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Detecting a decline in serial homicide: Have we banished the devil from the details?

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Abstract: The current research provides perspective regarding the true prevalence of serial murderers in modern society and addresses the conflict between the evidenced decline in serial homicide and the viewpoint that the phenomenon is increasing. The likelihood that serial murderers are responsible for most unresolved homicides and missing persons is examined in the context of a declining prevalence. A mixed methods approach was used, consisting of a review of a sample of unresolved homicides, a comparative analysis of the frequency of known serial homicide series and unresolved serial homicide series, and semi-structured interviews of experts. In failing to become serial killers, aspiring and probable serial killers and spree killers have impacted the rate of serial murder by not reaching their potential. The past decade contained almost half the cases (13%) that existed at the 1980s peak of serial homicide (27%). Only 282 (1.3%) strangled females made up the 22,444 unresolved homicides reviewed. Most expert respondents thought it unreasonable that any meaningful proportion of missing persons cases are victims of serial homicide. Technology, shifts in offending behavior, proactive law enforcement action, and vigilance of society have transformed serial killing and aids in viewing offenders as people impacted by societal shifts and cultural norms. The absence of narrative details inhibited some aspects of the review. An exhaustive list

ABOUT THE AUTHOR

Enzo Yaksic is the database coordinator at the Serial Homicide Expertise and Information Sharing Collaborative which he founded after a decade of researching serial homicide. As the director of the Atypical Homicide Research Group, he is at the forefront of serial homicide research. His work with the Murder Accountability Project aims to educate on the importance of accounting for unsolved homicides by helping to uncover clusters of potential serial homicide activity. The current research relates to a wider issue in signaling that the landscape of serial homicide is changing. It is more difficult for potential serial murders to fulfill their goals today given the risks posed by technology, advances in policing, and a vigilant public. Some of these offenders have failed and given up on the pursuit of serial murder while others have begun to shift to other outlets, such as mass murder, to victimize others in the modern age.

PUBLIC INTEREST STATEMENT

The interest in serial murder resultant from the current true crime boom has translated into an erroneous belief that there has been an increase in the prevalence of real world offenders. This misinterpretation has led to a misuse of law enforcement resources and undue fear. This research theorizes that aspiring and probable serial murderers and spree killers have impacted the landscape of serial murder and demonstrates that the actual occurrence of serial murder has decreased significantly over time partly due to their impact. Serial murderers are not responsible for most unresolved homicides or missing persons and are shifting to other outlets to victimize others, such as mass murder, due to the risks posed by new technology, advances in policing, and a more aware and vigilant public. By acknowledging that the panic over serial murder in recent years has been somewhat manufactured, resources can be dedicated to combating the rising threat of mass shooters and murderers.

of known unresolved serial homicide series remained elusive as some missing persons are never reported. Future research should incorporate those intending to murder serially, but whose efforts were stalled by arrest, imprisonment, or death.

Subjects: Social Sciences; Criminology and Criminal Justice; Violent Crime

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The impact that serial murders have on rates of violence is overstated due to congressional mandates, journalistic license, popular opinion, entertainment culture, media exaggeration, shifts in public policy prerogatives, experiences of surviving victims, and the agendas of the killers themselves. Confusion surrounding homicide rate increases (Asher, 2017; Economist Data Team, 2017; Park & Katz, 2016; Winkley, 2017), missing persons (Davis & Hermann, 2017), and intimate partner violence (Petrosky et al., 2017) has sustained a reliance on anecdotes to inform on serial murder[1]. Because these knowledge gaps hinder empirical analysis, impede study, interrupt investigations and continue a legacy of stereotypes, this current research aims to provide perspective regarding the presence of serial murderers in modern society. More specifically, the conflict between the evidenced decline and those maintaining the viewpoint that serial homicide is increasing will be addressed.

In the United States, serial murder is often probed as the first possibility as in recent panics along Cleveland, Ohio's 93rd Street (Ferrise, 2017; Goldenberg, 2017; Horansky, 2017), jogging paths (Williams, 2016b), waterways (Herzog, 2016; Rocheleau, 2017), trails (Paul, 2017) and homeless camps (Robinson, 2018) even though homicides are generally a one-off occurrences, detectives generally know the perpetrator's identity in the majority of unresolved killings (Lowery & Bennett, 2018), and most offenders that fit a deviant profile (Lohr, 2016b) are not serial murderers. This occurs because law enforcement organizations (LEO) fear that a lack of vigilance could result in missed opportunities to stop serial killers. The juxtaposition of characteristics[2] related to victimization can be indicative of serial murder activity, but constant analysis of these groupings together can cause police detectives (Augenstein, 2017; Lohr, 2016a), citizen sleuths (Thomas, 2017), journalists (Dissell, 2017; Guenthner, 2017; Sweeney, 2019) and family members (Anthony, 2015) to draw non-existent parallels between cases based only on minor similarities[3] and rely on offender profiling rather than await an investigative "tipping point" before taking conceptual leaps pertaining to serial murder (LePard, Demers, Langan, & Rossmo, 2015).

The theoretical basis for the posited decline in serial homicide is rooted in a proper segmentation of similar groups of offenders from the traditional definitional archetype. Spree killers have been included in the serial killer cohort since the Federal Bureau of Investigation (FBI) serial murder symposium (Morton & Hilts, 2008) but their behavioral style may signal that they are merely failed serial killers (Yaksic, 2019b). Two other groups, probable[4] and aspiring[5] serial killers, have been unacknowledged but may factor into the decline in serial killing as the differences between these groups are hardly semantic. It is likely that advances in technology have enabled law enforcement and potential victims to be more aware of the threat posed by serial murderers which may have contributed to a shift in offending behavior. As more aspiring and probable serial killers and spree killers fail to attain the rank of serial killer, the influence that these three categories have on the incidence of the phenomenon may become apparent. A more nuanced prevalence estimate would be possible if these three categories were to be considered apart from the larger classification of serial murder.

This work aims to help the field of serial homicide research achieve the important milestone of quelling the unwarranted fear that hundreds of unknown serial killers are trolling for victims and compliments contemporary literature by providing a frame of reference for thinking of serial murderers as people affected by societal changes. The current research offers explanations for the decline in serial homicide as being a byproduct of 1) technology, 2) shifts in offending

behavior, 3) proactive law enforcement action, and 4) increased vigilance of society. It also controverts the popular opinion that 1) serial killers are omnipresent and roaming uncontrolled across the United States victimizing scores of people, 2) their activities are disguised by the uptick in homicides between 2015 and 2017, 3) a significant percent of missing persons are killed by serial murderers, and 4) the term has been redefined to inflate the problem. The current research argues that claims of an increase in serial homicide exaggerate a social problem and are often made by those who continually reference killers from the decades of 1970 and 1980, generally referred to as the "golden age" of serial murder.

