECT Act also created a mandatory minimum term of supervised release of five years for all CSAM offenders and raised the maximum statutory term of supervised release from three years for most CSAM offenders to a lifetime term for all CSAM offenders.

As discussed, the statutory penalties for production- and non-production CSAM offenses increase if the offender has a qualifying prior conviction for a sex offense. However, prior research has been limited to examining practices in the imposition of those statutory penalties on CSAM because the existing literature focused on investigating implementations of statutory penalties on other types of crimes (e.g., conventional violent and property crimes). Therefore, if future research reveals answers to the following inquiries, it will be valuable for legal professionals, law enforcement, and policy makers.

Current Study

There exists relatively little empirical research focuses on the relationships between the demographic factors and sentencing disparities for CSAM offenders. The analyses presented below seeks to address these research gaps. Accordingly, this research was guided by the following research questions and hypotheses.

- Research Question 1: Do the age and gender of the offender play a significant role in sentencing decisions in CSAM cases?
- Hypothesis 1: The age and gender of the offender do significantly influence the length of sentences in CSAM cases.

The hypothesis 1 addresses the potential impact of the offender's demographic characteristics on the sentencing outcomes in CSAM cases.

- Research Question 2: Does the age of the victim play a significant role in sentencing decisions in CSAM cases?
- Hypothesis 2: The age of the victim does significantly influence the length of sentences in CSAM cases.

The hypothesis 2 aims to investigate the relationship between the victim's age and the severity of the sentence imposed.

- Research Question 3: What is the effect of an offender's previous conviction on the sentencing length in CSAM cases?
- Hypothesis 3: Offenders with a criminal history for CSAM or related offenses are likely to receive significantly longer sentences than first-time offenders.

The hypothesis 3 seeks to understand the extent to which having a prior criminal record influences the judicial decision-making process in determining sentences for CSAM offenses.

- Research Question 4: How do law enforcement organizational factors, such as agency jurisdiction and the number of partner agencies, influence sentencing lengths in CSAM cases?
- Hypothesis 4: The jurisdiction of the arresting agency and the number of partner agencies involved do not significantly affect the sentencing outcomes in CSAM cases.

The hypothesis 4 explores whether and how the aspects of law enforcement involvement might affect the severity of sentences in CSAM offenses.

- Research Question 5: How does the nature of the offense (CSAM-only vs. CSAM with hands-on child sexual offenses) influence sentencing lengths in CSAM cases?
- Hypothesis 5: Offenders charged with hands-on child sexual offenses, in addition to CSAM offenses, will receive significantly longer sentences compared to those charged with CSAM offenses only.

The hypothesis 5 investigate the significant role of the nature of the offense in determining sentencing outcomes in CSAM cases.

Methodology

Data

The data for this study was derived from the U.S. Department of Justice concerning CSAM offense convictions. To collect criminal record reports (i.e., indictment, complaints), the following term was utilized for the query: child sexual abuse material and/or CSAM. This initial search implemented and screened all these cases. In line with that, the researchers generated 500 cases. To that end, the researchers include 348 CSAM cases occurring between January 2020 and December 2020 in the multiple regression model because some cases with missing value: the length of the sentences have been excluded. To collect quantitative data, the Dyadic Cyber Incident and Dispute (DCID) Dataset, Version 1.5 Incident framework was employed to provide coding and interpretation of available variables applied to the 500 court cases.

In fact, the DCID was able to provide the operational ideas of the variables, including offense type, criminal history, individual characteristics, law enforcement agency, and the length of the sentences imposed. Previously, the DCID was designed to provide a method to construct a dataset for identifying cybercrime events. In addition, the Cyber Conflict Data Project was created to offer replicable and reliable datasets for all cybersecurity threats between public and private sector targets (Back, 2019). The original DCID dataset framework includes variables as the following lists (Maness et al., 2023) in Table 2. In other words, the DCID dataset framework provided a significant operational definition of measurement so that this study conceptualized and recreated new variables to measure the cybercriminal profiles and criminal justice practice. The following sections specifically illustrate the dependent and independent variables as well as the analytic plan.

