Offending patterns for serial sex offenders identified via the DNA testing of previously unsubmitted sexual assault kits

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ABSTRACT

Purpose: Much of what we know about serial sex offenders is based on multiple sexual assaults linked via conviction or self-report or offenders who primarily target strangers. Our data are derived from serial sex offenders linked via DNA testing of unsubmitted sexual assault kits—which provides a more objective examination of offending patterns.
Methods: Study uses descriptive statistics, chi-square tests, and sexual assault narratives to explore offending patterns for serial vs. nonserial sex offenders and crossover offending patterns by relationship, age, and gender for serial sex offenders. We examine crossover offending patterns for three groups of serial sex offenders: those who assaulted only strangers, both strangers and nonstrangers, and only nonstrangers.
Results: Findings show significant crossover offending by relationship and age. Over one-quarter sexually assaulted both strangers and nonstrangers. Serial sex offenders often vary their offending pattern across offenses. The offender-victim relationship appears particularly salient when assessing offending patterns.
Conclusions: Offending patterns are not a consistently reliable link across assaults. Many of these sexual assaults had not been linked prior to DNA testing, thereby illustrating the power of the DNA testing of SAKs for identifying and linking serial sex offenders, particularly when testing is followed by a thorough investigation.

1. Introduction

Hundreds of thousands of sexual assault kits (SAKs), also known as rape kits, have languished, untested in evidence storage facilities across the United States. A SAK is a set of items used by medical professionals for collecting and preserving evidence from a victim[1] of sexual assault for the purpose of investigation and prosecution. SAK examinations are usually administered in a hospital, take approximately four to 6 h to complete, and involve medical professionals photographing, swabbing, and examining the victim's entire body for evidence (Campbell et al., 2015; RAINN, 2016).

The existence of such a large number of untested SAKs highlights the criminal justice system's inadequate response to sexual assault (Bettinger-Lopez, 2016; Department of Justice, 2016; Luminais, Lovell, & Flannery, 2017). By not testing SAKs, victims are often denied a speedy judicial resolution (Strom & Hickman, 2010) while testing

SAKs sends a supportive message to victims (End the Backlog, 2016; Spohn, 2016). Unsubmitted SAKs are missed opportunities to identify unknown offenders, confirm the identity of known offenders, connect offenders to previously unsolved crimes, possibly exonerate innocent suspects, and populate the federal DNA database (Campbell, Pierce, Sharma, Feeney, & Fehler-Cabral, 2016; End the Backlog, 2016; Lovrich et al., 2004; Spohn, 2016).

Large "backlogs" of unsubmitted SAKs exist for several reasons. First, many SAKs pre-date modern DNA forensic analysis, which only became widely available in the late 1990s (National Institute of Justice, 2015; Ritter, 2016). If SAKs were tested at the time of collection, as compared to now, they would have had much less success at returning DNA hits because of technological advancements and because it has taken years for the federal DNA database to populate with profiles (Calandro, Reeder, & Cormier, 2005; Department of Justice, 2016; National Institute of Justice, 2015; Peterson, Johnson, Herz,

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[1] Many prefer the term survivor when referring to a person who has been a victim of sexual violence. In this paper, we use the term victim as this is nomenclature used by the criminal justice system to refer to the complainant in the sexually-based offense.

Graziano, & Oehler, 2012; Ritter, 2016). Second, when DNA testing became available, it was so expensive (an estimated $5000/kit) that many jurisdictions were not able to test all SAKs. When DNA testing was performed, a limited number of SAKs were prioritized for testing (Dickson, 2014; Luminais et al., 2017). Additional contributing factors to the backlog include: victim-blaming behaviors and beliefs; the lack of written policies and protocols for submitting SAKs for DNA testing; budget cuts that reduced the number of sexual assault investigators and crime lab personnel; inefficient DNA testing methods and/or equipment; high turnover in police leadership; strained relationships between police and prosecutors; SAKs being viewed as a prosecutorial rather than an investigative tool; delays in obtaining testing results; lack of community-based advocacy services; outdated record keeping; and no centralized storage location for SAKs (Bettinger-Lopez, 2016; Campbell et al., 2016; Human Rights Watch, 2013; Jan, 2004; Nelson, 2013; Peterson et al., 2012; Pratt, Gaffney, Lovrich, & Johnson, 2006; Ritter, 2016; Strom & Hickman, 2016).

1.1. Unsubmitted SAKs in Cuyahoga County (Cleveland, Ohio)

Starting in 2013, the Cuyahoga County SAK Task Force (Task Force) began following up (via investigation and prosecution) on the DNA testing of nearly 5000 previously unsubmitted SAKs from 1993 through 2009 using a "forklift" or "test-all" approach (where all untested SAKs were submitted). One main outcome of this testing (e.g., the probative value of the DNA testing) has been the identification of a large number of serial sex offenders—linked via DNA that was collected at the time the victim reported the crime and had a SAK collected. Since most of what we know about serial sex offenders is based on offenders who have admitted to and/or been caught and convicted of multiple offenses, our data provide a unique opportunity to explore serial sex offenders who are linked by more objective means and earlier in the process, when the SAK was collected.

2. Previous research on serial sex offenders

The literature on serial sex offenders has predominantly focused on the identification of serial sex offenders—either in comparison to nonserial sex offenders (single-victim offenders) or for the purposes of determining serial sex offender subtypes based on the characteristics of the offender and the nature of the offenses. Balteri and Andrade (2008) and Burgess, Hazelwood, Rokous, Hartman, and Burgess (1988) explored the links between prior sexual abuse and subsequent serial sex offending for prevention and early intervention purposes and found that serial sex offenders are more likely to have been sexually abused as children. Sea, Kim, and Youngs (2016) and Levenson and Socia (2016) identified distinct subgroups of serial sex offenders and found that they are not a homogenous class but rather display different offending patterns. Other studies have focused on serial sex offenders' criminal behaviors and patterns of offending. Some of this research could be categorized as criminal profiling research—for helping to identify serial sex offenders early in an investigation (Corovic, Christianson, & Bergman, 2012; Warren et al., 1999).

