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Protecting Children Online:

Using Research-Based Algorithms

to Prioritize Law Enforcement Internet Investigations

Technical Report

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Disclaimer

Abstract

There is increasing public and professional concern about Internet sexual offending, as reflected in increasing law enforcement cases and clinical referrals. While all instances of Internet offending against minors require intervention, the number of cases and the overarching goal of protecting children require law enforcement to prioritize cases. This project used data from 20 Internet Crimes Against Children task forces across the United States -- offender characteristics, crime characteristics, and online behavior -- to develop empirically-based recommendations to assist law enforcement in prioritizing: (1) cases involving production of child pornography over possession/distribution; (2) cases involving online luring for the purpose of meeting the minor to commit sexual offenses, over luring restricted to online behavior such as sexual chat or exchanging pornographic images; and (3) cases involving offenders who have committed contact sexual offenses against children over cases involving offenders with no known history. The research builds on a previous OJJDP-funded project by increasing the number of task forces and thereby sample size in order to develop practical recommendations, and adding a new component – a geographical analysis of cases – that will assist decision makers in the allocation of training and resources across the United States in order to combat online sexual exploitation and abuse of children.

Background

Statement of the Problem

There is increasing public and professional concern about Internet sexual offending involving children, as reflected in increasing law enforcement cases and clinical referrals for possession, distribution, and production of child pornography, online sexual solicitations of children, and conspiracy to commit these kinds of crimes (Motivans & Kyckelhan, 2007; United States Sentencing Commission, 2012). The National Child Exploitation Threat Assessment (U.S. Department of Justice, 2010) reported an overall increase in cases of child sexual exploitation in the U.S., with a specific increase by 230% in the number of complaints of online enticement of children from 2004 to 2008. Although changes in complaint processing by Internet Crimes Against Children Task Forces may account for some of this increase, there were 20,562 complaints reported during those four years. Mitchell and colleagues (2014) reported that approximately 1 in 11 youth experienced an unwanted sexual solicitation in the past year, and approximately 1 in 25 experienced an aggressive sexual solicitation. For some, online solicitation includes both online and offline exploitation or abuse.

The number of online offending cases exceeds law enforcement resources (e.g., Canwest News Service, 2009; Long et al, 29016; Seto, 2014). Faced with more cases than personnel or time to work them, law enforcement personnel must triage and prioritize their resources. But how should they do so? All Internet sex crimes involving children are serious and require attention. Given the importance of pursuing those who pose an immediate risk to children, one strategy is to work cases involving production of child pornography before those involving possession/distribution; cases of *contact-driven* solicitations over solicitations restricted to online behavior alone (*fantasy-driven*); and cases of Internet offenders known to have committed contact sexual offenses against children.

This study specifically addressed this resource challenge by systematically analyzing data from a sample of Internet Crimes Against Children (ICAC) Task Force cases representing a cross section of the United States, representing all geographic regions. This study expanded on a prior Office of Juvenile Justice and Delinquency Prevention (OJJDP) grant funded data collection of ICAC cases assembled to develop a typology of Internet offenders against children. In so doing this project identified variables that can be readily available to law enforcement officers at the field investigation stage and that have potential for use to distinguish each higher-priority group: (1) producers of child pornography; (2) contact-driven solicitations; (3) Internet offenders who have also committed contact sexual offenses.

There are numerous potential risk factors that might distinguish between these groups, but many are available only after a case is well underway or concluded. For example, it is likely that individuals under investigation who have been previously diagnosed with Antisocial Personality Disorder are more prone to produce child pornography, attempt contacts, and to directly offend against children, than their non-disordered counterparts, but such diagnostic information is typically unavailable until after arrest, when a clinical evaluation is conducted in preparation for a legal proceeding. Such after-the-arrest information is of little use to investigators who must triage cases early in the investigative process. In contrast, a criminal history check can be performed as soon as a suspect is positively identified and may reveal a prior offense related to the current investigation. In addition, the content and process of an offender's online activity with an actual minor or an undercover officer's persona is an integral part of the investigation and will be collected from the very beginning. These types of data might offer unique indicators of risk for harm and can be readily converted to a practical investigation priority guide (see Seto & Eke, 2015, on the development of an investigator-friendly risk

assessment tool for child pornography offenders, the Child Pornography Offender Risk Tool or "C-port").

Foundational research conducted by this study's team members to address these questions was in existence before the start of this study. This included research on the motivations of child pornography offenders (Seto et al., 2006), the explanations given by child pornography offenders for their crimes (Seto et al., 2010), the likelihood that Internet offenders have already committed contact offenses against children (Seto et al., 2011), the likelihood that Internet offenders will commit contact offenses in the future (Seto et al., 2011), and the factors that predict recidivism (Eke, Seto, & Williams, 2011; Seto & Eke, 2005, 2015).

Supporting Theoretical and Practical Background

As reviewed in this section, Internet crimes against children differ along a variety of important offender characteristics, which may be relevant in developing strategies to identify and triage more serious cases. These characteristics pertain to offender motivation, types, histories, and risk factors.

Offender motivations. Many, but not all, Internet offenders are motivated by a sexual interest in children. Seto and colleagues have, for example, reported that the majority of child pornography offenders evidenced greater sexual arousal to children than to adults; indeed, the relative preference for child stimuli demonstrated by child pornography offenders exceeded that of contact offenders (Seto et al., 2006). In a separate study, 33-50% of child pornography offenders admitted they were sexually interested in children or in child pornography (Seto et al., 2010). This relationship is sufficiently robust to support the inclusion of child pornography use in the proposed revision of the criteria for a diagnosis of Pedophilia (see Seto, 2010; Seto, Stephens, Lalumière, & Cantor, 2016). Not all child pornography offenders have pedophilia, however; some offenders report indiscriminate sexual interests, an "addiction" to pornography, and

curiosity (Seto et al., 2010). The method for obtaining access to sexual material may also be a discriminating factor; Wolak et al. (2011) found that individuals who obtain child pornography through peer-to-peer software have larger, more explicit collections of abusive imagery, and may therefore pose a greater risk for future contact offending. Identifying indicators of child sexual interest among Internet offenders has practical value for prioritization of cases.

Solicitation offender types. Research has identified differences between fantasy driven and contact-driven solicitation offenders. Briggs et al. (2011) have suggested that fantasy driven offenders engage in online activities such as sexual chat or exchange of pornographic images that is gratifying in and of itself, without a desire for physical contact with the victims. Contact-driven offenders, on the other hand, engage in online activities in order to arrange real-world meetings. Briggs et al. (2011) found that contact-driven offenders have fewer online sessions before attempting to meet victims. This suggests that early indicators that might distinguish contact-driven from fantasy-driven solicitation offenders to include the speed with which the offender attempts to arrange an in-person meeting and how much of the conversation is focused on discussing meeting offline versus online sexual interactions such as sending pornography, requesting sexually explicit images from the minor, or suggesting mutual masturbation via webcam.. This distinction between fantasy- and contact-driven solicitations has not yet been replicated.

Contact offending history. In a recent meta-analysis, Seto et al. (2011) identified 21 samples of Internet offenders with information about their contact offending histories. On average, one in eight had an official criminal record for contact sexual offending. In the six samples with self-report data, 55% admitted to a history of contact sexual offending. Identifying the factors that distinguish those who have contact offenses from those who do not would advance our understanding of risk of initial sexual offending and recidivism. Advance warning of

an impending contact offense based on factors identifiable during online contact would be important for effective early responding and the protection of children. Online behavior suggestive of poor self-control, such as simultaneously contacting multiple minors or bringing up sexual topics very quickly during online interactions, may be germane (Seto & Hanson, 2011).

