Linkage Behaviours and Outcomes for Serial Sexual Offenders

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Submitted in partial fulfillment
of the requirements for the degree of
Master of Arts

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Abstract

The purpose of the present study was three-fold; 1) to describe the behaviours exhibited by serial sexual offenders, including their criminal histories, 2) to gain a better understanding of the information that is used when linking (potential) serial sexual offences, and 3) to explore linkage outcomes and potential investigative barriers. Previous research on serial offenders has focused on how to link offenders to their multiple offences using a process known as linkage analysis. Through this process, trained analysts review case information and assess for potential links to other cases. Linking offences together allows investigators to focus their resources on investigating one offender that is responsible for multiple offences, rather than investigating each offence separately. Further, the linkage process facilitates communication between law enforcement agencies. This can help protect the public by aiding in the identification of offenders and potentially reducing victimization. There is a gap in the literature with respect to the information that is being used to link and confirm offences in practice. The current study aimed to address these limitations by reviewing a sample of 78 potential linkages (57 male sexual offenders) made by trained analysts from the Violent Crime Linkage Analysis System (ViCLAS) centre to examine the information and offence behaviours that were used to link serial sexual offenders to their offences. Further, this study described the current status of the linkages and potential investigative barriers. Overall, the information used to make linkages was consistent with previous research in that both consistent and distinctive offence behaviours were used. Regarding linkage outcomes, at the time of writing, the majority of linkages remain as potential (i.e., neither confirmed nor rejected) due to potential investigative barriers. As investigations continue, these may be updated and confirmed in the future. Implications and future directions are discussed.

Keywords: crime linkage analysis, ViCLAS, serial offender, sexual offender, criminal behaviour

Table of Contents

List of Tables

List of Figures

Linkage Behaviours and Outcomes for Serial Sexual Offenders

In Canada in the 1990s, a serial murderer and rapist (Paul Bernardo) remained unidentified for several years as he committed his multiple offences (Collins et al., 1998). A review by Justice Archie Campbell regarding the investigation of these offences determined that a lack of communication between agencies may have contributed to Bernardo's ability to remain undetected (Collins et al., 1998; Campbell, 1996). For this reason, it is vital that police agencies have a communication process in place to determine when one offender is committing multiple offences, and to be able to link an offender to his offences across agencies. Linking a serial offender to his multiple offences can increase the chances of detection, save police time as they focus on the group of offences, and can prevent further crimes. This process of linking offenders to their offences is known as linkage analysis. In Canada, in response to the Bernardo case, a computerized database known as the Violent Crime Linkage Analysis System (ViCLAS) was created to facilitate the linkage process. Trained analysts assess for potential links to other cases in the database by reviewing offence information such as offence behaviours (e.g., sexual behaviours) and by searching for similarities to other cases. This process is important because it facilitates communication between agencies and assists in the identification of serial offenders.

There are three objectives for the current study; 1) to describe offences committed by serial sexual offenders, including their criminal histories and age at time of offence, 2) to gain a better understanding of the information that is used when linking (potential) serial sexual offences, and 3) to explore the outcomes and potential barriers that may impact investigations into linkages. I will begin with describing sexual offender behaviours and the importance of linkages. Next, I will describe the linkage process and underlying theories, as well as potential

investigative barriers. Finally, I will review previous research on linkages and explain how the current study will address suggestions in the literature.