1. Background

1.1. Are serial homicide offenders hidden in the murder "surge"?

Attorney General Jeff Sessions has called a "surge" in murder rates between 2015 and 2017 a "dangerous permanent trend" (Bump, 2017). Subsumed within this "surge" is posited to be an increase in serial homicide, even though homicidal violence has been declining for decades (Pinker, 2011; Roser, 2017; Tcherni-Buzzeo, 2019). Stote and Standing (1995) found no sudden emergence of serial killers when investigating the supposed epidemic of serial homicide. Still, the belief that many successful killers have gone undetected endures (Giannangelo, 2012) bolstered by coverage of abysmal homicide clearance rates (Gramlich, 2017), issues facing detectives (Henderson, Tracy, Parascandola, & Mcshane, 2016; Kelly, Lowery, & Rich, 2016; Ransom, 2016) reports of the sheer number of unresolved homicides (Stein, Kimmerle, Adcock, & Martin, 2017) reference to the latter as a national crisis (Adcock, 2017) and speculative estimates based on bad data (Lester, 1995; Miller, 2014). The lack of consensus regarding the absence of official statistics on serial murderers (McNamara & Morton, 2004) bolsters support for the resurgence of true crime which is built on assertions that serial murderers are not only the worst type of criminal (Shenfeld, 2018), but that they are also "everywhere" (Byrne, 2017; Dumcius, 2017; Key, 2018; Kutner, 2017; Sasko, 2018; Sweeney, Williams-Harris, & Nickeas, 2018, Gellatly, 2017; Whiffen, 2017). These ideas are remnants of an assumption regarding linkages between thousands of unresolved homicides (Yaksic, 2019a) and each has given rise to the misconception that serial homicide is not declining.

1.2. Frequency estimation of undetectable events

Certain factors affect frequency estimates (Moss, 2015; Racine, 2015), such as the "discordance" and the unknown proportion of the "dark figure of crime" that serial murderers occupy. Endeavors to address the incidence of serial homicide have stalled since the 1990s (Hinch & Hepburn, 1998; Kiger, 1990; Mott, 1999; Schlesinger, 2001; Stote & Standing, 1995) while assumptions about the scope of investigations (Freeman, 2018) fuel the belief that serial murder is an epidemic. Claims of two serial killers operating in every city[6], that between 200 and 500 serial murderers kill 2,000 to 3,500 victims a year (Miller, 2014), or that two-thousand serial murderers are active (Chun, 2019; Wilkinson, 2017) are more than seventy times the average number of offenders apprehended annually in the United States. Meanwhile, more conservative estimates suggest the number of active serial murderers to be around 30, in a given year (Pappas, 2018).

1.3. Stranger murderers and the conjecture of additional victims

McIntire (2016) has used data visualizations to illustrate that the profile of a serial killer is more nuanced than Hollywood depictions, popularized by a study conducted in the 1980s by agents of the FBI (Beasley, 2004) and showcased in the Netflix series *Mindhunter* (Trenholm, 2017). The myths about serial homicide originated with the FBI, namely through the use of vague phraseology to explain the pervasiveness of offenders. Serial homicides were classified as "stranger murders" which led to a theory that links falling homicide clearances with an increase in serial murders (Schlesinger, 2001) That theory has been refuted by an analysis which revealed the entire decline in murder clearance rates since the 1980s to be attributable to Hispanic and black victims (Ryley, Singer-Vine, & Campbell, 2019), two groups most often victims of urban violence. Researchers still believe that serial murderers are omnipresent, predetermined to become killers and that they are compelled to complete their actions at all costs.

But it is inaccurate to attribute most stranger or unknown homicides to serial murder (Hinch & Hepburn, 1998) because of quantification problems such as incomplete data; doing so invites conjecture about the missing records. Quinet and Nunn (2014) challenge the myth that unresolved homicides are disproportionately stranger homicides. They revealed that decreased clearance rates are not due to increased stranger homicides and that the hidden proportion of unknown offender homicides that are stranger homicides has not increased. Pastia, Davies, and Wu (2017) found that incident characteristics—notably drug or gang involvement—determine differences in clearance, a population that inhabits the "dark figure of crime" (Sarteschi, 2016).

1.4. Missing persons and serial murder

Shanafelt and Pino (2013) propose that serial killing should be examined in a larger context as these offenders are credited with scores of both unknown perpetrator homicides and deaths of missing persons (Homant & Kennedy, 2009). It is rare for serial murders to occur without the discovery of remains (LePard et al., 2015) and rarer for the results of confessions to contain references to unclaimed bodies or for offenders to be the subject of "no-body" prosecutions (DiBiase, 2014). However, due to a lack of accurate data on the number of missing persons who are homicide victims, the percentage of missing persons killed by serial murderers is unknown. The state of missing persons has been called a "silent mass disaster" (Ritter, 2007), but the majority of records in the FBI's National Crime Information Center database in 2014 (635,155) were cleared at a rate of 99.87 percent (Yoder, 2016). Reflective of the FBI clearance rate, missing persons are frequently found unharmed with a small minority reaching the rank of "critical missing" (Jones, 2017).

1.5. Has serial murder been redefined to inflate the problem?

Serial killing incidence rates are complicated by a narrow focus on victim thresholds and time intervals (Homant & Kennedy, 2009), an emphasis on terminology (Yaksic, 2019a) and an inconsistent application of rigor to inquiries (Dowden, 2005; Levin & Fox, 2017), all of which distract from empirical investigation (DeLisi, 2015). The FBI's reduction of the victim threshold from three to two[7] is interpreted as a maneuver that artificially expands the boundaries of a series by accommodating offenders whose crimes fall short of earning categorization as "serial" (Yaksic, 2018). This may make the "serial killer problem" appear more significant (Hodgkinson, Prins, & Stuart-Bennett, 2017), but even in this context, there appears to be a decrease in serial murder.

1.6. Stuck in the "golden age" of serial murder

Those bereft of serial murder's "golden age"[8] posit theories of forensically aware prolific murderers with superior intellects and cunning abilities, contrary to a statistical decrease in the subset of murderers who kill more than three times the FBI's current allotted victim threshold (Aamodt et al., 2019). Morton, Tillman and Gaines (2014) found that offenders took no precautions to disguise their identity, or avoid leaving evidence, over half the time and took no action to alter crime scenes almost half of the time. The argument that serial murderers are trolling the countryside undetected is strengthened because some are captured by chance (Klint, 2016), and commentary advocates additional victims (Freeman, 2018) through vague, speculative, or nonexistent linkages (Harris, 2016; Homan, 2015; Mazzola, 2017; Smith, 2016; Ward & Shehade, 2016). Proponents of the idea that serial homicide is increasing may create or exaggerate a social problem (Kiger, 1990) and yearn for a return to a profitable heyday.