Risk of Sexual Recidivism. Seto et al. (2011) also reviewed recidivism rates available from nine samples of Internet offenders, followed for an average of a little over three years, with a range from 1.5 to 6 years. Approximately 1 in 20 (4.6%) committed a new sexual offense of some kind (whether contact or noncontact) during follow-up. These recidivism rates belie the idea that all Internet offenders pose a high risk of committing contact offenses in the future. But it is clear that Internet offenders vary in risk; some pose a relatively high risk to reoffend sexually and some will attempt to perpetrate contact sexual offenses. Thus, an important task for law enforcement is to identify those higher-risk individuals for investigation prioritization.

Content analysis of letters by stalking offenders to victims has been useful in determining whether stalkers are likely to attempt contact (Dietz et al, 1991a; Dietz et al, 1991b). It follows that similar comparisons might be made between contact-driven and fantasy-driven solicitation offenders using parameters such as the number of sexually explicit words in the chat, the total number of chat exchanges, the amount of time taken to initiate sexually explicit chat, sexual words in the offender's screen name, the use of a webcam, and the quantity of offender falsehoods.

Risk Factors. Research is beginning to emerge on the factors that predict recidivism among Internet sex offenders. These factors appear to be the same as factors identified in decades of research on conventional sex offenders. For example, classic criminological factors such as offender age at time of first arrest and prior criminal history predict recidivism, and failure on prior conditional release are related to risk of recidivism (Seto & Eke, 2005; Eke, Seto &

Williams, 2011). We also have shown that other intuitively sensible factors such as admission of sexual interest in children and the relative interest in boys versus girls, as reflected in child pornography and other child-related content, predict sexual reoffending (Seto & Eke, 2015). In particular, the ratio of boy to girl content predicts child pornography recidivism (Seto & Eke, 2015), just as contact offenders who victimize boys are more likely to reoffend than those who victimize girls (Seto, 2008). Online offenders who exhibit a sexual interest in boys (seeking child pornography content depicting boys or soliciting boys online) are therefore expected to be at greater risk of recidivism. Other investigators have reported that lower education, being single, possessing non-Internet child pornography (e.g., magazines), prior sexual offender treatment (likely a proxy for prior sexual offending history), and absence of depictions of adolescent minors within the child pornography cache predicted recidivism among child pornography offenders (Faust et al., 2009). It bears noting that our study, and the research cited on risk factors, pertain to adult offenders and not to adolescent offenders who, by definition will be young, will have younger victims, and will be single.

Prioritizing Cases for Law Enforcement

Based on the foregoing literature review, several variables appeared to be good candidates as potential early indicators for law enforcement to prioritize adult Internet sex crime cases. These include:

Offender demographic. Potentially relevant factors in this category include offender age, marital status, whether the offender resides with children, and whether the offender works in a child-focused occupation and/or volunteers in child-focused activities (e.g., teacher, sports coach, youth faith-based group);

Criminal record. Potentially relevant factors in this category include the offender's prior criminal history, specific types of prior offenses (e.g., violent offenses), and whether there is any indicator of failure on conditional release (Seto & Eke, 2005; Eke et al., 2011);

Online activity. Potentially relevant factors in this category include the ratio of boy to girl content and sexual interest in boys (Seto & Eke, 2015), the nature of online chat (i.e., fantasy- vs. contact-driven; Briggs et al., 2011) and the method for obtaining access to sexual material (e.g., peer-to-peer software versus commercial sites);

Child pornography content. Variables include the number, age and gender of children depicted in the abusive images; the ratio of child images to other forms of pornography; the ratio of younger (prepubescent) to older children; and the ratio of boys to girls depicted in the images;

Online time. Potentially relevant factors in this category include when online contact with victims was made (e.g., time of day and day of the week); frequency of online contact; and duration per session (frequency and duration may serve as proxy measures of an offender's drive or compulsiveness);

Sites visited. Potentially relevant factors in this category include number of different sites used by the offender and whether the sites an offender has visited suggest interest in a particular age group or a particular theme (e.g., indicative of pedophilia and/or other paraphilic sexual interests); sexual or not);.

Online name. Potentially relevant factors in this category include whether or not an offender's online name is sexually suggestive and whether an offender uses multiple aliases across different sites;

Number of victim targets. Potentially relevant factors in this category include the number of child victims being simultaneously targeted. We recognize that multiple victims are more

likely to be identified when other law enforcement officers are posing as children or when a citizen report has been made;

Chat content. Potentially relevant factors in this category include the speed with which sexual content is introduced or solicitation made; the speed with which an offender suggests a move to private setting; the introduction of questions about the victim's family or parent figures, the offender's request for victim's physical description, questions designed to elicit the victim's sexual knowledge or sexual experience; the offender's request for online sexual behaviors; the offender's request for/introduction of webcam activity;

Use of other communication methods. Potentially relevant factors in this category include whether the offender utilizes multiple methods for contacting a victim, including email, texting, and telephone.

Study Goals & Program Objectives

Goals

OJJDP identified the importance of predicting which subjects "of an online child exploitation investigation" pose the greatest "risk to harm children" (USDOJ, 2011). As a result of the increasing number of cases, "law enforcement officers need tools to identify which suspects and cases should be given priority in order to identify and rescue victims" (USDOJ, 2011). This study addressed these OJJDP priorities using data from ICAC task forces in the US (the risk assessment tool by Seto & Eke, 2015, was developed in Canada in parallel to the conduct of this project). The overall goal of this study was to develop methods for law enforcement personnel to use in real time, during investigations. The project built on the OJJDP funded research of Dwyer, DeHart, Moran (the principal investigator and co-investigators respectively of this proposal) and others by adding task forces and thus sample size. Geographical mapping of cases was conducted to identify if there is a greater prevalence of

certain types of online offending across the country, to facilitate the allocation of law enforcement resources and investigative efforts and to determine if there is meaningful geographic variation attributable to demographics, state laws/policies, and other broad factors.

The researchers designed the study to be conducted in partnership with ICAC Task Forces, obtaining data on closed cases, across a 3-year span of time, from a minimum of 50 ICAC Task Forces (representing each U.S. state). At the time of the proposal, more than one-third of the available ICAC Task Forces were already collaborating with Dwyer on a then in-progress project and they planned to continue with this current project. Recruitment of the remaining Tasks Forces was done with a final total of 20 ICAC Task Forces participating over a 4-year (extended from the original proposal) study period: Alaska, Arkansas, Georgia, Los Angeles Police Department, Maine, Maryland, Nebraska, New Mexico, Oklahoma, Oregon, Pennsylvania, Polk County (FL), Sacramento, San Diego, San Jose, Seattle, South Carolina, Texas, Utah, and Wisconsin. The distribution of sites provides for a cross section of the United States with different geographic regions (Southeast, Northwest, etc) represented.

By partnering with ICAC Task Forces to obtain data on hundreds of closed ICAC cases, the goal was for the study to be able to identify early and broadly available indicators of Internet offender risk and identify criteria for law enforcement to prioritize three types of investigations: (1) those involving production of child pornography over cases involving possession alone; (2) cases of contact-driven solicitations over fantasy-driven solicitations; and (3) Internet offenders who have already or are currently directly victimizing children over those who have no history of contact offending. This study addressed the OJJDP Child Protection Research Program goals of (a) identifying factors that reliably indicate whether subjects of online/Internet offense investigations pose great risk of harm to children, (b) prioritizing law enforcement resources for higher risk cases, and (c) encouraging research-law enforcement partnerships.

