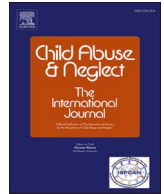




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Trauma behind the keyboard: Exploring disparities in child sexual abuse materials exposure and mental health factors among investigators and forensic examiners – A network analysis

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ABSTRACT

Background: Despite acknowledging the detrimental impact of child sexual abuse material (CSAM) exposure on the mental and physical well-being of investigators and forensic examiners, there is a need for comprehensive exploration into the complex relationship between CSAM exposure, its various dimensions, mental health (i.e., anxiety, depression, and PTSD), and burnout, as well as the presence of positive attitudes towards the job.

Objective: To understand how CSAM exposure, mental health and burnout interconnect and cluster within distinct networks of police investigators and forensic examiners.

Participants and setting: Police investigators and forensic examiners from across the United States who were exposed to CSAM as part of their professions ($N = 470$).

Methods: Participants, recruited through connections with the National Criminal Justice Training Center, completed an anonymous online survey.

Results: The network analysis revealed differences in centrality between investigators and forensic examiners, particularly in their associations with exposure factors and mental health variables. Edges invariance tests showed differences in the strength of these associations, with some factors being more strongly linked to PTSD avoidance symptoms among investigators and others among forensic examiners. Stability analyses suggested potentially greater heterogeneity among investigators, while both groups displayed high stability in other centrality indices.

Conclusions: This study contributes to our comprehension of the distinct experiences and challenges faced by CSAM investigators and forensic examiners, and specifically the nuanced disparities between CSAM investigators and forensic examiners in terms of their exposure to CSAM content and the associated mental health factors. These insights highlight the imperative need for tailored support mechanisms and interventions that can effectively address the unique challenges encountered by individuals working tirelessly in this critical field.

1. Introduction

Child sexual abuse material (CSAM) has emerged as a public health issue, not only in the United States but also on a global scale,

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largely driven by the proliferation of online and digital technologies (Wolak et al., 2011; Wolak et al., 2014). In accordance with federal statutes, CSAM is defined as the “visual depiction of sexually explicit conduct (18 USCS 2256) involving persons under age 18.” With the rapid expansion of the Internet since the mid-1990s, incidents involving the possession, distribution, and production of CSAM have risen significantly.

Because these cases involve technology, they require forensic examiners and investigators with specialized technical expertise and equipment. Consequently, many CSAM investigations are handled by specialized law enforcement units, such as the 61 Internet Crimes Against Children (ICAC) Task Forces. These task forces and affiliated agencies encompass over 7000 investigators and forensic examiners who, while handling cases of CSAM, may be exposed to considerable quantities of child pornography that graphically portray rape and child sexual abuse (Wortley et al., 2014). Investigators and forensic examiners fulfill distinct but interconnected roles in the realm of combating CSAM. Investigators bear the responsibility of conducting comprehensive investigations into CSAM cases, encompassing evidence collection, suspect identification, and legal proceedings. Their primary focus is on the broader aspects of criminal investigation, with the aim of bringing offenders to justice and safeguarding children. In contrast, forensic examiners, or digital forensic analysts, specialize in the technical aspects of CSAM investigations. They excel in the extraction, preservation, and analysis of digital evidence from various devices, providing critical insights for criminal prosecutions. Their expertise lies in digital forensics, utilizing specialized tools and techniques to recover and document digital evidence. While both professions encounter the distressing content of CSAM, little is known about how these differences in their job priorities impact their mental health.

2. Theoretical framework

The theoretical framework of the study is anchored in the exploration of the psychological challenges faced by law enforcement investigators and forensic examiners engaged in the investigation of CSAM cases. Through their work investigating CSAM cases, law enforcement investigators and forensic examiners often find themselves exposed to distressing explicit content graphically depicting the sexual abuse of children (Wortley et al., 2014). These images are profoundly disturbing, violating societal and moral standards through the depiction of heinous acts. Exposure to such material raises significant concerns about its potential corrosive effects on the mental health of investigators and forensic examiners (Burruss et al., 2018; Seigfried-Spellar, 2018).

This study draws on two key psychological phenomena—secondary traumatic stress (Greiner et al., 2019; Nelson & Wampler, 2000) and compassion fatigue (Figley, 1995, 1999)—as theoretical lenses to understand and analyze the impact of investigating CSAM cases on the well-being of these professionals. Secondary traumatic stress, also known as vicarious trauma, is a psychological phenomenon that refers to the emotional and psychological distress experienced by individuals who are indirectly exposed to traumatic events through their work or by supporting those who have directly experienced trauma (Greiner et al., 2019; Nelson & Wampler, 2000). As investigators repeatedly confront explicit and distressing materials, they may experience symptoms analogous to those faced by individuals who have directly undergone trauma (Bourke, Craun, 2014b; Burns et al., 2008; Perez et al., 2010). This framework posits that the intrusive nature of CSAM content can lead to psychological distress (Perez et al., 2010), increased general distrust towards others (Perez et al., 2010), discomfort engaging in routine physical interactions with their own children (Powell et al., 2015), over protectiveness of one’s own children (Denk-Florea et al., 2020), a sense of isolation from fellow law enforcement personnel (Burns et al., 2008), heightened vigilance to protect children and family (Burns et al., 2008; Perez et al., 2010), heightened sensitivity to child exploitation issues (Burns et al., 2008) traumatized sexuality (Gewirtz-Meydan, Mitchell, et al., 2023), and relationship dissatisfaction (Gewirtz-Meydan, O’Brien, et al., 2023). Investigators have also reported physical reactions such as headaches (Burns et al., 2008), mood swings (Burns et al., 2008), fatigue (Burns et al., 2008; Powell et al., 2015), sleep disturbances (Powell et al., 2015), and emotional numbness (Powell et al., 2015).

The second theoretical pillar is compassion fatigue (Figley, 1995, 1999), arising from the empathetic engagement required in investigating CSAM cases. Compassion fatigue is characterized by physical and emotional exhaustion resulting from the demands of providing care and empathy to those who are suffering. This framework asserts that the cumulative exposure to distressing narratives and imagery can lead to a sense of helplessness, decreased motivation, and a diminished ability to connect with the emotional aspects of the work. Previous research has demonstrated that crimes involving child victims pose unique challenges, as investigators and forensic examiners may struggle to establish emotional detachment from the victims, identify with them, envision their own children as potential victims, or perceive a failure, either personally or by society, to protect these vulnerable individuals (Krause, 2009a, 2009b; Violanti & Gehrke, 2004). Notably, investigations involving CSAM have been shown to be distressing for law enforcement personnel, exacting a toll on their mental health (Leclerc et al., 2022; Mitchell et al., 2022).

By employing the theoretical framework of secondary traumatic stress and compassion fatigue, this study seeks to provide a comprehensive understanding of the psychological challenges faced by investigators and forensic examiners in CSAM cases. The framework guides the exploration of coping mechanisms, organizational support structures, and access to mental health resources as potential mitigating factors in addressing the identified psychological impacts. Ultimately, this theoretical framework contributes to a nuanced understanding of the intricate interplay between the nature of the investigative work, the psychological well-being of the professionals involved, and the development of strategies to foster resilience and mitigate potential negative effects.

One critical aspect that warrants attention in the context of CSAM investigation is the heightened risk of burnout – which refers to the state of chronic physical and emotional exhaustion, often accompanied by feelings of detachment and a reduced sense of personal accomplishment, typically resulting from prolonged exposure to work-related stressors. This risk is intricately linked to the interplay between compassion fatigue and secondary traumatic stress (Alves et al., 2023; Brady, 2017; Canfield, 2005; Perez et al., 2010; Pirelli et al., 2020), both integral components of the theoretical framework shaping this study. The demanding nature of this work, characterized by constant exposure to distressing content and the imperative to safeguard children, places investigators and forensic

examiners at a notable risk for experiencing burnout (Brady, 2017; Cullen et al., 2020; Perez et al., 2010; Strickland et al., 2023). Burnout, a state of emotional exhaustion, depersonalization, and reduced personal accomplishment, can be particularly pronounced in professions that involve exposure to traumatic and distressing material, such as CSAM (Brady, 2017; Cullen et al., 2020; Perez et al., 2010; Strickland et al., 2023). The cumulative impact of viewing explicit and disturbing content, coupled with the emotional toll of investigating crimes against children, can contribute to elevated levels of stress and emotional fatigue among professionals in this field (Brady, 2017; Cullen et al., 2020; Perez et al., 2010; Strickland et al., 2023). Moreover, the complexities inherent in CSAM cases, including the need for meticulous attention to detail, the pursuit of justice, and the protection of vulnerable victims, can intensify the burden on these professionals (Bourke, Craun, 2014b; Brady, 2017; Burns et al., 2008). This heightened stress and emotional exhaustion can lead to a range of adverse consequences, including decreased job satisfaction, reduced effectiveness in investigations, and compromised mental health.