Unpacking Offender Behaviour for Linkages

To better understand and investigate offences, it is important to have knowledge of offence behaviours and the types of offences that individuals engage in over time (e.g., criminal history and recidivism). Previous research on individuals who commit sexual offences suggests that, on average, they first begin committing sexual assaults between the ages of 28 and 32 (Beauregard & Martineau, 2017; Deslauriers-Varin & Beauregard, 2014; Hewitt & Beauregard, 2014; Woodhams & Labuschagne, 2012), and that they tend to have extensive criminal histories (Schlesinger et al., 2010; Deslauriers-Varin & Beauregard, 2014), including offences such as property crimes (Beauregard & Martineau, 2012), and non-sexual assault (Beauregard & Martineau, 2017; Beauregard et al., 2018). Beauregard and Martineau (2017) noted that individuals who commit non-homicidal sexual offences tend to have a criminal history of mainly non-violent sexual offences, whereas those individuals who commit violent non-homicidal sexual offences tend to show the most versatility in their criminal history, including sexual assault, burglary, and violent crimes. This versatility may be due to the fact that violent non-homicidal sex offenders are likely not sexually motivated; rather, they tend to behave in ways that are consistent with antisocial offenders (Beauregard & Martineau, 2017). On the other hand, non-violent non-homicidal sex offenders are likely sexually motivated, and thus have a history of sexual offences (Beauregard & Martineau, 2017).

Further, in their sample of sexual homicides, Beauregard and Martineau (2012) found that individuals had an extensive history of violent and property offences, but that 80% of their sample did not have any prior convictions for sexual offences. When investigating sexual

homicides, investigators may tend to focus on individuals who have previously committed sexual offences; however, other information, including behaviour related to non-sexual offences, will also be important (Beauregard & Martineau, 2012; Beauregard & Martineau, 2017). Regarding recidivism, Harris and Hanson (2004) found that at a 5-year follow-up, 25% of sexual offenders had reoffended sexually[1], and that younger individuals (under the age of 50) were more likely to reoffend sexually compared to older individuals.

Repeat offenders who commit two or more offences within the same category of offences (e.g., sexual) are considered serial offenders (Woodhams et al., 2007). It is important to be able to identify serial offenders as early as possible to avoid further victimization. Thus, it is vital to successfully link these repeat offenders to their multiple offences. Successfully linking offences together allows investigators to focus their time and resources on one serial offender, instead of investigating each offence individually, as if they were unrelated (Woodhams et al., 2007). In applied practice such as in policing, trained analysts are often employed to review case file information including offender behaviour, and to assess for potential links to other cases in a police investigative or occurrence reporting system. These linked cases become known as series, and this process of linking multiple offences and attributing them to a single serial offender is known as linkage analysis (Hazelwood & Warren, 2004).

In Canada, the linkage process is facilitated by ViCLAS which was established in the 1990s by the Royal Canadian Mounted Police (RCMP) to streamline the crime linkage process and to facilitate communication regarding violent and sexual offences (Collins et al., 1998). The creation and use of ViCLAS improved the efficiency of the crime linkage procedure and

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[1] As noted by the authors and by Abbott (2020), actual sexual recidivism rates may be unknown, and likely higher than reported rates as there is a possibility that offenders committed sexual offences but were not charged or convicted, or the offence was not reported.

simplified the communication process for law enforcement professionals. While other linkage programs at the time focused on homicide offences, ViCLAS was unique in that it included sexual offences as well (Collins et al., 1998). Once a ViCLAS criteria offence occurs, investigators fill out a form answering detailed questions about the offence, victim, crime scene, and offender behaviour (Martineau & Corey, 2008). This completed form is then sent to the ViCLAS centre where analysts work on linking cases to others in the database. It is important to note that ViCLAS itself does not link cases; rather, analysts work through the ViCLAS database to determine if any cases may potentially be linked (Chopin & Aebi, 2017). If the analytic process results in a possible link to one or more other cases within the database, information is then sent to the police service(s) who have jurisdiction over the cases. Specifically, information used to support linkages and information about the cases is sent to the investigating agency; this is done using a consistent format and form. Each agency then investigates the potential linkage and is mandated to report back to ViCLAS with information regarding the outcome of their investigation (i.e., whether the offences are linked or not).

Individuals can be linked to their offences in many ways, including with forensic information (e.g., DNA), crime scene information (e.g., location), and behavioural information (e.g., how the offender approaches the victim), or a combination of these factors. Linking offences using forensic information is perhaps the most accurate way to link offences (Grubin et al., 2001); however, forensic evidence may not always be available for analysis and requires time and resources to collect, process, and analyze (Burrell & Bull, 2011; Davies, 1992; Hazelwood & Warren, 2004). As such, behavioural information can (and will often) be used to link offences Hazelwood & Warren, 2004), in the early stages of an investigation and also in later stages, in cases where forensic evidence is not available.