Data collection from multiple sites and use of both quantitative and qualitative analyses was required to create further understanding and hence practical applications. The specific study aims were: (1) Primary applied aim: Develop an algorithm(s) combining the variables that most accurately distinguish higher priority cases. (2) Primary scientific aim: Expand the empirical foundation of a behavioral typology of online offenders. (3) Ancillary scientific aim: Obtaining a broad geographic representation of ICACs would support evaluation of regional difference in prevalence of higher risk offenders across the three case types. Such regional differences have been found in related areas of research, such as online pornography use (Edelman, 2009). Geographical variations would be expected because of state differences in sociodemographic factors (e.g., access to broadband internet), state online offending laws and policies, and geographic variations in sexual offending related resources such as the availability of specialists to assist those who are concerned about their sexual interests and/or online sexual activities (McGrath et al, 2009; http://bit.ly/fkLYTb). (4) Ancillary applied aim: The final aim was to develop and implement a training program. This was to be in conjunction with our ICAC partners and with a commitment from the National Center for Missing and Exploited Children to work with the study team. The intent was to develop a field-based training curriculum for deploying the empirically based algorithms for prioritizing higher risk cases with the trainings developed specifically for ICAC and other law enforcement personnel who investigate online sex offender cases. As a result of the limited depth of data across the task forces who supplied case information, it was determined that there was insufficient material to warrant a training course, so instead specific recommendations are provided here for ICAC and other investigators and for those responsible for prevention initiatives.

Program objectives

The goals were addressed by completing the following objectives: (1) Collection of ICAC crime data: offender demographics and criminal history; victim (victim persona) demographics including age, sex, relationship to offender and education; offending behavior, initial charge(s) and result of adjudication. (2) Inferential statistical analysis for significant associations among offender, victim and crime details to identify types of offenders. (3) Collection of Internet chat texts between offenders and child victims or undercover officers portraying minors. (4) Content analysis of chat text, using qualitative methods, to identify patterns associated with higher priority cases. (5) Description of a sample of female offender cases. The focus was on male ICAC cases, as past research has shown that most (typically 99%+) Internet offenders are male and most of what is known about pedophilic disorder and sexual offending is based on studies of men (Seto, 2008). However, it was planned that if a sufficient sample of female Internet offenders could be obtained by combining all participating ICAC task forces, then descriptive and qualitative analysis of female Internet offenders would be reported. This will be among the first of its kind and help determine how and to what extent responses to this population need to differ.

Performance measures

Each of the proposed study aims was linked to specific objectives that could be evaluated via discernible, measurable deliverables subject to ongoing progress monitoring. Progress towards obtaining, organizing, classifying and analyzing data (Goals 1-5) was summarized within OJJDP bi-annual interim reports and this final report. The investigators will be presenting findings at professional conferences and will also develop peer-reviewed publications describing the discrimination of higher versus lower priority cases. Manuscripts will be submitted to refereed professional journals for publication. Policy recommendations and supporting research is presented herein for lay audiences and will be broadly disseminated to local, state and national

stakeholders representing ICAC and other law enforcement agencies and national victims' rights groups via OJJDP.

The original plan was for training to be provided at national conferences, offered as a component at Department of Justice National Advocacy Center (NAC) training courses for investigation of Internet crimes against children, and as a stand-alone course conducted on each coast, the New England region and the Midwest to reach the ICAC task force personnel not attending conferences or NAC trainings. As noted, there was not enough material to warrant courses, but rather only practical recommendations, as set forth in this report.

Methods

Design and Implementation

The study design involved a retrospective record review of closed ICAC cases. Data were extracted, entered into a secure database and analyzed using commercially available software. Each step was conducted and supervised by qualified research personnel. Protocols were in place to ensure confidentiality and other legal and ethical requirements were met. The database was stored on a secure server at the Medical University of South Carolina (MUSC). Access to the server was password protected and limited to necessary study personnel. All methods were approved by the PI's institutional review board at MUSC.

The study leveraged an ongoing project that included a law enforcement partnership with more than one third of the available ICACs. All data were collected from existing records that were created for non-research purposes. ICAC personnel conducted de-identification of cases files after geocoding and before providing data to the researchers. The variables sought were those typically found in law enforcement incident reports; investigative reports; arrest warrants; indictments; victim interviews and statements; subject interrogation reports, transcripts or statements; forensic examinations of computer media; Internet chat, email and text exchanges

(printed copies). The principal investigator had collected these variables for the majority of subjects in a single state (South Carolina) pilot study, demonstrating the feasibility of collecting this depth and breadth of data provided the other ICAC sites collected and maintained similar files. This level of data collection continued during this study for that site and approached the same level for another site, but unfortunately the majority of participating ICAC sites provided data with significantly less depth and breadth. Given data were collected from existing file systems, the research team could only process what was provided.

Data were extracted from available criminal justice system reports, which varied in content and format across task forces. Some ICACs has electronic records, for example, whereas data extract from other ICACs required reading police incident and investigative reports, court and probation documents and forensic evaluation results. As such the research team conducted training for the database entry personnel to ensure understanding of how to extract, code and enter data into the database. Given some variability in terminology across collected data, the term "offender" is used in this report to refer to all study subjects regardless of final adjudication status.

Quantitative Analysis

The original design to address the key research questions was to use a series of nested discriminant function analyses to identify key variables (offender characteristics, criminal history, online activity; when applicable, child pornography content and/or victim characteristics) that distinguish the critical group of cases from other relevant cases: (1) production of child pornography over cases involving possession alone; (2) cases of contact driven solicitations over fantasy-driven solicitations; and (3) Internet offenders who have already or are currently directly victimizing children over those who have no known history of contact offending. Significant discriminative variables from each set of variables would then be combined in an omnibus

discriminant function analysis, to determine overall classification accuracy. This analytic strategy has been successfully used in the development of sex offender risk measures (Quinsey et al., 2006) and other decision-making algorithms. However, these planned analyses were not possible as a result of significant problems with missing data; multivariate analyses such as discriminant function analysis require relatively complete data from large samples in order to produce robust results. Because these analyses were not possible, we instead conducted and report simpler group comparisons, distinguishing child pornography and solicitation offenders; fantasy- and contact-driven solicitation offenders (based on whether a meeting was attempted or completed); child pornography with offenders who committed both child pornography and solicitation offenses; and solicitation offenders with contact plus online offenders.

A relational database was designed and tested extensively prior to any data being stored from the study. The core of a good relational model is a process called normalization (Schwartz et al, 2012). Normalization ensures optimal performance with minimal resources, ensures that data is easily accessible for reporting, and removes duplication, which can lead to conflicting data.

The database consists of 16 tables and a customized data entry form for each table. Each form was customized to restrict data entry to predetermined choices. For instance, Gender was restricted to Female and Male choices only. Careful thought concerning data typing was used to improve the database design's efficiency while enforcing integrity. The primary purpose of data typing is to choose a data type that will give all the versatility needed and no more. On the one hand, if you use a 4-byte integer to store a value that you know will never get beyond 100, you are wasting 75% of your space. The cost of these redesigns is often problematic, so careful consideration was given at the beginning.

Data types also enforce integrity. By choosing an integer type, you ensure that letters will never be placed in this field. By choosing a date type, you will never put an invalid date in this field. All tables were indexed on the unique identity used for links between tables. This allowed for quick queries and reports. Indexing is the cheapest and easiest way to improve database performance. Indexing allows the database to perform well now and into the future. This design protected from errors and minimized the costs related to mistakes.

The database was documented with a detailed data dictionary for reference by the investigators and other approved researchers. Backup was automatically performed each night, with copies maintained locally. Each week offsite (MUSC) backups were performed so that in the event the storage site was compromised, the study could continue. Recovery procedures included the ability for access up to 30 days after individual backups, if needed. The database was password protected and stored on a secure university maintained server. Security threats to the databases are minimized using a good security model and MUSC has a very secure overall model given the need to maintain personally identifiable patient information. All data removed from the database for analysis was thoroughly cleaned prior to release by the database manager. Analyses were performed with SAS 9.4 or SPSS 23, with descriptive and analytical statistics detailed and summarized.

Geographic Analysis

An ancillary aim of examining geographic differences was included, given that local laws and policies can influence offender behavior as well as identified cases. Also, the distance an offender is willing to travel to meet a victim might be a fruitful indicator of risk (e.g., offenders willing to cross several state lines to meet a victim might pose a greater risk to children than offenders who remain in-state for their offending behaviors).