Engaging in challenging CSAM investigations offers professionals not just difficulties but also substantial positive aspects that can counterbalance mental health strains and burnout (Mitchell, Gewirtz-Meydan, Finkelhor, O'Brien, Jones, 2023a). Investigators and forensic examiners find pride in contributing to society, safeguarding vulnerable children, and preventing harm (Strickland et al., 2023). This sense of purpose motivates perseverance amid challenges (Denk-Florea et al., 2020; Strickland et al., 2023). Professionals derive energy from knowing their work makes a tangible difference, reinforcing their commitment to justice and child protection (Denk-Florea et al., 2020; Spence et al., 2023). This sense of purpose motivates perseverance amid challenges (Strickland et al., 2023). Lastly, maintaining control over their work and contributing to positive outcomes enhances professionals' well-being (Burns et al., 2008; Mitchell et al., 2022; Powell et al., 2015).

2.1. The present study

Despite acknowledging the adverse impact of CSAM exposure on investigators and forensic examiners, significant research gaps persist in two crucial areas. This study addresses critical gaps in understanding the impact of CSAM exposure on the mental well-being of investigators and forensic examiners. Recognizing the need for a comprehensive examination, we aim to explore the complex relationships among CSAM exposure, mental health outcomes (anxiety, depression, PTSD), burnout, and positive job attitudes using a network analysis. The utilization of network analysis in this study offers a more comprehensive approach compared to traditional statistical methods. By examining the interconnectedness of various factors, we aim to provide a holistic view of the mental well-being of professionals in the challenging field of CSAM investigations. In addition, our study seeks to shed light on the distinctive networks within the roles of investigators and forensic examiners, involving a comparative analysis to uncover unique stressors and protective factors contributing to the mental well-being of these professional groups. Specifically, we hypothesize that (1) Higher levels of CSAM exposure will be positively correlated with increased anxiety, depression, and PTSD symptoms, as well as elevated burnout and lower positive job attitudes. (2) The network analysis will reveal distinctive patterns in the experiences of investigators and forensic examiners, elucidating unique stressors and protective factors. Differences between forensic examiners and investigators will be examined in an exploratory manner, as limited available data make it challenging to establish specific hypotheses for these comparisons. However, given the distinctions in background and work between these professional groups, providing valuable context for our exploratory analysis. For instance, we lack information about distinctions between sworn and civilian officers. This comparison is motivated by the absence of information on differences between these groups of examiners. We are particularly concerned that civilian examiners, lacking law enforcement training, may be less prepared and more affected by CSAM content.

3. Methods

3.1. Participants

Participants were 698 police investigators, forensic examiners, and others connected with the criminal justice system from the across the United States who were exposed to CSAM as part of their professions. Inclusion criteria required any level of CSAM exposure, aligning with our study's focus on the frequency of exposure. The current paper included those participants who reported any CSAM exposure as part of their profession, had completed 85 % of the survey questions, and identified their job as either a forensic examiner, investigator, or both, resulting in an analytic sample of 470 participants. Sixty-three percent of participants were male ($n = 296$) and 35.7 % female ($n = 168$); most were between the ages of 35–44 (39.8 %, $n = 187$) with an additional 20.9 % aged 25–34 ($n = 98$) and 30.4 % ($n = 143$) aged 45–54. The majority of participants self-identified as White (85.7 %, $n = 403$), while 6.8 % ($n = 32$) self-identified as Hispanic or Latino ethnicity. Those in an examiner role were significantly older than participants who were investigators ($p = .03$). To disclose, in previous studies, we utilized unique subsets of the dataset (i.e., Gewirtz-Meydan, Mitchell, et al., 2023; Gewirtz-Meydan, O'Brien, et al., 2023; Mitchell, Gewirtz-Meydan, Finkelhor, O'Brien, Jones, 2023b; O'Brien et al., 2024).

3.2. Procedure

Participants were recruited through a variety of means connected with the National Criminal Justice Training Center (NCJTC). Specifically, recruitment occurred through announcements at the July 2021 ICAC Virtual Conference, the October 2021 ICAC Virtual Commanders Meeting, during NCJTC trainings, through the ICAC listserv, and through specific invitations to past NCJTC students with "forensic" in their title.

To gather data, participants were directed to complete an anonymous survey hosted through Qualtrics, an online survey data

collection system. Participants were told the aim of the study was to understand the impact of work-related exposure to CSAM. The data collection period was July 2021–December 2021. Participants were told they could skip any questions they did not want to answer. To ensure full anonymity, we turned off all Qualtrics tracking features, like IP address, longitude and latitude. We also encouraged participants to take the survey while in “incognito” mode and instructed them on how to do this.

The recruitment methodology using announcements at national conferences and trainings resulted in a convenience sample rather than a probability sample, so a meaningful response rate cannot be calculated. At the end of the survey participants were provided with resources where they could learn more about trauma, well-being, and seek help if needed (e.g., National Suicide Prevention Lifeline, National Mental Health Information Center, the IACP mental wellness for police officers’ website). All data were collected under the approval of the University of New Hampshire Institutional Review Board.

3.3. Measures

The measures consisted of a combination of established scales and those developed for the current study. Newly developed items were designed through interviews and consultations with criminal justice personnel and mental health providers.

Child Sexual Abuse Material Exposures was measured by 11 content exposure items which were combined to create a total content CSAM score ($\alpha = 0.95$; $M = 33.9$, $SD = 8.3$). These items were developed through extensive interviews and consultations with criminal justice personnel and mental health providers. Specifically, participants were asked to indicate, “In a typical month, approximately how often do you review CSAM images or videos that: 1) include children age 5 or younger, 2) include children age 6 to 10, 3) were graphic (focused on genitals or showed explicit activity), 4) involve penetration of a child, including oral sex, 5) involve violence beyond sexual assault, 6) involve nudity or semi-nudity, without being graphic, 6) involve suggested poses of minors with clothes on, 7) involve multiple children at the same time, 8) involve children clearly under the influence of drugs or alcohol, 9) involve multiple offenders, 10) involve fetishes (animals, costumes, role-playing, bondage), and 11) involve sound. Response options for each were never, sometimes, often, and all the time.

Depression and anxiety were measured using the Patient Health Questionnaire-4 (PHQ-4; Kroenke et al., 2009). The scale presents a list of four symptom profiles, two about anxiety (e.g., “Feeling nervous, anxious or on edge”) and two about depression (e.g., “Feeling down, depressed or hopeless”). Participants were asked to indicate how much each problem had bothered them in the past two weeks from 0 (“not at all”) to 3 (“nearly every day”). Items were combined to create a total scale score ($\alpha = 0.84$) with higher scores representing more symptomatology ($M = 5.77$, $SD = 2.33$).

Posttraumatic stress disorder was measured using the Posttraumatic Stress Disorder Checklist for DSM-5 (PCL-5; Blevins et al., 2015). The PCL-5 presents four reactions that some people have in response to stressful experiences (e.g., feeling distant or cut off from other people) and asks respondents to indicate how much they have been bothered by each in the past month. Response options range from 1 (not at all) to 5 (extremely). Items were combined to create a total scale score ($\alpha = 0.79$) with higher scores representing more PTSD symptomatology ($M = 6.52$, $SD = 2.75$).

Burnout was assessed using the Burnout Measure (Malach-Pines, 2005), and queried how often they endorsed 19 feelings in reference to the type of work they do. Questions covered both positive (e.g., useful, honored) and negative (e.g., hopeless, angry) feelings; negative work attitudes were included in the current analyses as an indicator of burnout (12 items, $\alpha = 0.89$). Response options ranged from 1 (never) to 5 (always). A total scale score was created with higher scores indicating more burnout.

Participant Demographics included information about the respondents such as their current job description, the types of crimes they investigate, years in their current position and in law enforcement, whether they work as part of the Internet Crimes Against Children (ICAC) Task Force program, gender, age, race, ethnicity, marital status, number of children and/or grandchildren who are currently minors, and the type of community they work in (large city, small town, etc.).

3.3.1. Data analysis

The study comprised 470 participants; 248 were only CSAM investigators (59.3 %, $n = 147$ males) and 222 had a CSAM forensic examiner role (67.1 %, $n = 149$ males). Within this group of forensic examiners, 56.3 % ($n = 125$) were also investigators. Given that forensic examiners of CSAM are an understudied group, we combined all forensic examiners into one group, even if they were also investigators. Before the primary analyses, we examined the normal distribution of all main study measures (i.e., exposure, PTSD, positive attitudes, burnout, anxiety, and depression) using a series Anderson-Darling normality tests. We also assessed the presence of multivariate outliers using the Minimum Covariance Determinant approach (performed with the *Routliers* R package). We found that all measures significantly deviated from normality ($p < .0005$ or lower, with $p = .066$ for burnout) and that 30 observations were multivariate outliers. Accordingly, we used non-parametric statistics in our primary analyses. In addition, 3.59 % of the data were missing (with 45 different patterns of missing data). We identified the type of missing data using Jamshidian and Jalal’s non-parametric Missing Completely At Random (MCAR) test. We found the data were missing at random (i.e., significant Hawkins’ test, $\chi^2_{\text{median}(10)} = 305.61$, $p = 1.01^{-59}$ and nonsignificant Anderson-Darling test $t_{\text{median}} = 4.45$, $p = .31$). Accordingly, missing data were handled using multiple imputation via the *mice* and *micemd* R packages.