Research comparing serial to nonserial sex offenders has found some differences in crime scene behavior (such as kissing and pre-offense alcohol use) on the part of nonserial sex offenders and criminal sophistication on the part of serial sex offenders, but no significant difference in the level of violence or sexual behaviors (Corovic et al., 2012). Park, Schlesinger, Pinizzotto, and Davis (2008) found similar results regarding interpersonal involvement (such as kissing) and criminal sophistication but stand in contrast to Corovic et al. (2012), in finding more violence among nonserial sex offenders. In work on offenders in the United Kingdom (Slater, Woodhams, & Hamilton-Giachritsis, 2014), researchers found that while there are some statistically significant differences between nonserial and serial sex offenders (such as method of approach and the use of restraints), none of these

variables are consistent enough across crime scenes to allow an analyst to predict whether any particular crime is the work of a nonserial or a serial sex offender.

Many of these studies limit their analyses to subcategories of serial sex offenders—in particular serial sex offenders who assault strangers (usually defined as a person completely unknown to the victim or just met prior to the assault) (Corovic et al., 2012; LeBeau, 1987; Slater et al., 2014). One reason to focus on stranger sexual assaults is to control for covariates; another is that some prior research has indicated that most victims of serial sex offenders are likely to be unknown to the offender (Hazelwood & Warren, 1989; Park et al., 2008; Slater et al., 2014). Additionally, stranger serial sex offender cases present the biggest challenges for investigators because they are complex (Rossmo, 2000).

There are several key areas of inquiry in the serial sex offender literature, mainly offending patterns for known vs. unknown offenders, whether serials are linked to more than one sexual assault via official data or self-report, how serial offenders are defined, and the profiling of different types of serial sex offenders. With regard to the importance of examining sexual assault patterns for known offenders and unknown offenders, Campbell et al. (2016) used DNA evidence collected from untested SAKs in Wayne County, Michigan (Detroit) and showed that DNA collected from SAKs involving both stranger and known offenders were almost equally likely to return DNA hits in the federal DNA database. This suggests that the previous finding that serial sex offenders primarily target strangers may be an artifact of the data being derived from official records (Cann, Friendship, & Gozna, 2007). Official records typically include arrest records, police reports, and victim narratives and are disproportionally comprised of sexual assaults committed by strangers because sexual assaults by strangers are more likely to be reported than sexual assaults perpetrated by someone known to the victim (Felson, Messner, & Hoskin, 1999; Felson & Paré, 2005; Paul, Zinzow, McCauley, Kilpatrick, & Resnick, 2013). As de Heer (2016) points out, official records provide researchers with information about victim outcomes (including injuries and the severity of the attack) that are not available from self-reports by offenders. Official data also have significant limitations, namely that approximately 80% of rapes are unreported and of those that are reported, only 10% lead to a conviction (National Research Council, 2014). On the other hand, self-reporting offers a window into potential motivations that cannot be assessed from official documentation and can potentially include populations of undetected offenders (Beauregard, Rossmo, & Proulx, 2007; Lisak & Miller, 2002; Stevens, 1997, 1998). Additionally, identified offenders may self-disclose further crimes in a research setting (Heil, Ahlmeyer, & Simons, 2003). However, self-reported data are also limited in that offenders must be able to recall, admit, and self-define these offenses as nonconsensual (LeBeau, 1985).

This discussion is further complicated by the limited agreement on the definition of a serial sex offender, particularly when relying on official sources. Most research defines a "serial" as two or more sexual assaults in separate incidences; however, research greatly varies in how and when two or more sexual assaults are linked. de Heer (2016) uses a rubric of a perpetrator with two or more victims but does not state how that is measured. Slater et al. (2014) uses two or more convictions. LeBeau (1987) defines a serial sex offender as an individual who commits two or more crimes before being caught. Finally, Park et al. (2008) focuses on both two or more individuals in at least two separate incidents. At issue, as noted by Graney and Arrigo (2002), is that individuals identified as non-serial sex offenders have the potential to be serial sex offenders who have simply not been identified in other sexual crimes. Despite differences in operational definitions, the consensus in the literature is that a serial sex offender is a person who has perpetrated at least two separate sexual offenses.

The thrust of much literature is on the profiling of different types of serial sex offenders for its probative value—usually to associate multiple crimes to an individual through crime linkage or predicting the

behaviors of at-large offenders (Beauregard et al., 2007; Corovic et al., 2012; Deslauriers-Varin & Beauregard, 2013; Hewitt & Beauregard, 2014; Hewitt, Beauregard, & Davies, 2012; Kocsis, Cooksey, & Irwin, 2002; Park et al., 2008; Slater et al., 2014; Warren et al., 1999; Woodhams, Hollin, & Bull, 2007). A more selective approach bases profiles on geographic analysis (Beauregard et al., 2007; Canter & Larkin, 1993; Lundrigan & Czarnomski, 2006; Meaney, 2004; Strangeland, 2005) where the authors ground their findings in the context of their own geographic locales (i.e., patterns observed in the USA are similar but not exactly the same as those observed in South Africa), but still reveals a level of consistency not generally found in other aspects of a "traditional" offending pattern, particularly in regard to "hunting grounds," release sites, and distance from an offender's home or work address. A recent line of inquiry involves understanding the environmental similarities of offense sites. Analysis reveals that this component of offending may remain more stable than other variables (Deslauriers-Varin & Beauregard, 2013). All of these studies assume that at least some aspects of a perpetrator's offending pattern remain stable enough across incidents to distinguish crimes committed by that individual from similar crimes committed by others, such as the level of sexual intrusiveness, the presence or type of weapon used, or even whether a trajectory pattern can be detected (cf. Sorochinski, 2015).