Gecoding the offender data. Raw data for GIS analysis was collected in a MS Access database containing only the offense code, address of the offender, and the agency that supplied the data. The data were exported to a format required by the US Census Geocoder tool and then geocoded. There were 1,615 records and 1,593 distinct addresses first run through the US Census Geocoder. Of those, 1,410 records (87.4%) of the records were successfully geolocated using the US Census Geocoder. An additional 179 (11.1%) records were geolocated using Google's geocoder and 26 (1.6%) of the records did not have enough information to successfully geocode.

Preparing the US Census data. 2010 US Census block files and summary files for the 36 states represented by the offender database were downloaded from the US Census FTP site. A MS Access database was created for each state containing a query template to export the fields desired for this study. The summary files were extracted and loaded into the appropriate database. Using the query template, comma delimited files were then exported from each database.

Geoprocessing. State by state, the comma delimited file containing the US Census summary file data needed for the study was loaded into GIS and joined to the corresponding block file based on the US Census defined GEOID field. The Select By Location tool was then used to select blocks in the newly joined block file using the point file of geocoded offender addresses. Selected blocks were copied into a GIS polygon file that would eventually contain the 1,542 census blocks represented by the 1,587 geocoded offender addresses. The geocoded point file of the offender addresses was then spatially joined with the GIS polygon file containing all of the census blocks of interest using the Join Attributes by Location tool. The attributes from the resulting joined GIS file were then exported into a new MS Access database for analysis.

Qualitative Analyses

From the total study dataset, 251 cases (19%) had chat, email, or social network files that informed qualitative analyses. Received case file content was scanned to PDF and uploaded to a secure file server for coding and analysis using MaxQDA software (VERBI GmbH Berlin, Germany). Using MaxQDA, text passages were marked and tagged with commentary or codes. The passages, codes, and commentaries were then sorted into hierarchies and grouped into categories.

The lead qualitative analyst (co-investigator DeHart) conducted first-cycle coding on a subset of 20 cases with provisional codes developed based on sexual offending literature (e.g., "grooming", "sexual interests," "request to meet;" Kontostathis, Edwards, Leatherman, 2010; Olsen et al., 2007). In addition, open coding was performed to further delineate data and provide analytic leads for exploration (Saldana, 2009). This 20 case subset was provisionally grouped into "families" representing possible typologies based on chat content (e.g., interested in children, wanting to meet for sex, online sex only). This process enabled identifying codes that could potentially differentiate various types of offenders, such as those specifically seeking children (as opposed to those seeking a sexual interaction regardless of the target's age). Opportunistic offenders, who were seeking an in-person meeting, kept chats brief and moved quickly to scheduling a personal meeting. "Online-only" offenders would more typically engage in or seek masturbation during the chat.

To investigate these leads, a second coder applied selected codes (e.g., "exposes self," "attempts to schedule," "real-time sex") to all 200 chat logs. Second-cycle axial coding was then conducted to differentiate and organize codes (Saldana, 2009). The analysts communicated throughout the coding process to address discrepancies, clarify concepts, and refine codes based on consensus (Hill, Knox, Thompson, Williams, Hess, & Ladany, 2005; Sandelowski & Barroso,

2003). As Forman and Damshroder (2008) have explained, such an approach supports construct development and validity.

Case classification. Coders performed a quantitative step by using dummy codes for identifying the presence or absence of specific event categories (e.g., engaging in real-time cybersex, requesting a meeting) and event timing (e.g., time-to-onset for introducing sexual content) and exporting the dataset into SPSS.

Next, using the qualitatively identified subset of key codes, the analyst used exploratory cluster analyses to determine which codes would aid in developing offender groupings. The following six key binary codes that were applied to cases were used in the cluster analysis: (1) whether the offender exposed himself sexually via photos or video; (2) whether the offender sought sexually themed photos of the victim; (3) whether the offender showed the victim third-party pornography; (4) whether the offender engaged in or encouraged real-time masturbation; (5) whether the offender attempted to schedule a meeting (i.e., specific times and places); and (6) whether the offender mentioned child-specific or incest topics in the chat.

Although grouping varied with the clustering methods used (e.g., two-step, hierarchical, k-means), the one revealed most frequently was that real-time masturbation and scheduling most impacted group classification. Using qualitative methodology to assess the exploratory clusters lead to classifying cases as one of three types: engaged in or encouraged real-time masturbation but didn't attempt meeting (*cybersex*); attempted scheduling to meet, but no real-time masturbation (*schedulers*); and online masturbation and scheduled meeting (*cybersex/schedulers*). This typology is similar to that of Briggs et al. (2011) differentiation of fantasy-driven (focus is on cybersex interactions) and contact-driven solicitation (focus is on meeting offline).

Using thumbnail case descriptions, an analyst sorted cases into three categories and that process led to adding a fourth category, that was a further distinction of the scheduler group in which chats included a third party (e.g., pimp, family member) and the goal was child sex trafficking (*buyers*). Several cases were dropped from the final set based on either a pre-existing relationship between offender and victim (19 cases) or lack of both masturbation and scheduling (2 cases). This left the groupings of the final sample set as cybersex-only offenders (n = 48), schedulers (n = 44), cybersex/schedulers (n = 64), and buyers (n = 23).

Miscellaneous Data Topics

Issues of Data Protection. Data was extracted from closed ICAC cases involving persons arrested for sexual offenses against children (or child personas of undercover law enforcement personnel) that originated via use of the Internet. The study did not involve contact with human participants. Data selection, safety and monitoring were addressed as following: (1) Case Selection Criteria: All closed cases resulting in conviction were considered for inclusion. ICAC task forces provided their data to the South Carolina (SC) Attorney General's office as a central collection point. The research team partnered with the SC Attorney General's office (specifically the ICAC Task Force commander and staff) to enable the participating ICAC Task Forces (TFs) to supply their files without having to redact sensitive undercover operational methods information or conduct de-identification of study subject data, which would be time and resource consuming potentially preventing participation. Another advantage of a centralized site for removal of this information before being provided to the research team was enabling oversight of consistency of methods; (2) Data safety. After extraction, all data was maintained on a secure, password-protected university server. Data was electronically transferred via the same means used to transfer legal case data from ICACs to the SC Attorney General's office. All presentations and publications will include aggregate data only so that no single case will be

identifiable. (3) Data monitoring. This was a retrospective record review, therefore direct contact with subjects did not occur and a formal data safety and management board (DSMB) was not warranted. Nevertheless, strict controls were put into practice and all study procedures were approved and monitored by the principal investigator's institutional review board (IRB).

Identification and management of relevant ethical issues was performed as follows: (1) Institutional Review Board (IRB): No data collection or analysis by study personnel was conducted until approval had been received from the MUSC IRB and co-investigator IRBs, where required. (2) Financial conflicts: There were no financial relationships between the study investigators and OJJDP. There are no commercial sponsors of this study. (3) Equity Interest in a Sponsoring Company or Company's Product: There were no pertinent equity interests to declare.

Results

Findings are addressed based on methodology and each of the associated study aims.

Primary applied aim: Algorithm Development

The study design was created with the goal of being able develop an algorithm using collected data for identifying offenders most likely to attempt an in-person meeting with a child first solicited online. The depth and breadth of quantitative data concerning offenders, victims to include undercover law enforcement officer personas of victims, and offense behavior varied to such an extensive degree across data sites that this was not possible at a national, generalizable level. The original sought depth and breadth of data as obtained during the pilot from a single ICAC Task Force did not meet expectations. As a result, the use of more sophisticated multivariate analysis was not possible.

Demographic and descriptive statistics are available and reported below. More success was experienced with chat room data; although still limited in scope of cross sectional

representation, but nonetheless sufficient for drawing conclusions and making recommendations as set forth herein.

Primary scientific aim: Expansion of Empirical Foundation for Online Offenders Behavioral Typology

Quantitative database: The database consisted of 1,341 usable cases. The majority of cases (57%) came from just two states, SC and UT, reflecting state differences in cases and in collaboration with the project. Because the data came from many different states, it was common to have missing variables.