The use of behaviour to make linkages has also been informed by previous psychological research, which has historically centred around the debate between whether behaviour is a result of the person or the situation (Funder, 2006). At this point, however, it is generally agreed that both the situation and the individual interact in order to elicit observable behaviour (Funder, 2006; Mischel & Shoda, 1995; Woodhams & Bennell, 2014). That is, people can perceive situations differently due to individual differences, such as differing personalities, and the behaviour that is exhibited is a combination of these factors (Mischel & Shoda, 1995; Woodhams et al., 2007). Additionally, changes in a situation may impact and alter an individual's behaviour in reliable ways depending on their traits (Funder & Colvin, 1991). As such, when observing an individual's behaviour, it is useful to determine if something may be influencing their actions. Attribution theories are particularly concerned with how judgements are made regarding an individual's behaviour (i.e., determining why someone exhibits certain behaviour; Kelley, 1973). An individual may have the motivation to behave in a certain way, but their situation may not offer them the opportunity to engage in that behaviour (Heider, 1958; Kelley, 1973). Further, a person may intentionally choose to display a specific behaviour, or the situation may be influencing them to act that way (Kelley, 1973). Therefore, if an individual behaves in a consistent way across situations, their actions may be attributed to some internal factor (e.g., personality) (Kelley & Michela, 1980). Likewise, if an individual differs in the way they usually behave, their behaviour could be attributed to external factors (e.g., the situation) (Heider, 1958; Kelley & Michela, 1980).

These elements are often taken into account when linking offences; analysts often utilize many factors in the linkage process, including information about the victim and the scene of the crime (Hazelwood & Warren, 2004). These elements can point to the offenders Modus Operandi

(MO). The MO refers to habits or patterns of behaviours that an individual exhibits that can assist in linking them to their offences, such as where the individual chooses to commit the offence or the manner in which the individual decides to assault the victim (Hazelwood & Warren, 2004). The MO is susceptible to change and can be impacted by the situation (e.g., the victim's reaction to the assault); however, the more the individual engages in a particular offence behaviour, the more familiarized that individual becomes with that behaviour and may continue to engage in it (Douglas & Munn, 1992; Hazelwood & Warren, 2004).

In addition to MO, signature can be used in the linkage process (Douglas & Munn, 1992). The signature refers to elements of an offence that provide some indication as to the fantasy or psychological aspects that are relevant to the individual and are exhibited in offence behaviours (Douglas & Munn, 1992). The signature usually refers to a combination of behaviours that are not necessary for the completion of the offence, but that have some important meaning to the offender (Douglas & Munn, 1992; Hazelwood & Warren, 2004). Specifically, for individuals who commit sex offences, the signature may present as actions of control or manipulation, such as forcing the victim to compliment the offender (Douglas & Munn, 1992). Contrary to the MO, the signature is not as changeable and tends to be more stable because it is based on the psychological needs of the offender; the general theme of the signature should be consistent within an individual and may be useful for the linkage process (Douglas & Munn, 1992).

Behavioural Assumptions of Linkages

Linkages using offence behaviours are based on two general assumptions that relate to the idea of behavioural consistency and distinctiveness. The first is the assumption of behavioural stability and consistency (also known as the Offender Consistency Hypothesis) (Canter & Youngs, 2003; Woodhams et al., 2007). This assumption purports that individuals are consistent or stable enough in their behaviour across their offences so that they can be

successfully linked (Canter & Youngs, 2003). The second is the assumption of distinctiveness and individuality. This second assumption states that individuals need to be distinctive enough in their behaviour so that they can be differentiated from others when attempting to link offences (Canter & Youngs, 2003).