1.7. Tracking a precipitous decline

The first anecdotal (Yaksic, 2005), academic (Quinet, 2011), and journalistic (Beam, 2011) mentions of a decline in serial homicide appeared long after Cavanagh's (1993) work on experimental procedures in estimation. Potential reasons for the observed decline had been introduced (Vronsky, 2018; Yaksic, 2013, 2015), but they have been countered by inaccurate representation of statistics. Quinet (2011) calls the reduction in detected cases of serial murder by decade as, "dramatic" and dispels the notion that a paucity of information has negatively affected our ability to assemble data; by noting that media coverage has increased to match the public interest. Levin and Fox (2017) consider the collective impact of unresolved and undetected homicides alongside

the methodological caveats concerning the completeness of data, improvements to data accessibility and quality, awareness by LEOs and interest by the general public to conclude that serial homicide has diminished over the past decade or two.

A recent snapshot of stories related to serial homicide[9], alongside renewed interest in long-standing dormant series from wide ranging areas of the country[10], does make it appear that the phenomenon has increased, but the length of these cases can span many years. A story appearing in the current news cycle may be the result of decades of activity. For that reason, it is deceptive to count the resolution of these homicides among the logs of their clearance year as it inflates serial murder's contribution to end of year rates, further confusing efforts to establish an accurate snapshot of offending. LEOs review unresolved homicides upon the discovery of suspected serial murders and craft readiness plans to prepare for the appearance of these killers (Andreu, 2017) which enhances the belief that crime rate increases can be attributed to these offenders when other more plausible explanations like border offenses, human trafficking (Department of Justice, 2017), or gang violence[11] (Hellgren, 2017; Wang, 2016) are to blame.

1.8. The killing season
Our lack of knowledge about the number of serial murderers in modern society was brought to the forefront by the docu-series *The Killing Season* (Yandolino, 2016). This program advocated that serial homicide offenders capitalize on systematic ignorance and broken systems to elude authorities, be they communication barriers among LEOs, weak mental health institutional structures, ineffectual legal proceedings and inadequate deterrents. These concepts, so the series argues, work in tandem to allow thousands to kill unmonitored and with impunity. To prove an increase, showrunners married three separate approaches: an algorithm created by the Murder Accountability Project (MAP) (Hargrove et al., 2017), tabulations from the FBI's ViCAP Highway Serial Killings Initiative (HSKI) (Newsweek Staff, 2011), and the "Gone Girls" profile (Warner, 2016).

The MAP algorithm pinpoints clusters of supposed serial homicide activity by utilizing the FBI's Supplemental Homicide Reports (SHR) to build a count of unresolved homicides. The HSKI indexes the number of unexplained deaths occurring on or near major highways. Both programs tally two killings as related if even the remotest similarities are shared, a methodology that overemphasizes linkages with little value if they were to be considered separately. Emphasis on these efforts furthered the premise that hundreds of serial murderers are roaming unabated, "more than in our nightmares" (Romano, 2016) which induced hysteria by inflating the threat serial murderers pose in modern society. MAP assumes that uncaught offenders are an overlooked facet of society that will inevitably kill again using identical methods of operation[12], and that most cities retain a few active serial murderers (Kolker, 2017), assertions put forth in claims of jogger abductions (Hansen, 2016), and murders staged as suicides (Augenstein, 2016).

There are some caveats regarding *The Killing Season*. The forecasting methods utilized by MAP were trained against the Green River Killer, notorious for a remarkably uncommon use of clustering victims in tight geographic spaces. The HSKI advertises the identification of 450 suspected offenders (Department of Justice, 2016), but some unknown percentage of these murderers would have to be "one-off" killers given the publicized victim count of 750 deaths. Because a victim's death must be paired with one other to be counted as part of a series (Morton & Hilts, 2008), the victim count should reach at least 900 if each offender killed at least twice. Efforts to link homicide victims to data points in the HSKI have been unsuccessful (Pacheco, 2010) because timelines related to the 450 potential suspects span back to four decades.

2. Present study
It is necessary to review the contribution serial murderers have on homicide rates as they are improved by implementing community policing strategies rather than a focus on unresolved homicides. This study examines the likelihood that serial murderers are responsible for a significant majority of unresolved homicides by investigating the plausibility of reaching a true

accounting of the phenomenon in the context of a declining prevalence. *Decline* is defined as a decrease in year-over-year discoveries of new serial homicide series by way of apprehensions or clearances based on validated confessions or forensic linkages after the offender's death.

3. Methods

A mixed methods approach was used in this study: a review of a sample of unresolved homicides; a comparative analysis of the frequency of known serial homicide series and unresolved serial homicide series, and semi-structured email interviews of thirty-four experts that are members of a listserv dedicated to the study of atypical homicide.

3.1. Materials

3.1.1. Searching for serial homicide victims among "the hall of justice" records

The Hall of Justice (Sunlight Foundation, 2017) is a robust, searchable website that inventories criminal justice datasets containing longitudinal records of unresolved homicides. Data from twenty-six LEOs across 19 states and districts is available. The population of these communities range from 51,000 to 5.3 million residents. Homicide Watch Programs (HWP) operating out of California contributed 15,187 cases. Project Cold Case of Florida contributed 3,287 cases. Table 1 shows that the number of unresolved homicides included in this review totaled 22,444. To ensure the status of the record was legitimate, updated, and current, unresolved homicide records must have been maintained by a LEO or journalistic source. Unresolved homicide records contained on the LEO websites spanned from a low of three to a high of 1,347. The Colorado and Georgia Bureaus of Investigation and Texas Department of Public Safety contained records also maintained by local LEOs and overlapping records were removed. The earliest unresolved homicide originated in 1950 with most recent records generated in 2016. LEOs maintained data for an average of 28 years and HWPs for 16 years. To create a cohort most closely resembling the "typical" serial homicide victim (James & Proulx, 2016; Kraemer, Lord, & Heilbrun, 2004; Sturup, 2018), this study focused on the number of female victims whose wrongful death resulted from strangulation, suffocation or asphyxia.[13] There were no prerequisites for sexual violence to accompany the commission of homicides.[14] All homicides resultant from firearm usage were excluded.[15]

3.1.2. Comparative analysis of known resolved and known unresolved serial homicide series

Data on known resolved serial homicide series was derived from the CSHOD (Aamodt et al., 2019). To avoid controversy (Yaksic, 2018), the authors utilized the three-victim threshold to generate the count of homicide series and excluded all non-US killers, those who operated in multiple countries including the US, and those who killed solely prior to 1970[16]. The final sample consisted of 1,638 offenders. To minimize selection bias (Harbort & Mokros, 2001; Kiger, 1990; Mott, 1999), counts of separate and unique known unresolved serial homicide series were collected from various sources—media reports, textbooks (Mendoza, 2002; Newton, 2006), independent datasets (Mott, 1999; Quinet, 2011), and cases submitted to the authors. A total of 104 known unresolved serial homicide series spanning four and a half decades were assembled (see supplemental materials). To generate Figure 1, series conclusion dates were used as the endpoints and overlaid with counts of known resolved series from the CSHOD.