The cases were divided into four categories: Child Pornography (child pornography) offenses, Child Solicitation offenses, Both (solicitation & child pornography) offenses and Contact (online & contact) offenses.

Table 1. Distribution of cases across states

State	Child Pornography	Solicitation	Both	Contact	Total
AK	91	27	1	15	134
CA	28	7	7	0	42
FL	1	33	2	0	36
GA	32	14	2	4	52
NE	84	14	7	14	119
OK	35	5	0	1	41
SC	112	217	8	1	338
UT	377	63	20	2	462
WA	16	7	2	0	25
Other	48	38	2	4	92
Totals	824	425	51	41	1341

Table 2. Mean Suspect Ages Across Case Types

Case	N	Mean Age	STD (Years)	Min	Max
Child Pornography	824	34.3	14.1	13	76
Solicitation	425	33.7	12.2	16	77
Both	52	36.2	12.1	15	66
Contact	41	41.0	13.5	20	81

Most of the analyses focused on comparing the two main types of online offenders (child pornography vs. solicitation offenders), further distinguishing between production and non-production child pornography offending and between fantasy-driven and contact-driven solicitation offenders when possible. Almost two-thirds (61%) of the 1,249 cases were a result of child pornography investigations. The two main offender types did not differ in mean age, gender, or ethnicity. Consistent with prior published work on internet sex offenders (Seto, 2013), almost all offenders identified in this study were male (98% of child pornography offenders, 99% of solicitation offenders) and offenders were disproportionately White (89% child pornography, 85% solicitation).

Table 3. Gender across Case Types

Gender	Child Pornography	Solicitation	Both	Contact	Total
Female	15	4	0	2	21
Male	809	421	52	39	1321
Total	824	425	52	41	1342

As noted in Table 3, there were 15 female child pornography offenders, 4 solicitation offenders, and 2 mixed offenders. Six of the 15 female child pornography offenders were minors, 5 from Utah, which raises the possibility that a significant proportion of the female offenders were investigated for sexting/peer related activities. For example, a teenaged girl who sent a

sexually explicit image of herself to another teen, or to an adult who solicited her, could conceivably be charged with production and distribution of child pornography. Indeed, further examination of the data for these teen offenders found that the child pornography content was self-produced, either as photos created by the teen or via webcam. In contrast, the four solicitation offenders and two mixed female offenders were all in their 20s or 30s, and all four solicitation offenders met real minors. One mixed offender had a 14 year old female victim; the other mixed offender and solicitation offenders had 15 or 16 year old boy victims.

Table 4. Ethnicity across case types.

Race	Child Pornography	Solicitation	Both	Contact	Total
White	642	350	41	28	1061
Black	24	29	1	3	57
Asian	2	4	1	1	8
Bi-racial	0	1	0	0	1
Hispanic	39	19	1	2	61
Other	10	9	2	2	23
Unknown	3	0	0	0	3
Total	**720**	**412**	**46**	**36**	**1214**

There were substantial missing data across the remaining coding variables, as shown in other tables reported in the Appendix, reflecting variations in what data were available and recorded by investigators, inconsistencies or ambiguities in the coding of files, and the

retrospective nature of the study, given files were created for investigation purposes rather than for research purposes (e.g., questions about childhood history might never have been asked because they were not immediately relevant to the investigations). We planned to code detailed information about childhood and family history, psychiatric history and substance use, but were not able to analyze these variables at all. Surprisingly, we also were not able to delve into criminal history either, which we would think is readily available to police investigators. A possible explanation is that many offenders had no prior record, or the record was not available at the time of the investigation and submission of the files for data analysis.

Because creation of algorithms depends on large samples and relatively complete data, the subsequent analyses were conducted on a variable-by-variable basis, in order to identify candidate factors that would be of assistance in distinguishing offender types.

For the 891 cases with data on living arrangements, an equal proportion of child pornography and solicitation offenders lived alone (19%); child pornography offenders were more likely to live with relatives (42% vs 31%) and less likely to live with a partner (30% vs 40%). Though child pornography offenders were less likely to live with a partner, they were more likely to be involved in a relationship, 74% vs 62% (n = 611). Of the 571 cases with information on sexual orientation, 90% of the sample was identified as heterosexual.

There was too much missing information on education to characterize. Identical proportions of child pornography and solicitation offenders were employed in some capacity (85%, n = 700).

There was a plurality with some child pornography offenders having both photos and video. The following are child pornography content categories rated yes for 50 or more cases (most of the other ratings are quite rare, e.g., depictions of rape): fellatio n = 336 yes; digital

vaginal penetration n = 177; object vaginal penetration n = 130; penile vaginal penetration n = 333; bondage n = 135; physical force n = 118; physical restraint n = 79.

In general, only a small number of offenders (n < 10) endorsed fantasy items, so group comparisons aren't possible except for those related to prepubertal and post-pubertal minors, distinguishing further between boys and girls. Overall, child pornography offenders were more likely to admit sexual fantasies about prepubescent children than solicitation offenders, as would be expected based on typical child pornography content vs. the ages of victims who are solicited (Seto, 2013). Also as expected, those who had committed both kinds of offenses or who committed contact sexual offenses as well were more likely to admit sexual fantasies about prepubescent girls (and postpubescent girls for those who committed both kinds of online offenses). It can't be definitively determined from the dataset, but it is likely that many of the both offenders had child pornography that depicted postpubescent rather than prepubescent children.

Table 5. Admission of sexual fantasies across case types.

Admit fantasies about	Child Pornography	Sexual Solicitation	Both	Contact
Prepubescent girls	14%	7%	36%	44%
Prepubescent boys	7%	0.2%	6%	1%
Postpubescent girls	14%	12%	40%	12%
Postpubescent boys	5%	2%	2%	2%

Qualitative Analysis Subjects

All offenders in the final qualitative data set (n=251) were men, with the one female offender excluded because of a pre-existing relationship with the victim. These cases come from 7 states, with offenders residing in 14 states. The majority is from South Carolina (68%), followed by Florida (17%), Georgia (3%), North Carolina (3%), Texas (2%), and Alaska (2%).

The remaining states from which study data was collected (California, Colorado, Illinois, Maryland, New York, Oklahoma, Virginia, and Washington) contributed less than 1% of cases. The predominant offender race was White (84%), followed by African American (6%), Hispanic (6%), Asian (2%), and other ethnicities (3%). The average offender age at offense was 34.75 years, with a range of 18 years to 74 years. There was a wide variability of charges with the most represented being criminal solicitation of a minor, assault or sexual battery, attempted criminal sexual conduct, lewd acts, and travel to meet a minor.

All the final qualitative cases involved undercover law enforcement posing as child victims (coded using first victim persona only for offenders with multiple victims), with a mean age of 13 years and an age range of 9 to 14. The majority (97%) of personas were females, with a small number of male personas (2%) and one with unspecified gender (1%). The vast majority began as online chats (87%), followed by online classified ads (12%), and social media posts (1%).

Duration of Online Interactions. Using chat logs, email threads, or social media posts, online interaction was defined as the total time from start to finish of an offender interaction with a child persona. The calculated range was ten minutes to almost four years. Time-to-onset for specific behavior was calculated as follows: asking for pictures of the victim (Median = 10 minutes); offender mentioning a sexual topic (Median = 12 minutes); offender asking to meet (Median = 50 minutes); offender suggesting to switch contact modalities (e.g., from a chat log to a cell phone; Median = 1 hour, 6 minutes); offender engaging in or encouraging online real-time sex acts (Median = 1 hour, 11 minutes.

Comparison of Offender Types. There were no significant differences in mean age at the time of the offense between any of the offender types. There was a moderate to strong

relationship between offender type and race. Small proportions of cybersex (2%) and cybersex/schedulers (8%) were non-White, in contrast to schedulers (32%) and buyers (39%).