Consistency of Behaviours

The first assumption underlying linkage analysis is that behaviours are consistent within an individual. Within personality psychology, stability across various situations can be considered evidence for personality constructs and traits (Mischel & Shoda, 1995). When considering cross-situational consistency, it is important to recognize the interaction between the individual's personality and the situation that they are in (Mischel & Shoda, 1995). Each individual assigns their own psychological meaning to a situation, and this meaning contributes to the consistency of their behaviour (Mischel & Shoda, 1995; Funder & Colvin, 1991). Moreover, the more experience one has with a situation, the more stable their behaviour becomes (Hettema & Van Bakel, 1997, as cited in Woodhams et al., 2007).

This information regarding behavioural stability has been used to inform the linkage process. Linkages relying on behaviour tend to focus on the similarity between offences; in other words, offences may be linked based on the consistency of behaviour across offences (Woodhams et al., 2007). Although the information regarding how offenders behave over time is important to consider, criminal history and recidivism rates may not necessarily be used in the linkage process itself, in part because analysts may be working with cases involving unknown individuals. Nevertheless, understanding the breadth of behaviours offenders engage in can be helpful. For example, individuals should not be ruled out of an analysis because they do not have (or do not solely have) other known sexual offences - those who have other types of offences (e.g., violent) may be important potential leads for investigators to pursue when considering

suspects. As well, when considering the likelihood of making potential links when analyzing

databases consisting of sexual offences, it must be recognized that for any individual case the

offender may not have a prior sexual offending history and/or their offences may not have been

reported to police.

However, psychological similarity across offences may be important to consider when

linking offences (Hazelwood & Warren, 2004; Woodhams et al., 2007). Focusing only on the

situation or only on specific behaviours without considering other factors may impact the linkage

process, in part because individuals may gain knowledge about how to commit offences and

might change their behaviour based on their experiences with previous offences (Douglas &

Munn, 1992; Hazelwood & Warren, 2004). Because of the interaction between the situation and

the individual, overall behavioural themes or patterns of behaviours may be most consistent as

opposed to specific offence behaviours (Bateman & Salfati, 2007; Douglas & Munn, 1992). A

study conducted by Grubin and colleagues (2001) examined whether behavioural themes would

be consistent across offences. In their study, they reviewed a sample of stranger sexual offences

in both Canada and the UK and sorted offence behaviours into four different themes: sex, style,

escape, and control behaviours. In their study, control behaviours were defined as behaviours

that were related to controlling or approaching the victim. For example, the use of a weapon to

control the victim, or using deception to trick the victim were considered control behaviours.

They found that behaviours relating to control on the offender's part were some of the most

consistent across offences, even more consistent than sexual behaviours. Other studies support

the finding that control behaviours are typically consistent across sexual homicides (Bateman &

Salfati, 2007), and that individuals who commit serial sexual offences may be particularly

consistent in the manner in which they approach their victims, especially when using deception

(i.e., a con) as an approach (Harbers et al., 2012).

Frequency of Behaviours

While the first assumption deals with consistency within individuals, the second

assumption refers to differences between individuals. Previous personality research has

suggested that there are individual differences that relate to how people behave based on their

personality or some internal psychological meaning (Mischel & Shoda, 1995). Thus, individuals

behave in a way that reflects their own psychological needs. In the context of criminal behaviour,

these psychological needs may refer to the signature, as it gives some indication as to the internal

motivations of the offender (Douglas & Munn, 1992). If an offender engages in behaviours that

are not necessary for the completion of the crime (e.g., asking the victim to say something

specific), this may point to some psychological need that this offender has that is not common to

other offenders. Therefore, if an offender is engaging in a behaviour that others do not engage in,

this behaviour could potentially be a useful factor to consider when linking offences.

For this reason, the frequency of offence behaviours (i.e., behaviours that are common or

rare to all offenders) must be considered when attempting to link offences. Results vary across

studies and depend on the population or type of offence that is being studied, but some of the

most common sexual and violent offence behaviours include the offender selecting the victim at

random (Beauregard & Martineau, 2012), a con or deceptive approach used to approach the

victim (Beauregard & Martineau, 2012; Chopin & Beauregard, 2018), and use of a weapon

(Beauregard & Martineau, 2012; Salfati & Bateman, 2005). Another common factor in sexual

offences is that the victim and offender often know each other in some way (Beauregard &