The literature on crossover behaviors complicates the findings on serial sex offenders. Crossover offending includes targeting victims who vary by age, gender, or relationship to the offender—also known as sexual polymorphism (Lussier, Leclerc, Healey, & Proulx, 2008). Studies based on offenders' self-report find significant crossover in their offending (Abel & Rouleau, 1990; Heil et al., 2003), as do studies based on official records (Cann et al., 2007; Guay, Proulx, Cusson, & Ouimet, 2001). Kleban, Chesin, Jeglic, and Mercado (2013) compiled a number of other studies and also found evidence for crossover by gender, age, and relationship. Sorochinski (2015) attempted to determine whether offenders remained consistent in their behaviors or at least stuck to an identifiable trajectory and discovered that none remained completely stable, although a subset remained fully consistent in at least one behavior pattern. Lussier et al. (2008) created a more nuanced schema to understand offending patterns by differentiating between offenders who assaulted strangers, familial, and nonfamilial victims (i.e., victims they were not related to). Their findings suggest that serial sex offenders are somewhat predictable in how they crossover, for example, from adult victims to adolescent ones, as opposed to adult victims to young children. This is in line with the approach taken by Harris, Knight, Smallbone, and Dennison (2011), who focused on the likelihood of reoffending for subsets of serial sex offenders, such as child molesters with mixed aged victims. Additionally, as the above examples illustrate, most studies of crossover offending by age analyze large age groups (e.g., children, adolescents, and adults). Others focus on crossover behaviors for the purposes of managing inmate populations and calculating risks for reoffending (Cann et al., 2007; Graney & Arrigo, 2002; Guay et al., 2001; Harris et al., 2011; Lin & Simon, 2016). Stephens, Seto, Goodwill, and Cantor's (2016) study is unusual in that it examines a constellation of crossover domains (age, gender, and relationship) as they relate to recidivism, ultimately suggesting that it is the number of victims of the offender, not the offender's polymorphic victim choice, that is the best predictor of re-offense.

Research on unsubmitted SAKs is in its infancy given that the problem has only recently been brought to light (Campbell, Fehler-Cabral, & Horsford, 2017; Human Rights Watch, 2009, 2013; Patterson & Campbell, 2012; Pratt et al., 2006; Ritter, 2011; Strom & Hickman, 2010). With pressure from the media and support at the federal and state levels, jurisdictions have begun the process of addressing their large "backlogs" of unsubmitted SAKs. A good deal of the literature focuses on: (1) the factors that created the "backlog" of unsubmitted SAKs and future areas of investigation (Campbell et al., 2015; Pinchevsky, 2016; Valentine et al., in press); (2) the action research process in SAK task forces (National Institute of Justice, 2015;

Nelson, 2013; Peterson et al., 2012; Shaw et al., 2016); (3) testing prioritization for unsubmitted SAKs (Campbell et al., 2016; Strom & Hickman, 2016; Wells, 2016); (4) the investigative value of the results from tested SAKs (Fallik & Wells, 2015; Menaker, Campbell, & Wells, 2016); and (5) victim advocacy and notification for victims whose SAKs remained unsubmitted for long periods of time (Campbell et al., 2015; Gaines & Wells, 2015; Joyful Heart Foundation, 2016). This article is the first to address offending patterns of serial sex offenders linked through DNA in unsubmitted SAKs.

2.1. Aim of this study

The purpose of this study is to explore how individuals who have been linked via DNA commit sexual offenses without the prism of self-reporting or official linkages distorting, or in some cases, inventing, a coherent narrative. We examine offending patterns for serial sex offenders linked via DNA from unsubmitted SAKs and describe the extent of their crossover offending. We begin by exploring differences in offending patterns for nonserial compared to serial sex offenders. Next, we examine crossover offending by relationship, age, and gender. Last, we describe the extent to which serial sex offenders maintain or fail to maintain a consistent offending pattern across their offenses by examining offenders who did and did not relationally crossover. We conclude with a discussion of the utility of testing SAKs, the utility of using offending patterns to link offenses, and implications for future research, practice, and policy.

3. Data and methodology

3.1. Data sources

We were given access to the Task Force's SAK case files via an electronic management platform organized so that documents necessary for investigation and prosecution are uploaded as PDFs into case files. Essentially, the platform functions as an electronic file drawer with some searchable data or fields, but mostly is PDF-driven. From the case files, the research team coded initial police reports, investigative reports (currently conducted by Task Force investigators), medical reports,[2] and lab reports. From these files, we created a database of SAK cases, discussed in detail below.

3.2. Sampling

Our database consists of almost 500 variables about the assault, the offender, the victim, the sexual assault kit, the investigation (at the time and current), and any prosecutorial activity (at the time and current). Our data are unique in that we have very detailed, historical data over a 20-year span of time for sexual assaults with unsubmitted SAKs in Cuyahoga County that were never successfully prosecuted at or near the time of the assault (e.g., did not result in a guilty verdict or plea). Our sample consists of all completed sexual assault investigations by the Task Force as of August 2015 (n = 433) that were either indicted (n = 341; 79%) or not indicted due to insufficient evidence (n = 92; 21%). We focus on these cases because they have complete documentation in the case files and represent cases that could currently be prosecuted. The Task Force is still investigating and prosecuting sexual assaults stemming from the DNA testing; thus, our sample does not include all serial sex offenders from the unsubmitted SAKs. The codes and coding procedures employed in this study were developed and refined via a pilot study that included 243 SAKs that are included in this sample (Lovell, Flannery, & Luminais, in press).

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[2] Medical records were examined to obtain information about the assault not included in the police reports, such as whether a condom used, the victim's relationship to the offender(s), type of penetration, etc.

The sexual assaults in our sample occurred between March 1992 and September 2014; however, the majority of the sexual assaults occurred between 1993 and 1999 (80.5%), which reflects the prioritization of cases based on the state's statute of limitations. While the Task Force's focus is on unsubmitted SAKs from 1993 through 2009, in some instances, if an offender is linked to a sexual assault outside of this time frame, the Task Force, when applicable, will incorporate this sexual assault with the unsubmitted SAK investigation and prosecution. This explains why our sample includes some sexual assaults before 1993 and after 2009.

3.3. Serial sex offender defined

In this study, a serial sex offender was defined as anyone associated with more than one linked SAK ("kit-to-kit") (n = 53) or a SAK and at least one arrest for sexual assault in his criminal history ("kit plus criminal history") (n = 192),[3] thus, two or more sexual assaults—in accordance with most previous research on serial sex offenders (de Heer, 2016; Graney & Arrigo, 2002; LeBeau, 1987; Park et al., 2008; Slater et al., 2014). SAKs could be linked via DNA from the other unsubmitted SAKs in the county (which comprise almost all of the linked SAKs) or linked via a current investigation. A nonserial sex offender was defined as being linked to only one SAK in the county and having no arrests for sexual assault in his criminal history. Of course, nonserial sex offenders might have committed additional sexual assaults that have yet to be identified.