There was a small to moderate association between offender type and offenders seeking sexual photos of victims. Cybersex/schedulers sought photos at a rate of 48%, followed by cybersex offenders at 42%, buyers at 30%, and schedulers at 23%. Offenders showing victims third-party pornography was rare in the sample and no association was identified.

There was a small to moderate association between offender type and their mentioning child-specific or incest topics during chats. Just over half (56%) of cybersex/schedulers mentioned these themes, followed by cybersex offenders and buyers at 35% each, and schedulers at 30%.

To analyze duration of interactions from start to finish, a dichotomy was created to differentiate those identified as relatively brief (less than 24 hours in duration) from more protracted. This reflects a qualitative difference among offenders with the shorter duration and the extreme of those lasting years. A moderate association was found for offender types and brief duration. Almost half of schedulers (43%) had brief chats, followed by buyers at 35%, cybersex offenders at 29%, and cybersex/schedulers at 13%.

A final significant association with offender type was found at a moderate level for cancellations/no-shows. Cancellations/no-shows were overrepresented among cybersex/schedulers who canceled/did not show at a rate of 34%, followed by schedulers at 21% and buyers at 4%.

Ancillary scientific aim: Evaluation of Regional Difference in Prevalence of Higher Risk Offenders across Case Types

Spatial analysis revealed disproportionate findings for two states, but they coincided with the sites providing the greatest volume of detailed records. Given the inability to adjust for this imbalance, no further analysis could be performed with the geocoding data. Consequently, no specific conclusion can be drawn. Summary tables from the GIS data are provided in the Appendix to this report.

Ancillary applied aim: Develop and Implement a Training Program for ICAC Personnel

Because an algorithm could not be developed, there is no need for an in-person training program. Rather recommendations based on findings of inferential statistical analysis and qualitative analysis are provided for use by field level law enforcement personnel.

Summary

The following is a brief characterization of each of the offender types: Cybersex offenders were typically White, engaged in sexual exposure to their victims, and almost 50% asked their victims for sexual photos. The majority had extended online interactions, with some lasting months. Although over half (54%) mentioned meeting, they didn't make any specific plans to do so. Approximately 1/3 engaged in child-specific or incest topics online. This type would on occasion exposure sexually on camera, would occasionally ask their victims about breast size and pubic hair, and try to give masturbation instructions.

The next type, Cybersex/Schedulers were also predominately White; approximately 50% sexually exposed via camera or video. In addition, about 50% asked victims for sexually explicit photos and were the most likely of all types to engage in child-specific or incest topics. They also usually had prolonged online interactions and asked victims about their secondary sex characteristics (e.g., breast size, pubic area appearance). Although they made specific plans to meet, they were the most likely of all the types to cancel or not show. Possible explanations about these scheduling results include: 1) the offender never wanted to meet, but wanted to keep

the victim engaged online, 2) the offender wanted to meet, but got scared or suspicious that they were involved in an undercover police operation, or 3) the scheduling process was interesting or gratifying (sexual or otherwise) in and of itself.

The third group, Scheduler*s*, included more non-White individuals than the other types. Unlike previous types, Schedules infrequently sexually exposed and less than 25% asked victims for sexual photos. The durations dropped to less than a day for about 50% of this type, and only about 1/3 engaged in child-specific or incest topics. The short duration is consistent with Brigg et al's (2011) observation that contact-driven offenders quickly tried for a meeting, and discontinued interaction if there was no interest from the minor. Others of this type would mention a meeting early, but not engage in planning a meeting until after chatting for some time.

Buyers were more ethnically diverse, unlikely to sexually expose themselves, and only about 1/3 asked victims for sexual photos. More than 1/3 mentioned child-specific or incest topics. Also, more than a 1/3 had interactions that lasted less than a day. The chats with this group were typically about scheduling and discussion of what could or could not take place, as well as cost. Most interactions did not start with chats, but rather as responses to posted ads.

Summary of significant child pornography vs solicitation offender differences

Returning to the overall sample and our quantitative analysis, child pornography offenders were more likely to be White, more likely to live with a parent, and less likely to live with a partner. Although tentative given the limited data available for this characteristic (n=65), child pornography offenders were more likely to be sexually abused (76% vs. 39%) than solicitation offenders. Child pornography offenders were also more likely to admit sexual fantasies about prepubescent children than solicitation offenders, consistent with Seto et al.'s (2012) comparison of child pornography and solicitation offenders.

Summary of Fantasy vs Contact Driven Solicitation Offenders

We were also able to compare 347 solicitation offenders who met or attempted to meet in-person (contact-driven) to the 70 who did not (fantasy-driven), in order to attempt a validation of the distinction described by Briggs et al. (2011). For this analysis, the solicitation and both offender groups were combined. There was no difference in gender, with most suspects being male. The contact-driven solicitation offenders were less likely to be White (80% vs. 96%) and there was no difference in being in a relationship or in sexual orientation. There was no statistically significant difference relative to prior adult criminal history which was relatively rare for Contact-driven vs. Fantasy-driven subgroups (18% vs 22%. respectively).

There was no statistically significant difference relative to who made contact first or who initiated private contact (72% vs. 81%) or a sexual chat (84% vs. 91%), with the suspect usually being the first to initiate. The likelihood of sharing photos was not significantly different. Contact driven offenders were significantly less likely to webcam (24% vs. 60%, respectively) and more likely to make phone contact (45% vs. 20%, respectively).

Contrary to Briggs et al. (2011), who found that contact-driven solicitation offenders had fewer contacts than fantasy-driven offenders, it was the opposite in this study: contact-driven offenders had more contacts (mean of 7.2 vs. 3.2) and had longer duration of contacts (79 min vs. 52 min when duration was recorded). This difference between our study and Briggs et al. might be the result of counting multiple short contacts in which offenders were setting up meetings. It is not accounted for by difference between undercover officer operations vs. real minor meetings because 76% of contact-driven and 71% of fantasy-driven offenders interacted with an undercover police officer.

Comparing Child Pornography to "Both" Offenders

Relative to child pornography only offenders, offenders who had committed both child pornography and solicitation offenses were more likely to admit sexual fantasies about

prepubescent (36% vs 14%) or postpubescent girls (40% vs 14%), suggesting that those who engaged in both forms of online sexual offending against children were more likely to be paraphilic. No difference was found between the two offender groups in interest in boys of either age range because there were very low rates for interest in boys (e.g., 7% and 6%, respectively, for prepubescent boys). With regard to child pornography content, a different pattern was found: child pornography offenders were more likely to have content depicting bondage (16% vs 4%, respectively0, physical force (14% vs 2%, respectively), or penile-vaginal penetration (40% vs 17%, respectively). The most likely explanation is that child pornography offenders were focused on collecting child pornography and thus had large collections where at least some images or videos would depict the described acts. Both Offenders, on the other hand, are more likely to have child pornography in the context of interactions with minors, either to show the images or to ask for images via webcam etc. The interactive images are more likely to be nudes rather than violent or paraphilic in content.

Comparing Solicitation to Mixed (Contact) Offenders

A similar pattern was found in comparing solicitation and mixed (contact) offenders, where both groups had attempted or had sexual contact with a minor. The contact offenders, who had committed both online and contact sexual offenses, were much more likely to admit sexual fantasies about prepubescent (44% vs 7%) or postpubescent girls (42% vs 12%); unlike the previous comparison, they were also more likely to admit sexual fantasies about prepubescent boys (10% vs 0.2%). The endorsement rates for child pornography content were generally too low to interpret.

Limitations, Discussion and Recommendations

Limitations

With regards to the qualitative analysis, the sample was a subset of chats, emails, and social network threads. In addition, only 19% of cases prosecuted by the supplying agencies included chats, emails, or social network interactions that were amenable to qualitative analysis, where there may be confounding differences between cases where this information was retained versus not retained. There is also a potential limitation in that the agencies supplying the needed data for qualitative analysis are not representative of all the participating task forces or the nation.