We first calculated the differences between CSAM investigators and forensic examiners in the measures of exposure, PTSD clusters, burnout, positive attitudes, anxiety, and depression by employing a series of Mann-Whitney *U* tests followed by Vargha and Delaney’s *A* values as effect sizes (the probability that a value from one group will be greater than a value from the other group). We used a False Discovery Rate (FDR) of 5 % to adjust the significance because of the multiple testing.

Next, we separately estimated two networks between all main study measures for CSAM investigators and forensic examiners. We specifically employed High-Dimensional Undirected Graph Estimation (huge), which employs nonparanormal (npn) transformation to

help relax the normality assumption and Meinshausen-Buhlmann graph estimation. The estimation process was performed with the *estimateNetwork* function of the *bootnet* R package. Following the estimation of the networks, we employed edges invariance tests with an FDR of 5 % to control for the multiple analyses and centrality invariance tests. Edges in network analysis are equivalent to partial correlations between two variables (known as nodes in network analysis). Centrality refers to a series of measures to evaluate the function of each node (i.e., variable) within the network, and centrality invariance tests allow distinguishing nodes of different networks using the centrality scores. We focused on the following scores: (i) Closeness a centrality measures how fast information can spread from a given node to other reachable nodes in the network. It is calculated as the inverse of the sum of distances from a node to all other nodes; (ii) Betweenness – quantifies the number of times a node acts as a bridge along the shortest path between two other nodes. It can highlight nodes significantly influencing the network, even if they are not directly connected to many other nodes; (iii) Strength – In the context of network analysis, strength centrality is the sum of the weights of a node's edges, often used in weighted networks to assess the influence or importance of a node; and (iv) Expected Influence – a measure used in weighted, directed networks that calculates the expected influence of a node by summing the weights of outgoing edges and subtracting the weights of incoming edges. It provides a nuanced view of a node's centrality, considering the direction of relationships. The invariance tests were performed with the *NetworkComparisonTest* R package.

We chose network analysis because it presents several advantages over Structural Equation Modeling (SEM) when comparing groups, offering a more nuanced exploration of the interactions between variables. One of the key strengths of network analysis lies in its ability to visualize complex relationships and patterns among variables, providing an intuitive and accessible representation of data that can enhance understanding and interpretation of psychological constructs (Borsboom & Cramer, 2013). This capability is precious in highlighting the role of potential effect modifiers or moderators, making it an indispensable tool for examining the intricate dynamics within psychological networks (Epskamp et al., 2018). Moreover, network analysis's flexibility in handling non-linear and asymmetric relationships between variables surpasses that of SEM, accommodating the complexity of psychological phenomena more effectively (McNally, 2016). While SEM is renowned for its structural approach to modeling variable relationships and its accessibility among social scientists (Kline, 2023), network analysis offers a comprehensive perspective on the interplay between variables, which is crucial for understanding the organizational structure of mental processes across different groups, especially when lacking a structured and a non-complex model (Costantini et al., 2015). Consequently, network analysis emerges as a superior method for researchers aiming to delve deeper into the connections and influences among psychological constructs, providing a rich, detailed view of how individual elements within a system interact and influence each other.

Table 1
Differences between investigators and forensic examiners in the main study measures

Variable	Investigators		Forensic Examiners		W^b	p	q^a	VDA ^c
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
Still images	2.84	1.98	4.02	2.40	20,295.0	0.0000	0.0000	0.350
Videos	2.30	1.71	3.14	1.93	20,762.0	0.0000	0.0000	0.358
Control over case assignments	2.78	1.39	3.32	1.51	19,282.0	0.0002	0.0015	0.333
Final case resolution?	3.05	0.85	2.80	0.80	33,880.5	0.0007	0.0035	0.585
Tenure in CSAM	2.81	1.40	3.26	1.50	24,286.5	0.0016	0.0068	0.419
Days review CSAM	1.45	0.82	1.67	0.86	24,728.0	0.0022	0.0077	0.427
Poses of minors	2.74	0.79	2.95	0.81	25,033.0	0.0061	0.0159	0.432
Avoidance	1.01	1.12	1.27	1.14	24,913.5	0.0055	0.0159	0.430
Substance abused children	1.82	0.59	1.94	0.63	26,302.0	0.0317	0.0741	0.454
Nudity	2.77	0.82	2.91	0.81	26,225.5	0.0566	0.1189	0.453
Penetration	2.82	0.87	2.97	0.79	26,355.5	0.0696	0.1217	0.455
Violence	2.10	0.79	2.21	0.78	26,526.5	0.0680	0.1217	0.458
Multiple offenders	2.15	0.74	2.24	0.72	26,839.5	0.1044	0.1686	0.463
Were graphic	3.03	0.83	3.14	0.76	27,032.5	0.1759	0.2638	0.467
Multiple children	2.32	0.80	2.40	0.77	27,322.5	0.2255	0.2994	0.472
Intrusiveness	0.60	0.89	0.69	0.93	27,335.5	0.2281	0.2994	0.472
Fetishes	2.26	0.78	2.33	0.73	27,374.0	0.2430	0.3001	0.472
Sexual contact	2.87	0.85	2.96	0.77	27,478.0	0.2992	0.3223	0.474
Sound	2.56	0.85	2.63	0.78	27,421.5	0.2786	0.3223	0.473
Anxiety	0.82	0.80	0.89	0.83	27,448.0	0.3070	0.3223	0.474
Children aged 5 or younger	2.66	0.86	2.71	0.84	28,007.0	0.5015	0.4579	0.483
Children age 6–10	2.85	0.82	2.90	0.80	27,977.5	0.4906	0.4579	0.483
Live stream videos	2.02	1.69	2.07	1.69	28,222.0	0.5842	0.5112	0.487
Alterations in Cognitions	1.24	1.10	1.29	1.15	28,445.5	0.7219	0.5831	0.491
Hyperarousal	1.00	0.99	0.95	0.94	29,503.5	0.7109	0.5831	0.509
Percentage of CSAM crimes	58.37	34.92	59.96	31.36	28,577.0	0.7970	0.5926	0.493
Positive Attitudes	3.42	0.58	3.38	0.67	29,378.0	0.7883	0.5926	0.507
Depression	0.59	0.66	0.64	0.75	28,635.5	0.8184	0.5926	0.494
Burnout	2.68	0.61	2.69	0.66	28,983.5	0.9924	0.6947	0.500

^a Bolded q-values are significant at FDR < 0.05

^b Wilcoxon rank sum test (Mann-Whitney U test)

^c Vargha & Delaney's A – 0.56-0.63 small effect, 0.64–0.70 moderate, 0.71+ strong

4. Results

4.1. Differences between groups in the main study measures

Means, standard deviations, and statistics regarding the differences between groups are presented in Table 1. The analyses revealed eight differences between CSAM investigators and forensic examiners that survived FDR correction. Specifically, forensic examiners had more exposure to still images and video clips, and suggested poses of minors with clothes on than investigators. In addition, they accumulated more days per month in reviewing CSAM and have longer tenure in CSAM. Forensic examiners also feel less control over the work that is assigned to them than investigators. Finally, forensic examiners endorsed greater PTSD avoidance symptoms than investigators. All these differences, however, were small in effect size.

Comparisons between forensic examiners who are also investigators ($n = 128$) versus those who are not ($n = 101$) on the key study variables depicted in Table 1 indicate that examiners who are also investigators are significantly more likely to have a larger percentage of their job dedicated to working CSAM crimes ($p < .05$), more likely to know the final case resolution ($p < .001$), and report higher burnout scores ($p < .05$). Those who are only forensic examiners are significantly more likely than those who are also investigators to view more CSAM images ($p < .001$) and videos ($p < .001$) in a typical month [not shown in table]. No additional significant differences were noted on the other constructs.