3.4. Interrater reliability

Two researchers coded the SAK case files. For the first 50 coded sexual assaults, the researchers coded as a team—by each reviewing case files at the same time in the same room on their own computers and then coming to a consensus on how to code the variables. When there were coding disagreements between the two researchers, the principal investigator on the project was consulted. After initial coding was complete, we randomly selected 30 SAK cases that were coded by one researcher to be coded by the other researcher to assess interrater reliability. We estimated the interrater reliability by calculating both an average Cohen's Kappa and a pooled Cohen's Kappa coefficient (De Vries, Elliott, Kanouse, & Teleki, 2008) for 18 variables about the sexual assault that were frequently present in the police reports. The average kappa coefficient was 0.73 (95% CI: 0.64, 0.81) and the pooled kappa coefficient was 0.71 (95% CI: 0.62, 0.80). Thus, there was a great deal of agreement between coders, especially given that the estimates represent agreement across all 18 variables.

The variables with the highest coefficients were details that were almost always mentioned in the initial police report, such as whether there was vaginal ($\kappa = 1.0$), anal ($\kappa = 0.92$), or oral ($\kappa = 0.83$) penetration; whether the offender used any type of control over the victim ($\kappa = 1.0$); whether the victim's clothes were removed ($\kappa = 0.91$); whether a weapon was used ($\kappa = 0.86$); and whether more than one offender was involved ($\kappa = 0.81$). The variables with the lowest coefficients involved more subjective details that were often missing in initial police reports but could sometimes be found in other documentation, such as medical records or notes made by the current investigator, such as whether the victim or the offender had been using drugs or alcohol at the time ($\kappa = 0.41$ and 0.52, respectively) and the means of contact prior to the sexual assault ($\kappa = 0.54$).

4. Results

4.1. Offender demographics

All offenders in our sample[4] were male and on average 28.6 years old at the time of the offense (range: 14–56), with 4.5% being minors (under the age of 18) at the time of offense. The majority of offenders in our sample were African American/Black—86.2%, 12.3% were Caucasian/White, and 1.5% were Hispanic/Latino. African American/Black comprise approximately 50% (49.5% in 1990 and 51.0% in 2000) of the population of Cleveland, where 98% of our sample of sexual assaults were reported (US Census Bureau, 1992; US Census Bureau, 2017). Our sample represents SAKs that were collected but never tested nor successfully prosecuted at the time. Based upon spatial analysis (not presented), the sexual assaults disproportionally occurred in predominately African-American neighborhoods.[5]

Of the 433 sexual assaults coded, 245 (56.3%) were connected to serial sex offenders. This figure should not be interpreted to say that more than half of all offenders in the unsubmitted SAKs are serial sex offenders. Rather, serial sex offenders are disproportionally represented in these data relative to their proportion of all unsubmitted SAKs in Cuyahoga County due to the Task Force's prioritization of serial sex offenders for prosecution. Nonetheless, the sheer number of serial sex offenders that have been linked to incidents, and their patterns of offending are higher than expected based on previous research on serial sex offenders (see Hanson & Morton-Bourgon, 2005, for example).

4.2. Differences in offending patterns: serial vs. nonserial sex offenders

Bivariate statistical analyses (2 × 2 chi-square) were performed to test the relationship between offending patterns and serial sex offender status. Only statistically significant results are discussed.

Table 1 illustrates that serial sex offenders were more frequently strangers to their victims compared to nonserial sex offenders. We defined a stranger as an offender who was completely unknown to the victim (the most conservative definition of stranger) and a casual/recent acquaintance as someone the victim had just met and/or someone the victim knew something about ("around the neighborhood") but did not know very well. Nonserial sex offenders more frequently sexually assaulted current intimate partners compared to serial sex offenders. We also assessed whether serial and nonserial sex offenders differed in their offending patterns. As illustrated by Table 1, serial sex offenders more frequently sexually assaulted in the outdoors or outside (defined as any public space not inside a building, regardless of how secluded the public space was) and in vehicles and less frequently in the offender's residence compared to nonserial sex offenders.

Table 2 illustrates that offenders differed with respect to some aspects of their offending patterns. Sexual assaults committed by serial sex offenders more frequently involved a weapon (e.g., primarily a firearm or a knife, respectively), kidnapping (defined as how the offender was able to "get the upper hand" by using force, threat, or deception to transport or detain a person against her/his will—a separate act/offense from the sexual assault), and verbal/physical threats (e.g., abusive language or threats of physical harm) compared to sexual assaults committed by nonserial sex offenders. Table 2 also details the type of bodily force used (defined as force used over and above the assault) by serial and nonserial sex offenders in the sexual assaults. While overall, serial and nonserial sex offenders used bodily force with similar frequency, nonserial sex offenders more frequently punched/slapped victims compared to serial sex offenders.

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[3] A "kit-to-kit" serial sex offender could also have an arrest for rape in their criminal history.

[4] These demographic data pertain to offenders whose identity is known. Not all offenders have been convicted of these crimes meaning they are "suspected" offenders.

[5] The racial/ethnic composition of the victims in our sample is: 67.7% African American/Black, 29.1% Caucasian/White, 3.0% Hispanic/Latina, and 0.2% Asian.

Table 1

Locations where sexual assaults occurred & relationship of victim & offender for serial versus nonserial sex offenders.[a]

	Serial sex offenders	Nonserial sex offenders
	Percent	Percent
Type of location		
In a vehicle	30.0**	17.8
Outdoors or outside	22.2**	12.2
Garage	2.9	1.1
Victim's residence	17.3	20
Offender's residence	8.6***	23.9
Third party residence	8.2*	15.6
Unknown	0.8**	5.3
All other	10.7	9.4
N	243	180
Type of relationship		
Stranger	65.5***	41.8
Casual/recent acquaintance	19.3**	33.5
Former intimate partner/dating	5.5	7.4
Current intimate partner/ dating	1.3***	9.1
Friend/not romantic	2.9	2.3
Relationship unknown	2.9*	7.4
All other	5.5	5.7
N	238	177

[a] Percentages based on non-missing data.
* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.