Martineau, 2017; Conroy & Cotter, 2014). However, cases where the victim and the offender

are strangers may be more complex and therefore may specifically require the use of crime

linkage (Slater et al., 2014). On the other hand, some rare sexual and violent offence behaviours include burning the victim (Beauregard & Martineau, 2012), oral sex by the offender (Bateman & Salfati, 2007; Salfati & Bateman, 2005), and biting the victim (Beauregard & Martineau, 2012; Salfati & Bateman, 2005). However, common versus rare offence behaviours differ to some extent based on geographical location (Woodhams & Labuschagne, 2012); thus, when linking offences, it is important to be familiar with the typical rates of offence behaviours for the area in which the linkages are being made (Burrell & Bull, 2011). Overall, the literature on offence behaviours suggests that individuals will not necessarily always engage in specific stable or consistent behaviours across offences (Bennell & Canter, 2002), but that the most consistent and most rare behaviours might be the most accurate to use to make potential linkages (Bateman & Salfati, 2007).

Barriers to Investigations and the Relevance of Linkage Analysis

Analyzing cases for potential linkages (the linkage process) can allow police to address some barriers to investigating serial crime. In particular, the linkage process addresses the barrier of linkage blindness. Linkage blindness occurs when investigators and police agencies are not aware of and/or do not communicate with each other regarding offences that occur across jurisdictions. Further, different reporting systems may be used by different agencies, and may not be accessible by all investigators across agencies. Thus, an individual committing offences across jurisdictional boundaries is investigated separately by each jurisdiction. Without the benefit of the pooled information, what is occurring in one area may not be known to law enforcement in another area (Egger, 1984). Linkage blindness was considered a significant issue when investigating Paul Bernardo; without a communication/linkage system in place, he was able to evade law enforcement (Campbell, 1996). In his report regarding the offences, Justice

Archie Campbell indicated that Bernardo would have been identified earlier if a database like

ViCLAS had been in place during that time (Collins et al., 1998; Campbell, 1996). Additionally,

a study conducted by Arndt and colleagues (2004) noted that when serial murderers committed

their crimes in various locations (as opposed to a more restricted geographical area), they were

able to remain undetected for their crimes for longer periods of time, compared to those

offenders that tended to offend in the same area. The authors suggested that this could possibly

be a result of linkage blindness. While linkage blindness can act as a barrier to investigations,

applying a crime linkage process that includes cases from across geographical lines can address

this barrier (also see Egger, 1984).

There are other important barriers to investigating criminal offences, with some specific to

different types of offences. For example, when investigating sexual offences there are often

delays in reporting to authorities (see Rotenberg, 2017). It can also be difficult for police to

investigate offences when a significant amount of time has passed. In fact, when there is a delay

between when a sexual crime occurs and when that crime is reported to the police, the case is

less likely to end up in court or with a conviction (Rotenberg, 2017). Further to this, in a sample

of sexual assaults reported to the police, Murphy and colleagues (2014) found that in

approximately 33% of cases, victims decided not to pursue charges after reporting. In many

instances, sexual assaults are never reported to the police; from their 2014 survey on self-

reported sexual assaults, Statistics Canada found that only about 5% (1 in 20) of sexual assaults

are reported to law enforcement, and this is down from 2004 where only about 8% were reported

to police (Conroy & Cotter, 2014; Rotenberg, 2017).

In one Canadian study, victims who reported their sexual assault to police were asked

about their experiences while those who did not report to the police were asked why they decided

not to disclose their assault (Prochuk, 2018). Participants noted that one of the most significant stressors when reporting their sexual assaults was the idea of having to relive their trauma and repeat their story. Another significant worry indicated by participants was the time commitment and resources needed to report the assault and meet with police. Further, many participants were reluctant to report their assault to police because they believed that there was not enough physical evidence for an investigation. However, linkages relying on behaviour are often used in the absence of forensic evidence (Bennell & Canter, 2002; Burrell & Bull, 2011; Hazelwood & Warren, 2004). Additionally, forensic evidence is often not available in sexual offences (Hazelwood & Warren, 2004). The use of behaviour to make linkages between cases and potentially aid investigations can be helpful for victims to know; thus, the linkage process can be a crucial factor in addressing some of these barriers.