Table 2. Correlations

	1	2	3	4	5	6	7	8	9	10
1.Offender Age	1									
2.Offender Gender	.120**	1								
3.Hands-on-offense	-.088	-.046	1							
4.Criminal history	.110*	.036	.013	1						
5.Victim Age	.015	.178*	.056	.012	1					
6.Victim Gender	.091	-.089	-.411*	.062	-.241**	1				
7.Number of Victims	.056	.095*	-.334**	.012	-.217*	.090	1			
8.Agency Jurisdiction	.035	.100*	-.182	-.071	.054	-.073	.065	1		
9.Number of Partners	-.031	.023	-.076	-.011	-.015	-.054	-.066	-.117**	1	
10.Sentences (in months)	.002	.034	.048	.026*	-.409**	.067	-.019	-.007	-.063	1

* p < .05, ** p < .01

Measures

Dependent Variable

The Length of Sentences

The current study focuses on measuring the length of sentences as the dependent variable. The length of sentences was operationally defined as the number of months sentenced for each CSAM offender. It was measured as a continuous variable for the ordinary least squares regression analysis in this study. The average length of the sentences was 199 months. The length of the sentences ranged from 8-2400 months.

Independent Variables

Offender Background Factors

Offender background factors were measured using four variables: offender gender and age, offender criminal history, and hands-on-offense. Gender was coded as 0 = female and 1 = male. Age was measured as a continuous variable. Criminal history of the CSAM offenders were measured in the analysis. The value for criminal history was dichotomously coded as follows: 0 = no, 1 = yes. The value for hands-on-offense was coded as 1 = CSAM, 2 = hands-on-offense, and 3 = other.

Victim Background Factors

Victim background factors were measured using three variables: victim gender, victim age, and number of victims. Gender was coded as 0 = female and 1 = male, and 2 = both male and female (which occurs when there are multiple victims). Age was measured as a continuous variable. Also, number of victims was measured as a continuous variable.

Law Enforcement Organizational Factors

Law enforcement organizational factors were measured using two variables: agency jurisdiction, and number of partner agencies. The value for agency jurisdiction was coded as 1 = local, 2 = state, and 3 = federal. The value for number of partner agencies was coded as follows: 0 = no partner, 1 = single partner, 2 = 2 partners, and 3 = more than 2 partners.

Analytic Strategy

All models were estimated using SPSS 27. First, descriptive statistics of the variables were shown. Second, bivariate correlations were employed to test the statistical associations of the variables. Third, a series of Ordinary Least Squares (OLS) regressions were employed in order to respond to the queries concerning the relationships between IVs and DV stated above. The OLS regression models were suitable to analyze this data since the relationship between the independent variables and dependent variable were linear. The Shapiro-Wilk test and Kolmogorov-Smirnov Test (K-S Test) determined that the dependent variable (see Flatt and Jacobs, 2019) was normally distributed (Shapiro-Wilk test: $p > .05$; 1-Sample Kolmogorov-Smirnov Test: $p > .05$). In addition, all the tolerance values are over .20 and all the VIF statistics are less than 10; therefore, there is no problem for multicollinearity among variables. The analyses began with a bivariate regression where the independent variables are modeled as the predictors of the length of the sentences. Next,

all the independent variables were added to the OLS regression model. Lastly, first ANOVA model was conducted to diagnose the difference of sentence length between CSAM-only offense and hands-on child sexual offense; furthermore, second ANOVA model was employed to examine the relationship between law enforcement involvement and the severity of sentences in CSAM offenses.

Results

Descriptive Statistics

Table 1 provides descriptive statistics for the variables used in the current study. The total number of cases collected was 500. Data in this study includes variables such as offender/victim background factors, law enforcement organizational factors, and the sentence length (in months) in all 348 cases. The average age of CSAM offenders in our sample was 39, and the average age of victims in our sample was 12. Interestingly, 97% of offenders were male.

Table 1. Descriptive statistics

Variables	N	Mean	SD	Min	Max
Offender Age	500	39.68	12.63	19	81
Offender Gender	500	.97	.16	0	1
Hands-on-offense	73	1.75	.64	1	3
Criminal history	500	.15	.35	0	1
Victim Age	138	12.10	3.79	0	17
Victim Gender	199	.26	.55	0	2
Number of Victims	500	2.97	1.35	1	5
Agency Jurisdiction	500	2.63	.70	1	3
Number of Partners	500	1.37	1.18	0	3

DV: Sentences (in months)	348	199.78	195.32	8	2400

Bivariate Relationships

Table 2 shows the bivariate correlations of the variables in this study. Offender gender and criminal history each had a significant, positive relationship with offender age. Victim age, number of victims, and agency jurisdiction each also had a significant, positive relationship with offender gender. Interestingly, victim gender and number of victims had a significant, negative relationship with hands-on-offense. It means that hands-on child sexual offenses are more likely to target female victims. Importantly, criminal history and victim age had a significant, negative relationship with sentences. In other words, the more offenders have criminal histories, the more they have severe punishments. The research hypotheses in this study were further tested with the ordinary least squares (OLS) regression model.