a Exposure effects among investigators

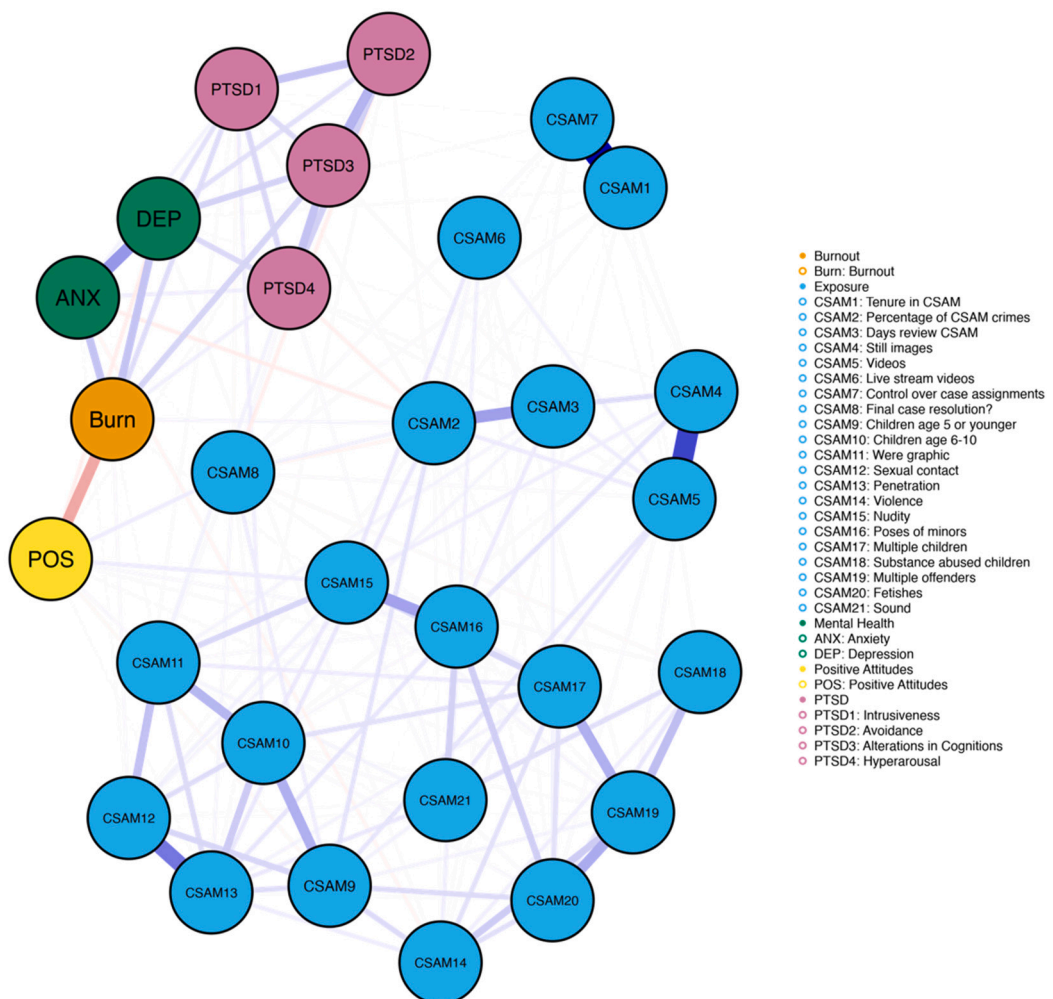


Fig. 1a. Network analysis among CSAM investigators. Blue edges (i.e., paths) reflect positive associations, whereas red edges reflect negative associations. The edges' brightness, distance, and width reflect different relative strength indicators. Nodes' colors were predefined to highlight burnout (orange), exposure factors (light blue), mental health factors (green), positive attitudes (yellow), and PTSD clusters (pink). (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

Comparisons among examiners who were sworn officers ($n = 168$) and those who are civilians ($n = 59$) indicated civilian examiners viewed significantly more images ($p = .004$) and videos ($p = .003$) in a typical month compared to those who were sworn officers. Civilian examiners were significantly less likely to know the final resolution of cases ($p < .001$) and less likely to review CSAM involving sound ($p < .05$).

4.2. Network analysis

The results of the network analyses are presented in Figs. 1a and 1b, and the centrality scores are in Figs. 2a and 2b.

4.2.1. Centrality

Results of the centrality invariance tests are presented in Table 2. They revealed that several factors significantly differed in *strength* between investigators and forensic examiners. Specifically, the strength of “exposure to images or videos involving penetration of a child, including oral sex” was higher for investigators than forensic examiners, whereas “PTSD avoidance symptoms” was lower. Node strength quantifies how well a node is *directly* connected to other nodes (Epskamp et al., 2018). Thus, these results signify that among

b

Exposure effects among forensic examiners

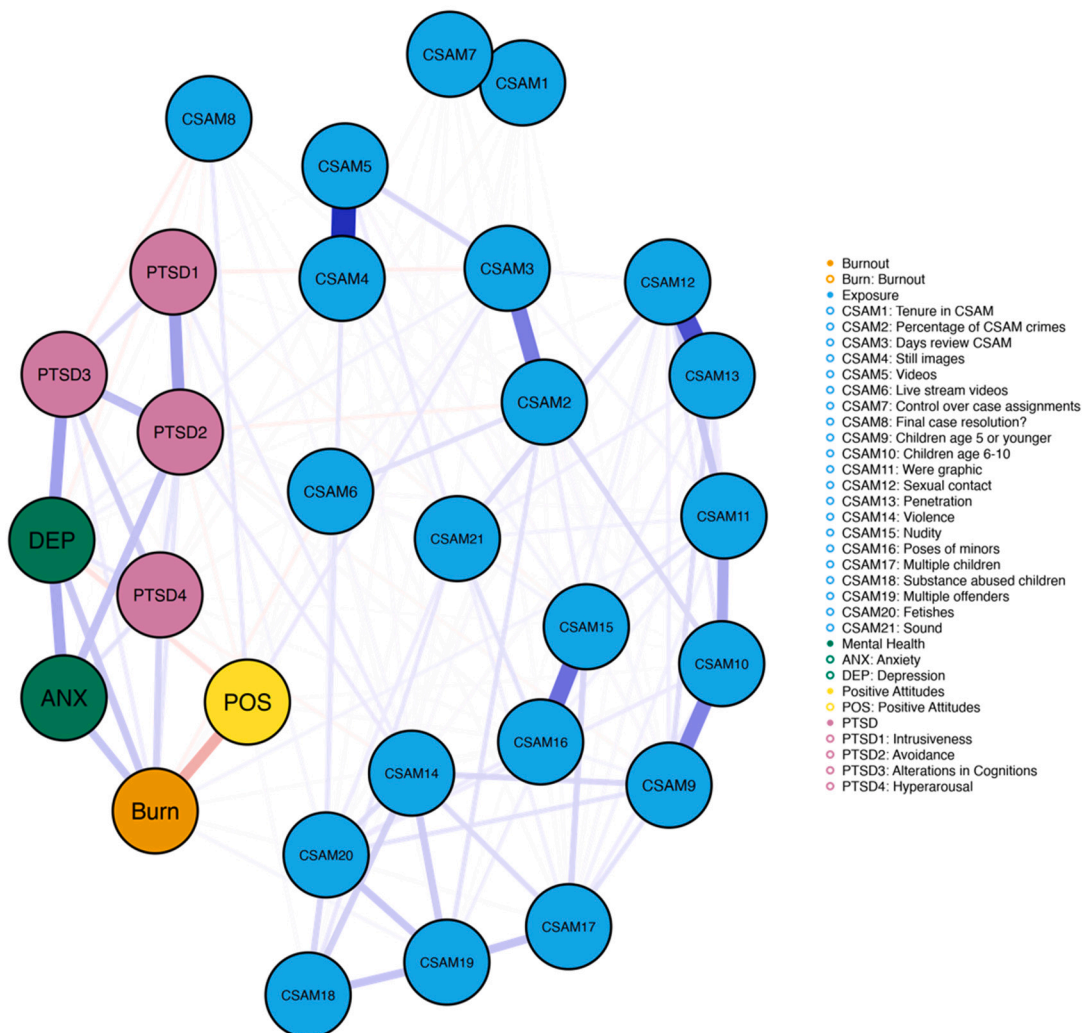


Fig. 1b. Network analysis among CSAM forensic examiners. Blue edges (i.e., paths) reflect positive associations, whereas red edges reflect negative associations. The edges’ brightness, distance, and width reflect different relative strength indicators. Nodes’ colors were predefined to highlight burnout (orange), exposure factors (light blue), mental health factors (green), positive attitudes (yellow), and PTSD clusters (pink). (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

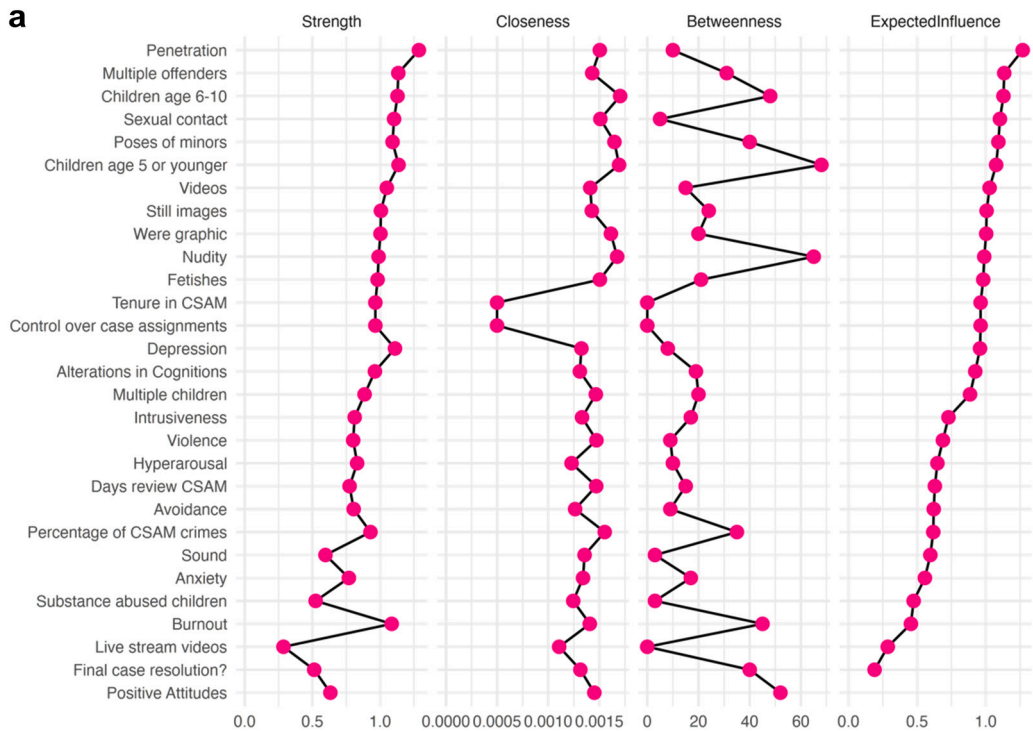


Fig. 2a. Measures of centrality related to the network among CSAM investigators.