Table 2

Type of control and bodily force used in the sexual assault for serial and nonserial sex offenders.[a]

	Serial sex offenders	Nonserial sex offenders
	Percent	Percent
Type of control used		
Kidnapped	55.8**	42.9
Verbally/physically threatened	29.6*	20
Restrained	53.8	57.7
Threatened with weapon	42.5***	25.1
N	240	175
Type of bodily force used		
Used any type of bodily force	73.1	72.1
Dragged/pushed	40.8	40.1
Punched/slapped	16.0*	23.8
Strangled	6.3	6.4
Held down	31.5	39
Injured victim to complete sexual assault	9.2	14.9
N	238	172
More than one offender involved in offense[b]	16.3	20.2

[a] Offenders could employ more than one type of control and bodily force; percentages based on non-missing data.
[b] Implies offender was involved in the offense but not necessarily involved in the forced penetration.
* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.

4.3. Extent of crossover offending for serial sex offenders

While Tables 1 and 2 show that serial sex offenders significantly differed from nonserial sex offenders with regard to some aspects of their offending patterns, during coding we observed a great deal of crossover offending among serial sex offenders. In the below section, we present our findings on crossover offending. We first present data on the

degree of crossover offending for serial sex offender by victim relationship status, age, and gender and then explore and describe the extent to which serial sex offenders maintain or fail to maintain a similar offending pattern across offenses and/or have a certain "type" of victim.

To do this, we examined serial sex offenders with more than one linked SAK that we coded (n = 53 offenders; n = 143 sexual assaults; M = 2.7; range: 2–7). These were offenders who had been linked to more than one unsubmitted SAK in Cuyahoga County, as this gave us access to the details of multiple assaults. The mean age of offender for their first identified sexual assault was 30.0 years and the mean age for the last was 34.7 years. The mean number of years between their first and last sexual assault was 4.71 years (SD = 5.0; range: 0–18), however, 39.6% were within a year or less.

Some offenders were young—one offender committed a sexual assault at 14 and again at 15 years old, one offender committed two at the age of 16, and one committed a sexual assault at 14 and again at 18. Conversely, some offenders were much older when committing the offenses—the offender with the most number of sexual assaults (n = 7) committed these sexual assaults between the ages of 48 and 57, one committed three sexual assaults at 56, and one committed four assaults between the ages of 49 and 51. Considering the truncated time period for most of the sexual assaults (e.g., 1993–1999) and that these only pertain to previously unsubmitted SAKs in Cuyahoga County, these findings suggest that our data are only capturing a portion of their serial sex offending.

For relationship crossover, we categorized the relationship status as either a stranger or a nonstranger. Our findings indicate that for the 53 serial sex offenders, 56.6% (n = 30) only sexually assaulted strangers, 28.3% (n = 15) sexually assaulted at least one stranger and at least one nonstranger, and 15.1% (n = 8) only assaulted nonstrangers. Thus, over a quarter of our sample assaulted both strangers and nonstrangers. The majority of these findings are presented descriptively, given the narrative nature of the sexual assaults and the sample size for the offender groups (stranger-only, stranger and nonstranger, nonstranger only).

With regard to the extent of the crossover offending by age and the timespan of our data, we analyzed this by calculating the differences in the age of the offender relative to all of their victims' ages. First, we calculated the age gap (age of the offender - the age of the victim). A positive number indicated the offender was older than the victim and a negative number indicated the offender was younger. Then, we calculated a difference-in-difference measure within offender (maximum age difference of offender to victim – minimum age difference of offender to victim) to assess how much variation in age existed among all victims relative to the age of the offender. Values closer to zero would indicate that the victims and offenders were of a similar age and larger numbers (either positive or negative) indicated crossover offending by age (M = 7.0, SD = 11.0). Less than half of the offenders were within ± 5 years of all their victims (44.4%) and 64.4% were ± 10 years of all their victims—showing that offenders did not just victimize near-age victims.

An in-depth examination of crossover offending by gender is limited in our data because only 4 of the 143 (2.6%) victims were male (three of these males were 12 years old or younger). Two offenders assaulted both a male and a female while one offender assaulted two juvenile males (ages 10 and 12).

To examine the extent to which offenders maintained similar patterns across all of their sexual assaults, we descriptively examined offending patterns for offenders: (1) who only assaulted strangers (Table 3); (2) who assaulted strangers and nonstrangers (Table 4); and (3) who only assaulted nonstrangers (Table 5).

Table 3 presents the counts and frequencies for the 30 offenders who only assaulted strangers (n of sexual assaults = 88). "Stranger-only" offenders were on average 30.4 years old for the first assault and 33.4 years old for the last assault, which means that offenders, on

Table 3
Offending patterns for serial sex offenders who assaulted strangers only (n = 30).[a]

	Mean	Range
Age offender first assault, age offender last assault	30.4, 33.4	14–56, 15–57
Age of youngest victim, age of oldest victim	23.1, 34.4	10–41, 12–71
Min. age difference offender to victim, Max. age difference offender to victim	1.5, 6.9	− 17–35; − 24–38

	N	Percent
Moved victim (yes = 1)	67 of 88 assaults	76.1
First contact with victim was outdoors (yes = 1)	73 of 88 assaults	83.0

	N	Percent
Type of location of first contact with victim		
Consistently used same type of location	22	75.9
Inconsistently used same type of location	7	24.1
Means of access		
Consistently used same means	9	31
Inconsistently used same means	20	69
Weapon used as means of control		
No	3	10
Yes, inconsistently used	12	40
Yes, consistently used	15	50
Types of bodily force used		
No bodily forced used	4	14.3
Inconsistently used bodily force	10	35.7
Consistently used bodily force	14	50.0
# Offenders involved in sexual assault		
# Same for all offenses	24	80.0
# Not all the same for all offenses	6	20.0

[a] Frequencies and percentages based on non-missing data.

average, committed all assaults within three years. Stranger-only offenders also exhibited a great deal of crossover offending by age, as shown by the variation in the age of the victims as well as the difference in ages of offenders compared to victims.

With respect to offending patterns, sexual assaults committed by stranger-only offenders show consistency (defined as being used in all sexual assaults committed by the offender) in two aspects of their offending—they frequently moved/transported the victim from the site of first contact, and they first contacted the victims outdoors or outside. Stranger-only offenders frequently used weapons to threaten victims but did not appear to use them consistently in all their offenses—half of the offenders used them consistently. The same is true for the use of bodily force—half of the offenders consistently used some type of bodily force in all their assaults (e.g., punched, slapped, held down, etc.). In terms of offending patterns typically used in the sexual assaults committed by strangers, we found type of location for the first contact was fairly consistent (e.g., outdoors or outside) as was the number of offenders who were involved in the sexual assault. On the other hand, almost 70% of stranger-only offenders were inconsistent in their means of accessing all victims. The following were the most frequently used means of access for stranger-only offenders (in rank order)—an immediate attack (which is consistent with the findings presented in Table 1), forcing a victim into a car, offering a ride, and offering or requesting assistance. Thus, our findings indicate that stranger-only offenders most frequently used an immediate attack as the means of access but also frequently employed other means.