The most obvious limitation of the quantitative analysis – already stated – is the amount of missing data. The pilot work done with the SC task force did not generalize to other task forces. In addition, participation by ICAC task forces was not as much as hoped, with 20 forces rather than 50 forces recruited in the end. Two task forces – SC and UT – provided 57% of cases, and thus we did not have a representative sample of cases across task forces or across geographic regions. Nonetheless, some interesting and potentially valuable findings were obtained in both the qualitative and quantitative analyses, as discussed below.

The obstacles and shortcomings of this study's findings support the need for all case data to be retained. This would include all content of online interactions needs to be saved to include date/time stamps, changes in modality from chair to email or phone, and full text and recordings or transcripts. Greater consistency in record keeping (including what information is sought, how it is recorded) would assist future research efforts. Academic researcher-law enforcement practitioner partnerships could serve to frame these needs and methods to meet them in a manner that would improve the field's understanding of sexual offending behavior, augment investigations, and facilitate risk reduction/prevention processes.

Discussion

The offender typologies we identified in the qualitative analysis is consistent with the fantasy- versus contact-driven model by Briggs et al. (2011). The qualitative study also identified a new type that has been discussed in the literature before but has never been systematically studied: commercial sex buyers who use the internet for this purpose. This study's focus and discoveries regarding preferred online modality (e.g., chats, classified ads, email, and social networks), duration of online interaction, attraction to exchanging sexually explicit material, child-specific/incest interests, likelihood of engaging in real-time sexual activity with victims, and likelihood of scheduling in-person meetings can benefit law enforcement in prioritizing cases based on risk to victims, developing investigative techniques to aid apprehension, and allocating criminal justice resources.

Prevention programs should take note that this research revealed that online interactions could rapidly escalate, as indicated by many offenders exchanging sexual images or discussing meeting after less than 10 minutes of online interaction. This certainly suggests that even a short period of unsupervised Internet use by children could pose a risk of victimization. Clearly there is a need to increase awareness, especially for those children most vulnerable to online solicitations (e.g., Marcum et al., 2010; Mitchell et al., 2007). Prevention would also be greatly aided by the development of risk-reduction technology such as software that identifies risky communications (Kontostathis, Edwards, & Leatherman, 2009) and the use of these technologies to flag interactions on social network and other interactive sites.

The quantitative analysis also supported a distinction between fantasy- and contact-driven offenders. Unlike Briggs et al. (2011), however, we found that contact-driven offenders were more likely to have multiple contacts, although these contacts might be quite brief (e.g., a single text message). Part of this might be how we operationalized contacts in terms of discrete interactions; an exchange of 10 text messages was counted as 10 interactions, but these 10 texts

might all have occurred in a single day-long session; in contrast, Briggs et al. and our qualitative analysis looked at discrete sessions where there might be many interactions spaced over time). Consistent with the idea that fantasy-driven offenders were more focused on the online interactions, fantasy-driven offenders were more likely to use webcams and less likely to call than contact-driven offenders.

For child pornography offenders, the results of this study confirmed a previous, smaller study showing that child pornography offenders are more likely to have paraphilic sexual interests than solicitation offenders (Seto et al., 2012), with child pornography offenders here being more likely to report sexual fantasies about prepubescent as well as postpubescent girls. Solicitation offenders tend to seek young adolescents, and thus may have more in common with statutory sex offenders who meet minors offline who are under the legal age to consent to sex but report they willingly engaged in prohibited sexual interactions (Seto, 2013). This study also confirmed previous work showing that engaging in multiple forms of sexual offending involving children is strong evidence of paraphilia, with higher proportions of Both offenders and Contact offenders – the former engaging in both child pornography and solicitation offending and the latter engaging in both online and contact offending – admitting sexual fantasies about prepubescent girls, and Both offenders being more likely to admit sexual fantasies about postpubescent girls.

The aforementioned has value for forensic mental health assessments relative to risk prediction. Specifically, sexual fantasies of prepubescent children and use of child pornography support rendering a diagnosis of pedophilic disorder, which in in turn is a factor in recidivism risk determination. Such a diagnostic finding is also important in the areas of classification and correctional management, where decisions are made about treatment programing. Mental health

treatment in the community must also consider intervention goals which are based on diagnosis and behavior history.

Recommendations

As noted there was insufficient data across fields for enough sites to construct an investigative algorithm for use in subject priority selection or assignment of resources. Fortunately, a child pornography offender specific risk tool intended to be investigator friendly was developed while this project was underway (Seto & Eke, 2015). Nevertheless, there were findings from this project worthy of consideration for use in investigations, forensic evaluations, and prevention policy development.

Given that the child pornography offenders were more likely than solicitation offenders to admit fantasy about prepubescent children, investigators working undercover should structure their exchanges accordingly. For example, an investigator could ask about what and why the offender wants to see depicted in solicited images/videos.

Those engaged in online trading, soliciting for child pornography or offering child pornography, are most likely to be interested in prepubescent content and investigators can dialogue accordingly. As with those investigators working cases with offenders having fantasies about prepubescent children, asking about and talking about their own (their undercover persona's) interest in particular physical characteristics indicative of prepubescence is likely to reveal the offenders interest areas. Correspondingly, time and resources for solicitation investigations will be most efficient when directed at those seeking pubescent children. These findings can be of value when conducting searches of seizure digital media, online exchange logs, etc. and recording information for investigation and post-investigation purposes. We note here that two items on the Child Pornography Offender Risk Tool refer to the gender representation of child pornography and other child related content (Seto & Eke, 2015). Noting

whether the offender had more content depicting boys so that later evaluators are aware is relevant to risk of sexual recidivism as well as psychiatric diagnosis and treatment planning.

Differences in online behaviors such as exposing oneself sexually or asking for sexual photos or videos from minors, and the speed with which such requests can be made, are relevant to investigators because it suggests their early interactions with suspects can quickly reveal whether someone is likely to be interested in scheduling a meeting offline. Investigators need to be alert to this behaviors as clues of the type of offender they are likely interacting with. For example requests for images or online exposure are more likely going to stay with online activities rather than move to an in-person meeting.

Those seeking to meet engaged in significantly shorter exchanges than other types. Thus the longer the interaction, the more likely the solicitation behavior will remain online only. This is also an important consideration for prevention planning in that those seeking an in-person contact will be quick to arrange such meetings.

We believe these recommendations can aid investigators in directing the focus of online undercover operations. Doing so without purpose and structure may lead to losing contact with potential offenders, missing data of evidentiary value, or expending limited resources with little chance of fruitful outcome. It is notable that offender classifications covaried with the investigative techniques and sample sites. For example, 65% of trafficking cases were identified from undercover officer posted ads and 100% of cybersex and 97% of cybersex/schedulers were identified from chats. These differences reveal that different investigative methods will result in detecting different types of offenders. Although not a focus of this study, it was noted during qualitative analysis that some investigators varied on whether they encouraged or discouraged in-person meetings and/or real-time sexual activity online. Future research should explore how

these differences impact online offending behavior and which approach or approaches prove most beneficial for detecting higher risk offenders.

More study is needed regarding the behavior of those engaging in internet-based offending with child victims. This study adds to existing research on types of online offenders, their varying sexual interest in prepubescent vs postpubescent children, and their online offending behavior. This study also identified new avenues and questions to pursue. It also revealed the difficulty in conducting a retrospective file-based study using data that were not originally collected for research purposes.

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Appendix

The database consisted of 1341 usable cases. The data was broken down into four categories:

Child Pornography, Sexual Assaults, Child Solicitation and Both (Solicitation & Child porn).

Because the data came from many different states, it was common to have missing variables for

certain states. All four categories are summarized below by the various other variables in the

dataset.