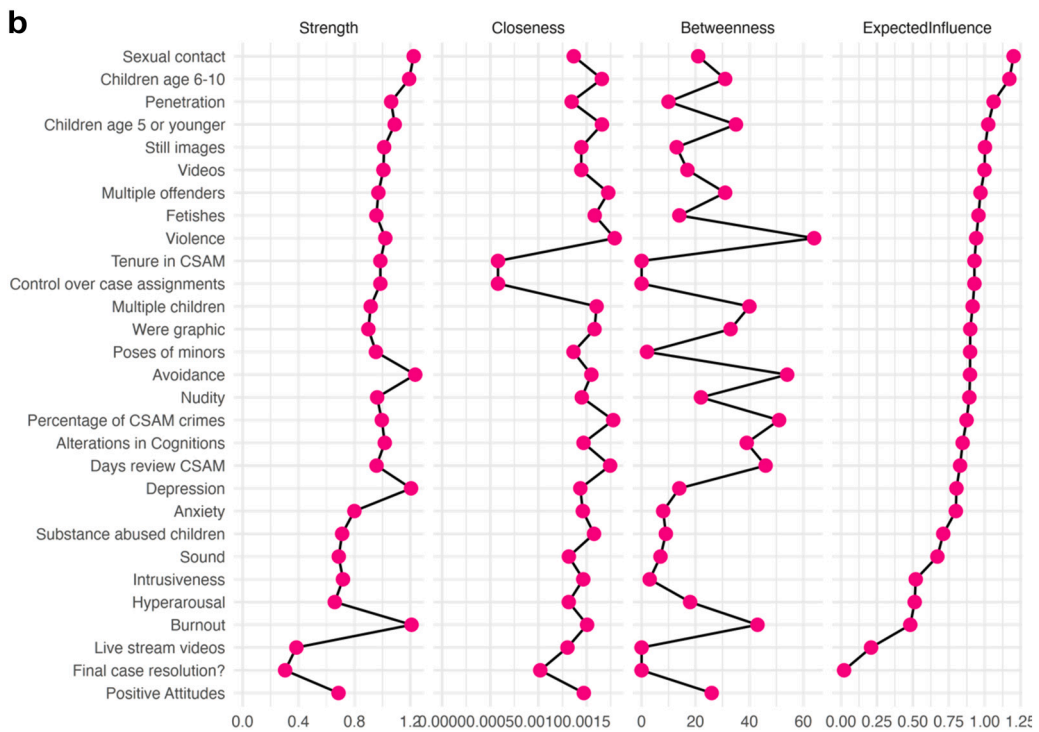


Fig. 2b. Measures of centrality related to the network among CSAM forensic examiners.

Table 2
Differences between investigators and forensic examiners in the centrality measures

Variable	Closeness	Betweenness	Strength	Expected Influence
Tenure in CSAM	0.664	1.000	0.622	0.354
Percentage of CSAM crimes	0.380	0.688	0.686	0.100
Days review CSAM	0.212	0.168	0.120	0.108
Still images	0.901	0.571	0.921	0.960
Videos	0.848	0.937	0.662	0.767
Live stream videos	0.459	1.000	0.428	0.541
Control over case assignments	0.663	1.000	0.623	0.353
Final case resolution?	0.259	0.122	0.217	0.317
Children aged 5 or younger	0.888	0.336	0.596	0.592
Children age 6–10	0.847	0.296	0.558	0.700
Were graphic	0.900	0.642	0.382	0.388
Sexual contact	0.403	0.096	0.142	0.236
Penetration	0.333	1.000	0.012	0.016
Violence	0.246	0.306	0.124	0.047
Nudity	0.338	0.157	0.819	0.397
Poses of minors	0.234	0.220	0.201	<i>0.074</i>
Multiple children	0.502	0.404	0.774	0.773
Substance abused children	0.127	0.677	0.155	<i>0.064</i>
Multiple offenders	0.199	1.000	0.138	0.147
Fetishes	0.718	0.760	0.844	0.853
Sound	0.826	0.782	0.475	0.569
Intrusiveness	0.580	0.520	0.533	0.197
Avoidance	0.248	0.202	0.012	0.150
Alterations in Cognitions	0.450	0.398	0.640	0.582
Hyperarousal	0.672	0.565	0.218	0.369
Burnout	0.670	0.954	0.429	0.846
Positive Attitudes	0.929	0.446	0.732	0.532
Anxiety	0.580	0.577	0.792	<i>0.078</i>
Depression	0.668	0.849	0.512	0.333

Note. All values refer to *p* values. Values <0.05 are in bold; values <0.10 (i.e., marginally significant) are italicized.

investigators, the exposure to images or videos involving penetration of a child, including oral sex, is significantly more important and tightly relates to other exposure indices, especially exposure to sexual content, more graphic content, and to children of all ages; among forensic examiners, it only relates to higher exposure to sexual content. Conversely, the higher strength of PTSD avoidance symptoms among forensic examiners signifies its greater importance such that it not only relates to the other PTSD clusters (the case among investigators) but also to co-morbidity in the form of higher anxiety symptoms and a sense of burnout.

In addition, the analysis revealed that the *expected influence* of “exposure to images or videos involving penetration of a child, including oral sex” and the “exposure to images or videos involving violence, beyond the sexual assault” was significantly higher in the network of investigators than in the network of forensic examiners. Node expected influence refers to a composite quantification of how well a node is directly and indirectly connected to other nodes and how important a node is in the average path between two nodes

Table 3
Network Edge Invariance Test between investigators and forensic examiners

Variable 1	Variable 2	<i>p</i> ^a	<i>q</i> ^{b,c}
Substance abused children	Avoidance	0.0070	1
Tenure in CSAM	Days review CSAM	0.0100	1
Were graphic	Depression	0.0100	1
Penetration	Violence	0.0110	1
Percentage of CSAM crimes	Avoidance	0.0150	1
Tenure in CSAM	Penetration	0.0170	1
Days review CSAM	Hyperarousal	0.0170	1
Videos	Sound	0.0190	1
Tenure in CSAM	Sexual contact	0.0220	1
Control over case assignments	Avoidance	0.0230	1
Poses of minors	Depression	0.0230	1
Children aged 5 or younger	Were graphic	0.0280	1
Multiple offenders	Anxiety	0.0330	1
Videos	Fetishes	0.0370	1
Percentage of CSAM crimes	Control over case assignments	0.0400	1
Tenure in CSAM	Burnout	0.0410	1

^a Bolded *p*-values are nominally significant at *p* < .05

^b Bolded variable names reflect significance after FDR correction

^c *q* refers to *q*-values (i.e., False Discovery Rate of 10 %)

(Epskamp et al., 2018). Thus, these results signify that exposure to images or videos involving penetration and/or violence shares significantly more influence on the network of investigators by linking more tightly to other types of exposures, particularly fetishes, children under the influence of substance abuse, and the presence of multiple offenders and/or multiple children (unlike among investigators where it is only linked to greater exposures to fetishes). It also signifies the greater influence of exposure to images or videos involving violence among investigators because of its link with greater severity of depressive symptoms.

4.2.2. Edges

The edges invariance tests are summarized in Table 3 (presenting only the nominally significant results) and Supplementary Table 1 (presenting all comparisons). Sixteen differences were nominally significant, of which eight were between exposure and mental health factors. First, we found three differences in edges linking the exposure factors of “control over case assignment”, “percentage of working CSAM crimes”, and “exposure to images or videos involving children clearly under the influence of drugs or alcohol” with the severity of PTSD avoidance symptoms. The analyses indicated that whereas the extent of control over case assignments and the percentage of working CSAM crimes were more strongly associated with the severity of PTSD avoidance symptoms among investigators than forensic examiners, the association between exposure to images or videos involving children clearly under the influence of drugs or alcohol and PTSD avoidance was significantly stronger among forensic examiners than investigators. It implies that PTSD avoidance is more closely related to the sense of control and general exposure to CSAM crimes among investigators and not to specific content. However, among forensic examiners, avoidance is tied to specific content and less to overall exposure. The other five edges corroborate this suggestion: We found that the links between exposure to more graphic content, and images or videos involving poses of minors with clothes on, to depression, as well as the link between exposure to content involving multiple children and anxiety, were stronger among forensic examiners than investigators. These three exposure factors reflect exposure to specific types of content. Conversely, we found that the link between the number of days per month reviewing CSAM and the severity of PTSD hyperarousal symptoms and the link between tenure and sense of burnout were stronger among investigators than forensic examiners.