Table 4 presents offending patterns for the 15 offenders who sexually assaulted both strangers and nonstrangers by detailing the pattern employed in each offense for each offender (e.g., Offender #49 committed four offenses—three were strangers and one was a casual/recent acquaintance). Table 4 illustrates just how varied their categorized offending patterns were and even these categorizations mask the extent

of the variation in the offending pattern, identified via details contained in the victims' narratives of the events (which is described below for some offenders but not provided in the Tables). For example: Offender #15 committed four offenses over ten years—one involved only himself, two involved himself and another offender (each incident involved two victims), and another involved himself and four other offenders. Offender #92 assaulted one victim who was 19 years his senior and another who was 12 years his junior. Offender #3000 was one of four offenders involved in the sexual assault of a 13-year-old girl, a stranger, and two months later assaulted his three-year-old son. Offender #5 assaulted two females in separate incidents and in another offense, broke into a group home and assaulted a 29-year-old sleeping male. Offender #1095 assaulted two women, one known and one unknown, in two separate incidents—in one of these offenses he held the victim (the stranger) captive, in a third-party's home for three days. Offender #1184 assaulted two women in separate offenses—one victim was 13 and another was 26 and in those offenses used vastly different levels of bodily force/threat. The 13-year-old was his "girlfriend" (although he was 20 years old at the time); the other victim was a stranger who he vaginally, orally, and anally penetrated while keeping a gun to her head during the entire assault. Table 4 illustrates that for those who crossover offended by relationship, many of their offenses were demonstrably different from each other in terms of who, when, where, and how they assaulted and because of the DNA testing, have now been linked.

Table 5 includes information on the eight offenders who sexually assaulted only non-strangers (n of sexual assaults = 17). A majority of these offenses involved the assault of a casual/recent acquaintance. The victim's narratives of the events indicate that even for those labeled as casual/recent acquaintances, most hardly knew the offenders (e.g., met that day, knew her brother, had seen around the neighborhood). Table 5 also illustrates that, overall, nonstrangers tended to have less variation in the age of their victims (relative to offender's age), most occurred in residences, and did not involve weapons or use of force. Overall, this group had somewhat similar offending patterns across offenses. For example: Offender #88 committed three assaults within a two-year span with similar offending patterns—all attacks were of women he knew while they slept, with no force, and no weapon. He just knew the victims differently—relative, friend, and neighbor. Offender #97 had a similar offending pattern in both of his offenses that occurred within three months of each other—he was hanging out with women he casually knew while with a larger group of people, got the victims alone, and sexually assaulted them by dragging and holding them down. In both cases, the interactions began consensually and no weapon was used; however, in one of these offenses, a second suspect attempted to assault the victim after Offender #97. Offender #154 assaulted two women he met while working at the bus station. In both assaults the interactions began consensually with the victims agreeing to drink with/go on a date with the offender and with the offender then taking the victims to his house and sexually assaulting them.

For the offenders who most varied their offending pattern in this group, they knew the victims in different capacities. For the two offenders who assaulted current intimate partners/roommates and very casual/recent acquaintances (Offenders #171 and #63), they varied their use of force and use of a weapon in these assaults. Offender #1049's assaults were very different from each other. In one of the offenses, the sexual assault was a home invasion, involved multiple offenders, severely injured the victim (e.g., threw a brick at her stomach, hit her in the back of the head with a blunt object), assaulted her while keeping a gun to her head, and only very casually knew the victim (i.e., knew her brother's name). In the other offense, the victim and offender knew each other, were at a party and the offender offered her a ride. During the ride, he propositioned her for sex, and, when she refused, sexually assaulted her.

When comparing the three groups (Tables 3 through 5), it appears that stranger-only and nonstranger-only offenders tended to be more

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Table 4
Offending patterns for serial sex offenders who assaulted strangers & non strangers only[a] (n = 15).

O ID	#49	#15	#92	#83	#5	#88	#1149	#1095	#3000	#115	#52	#56	#1184	#62	#1079
# Sexual assaults coded	4	4	4	3	3	3	2	2	2	2	2	2	2	2	2
Relation to V	3-S; 1 CA	2-S; 2-CA	3-S; 1-CA	2-S; 1-Unkn	1-CA; 1-FIP; 1-S	1-CA; 1-N; 1-F	1-CA; 1-S	1-S; 1-IP	1-P; 1-S	1-CA; 1-S	1-S; 1-CA	1-S, 1-CA	1-S; 1-IP	1-S; 1-CA	1-S; 1-F
O age	22 to 29	20 to 29	18 to 35	24 to 37	39 to 47	43 to 44	28 & 45	33 & 42	22 & 22	27 & 31	19 & 25	36 & 41	20 & 22	49 & 49	35 & 53
V age	18 to 23	14 to 20	23 to 40	17 to 20	29 to 40	30 to 41	21 & 50	18 & 42	3 & 13	14 & 37	16 & 16	21 & 21	13 & 26	30 & 30	38 & 44
Min., max. age difference O:V (yrs.)	3 to 9	0 to 9	−19 to 12	7 to 17	−1 to 18	3 to 13	−5 to 7	0 to 15	9 to 19	−6 to 13	3 to 9	15 to 20	−6 to 9	1 & 1	−9 to 15
Yr. of offense	2005, 2008, 2011, 2013	2004, 2005, 2008, 2014	1996, 1999, 2000, 2013	1995, 1997, 2009	2001, 2008, 2009	1998, 1999, 1999	1993, 2011	2004, 2012	1995, 1995	1993, 1996	1994, 2000	1994, 1998	1993, 1995	1996, 1996	1993, 2011
1st contact with V location-type	4-car	4-car	2-car, 2-outdoors	2-car; 1-unkn	1-3rd party house; 1 outdoors; 1-V's home	2-V's home; 1-3rd party home	2-outdoors	1-3rd party home; 1-car	1-V's home; 1-3rd party home	1-V's home; 1-car	1-car; 1-3rd party's home	1-car; 1-V's home	1-outdoors; 1-3rd party home	1-car; 1-houseboat	1-abandoned home; 1-O's home
Means of access	3-offered ride; 1-forced into car	2-walking, forced in car; 1-offered drugs; 1-offered ride	1-walking, forced in car; 1-reqired asst.; 1-forced into car; 1-meetup	2-offered ride; 1-missing	1-propositioned V; 1-immed. attack; 1-attack while asleep	3-attacked while asleep	1-selling item; 1-offered ride	1-offered ride; 1-at a party	1-parental figure; 1-at a party	1-immed. attack; 1-walking, forced in car	2-offered ride	1-immed. attack; 1-at party	1-immed. attack; 1-deceit	1-offered ride; 1-attack while sleep	1-forced into car; 1-using drugs
Weapon used	3-threatened w/ gun, 1-none	2-threatened w/ gun; 2-none	2-threatened w/ gun; 1-used mace; 1-none	3-none	3-none	3-none	2-none	2-none	2-none	2-none	1-threatened w/ gun; 1-none	1-none; 1-missing	1-threatened w/ gun; 1-none	2-threatened w/ knife	2-none
Type of bodily force used	1-restrained; 1-none; 2-pushed/ dragged	2-restrained; 2-none	1-punched ribs; 1-pushed; 1-dragged	1-grabbed throat; 1-not reported; 1-missing	1-punched victim; 2-threw/ held victim down	3-none	2-pushed/ dragged	1-pushed/ dragged; 1-missing	1-missing; 1-punched/ slapped/ held down	1-punched/ slapped/ held down; 1-held down	2-none	1-held down; 1-missing	1-held down; 1-none	2-none	2-punched/ slapped/ dragged
# O's involved	4-single	1-single; 2-two O's; 1-five O's	4-single	4-single	3-single	3-single	1-single; 1-two O's	2-single	1-single; 1-four O's	2-single	2-single	1-single; 1-two O's	1-single; 1-two O's	2-single	1-two O's; 1-single