3.1.3. Attitudes towards unresolved murders in the context of serial homicide

To understand current attitudes on how the disagreement in relatedness between missing and unidentified persons, unresolved murders, no-body homicides, equivocal and mislabeled deaths, the "missing missing" (Quinet, 2007), and the unclaimed dead [a grouping referred to herein as the "discordance"] relates to serial homicide, thirty-four subject matter experts [15 professors, seven law enforcement officers, ten practitioners, two reporters] were identified as maintaining expertise in one or more of three domains: 1) serial homicide, 2) missing persons, 3) unresolved homicides (see Materials). Given the location of experts spanned the entirety of the United States, they were interviewed via email. A semi-structured approach was used (see Appendix 1 for list of questions).

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Table 1. Hall of justice records

Agency Compiling Information	State	Population	Earliest	Latest	Year Span	# of cases	# Strangled	% Strangled
Vallejo Homicide Watch	CA	118,837	2000	2016	16	100	0	0.0
LA Times	CA	3.8 million	2000	2016	16	15,087	72	0.5
Boulder Police	CO	103,166	1982	2013	31	6	0	0.0
Colorado Springs Police	CO	439,886	1956	2011	55	90	9	10.0
Colorado Bureau of Investigation	CO	5.3 million	1950	2015	65	1,347	47	3.5
Metropolitan Police	DC	658,893	1951	2015	64	1,191	26	2.2
Tallahassee Police	FL	186,411	1957	2009	52	17	0	0.0
Project Cold Case	FL	10.7 million	1961	2013	52	3,287	53	1.6
Savannah Chatham County	GA	142,772	2000	2013	13	9	0	0.0
Atlanta Police	GA	447,841	1971	2013	42	32	2	6.3
Georgia Bureau of Investigation	GA	10.1 million	1980	2014	45	51	6	11.7
Kauai Prosecuting Attorney	HI	65,689	1979	2010	31	13	1	7.7
Rockford Police	IL	150,251	2003	2011	8	36	1	2.8
Indianapolis Metropolitan Police	IN	852,866	2000	2011	11	271	2	0.7
Frederick Police	MD	66,893	1974	2006	32	13	1	7.7
Boston Police	MA	645,966	1985	2015	31	120	0	0.0
Southaven Police	MI	50,997	2005	2007	2	3	0	0.0
Nevada Public Safety	NV	2.8 million	1978	2008	30	17	2	11.8
Raleigh Police	NC	431,746	1994	2009	15	10	0	0.0

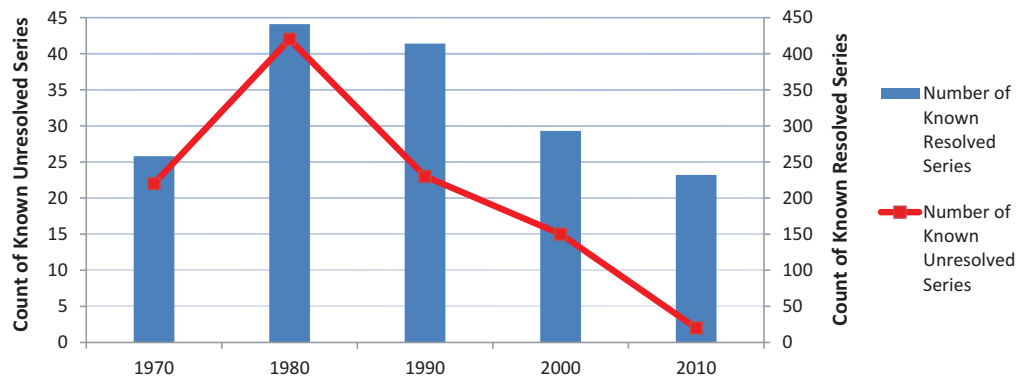*(Continued)*

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Table 1. (Continued)

Agency Compiling Information	State	Population	Earliest	Latest	Year Span	# of cases	# Strangled	% Strangled
Tulsa Police	OK	398,121	1968	2013	45	242	10	4.1
Knox County Sheriff's Office	TN	444,622	1976	2006	30	24	2	8.3
Austin Police	TX	885,400	1983	1997	14	11	2	18.2
Texas Public Safety	TX	26.9 million	1990	2007	17	12	2	16.7
Montgomery County Sheriff	TX	499,137	1979	2009	30	57	6	10.5
San Antonio Police	TX	1.4 million	1972	2001	29	58	2	3.4
Fort Worth Police	TX	792,727	1960	2009	49	95	21	22.1
Salt Lake City Police	UT	191,180	1996	2010	14	8	0	0.0
Richmond Police	VA	214,114	2008	2016	8	75	0	0.0
Milwaukee Police	WI	599,164	1969	2014	45	162	15	9.3

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Figure 1. Comparative analysis of known resolved and known unresolved serial homicide series.

The chart utilizes the three-victim threshold for the count of known resolved series.The decade of 2010 includes all known serial homicide series through the end of 2018. Each of the offenders operating in teams was counted separately.

The authors disseminated a five-question survey to 168 experts to determine which factors could be affecting the incidence of serial murder and received 34 responses for a return rate of 20%. Respondent's were organized based on their rank/role in their organization across five categories: out of 65 *Law Enforcement Officials*, 7 responded (11%), out of 61 *Professors*, 15 responded (25%), out of 35 *Practitioners*, 10 responded (29%), out of 2 members of the *Media*, 2 responded (100%), out of 5 *Students*, 0 responded (0%).