4.2.3. Stability

As noted in Supplementary Fig. 1, the betweenness stability index was significantly lower among investigators than forensic examiners. This result implies a potentially greater heterogeneity among investigators than forensic examiners. Both groups had high stability of the closeness, strength, and expected influence centrality indices.

5. Discussion

Several research studies have indicated that law enforcement investigators face an elevated risk of experiencing emotional distress when handling child sex exploitation cases (Bourke, Craun, 2014b; Brady, 2017; Burns et al., 2008; Violanti & Gehrke, 2004). While there are fewer studies focused on forensic examiners, they also report work-related stress due to their exposure to images depicting child sex abuse (Holt & Blevins, 2011; Perez et al., 2010; Strickland et al., 2023). However, it is important to note that the roles of forensic examiners and investigators often significantly overlap when handling cases related to Internet crimes against children – in the current study, 56 % of the forensic examiners were *also* investigators. Consequently, this study aimed to address this gap in the existing literature by comparing the networks of exposure to CSAM, mental health symptoms, and burnout between those with a forensic examiner role versus those who only conducted investigations. Findings from the current study shed light on several significant differences between CSAM investigators and forensic examiners, providing valuable insights into the challenges and nuances of their respective roles.

Firstly, the study revealed differences in two professional groups: Investigators and forensic examiners. Forensic examiners had more exposure to still images and video clips, accumulated more days per month in reviewing CSAM and had longer tenure reviewing CSAM. These findings align with previous studies that found that the frequency of reviewing CSAM can have a pronounced impact on the well-being of both forensic examiners and investigators (Mitchell et al., 2022; Shaw & Browne, 2013), and with findings from a recent study indicating forensic examiners endure extended and heightened exposure to CSAM content over time, encompassing a wider range of such material in their professional duties (Strickland et al., 2023). This underscores the diversity and intricacy of their exposure, which may potentially exacerbate the emotional challenges associated with their work.

A noteworthy finding was the higher endorsement of avoidance symptoms among forensic examiners, which also occupied a more central position in their network (compared to the network of investigators). The higher strength of avoidance symptoms among forensic examiners signifies its greater importance in the network such that it not only relates to the other PTSD clusters (the case among investigators) but also to co-morbidity in the form of higher anxiety symptoms and a sense of burnout. These findings align with previous research, indicating that forensic examiners reported significantly higher levels of anxiety symptoms and burnout compared to investigators (Strickland et al., 2023). It is possible that this heightened endorsement of avoidance symptoms among forensic examiners may be due to several intertwined factors within their work environment. One contributing factor is the extent of their exposure to a significant number of CSAM per month. In the context of investigating CSAM, this heightened exposure to explicit and distressing content can manifest in avoidance symptoms, as individuals instinctively strive to shield themselves from the emotional distress that may arise from engaging with such graphic material. As research suggests, these avoidance behaviors are often rooted in the instinctive human response to reduce anxiety and emotional discomfort associated with prolonged exposure to disturbing content (Moulds et al., 2008). This aligns with findings from a preceding qualitative study involving forensic examiners, revealing that a significant number felt a compelling need to establish emotional distance from their work, particularly in consideration of concerns regarding the potential long-term impact that their exposure to explicit CSAM may have on their psychological well-being (Strickland

et al., 2023). Paradoxically, the literature highlights that while avoidance strategies may provide a temporary sense of relief, they can contribute to the maintenance of psychological disorders (Salkovskis, 1989). Studies examining coping in the context of secondary traumatic stress have indicated a correlation between coping through denial and higher PTSD scores (Bourke, Craun, 2014a, 2014b; Craun et al., 2014). Understanding how cultural norms within the police force may intersect with avoidance behaviors is crucial. Anecdotal evidence suggests that police personnel may refrain from acknowledging the emotional impact of certain incidents, often adhering to a prevailing attitude that individuals entering the police force should anticipate and display a 'stiff upper lip' (Pryce, 2007).

The higher prevalence of avoidance symptoms among forensic examiners may also be attributed to their perceived lack of control over assigned tasks compared to investigators. A sense of control over one's work and the ability to contribute to positive outcomes have been consistently associated with improved well-being (Burns et al., 2008; Mitchell et al., 2022; Powell et al., 2015). The partial involvement of some forensic examiners in investigations can add to the perceived lack of control and foster avoidance symptoms. Their primary focus on technical analysis may limit their exposure to the entire investigative process, potentially resulting in a sense of detachment from the broader context. For instance, in a study that assessed the psychological well-being and coping mechanisms of law enforcement investigators vs. digital forensic examiners of CSAM (Seigfried-Spellar, 2018), investigators reported more psychological distress than examiners but they also reported higher job satisfaction, suggesting that witnessing the case through to its conclusion can be satisfying and provide emotional closure for investigators. Unfortunately, it is rare for forensic examiners to see cases from the beginning to end, which may prevent them from fully understanding the outcomes of the cases they work on, further contributing to emotional detachment and avoidance. While our data did not reveal significant differences in terms of access to Officer Wellness Programs between examiners and investigators, among the forensic examiners, civilians (as opposed to sworn officers) were notably less likely to have access to an Officer Wellness Program. This limited access to specialized wellness programs and support services could also contribute to increased avoidance symptoms (Molnar et al., 2020). Unlike investigators who have access to a broader range of resources, forensic examiners may lack tailored mental health support, potentially exacerbating their avoidance symptoms and other mental health challenges.

The network analysis provided a deeper understanding of the complex interconnections between CSAM exposure and mental health symptoms and also reveals differences between those who work as forensic examiners in some capacity and those who are only investigators. Among investigators, CSAM involving child penetration and images or videos containing oral sex emerged as central elements in their network, showing significant associations with other CSAM exposure indices. Furthermore, the impact of exposure to images or videos involving child penetration, including oral sex, as well as exposure to images or videos featuring violence beyond sexual assault, was notably stronger within the network of investigators compared to the network of forensic examiners. Several considerations may contribute to this pattern. First, investigators' direct involvement in the investigative process, including interactions with victims, suspects, and witnesses, might lead to exposure to CSAM content depicting the victim of the case they are actively handling. This direct connection could potentially augment the psychological impact, as investigators may experience heightened emotional responses due to their intimate knowledge of the individuals involved. Second, investigators might have varying levels of familiarity or desensitization to CSAM content. If investigators are less accustomed to viewing or being exposed to such material, encountering more severe content, such as child penetration or explicit violence, may indeed have a more shocking effect. This heightened impact could be a result of the novelty or increased severity of the content, leading to stronger emotional reactions among investigators. This underscores the substantial influence and significance of these factors within their respective professional contexts.

Conversely, for forensic examiners, the higher strength of avoidance symptoms in the network signifies its greater importance, to the extent that it not only relates to the other PTSD symptoms clusters (as is the case among investigators) but also contributes to co-morbidity in the form of heightened anxiety symptoms and burnout. The centrality of avoidance symptoms in the network of forensic examiners may be attributed to the technical nature of their work and limited direct interaction with the human aspects of CSAM cases. Forensic examiners primarily focus on the technical analysis and documentation of digital evidence, often involving explicit and distressing CSAM content. To maintain objectivity and reduce emotional distress, avoidance symptoms, such as emotional distancing, likely becomes a central coping strategy. Additionally, the high co-morbidity between avoidance symptoms, anxiety, and burnout suggests that forensic examiners rely on avoidance to manage both their own anxiety and the emotional toll of their work.

The analysis of edge differences underscored the unique associations within each group, highlighting the distinct ways exposure factors are related to mental health symptoms. For investigators, control over case assignments and the percentage of time working CSAM crimes were strongly tied to the severity of avoidance symptoms. This implies that avoidance is more closely related to the sense of control and general exposure to CSAM crimes among investigators and not to specific content. This is understandable given their significant involvement in the broader investigative process. Furthermore, it is important to note that a sense of control over their work and the ability to contribute to positive case outcomes can have a beneficial impact on the well-being of professionals, which is consistent with earlier research findings (Burns et al., 2008; Mitchell et al., 2022; Powell et al., 2015). However, among forensic examiners, avoidance is tied to specific content and less to overall exposure (such as content depicting children under the influence of drugs or alcohol), suggesting that their avoidance was more tied to specific content.

Findings from our study can be understood in the theoretical lens of secondary traumatic stress and compassion fatigue. The higher prevalence of avoidance symptoms among forensic examiners aligns with the concept of compassion fatigue, where individuals exposed to traumatic material develop coping mechanisms, such as emotional distancing, to shield themselves from the emotional distress associated with their work. Additionally, the central role of avoidance symptoms in the network of forensic examiners indicates a potential connection with secondary traumatic stress, as these symptoms not only relate to other PTSD clusters but also contribute to co-morbidity with heightened anxiety symptoms and burnout.