Regression Analysis

Table 3 shows the series of ordinary least squares (OLS) regression analysis. There are two crucial factors into determining CSAM sanctions. The age of the victim has a significant negative effect on the sentence length (b = -17.93, SE = 4.18, p < .001). The negative coefficient indicates that as the age of the victim increases, the length of the sentence for the offender decreases. This indicates that sentences tend to be lengthier for crimes involving younger victims, affirming hypothesis 2. Additionally, the offender's criminal history plays a significant role (b = 101.30, SE = 35.60, p < .01). This positive coefficient indicates that offenders with a criminal record are likely to receive a substantial longer sentence when compared to first-time offenders. In other words, Offenders with prior records receive considerably longer sentences, roughly 101 months more, equivalent to approximately 8 years and 5 months, supporting hypothesis 3. The analysis also

reveals that other variables such as the offender's age and gender, the number of victims, and agency jurisdiction do not significantly affect sentencing outcomes. The model's R-square value of .26 denotes a moderately strong fit.

Table 3. Ordinary Least Squares (OLS) regressions for sentence length

	Model 1		Model 2	
Variables	*B*	SE	*b*	SE
Offender Age	-1.05	1.12	-1.03	1.16
Offender Gender	73.32	61.83	67.34	63.21
Criminal history	101.30**	35.60	98.08**	37.41
Victim Age	-17.40***	4.18	-17.93***	4.30
Number of Victims	-1.57	11.66	-1.84	11.81
Agency Jurisdiction			2.03	16.93
Number of Partners			-7.17	11.93
R^2	.25		.26	

* p < .05; ** p < .01; *** p < .001

ANOVA Tests

First, this study employed ANOVA test to explore the significant role of the nature of the offense in determining sentencing outcomes in CSAM cases. Table 4 demonstrates the ANOVA results on sentence length by offense type ($F = 1.46, p < .05$). For instance, offenders with hands-on child sexual offenses charges received substantially longer sentences (237 months on average) compared to those with CSAM violations only (189 months on average). This indicates that the legal system imposes harsher sanctions on more severe offenses, reflecting the increased gravity of hands-on sexual abuse. The sentence length for hands-on child sexual offenses was 148% longer

than for CSAM-only offenders, highlighting the significant impact of the offense type on judicial sentencing decisions. Consequently, this result does support hypothesis 5.

Table 4. ANOVA results on sentence length by offense type

	Mean number of assigned years in prison	*F*	*P*
Offense Type		1.46	.04
CSAM-only	189.75		
Hands-on	237.11		
Other	176.29		

Tables 5 and 6 present the findings from the ANOVA and LSD/Dunnett t-tests, examining the interplay between main governing agencies and their partnering counterparts. The ANOVA test highlights a significant variation in the average number of partner agencies across local, state, and federal levels ($F = 6.80$, $p < .001$). State agencies reported the highest average number of partner agencies (Mean = 1.85), followed by local (Mean = 1.53), and federal agencies (Mean = 1.27). This result underscores differing levels of collaboration or resource allocation among jurisdictions, and notably, suggests that CSAM-related cases necessitate extensive collaboration predominantly spearheaded by state law enforcement agencies. Furthermore, Figure 1 visually depicts these relationships. Subsequent multiple comparisons via LSD and Dunnett t-tests reveal a notable disparity in the number of partnering agencies between state and federal levels (Mean Difference = 0.58, $p < .001$), with state agencies engaging more partners. State agencies had more partner agencies on average compared to federal agencies. The disparity between local and federal agencies, although apparent, did not achieve statistical significance.

Table 5. ANOVA test results on the relationship between the main governing agency and the partnering agency

	Mean number of partners	*F*	*P*
Agency-level		6.80	.001
Local	1.53		

State	1.85
Federal	1.27

Table 6. LSD/Dunnett t-test results on the relationship between the main governing agency and the partnering agency

Comparison	Mean Difference	Std. Error	Sig.	95% Confidence Interval
State vs. Federal	0.58	0.16	<0.001	[0.2541, 0.9114]
Local vs. Federal	0.26	0.15	0.093	[-0.0441, 0.5722]
State vs. Local	0.31	0.21	0.135	[-0.0999, 0.7372]