Using the qualitative data analysis software NVivo 10, coders placed respondent's answers into categories until eight themes that summarized attitudes towards the accuracy of serial homicide rates across the survey responses emerged: 1) *Capable Offenders* (offenders are getting better at killing) 2) *Deliberate Fear-mongering* (data is used to intentionally stoke fear in the public) 3) *Extent Unknown* (no one knows the true prevalence of serial killing) 4) *Gang Overrepresentation* (gang homicides are responsible for the increase in homicides) 5) *Inadequate Records* (the current means to calculate true prevalence of serial killing are subpar) 6) *Information Ubiquity* (serial killing appears to have increased only due to greater access to information) 7) *Political Inferences* (data is interpreted mischievously to serve an agenda) and 8) *Trend Misinterpretation* (data is accidentally manipulated in a manner that leads to a misinformed public). Coders then resolved differences until 70 percent agreement was reached.

4. Results

To elucidate a fuller picture of the perpetration of serial murder in the United States, the current research utilizes the Consolidated Serial Homicide Offender Database (CSHOD) (Aamodt et al., 2019), an effort that merged the myriad of independent endeavors to document the phenomenon that had emerged over the past few decades (Boyne, 2014). This resource was used alongside a comparative analysis of the frequency of known and unresolved serial homicide series, and semi-structured email interviews of thirty-four experts. In failing to become serial killers, aspiring and probable serial killers and spree killers have impacted the rate of serial murder by not reaching their potential. The past decade contained almost half the cases (13%) that existed at the 1980s peak of serial homicide (27%). Only 282 (1.3%) strangled females made up the 22,444 unresolved homicides reviewed. Most expert respondents thought it unreasonable that any meaningful proportion of missing persons cases are victims of serial homicide.

4.1. Testing the impact of definitions on the prevalence of serial homicide

To test the impact that definitions may have on how the decline is measured, Yaksic (2019b) separated serial and spree killers using components distinct to these designations (Schlesinger, Ramirez, Tusa, Jarvis, & Erdberg, 2017). Figure 2 incorporates that data and shows that an inverse relationship exists between these two categories; when serial homicides increase, spree killings decrease and vice versa demonstrating that they are two samples generated by the same underlying phenomenon. From 2011 to the most recent period that data is available (end of 2018), it is

evident that both serial and spree killings have declined along a similar downward trajectory meaning that no matter what multiple murderers are called, they are becoming rarer. Data from another effort (Yaksic et al., 2019) cataloging aspiring and probable serial homicide offenders was also incorporated into Figure 2 to demonstrate that the downturn in serial murder can partly be explained by the presence of these two previously unacknowledged offender cohorts. If aspiring and probable serial murderers and spree killers had realized their potential and become successful serial murderers, the rate of serial homicide would be similar to that of previous decades.

4.2. Hall of justice records
Of the 22,444 unresolved homicides indexed within the Hall of Justice records, 282 (1.3%) were committed against females and caused by strangulation, suffocation, or asphyxia. Only a small fraction of these 282 unresolved homicides will end up being the result of serial homicide activity which illustrates the point that serial killings are an extremely low frequency event. The low occurrence of strangulation homicides among these records complements Schlesinger's (2001) argument that serial homicide is not increasing given that victimization of women has been steadily decreasing.

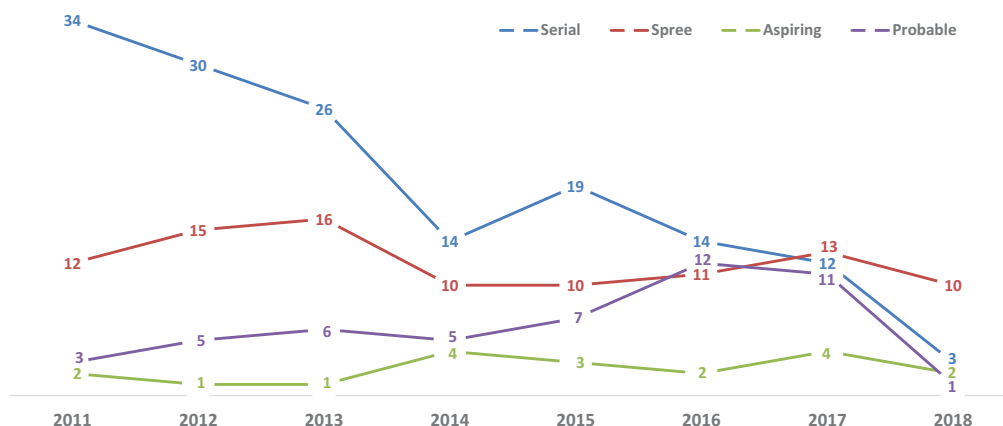### 4.3. Known resolved and known unresolved serial homicide series
Figure 1 demonstrates that the number of serial homicide series peaked in the 1980's at 441, a number previously seen at 258 in the 1970s. As of 1990, these numbers dropped to 414, and continued falling, marking 293 in 2000. There have been 232 separate serial homicide series since 2010. Overall, since its peak in the 1980's, data shows a continuous decline in serial homicides; 16% of cases occurred in the 1970's, 27% in the 1980's, 25% in the 1990's, 19% in 2000's and 13% since 2010. The decline has co-occurred in both the known unresolved and known resolved serial homicide series. The trajectory of both series—known unresolved and known resolved—follow alongside each other in parallel, throughout the decades. In recent decades, there have been fewer unresolved serial killing series with smaller victim counts and shorter spans between first and last known kills.

4.4. Attitudes towards unresolved murders in the context of serial homicide
Results from the email interviews varied by respondent category. LEO representatives disagreed with the premise that serial homicide is declining, claiming that the number of uncovered killers is expansive when coupled with the thousands more case linkages within the Violent Criminal Apprehension Program (ViCAP). Two respondents fit under the Inadequate Records theme and felt that the lack of data on serial murderers could be explained by limited resources, that the numbers of annual new unresolved homicides, missing persons, and unidentified bodies are "startling", and that record keeping is too inadequate to monitor these categories. Two respondents fit under the Capable Offender theme and stated that administrative issues which restrict LEOs and hamper efforts to apprehend evolving offenders that are "more cautious and learning from the mistakes of others". One respondent fit under the Political Inferences theme and believed

Figure 2. Frequency of homicide offending by serial, spree, aspiring and probable murderers (2011–2018).

The chart utilizes the three-victim threshold for serial and spree murderers. Aspiring killers were not responsible for any homicides but expressed a desire to kill serially. Probable murderers killed at least one person and expressed a desire to kill serially.

that numbers were being manipulated to force the need for the allocation of additional funds. One respondent fit under the Information Ubiquity theme and thought that the rate of serial homicide has changed due to greater access to information.