The difficulties in investigating offences, including specifically sexual offences, can have significant implications such as the amount of time it takes to identify and apprehend an offender (Burrell and Bull, 2011; Grubin et al., 2001). Thus, it is important to have methods to investigate sexual offences, across time and across geographical limits. In Canada, ViCLAS assists with this work. Although the linkage process can help address these investigative barriers, they may still impact investigations; thus, research that supports an understanding of offender behaviour and potential linkages, as well as linkage outcomes, is clearly valuable to this process.

Previous Research on Linkage Decision-Making

Linkages using offender behaviour (as detailed above) require the input and expertise of trained analysts. It is up to these analysts to determine what behaviours they think are salient enough to use in a potential linkage. It is imperative to investigate the way in which linkage decisions are made and the specific behaviours that are used to make these linkages. Decision-

making research in the field of social psychology has produced findings and theories that inform various practices in forensic psychology, such as linkage analysis and violent risk assessments (Dawes et al., 1989; Woodhams et al., 2007). Likewise, decisions in violent risk assessments have been likened to the decisions made in linkage analysis, in that both human decision-makers and tools are often utilized for both (Woodhams et al., 2007).

Risk assessment approaches can be actuarial, clinical, or a combination of the two. In the actuarial approach, assessment tools and computer programs or systems are used to make decisions, with minimal input from clinicians or other individuals (Otto, 2000). The clinical approach relies on individuals interpreting information and making decisions and judgements based on their expertise (Otto, 2000). The third approach combines the actuarial and the clinical approaches and is known as Structured Professional Judgement (SPJ) (Hare & Logan, 2011). The linkage process can contain a combination of these approaches (Woodhams et al., 2007), and is most similar to the SPJ approach in that a tool may be utilized as a basis but does not comprise the full assessment. It is still important to have human input when making linkages (Woodhams et al., 2007); although the information that is given to analysts is structured, they are able to choose what they want to focus on to make a linkage. Because it may be helpful to focus on behavioural themes (as opposed to specific behaviours) when making linkages, it is important to consider the context in which these behaviours are occurring (Salfati, 2021). In this case, human judgement would be beneficial; for instance, an offender may exhibit a behaviour because he chose to, or the behaviour may be a reaction to something in the situation (Salfati, 2021; Woodhams & Bennell, 2014). Additionally, when rare behaviours are present, they may be overlooked by actuarial methods (Dawes et al., 1989). The opinion and expertise of analysts would be helpful in such situations (Woodhams & Bennell, 2014).

Previous research on linkages often focuses on the strategies that individuals use to make accurate decisions when linking offences. Bennell and colleagues (2010) examined the accuracy of the linkage process using a sample of serial burglaries. In this study, the researchers compared linkage accuracy of law enforcement professionals to that of students and to an actuarial method (a logistic regression model). They trained half of each comparison group with linking cues relevant to burglaries, while the other half received no training. Although they found that training increased linkage accuracy, they also found that the logistic regression model was the most accurate at linking, and that students were more accurate than law enforcement professionals. However, the authors noted some limitations with their study, including the fact that they provided participants with base rate information regarding the linkages. When linking offences in an applied setting, base rates are often not available. Additionally, some vital offence information (i.e., temporal factors) was not available to the participants of this study, which may have impacted the results.

A study conducted by Santtila and colleagues (2004) focused on car crime linkages and compared linkage accuracy of several groups, including car crime expert investigators, other investigators, those with little investigative experience, and lay people. The researchers asked participants to voice their thought process aloud while linking, which provided detailed information about the linkage process that the participants were utilizing. They found that investigators were more accurate overall; also, compared to all other participants, the investigators with experience investigating car crimes tended to use fewer variables to link offences. Additionally, effective linkages were most often made when geographical information or the time that the offence occurred were used to make a linkage. As noted by the researchers,

the fact that experienced investigators used fewer variables to link suggests that the experts knew which variables may be most useful for potential linkages.