Furthermore, five other edges indicated similar trends, showing that exposure to graphic content, images or videos of clothed minors, and content involving multiple children had stronger links to depression and anxiety symptoms among forensic examiners. Interestingly, the number of days spent reviewing CSAM and years of experience on the job had stronger associations with hyperarousal symptoms and burnout among investigators. Finally, the number of days per month reviewing CSAM and the severity of hyperarousal symptoms and the link between job experience and burnout were stronger among investigators than forensic examiners. This suggests that a higher workload in reference to CSAM was associated with heightened hyperarousal symptoms. Notably, the link between job experience and the burnout was more pronounced among investigators, suggesting that longer-serving investigators were more susceptible to experiencing burnout in their roles compared to forensic examiners.

For investigators, the association with workload and job experience underscores the complexity of their role in dealing with CSAM cases over time. The nuanced relationship between exposure, hyperarousal, and burnout aligns with the theoretical frameworks of both secondary traumatic stress and compassion fatigue. For forensic examiners, the less pronounced connection between hyperarousal symptoms and exposure factors suggests a unique aspect of their experience, possibly influenced by the technical nature of their work. Integrating hyperarousal into the theoretical frameworks enhances our comprehension of the diverse ways in which CSAM exposure affects the mental health and well-being of these professionals.

In terms of stability of the networks, the study identified lower stability in certain centrality indices among forensic examiners, suggesting potentially greater heterogeneity in their experiences and networks. In other words, there may be greater diversity in how forensic examiners are exposed to CSAM content and how those experiences are associated with mental health factors. This can be attributed to the diverse composition of this group in our study. Within our sample, forensic examiners encompass a mix of sworn police officers, civilians, and individuals who fulfill dual roles as both forensic examiners and police investigators. Some differences are noted among these groups specific to how much CSAM is viewed in a typical month (more for those who were only forensic examiners, and more for civilian examiners within the examiner group) and frequency of knowing the final case resolution (less for those who were only forensic examiners and less for civilian examiners within the examiner group). This diversity in professional backgrounds and roles within the forensic examination field likely contributes to a broader range of experiences and perspectives among forensic examiners (Edelmann, 2010).

5.1. Limitations and future research

The present study has some limitations that warrant consideration when interpreting its findings. Firstly, the data were collected through a convenience sample, which may not accurately represent the broader population of investigators and forensic examiners involved in CSAM cases. Additionally, there might have been an inherent bias in a study focused on police wellness, where individuals who are either more resilient or facing more significant challenges may have been more inclined to participate in a survey about their CSAM exposure and mental health. Secondly, the study relied on self-report measures, introducing the potential for response bias, such as underreporting or overreporting of information. It is worth noting that individuals in law enforcement may have particular reservations or biases against acknowledging mental health symptoms (Marshall et al., 2021). Third, the study is constrained by the amalgamation of forensic examiners with a singular role and those with dual roles, impacting the ability to conduct separate and statistically robust analyses for these distinct groups. Lastly, the research design was cross-sectional, meaning it captured data at a single point in time. Consequently, it is not possible to establish causal relationships between the variables studied.

5.2. Clinical implications

Findings from the current study offer actionable insights for practical interventions aimed at improving the well-being of professionals engaged in CSAM investigations. Tailored support mechanisms are crucial, considering the elevated risk of emotional distress among investigators and forensic examiners. Interventions could focus on coping strategies designed for handling high-content cases, providing targeted counseling sessions or workshops. Proactive mental health measures, particularly for forensic examiners experiencing higher PTSD avoidance symptoms, could include regular mental health check-ins and accessible resources.

Recognizing the nuances of exposure, interventions should be sensitive to the diverse experiences of investigators and forensic examiners. Customized training and support programs that consider the unique challenges each group faces could enhance the effectiveness of interventions. Acknowledging variations in access to Officer Wellness Programs and workload in reference to CSAM differences among subgroups, interventions should be tailored to specific needs. Specialized resources for civilian examiners and recognition of the impact of dual roles on well-being can enhance the effectiveness of support. The network analysis serves as a guide for targeted interventions, revealing associations between exposures and mental health outcomes. For forensic examiners, addressing the high co-morbidity between avoidance symptoms, anxiety, and burnout could be a focal point. For investigators, strategies enhancing their sense of control and satisfaction in the investigative process are warranted.

5.3. Conclusions

This study contributes to our comprehension of the distinct experiences and challenges faced by CSAM investigators and forensic examiners, and specifically the nuanced disparities between CSAM investigators and forensic examiners in terms of their exposure to CSAM content and the associated mental health factors. These insights highlight the imperative need for tailored support mechanisms and interventions that can effectively address the unique challenges encountered by individuals working tirelessly in this critical field. As the battle against child exploitation continues, it is imperative that we continue to refine our understanding of the experiences of

those who dedicate their careers to this cause. Through ongoing research and a commitment to providing the necessary support, we can empower CSAM investigators and forensic examiners to confront the challenges they face while safeguarding the well-being of these essential professionals.

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CRediT authorship contribution statement

Ateret Gewirtz-Meydan: Conceptualization, Formal analysis, Investigation, Writing – original draft, Writing – review & editing, Methodology. **Kimberly J. Mitchell:** Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Writing – review & editing. **Jennifer E. O'Brien:** Conceptualization, Investigation, Writing – review & editing.

Declaration of competing interest

The authors declare no conflict of interest with respect to the content of this manuscript.

Data availability

Data will be made available on request.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.chiabu.2024.106757>.

References

- Alves, L., Abreo, L., Petkari, E., & Pinto da Costa, M. (2023). Psychosocial risk and protective factors associated with burnout in police officers: A systematic review. In *Vol. 332. Journal of Affective Disorders* (pp. 283–298). Elsevier B.V. <https://doi.org/10.1016/j.jad.2023.03.081>.
- Blevins, C. A., Weathers, F. W., Davis, M. T., Witte, T. K., & Domino, J. L. (2015). The posttraumatic stress disorder checklist for DSM-5 (PCL-5): Development and initial psychometric evaluation. *Journal of Traumatic Stress, 28*(6), 489–498. <https://doi.org/10.1002/jts>
- Borsboom, D., & Cramer, A. O. J. (2013). Network analysis: An integrative approach to the structure of psychopathology. In *Vol. 9. Annual Review of Clinical Psychology* (pp. 91–121). <https://doi.org/10.1146/annurev-clinpsy-050212-185608>
- Bourke, M. L., & Craun, S. W. (2014a). Coping with secondary traumatic stress: Differences between U.BURNK. and U.S. child exploitation personnel. *Traumatology, 20*(1), 57–64. <https://doi.org/10.1037/h0099381>
- Bourke, M. L., & Craun, S. W. (2014b). Secondary traumatic stress among internet crimes against children task force personnel: Impact, risk factors, and coping strategies. *Sexual Abuse: Journal of Research and Treatment, 26*(6), 586–609. <https://doi.org/10.1177/1079063213509411>
- Brady, P. Q. (2017). Crimes against caring: Exploring the risk of secondary traumatic stress, burnout, and compassion satisfaction among child exploitation investigators. *Journal of Police and Criminal Psychology, 32*(4), 305–318. <https://doi.org/10.1007/s11896-016-9223-8>
- Burns, C. M., Morley, J., Bradshaw, R., & Domene, J. (2008). The emotional impact on and coping strategies employed by police teams investigating internet child exploitation. *Traumatology, 14*(2), 20–31. <https://doi.org/10.1177/1534765608319082>
- Burruss, G. W., Holt, T. J., & Wall-Parker, A. (2018). The hazards of investigating internet crimes against children: Digital evidence handlers' experiences with vicarious trauma and coping behaviors. *American Journal of Criminal Justice, 43*(3), 433–447. <https://doi.org/10.1007/s12103-017-9417-3>
- Canfield, J. C. (2005). Secondary traumatization, burnout, and vicarious traumatization. *Smith College Studies In Social Work, 75*(2), 81–101. <https://doi.org/10.1300/J497v75n02>
- Costantini, G., Epskamp, S., Borsboom, D., Perugini, M., Mõttus, R., Waldorp, L. J., & Cramer, A. O. J. (2015). State of the art personality research: A tutorial on network analysis of personality data in R. *Journal of Research in Personality, 54*, 13–29. <https://doi.org/10.1016/j.jrp.2014.07.003>
- Craun, S. W., Bourke, M. L., Bierie, D. M., & Williams, K. S. (2014). A longitudinal examination of secondary traumatic stress among law enforcement. *Victims and Offenders, 9*(3), 299–316. <https://doi.org/10.1080/15564886.2013.848828>
- Cullen, O., Ernst, K. Z., Dawes, N., Binford, W., & Dimitropoulos, G. (2020). "Our Laws have not caught up with the technology": Understanding challenges and facilitators in investigating and prosecuting child sexual abuse materials in the United States. *Laws, 9*(4). <https://doi.org/10.3390/laws9040028>
- Denk-Florea, C. B., Gancz, B., Gomoiu, A., Ingram, M., Moreton, R., & Pollick, F. (2020). Understanding and supporting law enforcement professionals working with distressing material: Findings from a qualitative study. *PLoS ONE, 15*(11 November). <https://doi.org/10.1371/journal.pone.0242808>
- Edelmann, R. J. (2010). Exposure to child abuse images as part of one's work: Possible psychological implications. *Journal of Forensic Psychiatry and Psychology, 21*(4), 481–489. <https://doi.org/10.1080/14789940903540792>
- Epskamp, S., Borsboom, D., & Fried, E. I. (2018). Estimating psychological networks and their accuracy: A tutorial paper. *Behavior Research Methods, 50*(1), 195–212. <https://doi.org/10.3758/s13428-017-0862-1>
- Figley, C. R. (1995). Compassion fatigue: Coping with secondary traumatic stress disorder in those who treat the traumatized. *New York: Routledge*.
- Figley, C. R. (1999). Compassion fatigue: Toward a new understanding of the cost of caring. In B. H. Stamm (Ed.), *Secondary traumatic stress* (pp. 3–28). Sidran Institute.
- Gewirtz-Meydan, A., Mitchell, K. J., & O'Brien, J. E. (2023). Sexual posttraumatic stress among investigators of child sexual abuse material. *Policing: A Journal of Policy and Practice, 17*. <https://doi.org/10.1093/police/paad052>
- Gewirtz-Meydan, A., O'Brien, J. E., & Mitchell, K. J. (2023). Correlates of intimate relationship satisfaction among investigators of child sexual abuse material. *Frontiers in Public Health, 11*. <https://doi.org/10.3389/fpubh.2023.1237510>