State	Child Pornography	Sexual Solicitation	Both	Contact	Total
AK	91	27	1	15	134
CA	28	7	7	0	42
FL	1	33	2	0	36
GA	32	14	2	4	52
NE	84	14	7	14	119
OK	35	5	0	1	41
SC	112	217	8	1	338
UT	377	63	20	2	462
WA	16	7	2	0	25
Other	48	38	2	4	92
Totals	824	425	51	41	1341

Gender	Child Pornography	Sexual Solicitation	Both	Contact	Total
Female	15	4	0	2	21
Male	809	421	52	39	1321
Total	824	425	52	41	1342

Race	Child Pornography	Sexual Solicitation	Both	Contact	Total
Black	24	29	1	3	57
Asian	2	4	1	1	8
Bi-racial	0	1	0	0	1
Hispanic	39	19	1	2	61
other	10	9	2	2	23
unknown	3	0	0	0	3
white	642	350	41	28	1061
Total	720	412	46	36	1214

lives with	Child Pornography	Sexual Solicitation	Both	Contact	Total
Alone Stable	88	39	5	4	136
alone transient	6	6	0	0	12
grandparents	7	3	0	0	10
other	57	12	4	3	76
other-Relative	47	12	4	2	65
parents	224	57	6	4	291
platonic fiend	32	12	1	1	46
significant other	194	94	16	20	324
state group home	1	0	0	0	1
Total	656	235	36	34	961

Home Type	Child Pornography	Sexual Solicitation	Both	Contact	Total
Apartment	135	47	4	11	197
Duplex	11	3	2	1	17
House	383	114	17	14	528
Mobile home	30	22	1	4	57
Other	41	16	4	0	61
Unknown	3	0	0	0	3
Total	603	202	28	30	863

High school - Highest	Child Pornography	Sexual Solicitation	Both	Contact	Total
8	2	0	0	0	2
9	4	3	0	0	7
10	2	4	0	0	6
11	4	5	0	0	9
12	104	99	7	5	215
Total	116	111	7	5	239

HS Degree	Child Pornography	Sexual Solicitation	Both	Contact	Total
Diploma	104	100	7	5	216
GED	6	6	0	0	12
None	4	1	0	0	5
Still in School	46	6	1	0	53
Unknown	1	0	0	0	1
Total	161	113	8	5	287

Type of Education	Child Pornography	Sexual Solicitation	Both	Contact	Total
Regular	4	15	0	0	19
Special Ed	2	4	0	0	6
Unknown	0	0	1	0	1
Total	6	19	1	0	26

College Degree	Child Pornography	Sexual Solicitation	Both	Contact	Total
Associate	10	2	0	0	12
BA/BS	15	17	1	1	34
Doctorate	4	0	0	0	4
Masters	2	5	0	0	7
Some College	55	41	3	3	102
Technical	6	5	0	0	11
unknown	5	6	0	1	12
Total	97	76	4	5	182

MH Treatment	Child Pornography	Sexual Solicitation	Both	Contact	Total
No	9	10	0	0	19
Yes	61	29	2	3	95
Unknown	0	0	0	0	0
Total	70	39	2	3	114

Significant other	Child Pornography	Sexual Solicitation	Both	Contact	Total
No	97	91	4	3	195
Yes	273	150	23	28	474
Unknown	1	0	0	0	1
Total	371	241	27	31	670

Marital Status	Child Pornography	Sexual Solicitation	Both	Contact	Total
Committed Partner	10	1	1	0	12
Divorced	37	24	1	6	68
Married	164	94	15	16	289
Never married	58	51	2	3	114
Separated	15	12	2	4	33
Unknown	2	0	1	0	3
Widowed	1	1	0	0	2
Total	287	183	22	29	521

Income Source	Child Pornography	Sexual Solicitation	Both	Contact	Total
Family-Full	15	5	0	0	20
Family Partial	4	0	0	0	4
Job-Criminal	3	0	0	1	4
Job-Legit	335	235	30	24	624
Other-Full	3	2	0	0	5
Other-Partial	1	2	0	0	3
Social Security	9	6	1	0	16
Unknown	3	2	0	1	6
Total	373	252	31	26	682

Employed	Child Pornography	Sexual Solicitation	Both	Contact	Total
No	63	43	3	6	115
Yes	349	245	30	26	650
Total	412	288	33	32	765

Physical Abuse	Child Pornography	Sexual Solicitation	Both	Contact	Total
No	6	7	0	0	13
Yes	4	7	0	0	11
Unknown	1	0	0	0	1
Total	11	14	0	0	25

Sexual Abuse	Child Pornography	Sexual Solicitation	Both	Contact	Total
No	11	11	1	0	23
Yes	34	7	3	3	47
Unknown	2	0	0	0	2
Total	47	18	4	3	72

Neglect	Child Pornography	Sexual Solicitation	Both	Contact	Total
No	4	7	0	0	11
Yes	0	0	0	0	0
Unknown	1	0	0	0	1
Total	5	7	0	0	12

Age:

Case	N	Mean	STD	Min	Max
Both	52	36.2	12.1	15	66
Child Porn	824	34.3	14.1	13	76
Sexual Assault	41	41.0	13.5	20	81
Solicitation	425	33.7	12.2	16	77

Geocoding Results

Offenders living in Urban vs. Rural defined census blocks

Urban/Rural	Number of offenders
Urban	1311
Rural	238
Undefined	40

Offenders living in Urban vs. Rural defined census blocks by Offense Type

Offense Type	Urban	Rural	Undefined
Pornography	921	133	43
Chat	339	91	5
Both	28	4	0
Missing	19	10	1

Offenders living in Urban areas by Urban Area Type

Urban Area Type	Number of Offenders
Urban Area	1153
Urban Cluster	154
Not in Urban Area or Undefined	287

Offenders by Urban Area Type and Offense Type

Offense Type	Urban Area	Urban Cluster	Not in Urban Area or Undefined
Pornography	815	106	176
Chat	293	46	96
Both	28		4
Missing	17	2	11

Racial makeup of census blocks in which offenders reside

Offense Type	Average Percent White	Average Percent Black	Average Percent American Indian and Alaska Native	Average Percent Asian	Average Percent Native Hawaiian and Other Pacific Islander	Average Percent Other Race	Average Percent Two or More Races
Pornography	77.3%	6.9%	2.1%	3.1%	0.7%	6.3%	3.6%
Chat	75.6%	13.1%	1.0%	2.7%	0.5%	4.7%	2.4%
Both	75.0%	9.3%	0.9%	6.4%	0.2%	5.0%	3.2%
Missing	73.3%	7.0%	3.4%	6.1%	0.2%	6.6%	3.4%

Family Households in census blocks in which offenders reside

Offense Type	Average Percentage of Family Households	Average Percentage of Husband-Wife Family Households	Average Percentage of Male householder, no wife present	Average Percentage of Female householder, no husband present
Pornography	68.1%	51.1%	5.0%	11.9%
Chat	67.3%	49.2%	5.2%	13.0%
Both	69.6%	51.5%	4.9%	13.3%
Missing	66.6%	50.2%	5.2%	11.2%

Non-Family Male Households in census blocks in which offenders reside

Offense Type	Average Percentage of Non-Family Households	Average Percentage of Non-Family Male households	Average Percentage of Males Living Alone households	Average Percentage of Males Note Living Alone households
Pornography	31.9%	49.9%	36.7%	13.3%
Chat	32.7%	48.8%	36.9%	11.9%
Both	30.4%	49.8%	37.3%	12.5%
Missing	33.4%	51.1%	38.2%	12.9%

Non-Family Female Households in census blocks in which offenders reside

Offense Type	Average Percentage of Non-Family Households	Average Percentage of Non-Family Female Households	Average Percentage of Females Living Alone households	Average Percentage of Females Note Living Alone households
Pornography	31.9%	50.1%	40.8%	9.3%
Chat	32.7%	51.2%	42.9%	8.3%
Both	30.4%	50.2%	40.6%	9.7%
Missing	33.4%	48.9%	41.8%	7.1%