*** p < .001

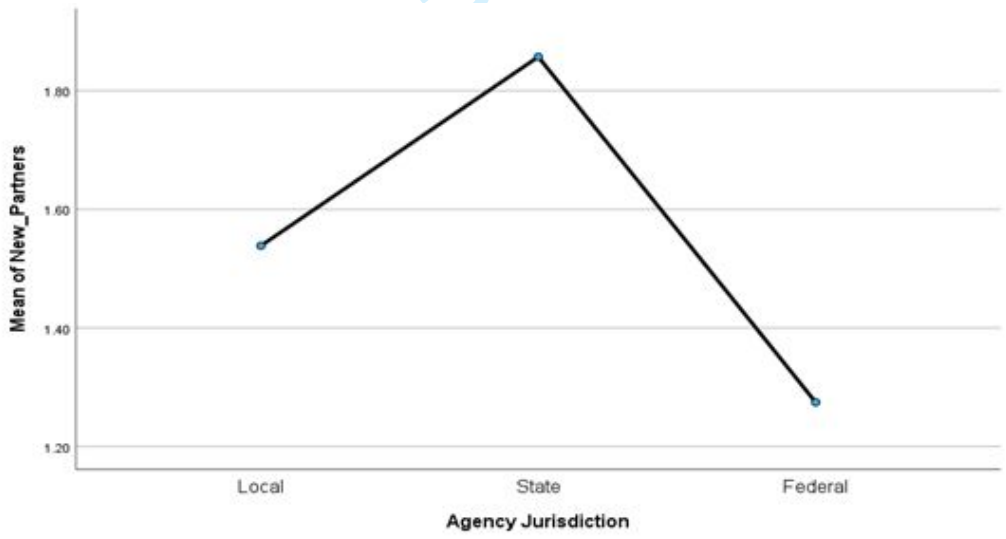

Figure 1. The relationship between the main governing agency and the partnering agency

Discussion

The current study aims to diagnose how online child exploitation sanctions are determined through analyzing U.S. federal CSAM cases. Looking at the length of sentences imposed to the offender, the current study explores how the U.S. criminal justice system decides to punish these offenders based on various factors. Moreover, each of these research questions directly corresponds to the hypotheses and aims to further investigate the dynamics and factors influencing

sentencing decisions in CSAM cases. This can be useful for guiding future empirical studies in criminal justice and legal research, focusing on child protection and the determinants of judicial sentencing.

Accordingly, the current study provides numerous invaluable insights. Regarding this study's first hypothesis, there was no significant influence of the offender's age and gender on sentencing lengths in CSAM cases. The current study's findings contrast broader trends which show sentencing disparities based on these offenders' demographics (Baumer, 2012; Cassidy and Rydberg, 2019; Rodriguez et al., 2006). This divergence may suggest a specific judicial approach in CSAM cases that focuses more on the nature and severity of the offense rather than on traditional demographic factors. Furthering this, and consistent with previous findings, this study observed a significant negative relationship between the victim's age and the sentence length highlighting the judiciary's heightened sensitivity to offenses involving younger victims in CSAM cases (Hunn et al., 2018; Wolak et al., 2006). This alignment with societal and legal views on protecting younger individuals is reflected in the harsher penalties for offenses targeting this demographic. These results also align with the proposed notion sentences for CSAM related sanctions may be influenced more by the demographics of the victim and nature of the crime, than by the offender's own demographics; this supports hypothesis two.

Supporting hypothesis three, this study found that offenders with previous criminal records receive longer sentences. This variability in sentencing may be attributed to a multitude of factors. For instance, the U.S sentencing guidelines recommend more severe penalties for repeat offenders (United States Sentencing Commission, 2021b). However, it is crucial to note that these recommended sentencing minimums only apply offenders with previous sex crime offenses; nevertheless, our findings (as they did not differentiate between previous criminal offenses)

indicated that *all* the offenders with previous convictions were more likely to face harsher sanctions. One plausible explanation may be due to the perception of judges who may feel the potential for rehabilitation for individuals consistently engaged in criminal activities is lower. Alternatively, these harsher sanctions could be influenced by the concept of "incapacitation", suggesting that judges may feel these individuals pose a higher risk to society, prompting them to place them under supervision for longer lengths of time. However, these are speculations, and future research on the sentencing of CSAM offenders should attempt to identify the underlying reasons behind the sentencing variations of first-time CSAM offenders with no previous records and those with a prior criminal history. Overall, these results show that a criminal record increase sentencing for CSAM offenders and reflects the judicial system's approach to recidivism and its commitment to imposing harsher penalties on repeat offenders.