[a] O = offender, V = victim, S = stranger, CA = casual acquaintance, FIP = former intimate partner, IP = intimate partner, P = parent, N = neighbor, F = friend, Unkn = unknown.

Table 5
Offending patterns for serial sex offenders who assaulted non strangers only[a] (n = 8).

O ID	#88	#1152	#154	#171	#104	#1045	#63	#97
# Sexual assaults coded	3	2	2	2	2	2	2	2
Relation to V	1-F; 1-Rel; 1-N	2-CA	2-CA	1-CA; 1-FIP	2-CA	1-unk; 1-CA	1-Room; 1-unkn	2-CA
O age	43 to 44	13 & 14	46 & 51	41 & 49	24 & 25	34 & 36	19 to 22	22 & 22
V age	30 to 41	14 & 14	19 & 19	35 & 38	19 & 28	45 & 47	19 & 20	17 & 21
Min, max. age difference O:V (yrs.)	0 to 13	−1 to 0	27 to 32	3 to 14	−3 to 5	−9 to −11	−1 to 3	1 to 3
Yr of offense	1998 1999 1999	1993 1994	2003 2008	2006 2014	1995 1996	1993 1995	1993 1996	1994 1994
1st contact with V location-type	1-3rd party home; 2-V's home	2-3rd party home	2-Greyhound station	1-walking; 1-V's home	1-car; 1-outdrs	1-V's home	1-V's home; 1-car	1-outdrs; 1-abandoned building
Means of access	3-attack while asleep	1-proposition for sex; 1-immed. attack	2-on date/party	1-forced into vehicle; 1-DV case	1-asked for ride; 1-immed. attack	1-immed. attack; 2-propositioned	1-DV case; 1-in car	2-began consensually
Weapon	3-none	2-none	2-none	2-used weapon (1-gun, 1-knife)	1-weapon; 1-none	1-weapon; 1-none	1-weapon; 1-none	2-none
Type of bodily force used	3-none	1-missing; 1-dragged/down/strangled	2-none	1-none; 1-dragged/held down	1-slapped; 1-slapped/dragged/held down	1-dragged; 1-none	1-used force; 1-none	2-dragged, held down
# Os involved	3-single	2-single	2-single	2-single	2-single	1-four Os; 1-single	2-single	1-two Os; 1-single

[a] O = offender, V = victim, S = stranger, CA = casual acquaintance, FIP = former intimate partner, N = neighbor, F = friend, IP = intimate partner, Rel = relative, Room = roommate, Unkn = unknown.

similar in their offending patterns compared to offenders who assault both strangers and nonstrangers. In other words, those that relationally crossed over (Table 4) tended to significantly vary their offending patterns. Table 5 (nonstranger-only) shows that offending patterns varied greatly for offenders who knew their victims in completely different capacities, like those who assaulted current intimate partner/roommates vs. very casual/recent acquaintances. In terms of crossover offending by age, Tables 3 and 4 show that the crossover offending by age is greatest when the victim did not know the offender or did not know him very well.

Overall, serial sex offenders often did not a have a certain "type" of victim and often varied their offending. In fact, even for those offenders who exhibited a great deal of violence in one assault, the other assault (s) did not include extreme violence. Stranger-only offenses were characterized by large differences in age between victims and offender. The data show large age differences even with offenders who kept a somewhat similar offending pattern across offenses. Therefore, offenders who sexually assaulted strangers did not appear to consistently stick with a certain age "type."

5. Discussion and conclusion

Most of what is known about serial sex offenders is based on offenders who have been convicted of multiple sexual assaults where the offender has been "caught" or offenders who self-report multiple assaults. In the former, convicted serial sex offenders represent a very small and skewed proportion of all sexual offenders as convictions for sexual assault are the exception rather than the rule (RAINN, 2017). Additionally, self-reported multiple offending has the inherent issue of relying on the offender to recall, disclose, and self-define more than one of their sexual acts as nonconsensual. Our data, on the other hand, pulls from a large sample of sexual assaults with unsubmitted SAKs over a 20-year span of time and these linkages across offenses are more objectively connected—via DNA at the time of reporting and/or criminal history of sexual assault offending. In addition, most of what was previously known about serial sex offenders is based on serial sex offenders who assault strangers. Much less is known about serial sex offenders who crossover and serial sex offenders who assault only known victims. Our data provide a unique opportunity to explore offending patterns, especially crossover offending, for perpetrators linked via DNA.