Professors on the whole were not convinced that serial homicide is increasing and claimed that detection of serial murder has improved while overall counts are diminishing. Four respondents fit under the Trend Misinterpretation theme and were adamant that "there is no persuasive argument to attribute any significant number of cold cases and missing people to serial killings" and "no reason whatsoever to believe that any meaningful proportion of unresolved cases are the result of serial killers"; describing efforts to attribute the recent homicide spike to serial killing as "ludicrous". One of those respondents pointed out that "the world is safer now than at any other point in history" but was careful to remind of our use of anecdotal clues which provided much of what is known about violence. The last of those respondents suggested that there is no "credible evidence that the number of missing persons that are actually homicides not yet known to police is very large" and called for "an empirically based assessment tool to minimize cognitive biases associated with simplified heuristics based on individual investigators' experience." Two respondents fit under the Information Ubiquity theme and thought that ready access to data has given only the appearance that serial killing has increased. Three respondents fit under the Gang Overrepresentation theme where others are thought to be conflating an increase in these killings with serial homicide. One respondent fit under the Inadequate Records theme because they stated that the population of "missing persons" is not included in cold case files, but an unknown percentage of them are homicide victims. One respondent fit under the Deliberate Fear-mongering theme as they believe that those claiming that serial killing has increased are doing so to scare the public.

Practitioners believe that our lack of knowledge bolsters offenders and makes their careers longer and that estimates are relied upon to guide knowledge. Three respondents fit under the Trend Misinterpretation theme and observed that researchers tend to "rig the numbers" associated with victim thresholds to facilitate theories and stated that "there are huge gaps in data gathering which leads to guesstimating the real numbers" and that "wild guesses are dressed up to look meaningful". Two respondents fit under the Inadequate Records theme stating that some agencies do better at reporting than others and that we lack the proper tools and instruments to accurately measure rates. Three respondents fit under the Extent Unknown theme, stating that we cannot know what cannot be known and indicated that it is "far harder today to create a John or Jane Doe" and introduced a measure of skepticism that "a majority of the 40,000 unidentified human remains can be chalked up to serial killers.". One respondent fit under the Information Ubiquity theme, stating that the availability of data sources has changed drastically over time.

Both reporters, each supervising their paper's homicide tracking database, were confident that serial murders are the minority exception rather than the norm among homicide cases, each noting that the hallmarks of serial homicide (strangulation, mutilation, dismemberment) are found just as often in interpersonal homicides. Both respondents fit under the Extent Unknown theme, stating that serial homicide is just one facet of the large criminal justice system.

Five respondents offered advice on how to calculate accurate rates (four professors and one LEO). One respondent could not be classified as their organization did not keep records.

4.5. Suspected and probable explanations for the decline in serial homicide

Quinet (2011) credits progress made in reducing the serial murderer's active killing periods and the average length of time they remain active since the 1970s to lessening "linkage blindness" and the creation of the National Missing and Unidentified Persons System. To grasp the decline, researchers, practitioners, LEOs and the media must appreciate that it evidences choices made by the serial homicide offender and that small changes in their experiences have tremendous effects, meaning that serial killers result from combinations of highly unique factors (Homant & Kennedy, 2009) and function in terms of widely shared cultural and psychological processes (Shanafelt & Pino, 2013)

and social context (Shanafelt & Pino, 2015). These influences are important when considering changes in the incidence rates of serial killing over time (Homant & Kennedy, 2009), categorized here into four domains: Technology, Shifts in Offending Behavior, Proactive Law Enforcement Action, and Increased Vigilance of Society.

4.5.1. Technology
The landscape of serial murder has been impacted by technological advances that make some of the factors in the three domains possible. The advent of cell phones, always connected social media accounts, assault prevention software (Glaser, 2016), facial recognition (Waddell, 2016), crime awareness mobile applications (Summers & Johnson, 2016) and the dawn of the surveillance age place offenders at exceptional risk of being detected far earlier in their offence behavior (Sane, Mugadlimath, Farooqui, Janagond, & Mishra, 2017; Yaksic, Konikoff, et al., 2019). As potential victims turn their attention to alternatives that remove human contact from their day-to-day lives and migrate to services that will keep them indoors (Vincent, 2017), serial homicide offenders may be unable to adapt to a future without ready access to potential victims.

4.5.2. Shifts in offending behavior
Serial murder is no longer viewed as a shortcut to celebrity status, but it is still of interest around the world (Donley & Gualtieri, 2017). The unintentional byproduct of this attention pushes some main-taining homicidal ideation into behaviors such as a utilization of the underground sex trade and human trafficking networks, warehousing abductees (Conti, 2015), alteration of modus operandi, retiring early or adopting tactics associated with the spree murderer (Aamodt & Yaksic, 2015). The Internet provides would-be offenders an open forum to explore activities associated with leisure (Williams, 2016a)—journaling, collecting pornography and photographs—and the opportunity to placate their paraphilic behavior without exploiting unwilling participants. Much like virtual reality gaming supplies a vicarious outlet for violence, avenues like sex dolls that simulate rape (Claire, 2017) removes contact with a victim, hence eliminating the murder of a victim[17].

Furthermore, two occupations that serial murderers gravitate towards—long haul trucking and the medical industry—are placing workers under tighter scrutiny (Bostock, 2017) or replacing them altogether (Davies, 2015). Younger offenders are growing up in a world where sentiment, sup-ported by the collection of physical items that fuel imagination, fantasy and rumination, is less emphasized. Enough is known about serial offending to preemptively assist would-be offenders in warding off potential symptoms (Reisner, Mcgee, & Noffsinger, 2003), or address malingering of individuals yearning to emulate killers (Fischer, Beckson, & Dietz, 2016). The self-harm epidemic (Ingraham, 2016) may be removing future threats from society.

4.5.3. Proactive law enforcement action
Jurisdictional conflicts between LEOs, once commonplace, have subsided in favor of increased collaboration. LEOs consult the public for assistance (Backus, 2015) more frequently, and more readily consider that a serial offender could operate in their jurisdiction (Kaste, 2015). Advances in technology have made it easier for LEOs to ensure that abduction attempts (Larimer, 2016) are far less successful while harsher punishments and more restrictive use of parole ensures that would-be serial murderers are incarcerated for longer (Aamodt & Yaksic, 2015; Crockett, 2016). Many would-be serial murderers have been captured as LEOs clear rape kit backlogs (Mai, 2017; Waltke & Ames, 2017) and use familial DNA and genealogical techniques to reveal offenders (Pelisek, 2017; Smith, 2018). LEOs benefit from the inexperience of younger offenders and stop them before they amass greater body counts (Yaksic, Konikoff, et al., 2019).