The results of this study provide a noteworthy insight by not supporting hypothesis four, demonstrating that law enforcement jurisdiction and the number of partner agencies do not significantly impact the severity of sentencing outcomes. This finding indicates a commendable impartiality in the judicial process, ensuring that the sentences are not biased by the level or intensity of law enforcement involvement.

While the data did identify notable variations in the number of partner agencies across local, state, and federal jurisdictions, emphasizing differences in collaboration levels, it is crucial to recognize that state agencies, with the highest average number of partner agencies, likely benefit from greater resource allocation and operational capacity. State agencies, with the highest average number of partner agencies, emerge as central figures in coordinating resources and operational strategies across multiple levels. This central position underlines the significance of state law enforcement in bridging local and federal efforts, ensuring a unified and comprehensive approach

to tackling CSAM offenses. Although multi-agency collaboration is crucial for the effective investigation and apprehension of offenders, it's reassuring to note that such collaboration does not bias the judicial sentencing outcomes. Hence, the integral role of state law enforcement in fostering robust collaboration among local and federal agencies is paramount, highlighting their crucial position in the concerted fight against CSAM.

Supporting hypothesis five, the finding that hands-on child sexual offenses result in significantly longer sentences complements, the observations of Tsagaris et al. (2017) and Christensen and Tsagaris (2020), who noted the diversity in offender profiles and sentencing outcomes. This crucial insight underscores the stringent penalties faced by offenders who directly engage with children. Nevertheless, with the escalating prevalence of CSAM offenses and online child exploitation crimes, including minor-focused sextortion (National Center for Missing & Exploited Children, 2021), the perception that "online-only" crimes are less severe could impede effective prosecution, sentencing, and deterrence of these offenses. While the physical harm from direct offenses is acknowledged with appropriate sanctions, it is imperative to equally recognize the profound, lasting impact of online offenses and incorporate this understanding into the sentencing process.

Another consideration is that the rise of AI-generated CSAM and automated bots targeting children introduces a complex layer to the issue, accentuating the need for clear, comprehensive sentencing guidelines. The findings of this study underline the key factors that currently influence formal sanctions against CSAM offenders—factors such as the offender's criminal history, the demographics of the victims, the nature and method of the crime. These sanctions, however, seem not to consider the offender's personal characteristics or the extent of inter-agency collaboration. While these insights deepen our understanding of the current sanctioning framework, they also

spotlight the pressing need to adapt and refine this framework. This adaptation is crucial, especially to effectively address the evolving challenges posed by sophisticated digital threats like AI-generated CSAM and bots that specifically target vulnerable children and teenagers. In shaping a future-proof judicial response, it is essential to calibrate sentencing guidelines to the nuanced, pervasive impact of these emerging online threats, ensuring that justice is served comprehensively, and deterrents are effectively positioned in the digital era.

Policy Implications

The insights from this study underscore a judicial trend that prioritizes the specifics of the offense over the offender's demographic characteristics. In this regard, three insightful policy implications may be drawn from this latter set of findings.

Firstly, more nuanced CSAM offense guidelines that align with the judicial shift towards considering the offense's nature and its victim impact should be forthcoming. These guidelines should categorize sanctions based on the type and severity of online child sexual exploitation. For instance, possessing or viewing content depicting active abuse or violence against children should warrant harsher penalties. Furthermore, the guidelines should factor in the victim's age, with crimes against younger victims warranting more severe sentences. By integrating these specific offense characteristics and victim impacts, the guidelines would not only reflect the judicial progression but also ensure consistency in sanctions across similar offenses.

Secondly, the pronounced influence of an offender's criminal history on sentencing length calls for robust rehabilitation programs, particularly for repeat offenders. Given their longer sentences, this period should be leveraged for targeted, intensive rehabilitation, including

specialized psychological interventions. Post-release, repeat offenders should undergo strict monitoring and receive support to reintegrate into society, reducing the likelihood of recidivism.

Thirdly, while hands-on child sexual offenses understandably incur longer sentences, it is imperative to ensure that the severity of online-only CSAM crimes, including those involving AI-generated material and automated bots targeting minors, is fully recognized and appropriately penalized. Hence, it is crucial for legislation to impose sanctions that truly mirror the crime's severity and the victim's trauma. Additionally, public awareness initiatives about the severe legal repercussions and the lasting harm caused by CSAM can serve as a deterrent, emphasizing the seriousness of these crimes, regardless of physical contact with the victim.

The current study's findings offer valuable insights into the judicial handling of CSAM cases in the U.S. and suggest several policy implications that could enhance the effectiveness of the criminal justice system in addressing these offenses. By focusing on the nature of the offense, victim impact, and effective rehabilitation and deterrence, these policy recommendations aim to strengthen the judicial response to CSAM offenses and contribute to the broader goal of child protection and crime prevention in the digital age.