While our findings go beyond much of the previous research on serial sex offending, there are limitations to our data. Our sample is limited to unsubmitted SAKs in Cuyahoga County that were never successfully prosecuted, with most occurring in the mid-to-late 1990s. The SAKs are disproportionally comprised of stranger and/or very casual acquaintances as these are more likely to be reported and/or have SAKs collected. Most offenders were identified because they were in the federal DNA database indicating previous contact with the criminal justice system, which disproportionally contains marginalized groups (such as people of color, economically disadvantaged, etc.). The majority of our findings pertain to offenders who linked to more than one SAK in the inventory of unsubmitted SAKs, which means our data are likely capturing only a portion of their offenses. Offenders without linked DNA may be different (in some currently unknown way) from known offenders. Additionally, most of these SAKs included offender DNA in the kits. SAKs without testable DNA (which is 41% of all unsubmitted SAKs in Cuyahoga County [Lovell & Flannery, 2017]) might be different from SAKs with DNA in currently unknown ways. As this project matures, we hope to be able to examine a greater diversity of sexual assaults.

While serial sex offenders are disproportionately represented in our sample relative to their proportion of all offenders in the unsubmitted SAKs in Cuyahoga County, our findings emphasize that serial sex offending is quite common—a finding that has significant policy and practice implications for changing the way sexual assaults are investigated and the way the system views sexual assault, offenders, and

victims. Our data also suggest that we have only captured a portion of offender perpetrations, given the short time span between assaults and the ages of the offenders.

Our findings are consistent with previous literature that suggest serial sex offenders often crossover and do not often have a "type" of victim or a consistent offending pattern. In other words, offenders in our data exhibit a great deal of versatility or sexual polymorphism. In assessing the narratives, even for offenders who are similar in several of their assaults, they often have one or more sexual assaults that are not similar. In other words, there is a pattern until there is not one. Moreover, our findings expand on what is known about the extent of crossover offending by age due to our ability to explore age as a continuous variable.

With regard to the differences between serial and nonserial sex offenders, these differences might be more a function of serial sex offenders more often attacking strangers more so than an offender maintaining a certain offending pattern. In other words, offending patterns seem to be driven to a large extent by the victim-offender relationship more so than maintaining a consistent offending pattern, as the former sets the stage for how the offense occurs. Previous research on serial sex offenders supports this assumption but also finds that the victim-offender relationship is complicated by other factors such as the age of the victim and situational, environmental, and geographic factors (Beauregard, Leclerc, & Lussier, 2012; Deslauriers-Varin & Beauregard, 2013, 2014). Future research should explore the extent to which these findings apply to serial sex offenders identified via the DNA testing of unsubmitted SAKs.

The diverse offending patterns presented here might also be at least partially explained by the extent of the victim's ability to resist the sexual assault (e.g., the age of the victim, whether a weapon was used, and the victim-offender relationship) as a victim's resistance and the context of that resistance can alter an offending pattern (Balemba & Beauregard, 2012; Balemba, Beauregard, & Mieczkowski, 2012; Ullman, 1998; Ullman & Knight, 1992). We present findings on the type of control and bodily force employed by the offender and found that serial sex offenders were significantly less frequently punching/slapping victims compared to nonserial sex offenders and less frequently injuring the victim in order to complete the assault (although not significantly, $p = 0.052$). This finding might be partially explained by that fact that serial sex offenders were also more frequently kidnapping and threatening victims with weapons, which could reduce a victim's ability to resist; however, this finding is incongruent with previous research (Balemba et al., 2012; Coker, Walls, & Johnson, 1998; Ullman, 2007) that correlates the presence of a weapon with a greater likelihood of injury beyond what occurs tactically to complete an assault. Future research on unsubmitted SAKs should examine the role of victim resistance in explaining variations in offending patterns among serial sex offenders and, furthermore, investigate why the presence of a weapon might serve to decrease the level of physical injury, rather than the inverse.

With regard to implications for policy and practice, given the number of serial sex offenders identified and the variety of their offenses, our findings suggest that law enforcement should investigate each sexual assault as if it were potentially perpetrated by a serial sex offender, as it is likely that a sexual offender has either previously sexually assaulted or will offend again in the future. Serial sex offenders have traditionally been investigated according to the consistency of their offending pattern; yet, our findings suggest that serial sex offenders exhibit a great deal of versatility in their offending (sexual polymorphism), which means that a "traditional" offending pattern or *modus operandi* (e.g., who they assault, where they assault, how they assault, etc.) is likely not a reliable link across sexual assaults. Findings presented here suggest that law enforcement may be more successful in investigating sexual assaults if the focus of the investigation shifted from a single incident and/or victim to the offender and the offender's other possible sexual assaults. The process of identifying additional

sexual assaults would likely be more successful if investigators searched on aspects of offending patterns that have been found in the crime linkage research to be more consistent, such as time or location of first contact (Balemba & Beauregard, 2013; Deslauriers-Varin & Beauregard, 2013, 2014). However, the most important factors for greater success might lie in better training and additional resources—better training for responding officers in capturing more extensive details from victims and witnesses for the investigators who follow-up and providing those follow-up investigators the resources and training they need to do a "deep dive" in the case and the offender, turning those details into solid leads.

Even with these improvements, some sexual assaults would likely never be linked without the benefit of DNA. Our findings illustrate how powerful the DNA testing of SAKs can be and the probative value of this testing for identifying and linking serial sex offenders, which is extremely useful for informing future practice and policy as more and more jurisdictions address their inventories of unsubmitted SAKs. Moreover, this value is greatest when all SAKs are tested and not just SAKs from stranger-cases or SAKs from victims who are interested in prosecuting, as has traditionally been the case. Testing each and every SAK not only populates the DNA database for possible future matches, it also can link crimes across space and time. Of course, a DNA match is only the first step in the process. Cases, even with a DNA match, must still be thoroughly investigated or prosecuted. When this occurs, the potential exists to greatly reduce the number of future offenses across the country. Future research should explore in greater detail the benefit vs. cost of testing and the follow up investigation of unsubmitted SAKs, as these cases provide an important opportunity to examine past practices and policies to improve how the system currently responds to sexual assault and sexual assault survivors.

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