- Greinacher, A., Derezza-Greeven, C., Herzog, W., & Nikendei, C. (2019). Secondary traumatization in first responders: A systematic review. *European Journal of Psychotraumatology*, 10(1). <https://doi.org/10.1080/20008198.2018.1562840>
- Holt, T. J., & Blevins, K. R. (2011). Examining job stress and satisfaction among digital forensic examiners. *Journal of Contemporary Criminal Justice*, 27(2), 230–250. <https://doi.org/10.1177/1043986211405899>
- Kline, R. B. (2023). *Principles and Practice of Structural Equation Modeling*. Guilford publications.
- Krause, M. (2009a). Identifying and managing stress in child pornography and child exploitation investigators. *Journal of Police and Criminal Psychology*, 1(24), 22–29. <https://doi.org/10.1007/S11896-008-9033-8>
- Krause, M. (2009b). In Harm's way: Duty of Care for Child Exploitation and Pornography Investigators. *FBI Law Enforcement Bulletin*, 78(1), 20–29.
- Kroenke, K., Spitzer, R. L., Williams, J. B. W., & Löwe, B. (2009). An ultra-brief screening scale for anxiety and depression: The PHQ-4. *Psychosomatics*, 50(6), 613–621. [https://doi.org/10.1016/S0033-3182\(09\)70864-3](https://doi.org/10.1016/S0033-3182(09)70864-3)
- Leclerc, B., Cale, J., Holt, T., & Drew, J. (2022). Child sexual abuse material online: The perspective of online investigators on training and support. *Policing: A Journal of Policy and Practice*, 00(0), 1–15. <https://doi.org/10.1093/police/paac017>
- Malach-Pines, A. (2005). The burnout measure, short version. *International Journal of Stress Management*, 12(1), 78–88. <https://doi.org/10.1037/1072-5245.12.1.78>
- Marshall, R. E., Milligan-Saville, J., Petrie, K., Bryant, R. A., Mitchell, P. B., & Harvey, S. B. (2021). Mental health screening amongst police officers: Factors associated with under-reporting of symptoms. *BMC Psychiatry*, 21(1). <https://doi.org/10.1186/s12888-021-03125-1>
- McNally, R. J. (2016). Can network analysis transform psychopathology?. In , Vol. 86. *Behaviour research and therapy* (pp. 95–104). Elsevier Ltd.. <https://doi.org/10.1016/j.brat.2016.06.006>
- Mitchell, K. J., Gewirtz-Meydan, A., Finkelhor, D., O'Brien, J. E., & Jones, L. M. (2023a). The mental health of officials who regularly examine child sexual abuse material: Strategies for harm mitigation. *BMC Psychiatry*, 23(1). <https://doi.org/10.1186/s12888-023-05445-w>
- Mitchell, K. J., Gewirtz-Meydan, A., Finkelhor, D., O'Brien, J. E., & Jones, L. M. (2023b). The mental health of officials who regularly examine child sexual abuse material: Strategies for harm mitigation. *BMC Psychiatry*, 23(1). <https://doi.org/10.1186/s12888-023-05445-w>
- Mitchell, K. J., Gewirtz-Meydan, A., O'Brien, J., & Finkelhor, D. (2022). Practices and policies around wellness: Insights from the internet crimes against children task force network. *Frontiers in Psychiatry*, 13(June), 1–12. <https://doi.org/10.3389/fpsy.2022.931268>
- Molnar, B. E., Meeker, S. A., Manners, K., Tieszen, L., Kalergis, K., Fine, J. E., ... Wells, M. K. (2020). Vicarious traumatization among child welfare and child protection professionals: A systematic review. *Child Abuse and Neglect*, 110. <https://doi.org/10.1016/j.chiabu.2020.104679>
- Moulds, M. L., Kandris, E., Williams, A. D., Lang, T., Yap, C., & Hoffmeister, K. (2008). An investigation of the relationship between cognitive reactivity and rumination. *Behavior Therapy*, 39(1), 65–71. <https://doi.org/10.1016/j.beth.2007.05.001>
- Nelson, B. S., & Wampler, K. S. (2000). Systemic effects of trauma in clinic couples: An exploratory study of secondary trauma resulting from childhood abuse. *Journal of Marital and Family Therapy*, 26(2), 171–184.
- O'Brien, J. E., Gewirtz-Meydan, A., & Mitchell, K. J. (2024). Emotional wellbeing and cognitive appraisals among law enforcement exposed to child sexually explicit materials. *Criminal Justice and Behavior*. <https://doi.org/10.1177/00938548231224815>
- Perez, L. M., Jones, J., Englert, D. R., & Sachau, D. (2010). Secondary traumatic stress and burnout among law enforcement investigators exposed to disturbing media images. *Journal of Police and Criminal Psychology*, 25(2), 113–124. <https://doi.org/10.1007/s11896-010-9066-7>
- Pirelli, G., Formon, D. L., & Maloney, K. (2020). Preventing vicarious trauma (VT), compassion fatigue (CF), and burnout (BO) in forensic mental health: Forensic psychology as exemplar. *Professional Psychology: Research and Practice*, 51(5), 454–466. <https://doi.org/10.1037/pro0000293>
- Powell, M., Cassematis, P., Benson, M., Smallbone, S., & Wortley, R. (2015). Police officers' perceptions of their reactions to viewing internet ChildA exploitation material. *Journal of Police and Criminal Psychology*, 30(2), 103–111. <https://doi.org/10.1007/s11896-014-9148-z>
- Pryce, J. G., S. K. K., & P. D. H. (2007). *Secondary traumatic stress and the child welfare professional*. Oxford University Press.
- Salkovskis, P. M. (1989). Cognitive-behavioural factors and the persistence of intrusive thoughts in obsessional problems. *Behaviour Research and Therapy*, 27(6), 677–682.
- Seigfried-Spellar, K. C. (2018). Assessing the psychological well-being and coping mechanisms of law enforcement investigators vs. digital forensic examiners of child pornography investigations. *Journal of Police and Criminal Psychology*, 33(3), 215–226. <https://doi.org/10.1007/s11896-017-9248-7>
- Shaw, A., & Browne, A. (2013). A practical and robust approach to coping with large volumes of data submitted for digital forensic examination. *Digital Investigation*, 10(2), 116–128. <https://doi.org/10.1016/j.diin.2013.04.003>
- Spence, R., Harrison, A., Bradbury, P., Bleakley, P., Martellozzo, E., & DeMarco, J. (2023). Content moderators' strategies for coping with the stress of moderating content online. *Journal of Online Trust and Safety*, 1(5). <https://doi.org/10.54501/jots.v1i5.91>
- Strickland, C., Kloess, J. A., & Larkin, M. (2023). An exploration of the personal experiences of digital forensics analysts who work with child sexual abuse material on a daily basis: "you cannot unsee the darker side of life.". *Frontiers in Psychology*, 14. <https://doi.org/10.3389/fpsyg.2023.1142106>
- Violanti, J. M., & Gehrke, A. (2004). Police trauma encounters: Precursors of compassion fatigue. *International Journal of Emergency Mental Health*, 6(2), 75–80.
- Wolak, J., Finkelhor, D., & Mitchell, K. (2011). Child pornography possessors: Trends in offender and case characteristics. *Sexual Abuse: A Journal of Research and Treatment*, 23(1), 22–42. <https://doi.org/10.1177/1079063210372143>
- Wolak, J., Liberatore, M., & Levine, B. N. (2014). Measuring a year of child pornography trafficking by U.S. computers on a peer-to-peer network. *Child Abuse & Neglect*, 38(2), 347–356. <https://doi.org/10.1016/j.chiabu.2013.10.018>
- Wortley, R., Smallbone, S., Powell, M., & Cassematis, P. (2014). Understanding and managing the occupational health impacts on investigators of internet child exploitation. http://discovery.ucl.ac.uk/1447785/1/Wortley_Understanding_and_Managing_the_Occupational_Health_Impacts_on_Investigators_of_Internet_Child_Exploitation.pdf.