Conclusion

The current study sheds light on the complexities of sentencing in CSAM cases, highlighting the importance of victim characteristics and the nature of the offense over offender demographics or law enforcement organizational factors. These insights are vital for understanding judicial priorities and can inform future policy and procedural adjustments in handling CSAM offenses. Further exploration is essential, particularly in investigating the role of AI in detecting CSAM within the Metaverse, understanding jurisdictional complexities in virtual spaces, and

developing methodologies for victim identification and protection. Addressing these areas of research is key to evolving our legal, technological, and psychological frameworks to effectively confront CSAM in the age of virtual environments and AI.

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References

Akshata S, Nitish C, Raj P, et al. (2020) End (-to-end encrypted) child sexual abuse material. Available at: https://assets-global.website-files.com/64b94adadbfa4c824629b337/64fd87f39f74e8672ef575ce_End-to-end-Encrypted-CSAM-2.pdf.

Allen E (2021) Defending the privacy of child sexual abuse victims online, in the EU and worldwide. Available at: https://www.weprotect.org/blog/defending-the-privacy-of-child-sexual-abuse-victims-online-in-the-eu-andworldwide/.

Babchishin KM, Hanson RK and Hermann CA (2010) The characteristics of online sex offenders: a meta-analysis. *Sexual Abuse* 23(1): 92–123.

Back S (2019) *The cybercrime triangle*. Doctoral Dissertation, Florida International University, Florida.

Banerjee P (2020) Telegram now has 400 million users worldwide. *LiveMint*, 27 April.

Baumer EP (2012) Reassessing and redirecting research on race and sentencing. *Justice Quarterly* 30(2): 231–261.

Biden J (2022) *Memorandum of the Establishment of the White House Task Force to Address Online Harassment and Abuse.* Washington D.C.: The White House.

Boal AL, Choi K, Jones LM, et al. (2022) Technology-facilitated crimes against children. *Interpersonal Violence Against Children and Youth* 135: 135–161.

Cassidy M and Rydberg J (2019) Does sentence type and length matter? Interactions of age, race, ethnicity, and gender on jail and prison sentences. *Criminal Justice and Behavior* 47(1): 61–79.

Choi K-S and Lee H (2023) The trend of online child sexual abuse and exploitations: a profile of online sexual offenders and criminal justice response. *Journal of Child Sexual Abuse*. 1–20. DOI: 10.1080/10538712.2023.2214540.

Christensen LS and Tsagaris GS (2020) Offenders convicted of child sexual exploitation material offences: characteristics of offenders and an exploration of judicial censure. *Psychiatry, Psychology and Law* 27(4): 647–664.

Davidson HA (1982) Sexual exploitation of children-an overview of its scope, impact and legal ramifications. *Prosecutor* 16(5): 6–11.

Deutsche Welle (2020) Germany: two men sentenced for sexual abuse, child porn. *Deutsche Welle*, 11 September.

Endeley RE (2018) End-to-end encryption in messaging services and national security—case of whatsapp messenger. *Journal of Information Security* 9(1): 95–99.

Esafety Commissioner (2020) Protecting Voices at Risk Online. Available at: www.esafety.gov.au

Farivar C (2017) Creator of infamous playpen website sentenced to 30 years in prison. *Ars Technica*, 5 May.

Federal Bureau of Investigation [FBI] (n.d.) National cyber investigative joint task force. Available at: https://www.fbi.gov/investigate/cyber/national-cyber-investigative-joint-task-force.

Franklin TW (2018) The state of race and punishment in America: is justice really blind? *Journal of Criminal Justice* 59: 18–28.

Gannon C, Blokland AAJ, Huikuri S, et al. (2023) Child sexual abuse material on the darknet. *Forensische Psychiatrie, Psychologie, Kriminologie* 17(4): 353–365.

Hunn CM, Cockburn H, Spiranovic C, et al. (2018) Exploring the educative role of judges' sentencing remarks: an analysis of remarks on child exploitation material. *Psychiatry, Psychology and Law* 25(6): 811–828.

Jasper S (2022) How we detect, remove and report child sexual abuse material. Google. Available at: https://blog.google/technology/safety-security/how-we-detect-remove-and-report-child-sexual-abuse-material/ (accessed 28 October 2022).

Jung S and Stein S (2012) An examination of judicial sentencing decisions in child pornography and child molestation cases in Canada. *Journal of Criminal Psychology* 2(1): 38–50.