4.5.4. Increased vigilance of society
Society has reversed a trend of ignorance of the serial murderers' means and motives that had allowed them the freedom that they can no longer enjoy. Many longstanding myths have been broken, specifically regarding the "white, loner" stereotype (Bartels, 2017; Branson, 2013; Hickey, 2014; Kuhn & Coston, 2005; Sharma, 2018; Walters, Drislane, Patrick, & Hickey, 2015; Yaksic, 2006). Serial crimes

had remained unresolved as investigators adhered too firmly to stereotypes (Mott, 1999). The disappearance of the 1960s "if-it-feels-good-do-it" ethos led to a greater distrust of strangers, the abolishment of hitchhiking, and parents who are reluctant to allow children to play freely without supervision (Aamodt & Surrette, 2013), changes in behavior that have diminished potential victim pools. Certain ruses that serial murderers previously used to lure victims, such as posing as a photographer, are no longer plausible, as the veracity of others is easily verifiable online. Efforts to educate the public about serial murder has led to awareness of the hallmarks (Wall & Johnson, 2015), odd behaviors (Gelinas & Hadjistavropoulos, 2015; Woollaston, 2015), stalking offenses (Lloyd-Goldstein, 2000), paraphilias (Yakeley & Wood, 2014), and violent tendencies toward animals (Broussard, 2016; Levin & Arluke, 2016; Patterson-Kane, 2015) or others in youth (Hartley-Parkinson, 2015). Countrywide movements are working to strip a generation of undrafted young men of toxic masculinity (Gilbert, 2017) and instill respect for women which may ward off future criminality.

5. Discussion

Some dispute that serial murder is in decline due to perceptions of an epidemic of repeat killings. This study used the CSHOD and found that there have been fewer unresolved serial killing series as well as a decline in known resolved serial killings. The authors determined that the past decade contained almost half the percentage of cases (13%) that existed at the peak of serial homicide in the 1980's (27%). In recent decades, there have been fewer unresolved serial killing series with smaller victim counts and shorter spans between first and last known kills. The cause of the decline in serial homicide may be due to developments in law enforcement techniques, in technology, and increased personal safety measures over time. Although anyone can engage in serial murder, mythmaking has fallaciously transformed the concept (Homant & Kennedy, 2009; Jenkins, 2002) into one where only those harboring complex idiosyncratic combinations of emotions, memories, intentions, fantasies, plans (Shanafelt & Pino, 2013), and warped views of culture (DeFronzo, Ditta, Hannon, & Prochnow, 2007; Wiest, 2016) can kill serially.

In the sample of experts, it was found that those supporting the idea that serial homicide is in decline are from fields outside the serial homicide mainstream. Most of the respondents thought it unreasonable to classify any statistically meaningful proportion of missing persons cases as homicides, let alone victims of serial homicide. The contrast in opinions between LEOs and professors warrants further investigation as biased or uneducated viewpoints may result in repeating stereotypes. As new discoveries of unresolved series are at the lowest point in recorded history, with the number of known unresolved serial homicide series having been halved with each passing decade, the fear that hundreds of unknown serial killers are trolling for victims is unwarranted. It is unlikely that further victimization will result from the unknown offenders included in this study, as they undergo biological changes that restrict their willingness to continue their campaigns. The offenders responsible for half of the unresolved series in this query are, in all probability, either dead (Reid, 2017) or retired (Smith, 2018), given that most serial murderers begin their careers in their thirties and were active for an average span of three years (Aamodt & Yaksic, 2015). Results of this study demonstrated that we cannot attribute any significant majority of missing or unidentified persons to serial homicide activity.

Much of the literature on serial homicide focuses on the need for better detection methods rather than the etiology and criminogenic factors that influence offender choices. The reasons for the decline as being a byproduct of 1) technology, 2) shifts in offending behavior, 3) proactive law enforcement action, and 4) increased vigilance of society urge researchers to acknowledge that serial murderers are people impacted by societal shifts and cultural norms as opposed to monsters mindlessly trolling and seething. The construct of the infallible, adaptable, and successful serial killer has allowed LEOs to attribute their failures in resolving homicides to being outmatched by superior criminals, an excuse unsupported and challenged by the observed decline. Researchers must break away from their areas of expertise to provide the decline with ample attention and consideration (Shanafelt & Pino, 2013). DeLisi (2015) holds researchers accountable for limiting scholarly thought related to serial murder by shunning it as an aberration and relegating its study

to true crime authors and expert practitioners that field questions about the offender's accomplishments corresponding to body counts or methods of deaths. Researchers rarely effect change on real world circumstances, frustrated that the decline in serial homicide has happened outside of their efforts to orchestrate it. Both tracks contribute to disbelief in the phenomenon of the decline.

The current research attempts to highlight perceptions within circles and subcategories of experts and represent the presence of serial murderers in modern society where they remain a threat to the public (Crimaldi, 2017). Serial murderers are not, however, waiting to reemerge and capitalize on a criminal justice system in disarray[18]. The results of the current study reveal that there has been a decline in serial homicide. This may surprise those with a fascination with violence. Genetic genealogy has resolved some long dormant homicide series (Gafni, 2019) whose inclusion in the estimates of previous decades will increase the share 'golden age' serial murderers have on the overall total. This will, in turn, make the recent drop off in serial killings appear even more prominent and further widen the gap between then and now. Although some warn of a future increase in serial homicide (Miller, 2018), the landscape of prior decades has been permanently transformed through technology, shifts in offending behavior, proactive law enforcement action, and increased vigilance of society.

6. Future research directions

Future research should be less concerned about whether the decrease has occurred, but rather why the 1980s spike took place (Dimond, 2014). The complexity of multiple interacting variables is often too complicated to completely understand, especially given the small everyday life choices that send us down paths neither anticipated nor entirely predictable (Shanafelt & Pino, 2013). Because DeLisi et al. (2016) draw a distinction between most homicides being reactive, expressive, and impulsive actions and those entailing homicidal ideation or planning to complete, Yaksic, Konikoff, et al. (2019) explored whether homicidal ideation has dissipated among modern day offenders and found that thinking about committing murder has not abated but prospective killers often fail to follow through with their schemes. A true estimate of serial homicide offending will be incomplete unless it incorporates those that intended to murder serially, but whose efforts were stalled by arrest or imprisonment. Future research should more closely examine the perception of the trends of serial homicide and theoretically examine why serial homicide has decreased over time in the context of the reasons discussed in the current research.

7. Limitations

Some of the potential limitations in this study are endemic to homicide research. The intervention of LEOs in the formative years of a serial murderer's career prevents longitudinal research on which traits would have coalesced during the transformative process of offender's like Christopher Duntsch (Guillen, 2017) or Gannon LeBlanc (Bienick, 2016). Fatigue (Bialik, 2016) may have impacted the current study as strain induced by reports about death can be unsettling. The study of unresolved homicides cannot allow researchers to analyze known events attributed to tangible offenders. It was not possible to assemble an exhaustive list of known unresolved serial homicide series because some missing persons are never reported to the police and those that are, can be overlooked as transient (LePard et al., 2015).