Lehmann PS (2023) The trial tax and the intersection of race/ethnicity, gender, and age in criminal court sentencing. *Law and Human Behavior* 47(1): 201–216.

Lehmann PS and Gomez AI (2022) Racial, ethnic, gender, and economic sentencing disparity. In: Jeglic E and Calkins C (eds) *Handbook of Issues in Criminal Justice Reform in the United States*. Cham: Springer International Publishing, pp.127–142.

Los Angeles County District Attorney's Office (n.d.) Stalking. Available at: https://www.csun.edu/sites/default/files/stalking-lada.pdf (accessed 11 October 2023).

Maness RC, Valeriano B, Hedgecock K, et al. (2023) Expanding the dyadic cyber incident and campaign dataset (DCID). *The Cyber Defense Review* 8(2): 65–90.

McCarthy JA (2010) Internet sexual activity: a comparison between contact and non-contact child pornography offenders. *Journal of Sexual Aggression* 16(2): 181–195.

Mitchell O (2005) A meta-analysis of race and sentencing research: explaining the inconsistencies. *Journal of Quantitative Criminology* 21(4): 439–466.

National Center for Missing & Exploited Children (2020) 2019 CyberTipline reports by country. Available at:

https://www.missingkids.org/content/dam/missingkids/pdfs/2019%20CyberTipline%20Reports%20by%20Country.pdf (accessed 12 October 2023).

National Center for Missing & Exploited Children (2021) CyberTipline data. Available at: https://www.missingkids.org/gethelpnow/cybertipline/cybertiplinedata.

National Center for Missing & Exploited Children (2023) Child sexual abuse material. Available at: https://www.missingkids.org/theissues/csam.

Netclean (2019) Netclean Report. A report about child sexual abuse crime. Available at: https://www.datocms-assets.com/74356/1662373940-netcleanreport-2019.pdf.

New York State Police (n.d.) Computer crimes: overview. Available at: https://troopers.ny.gov/computer-crimes (accessed 2 November 2023).

Newman LH (2023) Apple's decision to kill its CSAM photo-scanning tool sparks fresh controversy. *Wired*, 31 August.

Office of Public Affairs (2017) Florida man sentenced to prison for engaging in a child exploitation enterprise. Available at: https://www.justice.gov/opa/pr/florida-man-sentenced-prison-engaging-child-exploitation-enterprise.

Przybylski R (2015) Chapter 5: adult sex offender recidivism. Report, Office of Sex Offender Sentencing, Monitoring, Apprehending, Registering, and Tracking, June. Available at: https://smart.ojp.gov/somapi/chapter-5-adult-sex-offender-recidivism#:~:text=One%20of%20the%20most%20important.

RAINN (2022) What is child sexual abuse material (CSAM). Available at: https://www.rainn.org/news/what-child-sexual-abuse-material-csam#:~:text=Studies%20have%20shown%20that%20the.

Raymond N (2015) Two people in N.Y. charged in massive probe of child porn website. *Reuters*, 9 July.

Rodriguez SF, Curry TR and Lee G (2006) Gender differences in criminal sentencing: do effects vary across violent, property, and drug offenses? *Social Science Quarterly* 87(2): 318–339.

Schiemer J (2018) Strong and responsible: can encryption be both? FlagPost. Available at: https://www.aph.gov.au/About_Parliament/Parliamentary_Departments/Parliamentary_Library/FlagPost/2018/October/Encryption (accessed 3 October 2018).

Schulz A, Bergen E, Schuhmann P, et al. (2016) Online sexual solicitation of minors: how often and between whom does it occur? *Journal of Research in Crime and Delinquency* 53(2): 165–188.

Shields RT and Cochran JC (2019) The gender gap in sex offender punishment. *Journal of Quantitative Criminology* 36(1): 95–118.

Spohn C (2000) Thirty years of sentencing reform: the quest for a racially neutral sentencing process. *Criminal Justice* 3(1): 427–501.

Starr SB and Rehavi MM (2013) Mandatory sentencing and racial disparity: assessing the role of prosecutors and the effects of Booker. *Yale Law Journal* 123: 39.

Steel CMS (2015) Web-based child pornography: the global impact of deterrence efforts and its consumption on mobile platforms. *Child Abuse & Neglect* 44: 150–158.

Stevens D (2020) Consumers seek out apps with enhanced privacy features to keep in touch in our new normal. Available at: https://www.data.ai/en/insights/market-data/consumers-seek-enhanced-privacy-app-features.