Findings from the review of the Hall of Justice records may not be generalizable as McNamara and Morton (2004) warn that geographic, demographic, and cultural issues limit the representativeness of a sample when attempting to project the national percentage of serial homicide victimization. Many aspects of the review, such as potential victim-offender relationships and if the unresolved strangulation murders were stranger homicides, were unknown because pertinent narrative details were unavailable. One drawback of relying on the LEO websites from the Hall of Justice is that the full case list is not always available (Friedenberger & Stevens, 2017) which affects the replicability of this study. The review of these unresolved homicides could be underpowered since it covered only a fraction (10%) of the estimated 230,355 unresolved homicides identified by Stein et al. (2017) and it can be too subjective to be meaningful. The authors had hoped to identify characteristics of cases least likely to be attributable to serial

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homicide and provide comparative ratios but obtaining clear and complete contrast groups to analyze accurate ratio statistics is not possible in serial homicide research. Although the review was influenced by two popular concepts in serial homicide research—strangled females—these parameters may have narrowed its scope. Still, while the normal approach in research is to provide analyses that can be generalized to a wide population, in law enforcement investigations, LEOs prefer specific, focused information.

8. Implications

By acknowledging the decline in serial homicide, criminologists and LEOs are free to consider if potential serial killers have elected to pursue other avenues, such as mass murder, to express their violent machinations. The recent influx of men whose desire to inflict pain and suffering on a wide segment of society demonstrates that the impulse to kill many people may not be lessening but rather the mechanism through which their murderous intentions are carried forth is beginning to change. Involuntarily celibate men, in particular, share many traits in common with serial murderers but are much more apt to reach out to others like them in the modern age via online forums. These connections urge them to kill many victims at once as opposed to sustaining their contempt for women over the span of many years and acting on it sporadically. Theoretically, these men could have been on the trajectory to becoming serial murderers if they had explored their hatred alone and not been encouraged by others like them. This is an important implication given that the resources dedicated to locating serial murderers could better be used to combat the influx of mass murderers that society has faced in recent times.

9. Conclusion

The current research investigated the veracity of claims that serial homicide is increasing by relying on data gathered from the CSHOD, expert interviews, and the Hall of Justice records and found that there is no empirical or theoretical basis to support such statements. This discrepancy between public and expert opinion occurs at a time when the landscape of multiple murder is changing but it is becoming more difficult for potential killers to sustain a career and attain longevity (Yaksic et al., 2019), not easier. The combination of technology, shifts in offending behavior, proactive law enforcement action, and increased vigilance of society has forced those with murderous intent to explore other avenues, such as mass murder, to victimize others in the modern age. By acknowledging that the panic over serial murder in recent years has been somewhat manufactured, resources can be dedicated to combating the rising threat of mass shooters and murderers.

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Notes
1. For example, detectives at the Tacoma Police Department in Washington reviewed all unresolved homicide cases from 1970 to 2017 involving female victims aged 14–40 known to be involved in prostitution to look for linkages, and found that only 80 individuals fit that potential serial killer victim description over a span of nearly 50 years. It is

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difficult to contrast this finding with a popular notion that the Northwest generates more serial murderers than other geographic regions (Bartlett, 2016).

2. Similar demographics (single, white, female), proximity of remains (small geographic zones), identical methods of death (typically "hands on" means like strangulation or asphyxiation), and the presence of non-standard pre/post mortem activities abduction, sexual assault, mutilation or dismemberment) also known as the "Gone Girls Profile".

3. Such as comparable geography, being felled on the same day of the month, or dates that are equal to demonic numbers (Giacalone, 2017).

4. Those that were responsible for at least one homicide and desired to kill serially.

5. Those that were not responsible for any homicides but desired to kill serially.

6. Phelps, M. W. (26 September 2013). RE: Quantifying the Instances of Serial Homicide in the US. Message posted to Multidisciplinary Collaborative on Sexual Crime and Violence electronic mailing list.

7. The FBI defines serial murder as the killing of at least two victims in separate events at different times (Morton, Tillman, & Gaines, 2014).

8. The period of time spanning from 1970 through 1989.

9. Gary Sampson (Valencia, 2016), Michael Monert (Fraley, 2016), Steven Gordon (Goffard, 2016), Aeman Presley (WSBTV Staff, 2017), Anthony Kirkland (WKRC Staff, 2016), Stanley Adams (Simeon, 2017), David Ray Contreras (Patch Staff, 2017), Kwauhuru Govan (Weill, 2017), Samuel Little (Kim, 2014), and Clifton Bloomfield (Associated Press, 2016).

10. West Mesa, Daytona Beach, Long Island, Jefferson Davis Parish, Colonial Parkway, and Atlantic City.

11. Gang members are contributors to serial murder in the U.S. but the current study is focused on other types of serial murder.

12. Serial murderers often alter their methods over time (Larson, 2017) or even when killings are minutes apart (Collins, 2017).

13. Morton, Tillman and Gaines (2014) discovered that manual and ligature strangulation, suffocation and asphyxia were the primary cause of death in almost half of their sample (42.5%).

14. Sexually motivated murders were conflated with serial homicide, an artifact of a historical crime trend that coincided with the rise in academic scholarship into serial murder .

15. Gangland and professional hit killings would overtake the research.

16. Selected as an appropriate starting point due to improvements in record keeping and tracking.

17. The relationship between sex doll use and desistance from crime against humans has not been studied at length.

18. Caused by instances of police abuse, brutality and unjustified shootings (Serwer, 2017), continued use of questionable forensic techniques (Green, 2017), discovery of rape kit backlogs (Reilly, 2015) or prosecution of innocent men and women (Segura, 2017).

Disclosure statement
The authors intend to make the entire database available to all interested parties.

Supplemental material
Supplemental data for this article can be accessed here.

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Appendix 1. Questions posed to interviewees to gauge attitudes towards unresolved murders in the context of serial homicide

(1) Can a true prevalence of serial homicide offender activity ever be reached?

(2) Is it reasonable to assume that serial murderers are responsible for a large proportion of missing persons and/or unresolved homicides?

(3) Is there a correlational relationship between declining clearance rates and the recent increase in homicide rates?

(4) Is the Hall of Justice data adequate enough to allow for a search of the "typical" serial murder victim profile of the "strangled female"?

(5) Is it reasonable to assume that there are serial murderers hiding in the "dark figure of crime" and/or the Highway Serial Killings Initiative?