Technopedia (2018) Cyberlocker: what does cyberlocker mean? Available at: https://www.techopedia.com/definition/27694/cyberlocker.

Teunissen C and Napier S (2022) Child sexual abuse material and end-to-end encryption on social media platforms: an overview. *Trends and Issues in Crime and Criminal Justice* (653): 1–19. DOI: 10.52922/ti78634.

Tremblay P (2006) Convergence settings for nonpredatory 'boy lovers'. In: Wortley R and Smallbone S (eds) *Situational Prevention of Child Sexual Abuse*. Monsey: Criminal Justice Press, pp.145–168.

Tsagaris GS, Bach JE and Cimino C (2017) The characteristics of federal offenders sentenced for sexual exploitation of children within a large urban metropolitan region. *Journal of Sexual Aggression* 23(2): 181–194.

Ulmer JT (2012) Recent developments and new directions in sentencing research. *Justice Quarterly* 29(1): 1–40.

United States (2003) The PROTECT Act, 2003, Pub. L. No. 108-21, § 1-218, 117 Stat. 650.

United States Code (1990) Title 18, section 225.

United States Sentencing Commission (2021a) Federal sentencing of child pornography: production offenses. Report. Available at: https://www.ussc.gov/sites/default/files/pdf/research-and-publications/research-publications/2021/20211013_Production-CP.pdf.

United States Sentencing Commission (2021b) Federal sentencing of child pornography: non-production offenses. Report. Available at: https://www.ussc.gov/sites/default/files/pdf/research-and-publications/research-publications/2021/20210629_Non-Production-CP.pdf.

United States Sentencing Commission (2023) Quick facts: child pornography offenders. Report. Available at: https://www.ussc.gov/sites/default/files/pdf/research-and-publications/quick-facts/Child_Pornography_FY22.pdf.

US Department of Justice (2023) National strategy for child exploitation prevention and interdiction: Child Sexual Abuse Material. Report, 28 October.

Westlake BG and Bouchard M (2016) Liking and hyperlinking: community detection in online child sexual exploitation networks. *Social Science Research* 59: 23–36.

Westlake BG and Frank R (2017) Seeing the forest through the trees: identifying key players in online child sexual exploitation distribution networks. In: Holt T (ed) *Cybercrime Through an Interdisciplinary Lens*. New York: Routledge, pp.189–209.

Wolak J, Mitchell KJ and Finkelhor D (2006) Online victimization of youth: five years later. *PsycEXTRA Dataset* 17(3). DOI: 10.1037/e525892015-001.

Wortley RK and Smallbone S (2012) *Internet Child Pornography: Causes, Investigation, and Prevention.* Santa Barbara: ABC-CLIO.

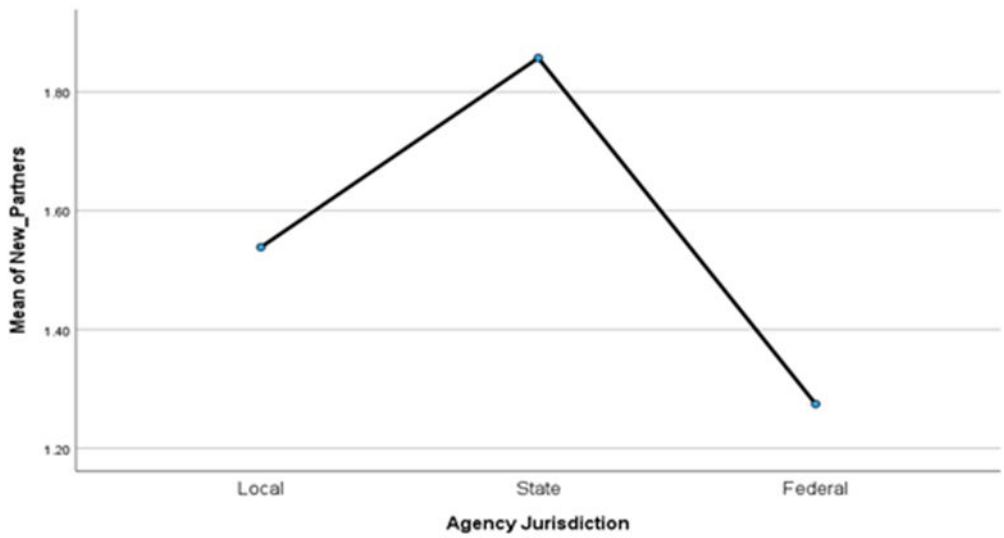

Figure 1. The relationship between the main governing agency and the partnering agency

Discussion