While the research described to this point has included law enforcement professionals as participants and has utilized real crime data, these studies have been primarily conducted in lab settings or they have not reviewed real linkage reports. Some potential linkages can take a long time to complete (Burrell & Bull, 2011), whereas in an artificial setting, participants would not have access to the same amount of time. Additionally, these studies may use crime data from locations that are not familiar to the participants in the study (Woodhams & Bennell, 2014). Offender behaviour may differ across geographical locations (Woodhams & Labuschagne, 2012), and the participants in these studies may be using linkage tactics relevant to their own location that may not be generalizable to other locations. Thus, these studies may not accurately reflect the linkage process as it occurs in real life settings.

On the other hand, some studies have investigated the linkage process used by analysts in real-world cases. An informative study on the process of crime linkages was conducted by Burrell and Bull (2011). They surveyed crime analysts in the UK and asked them to report on how they make linkages. In their study, they found that analysts reported that they often use behaviour and temporal/spatial trends to link offences, along with offender descriptions. The analysts also mentioned that forensic information is rarely used in potential linkages as it is often not available at the time that the linkage is being made. They also noted that unique behaviours are often helpful in the linkage process, and that linking sexual or violent offences may be easier compared to other crimes (such as car theft) due to distinct offender behaviours, including MO.

More recently, Davies (2018) interviewed ViCLAS analysts in the UK about the linkage process for sexual offences and asked participants to provide information regarding cases that

they had worked on as linkage analysts. Analysts noted that they often found that geographical

factors and offender approach to the victim were consistent behaviours. Notably, they mentioned

that offender approach is particularly important as this action is something that the offender

chooses to do and is the first act of the offence; thus, it will not be impacted by other factors

(e.g., the victim's reaction). Additionally, the analysts mentioned difficulties involved in the

linkage process, and one of the issues they mentioned was a lack of feedback regarding the

outcome of their linkages (i.e., whether the linkage was successful or not). Lack of feedback to

analysts regarding linkages has been observed in other studies as well (Tonkin & Weeks, 2021).

Overall, analysts report using both consistency (e.g., offender approach) and

distinctiveness (e.g., rare or unique offence behaviours) criteria in making linkages (Burrell &

Bull, 2011; Davies, 2018). Because analysts were asked to describe the process that they had

used to make linkages, there is still a gap in the literature with respect to whether the factors that

were reported are consistently being used to make linkages in practice. Further, linkage

outcomes and investigations have not been reviewed. In applied settings, the linkage process

involves linking incoming offences to thousands of offences already included in a specific

database. Additionally, the information that is known about each offence and offender can differ

greatly. Previous linkage studies provide an idea of the process, but it is difficult to capture the

reality of the process and linkage outcomes without reviewing actual linkage reports that

describe behaviours used to make linkages, and how those linkages were investigated. Previous

research has suggested that linkage reports should be utilized to identify offender and

behavioural factors used by analysts to make potential links and to assess what information

confirmed a series (e.g., forensic evidence) (Burrell & Bull, 2011). It has also been suggested

that linkage research would benefit from more collaboration between researchers and

practitioners (Davies & Woodhams, 2019).

Current Study

The present study had three objectives; 1) to examine criminal history and age for the

offenders in the sample 2) to describe the factors used to make potential linkages, and 3) to

explore linkage outcomes and potential barriers to investigations. Using a sample of linkages

from the ViCLAS centre managed within the Criminal Behaviour Analysis Section (CBAS) of

the Ontario Provincial Police (OPP), we aimed to gain a better understanding of the behaviors of

serial sexual offenders, the information analysts have used when linking (potential) serial sexual

offences, and the investigative responses by the police agencies receiving information about

potential linkages, as this also plays an important role in understanding case outcomes. Overall,

this work is a preliminary step in examining serial sexual offending behaviour and linkages, via

actual cases and the real work produced by analysts. It is a unique addition to the literature

which, to date, has often relied on studies designed within university or other settings that may

not be generalizable to the actual linkage process, and has not examined what happens with

linkages once they are shared with police for additional investigation.

Research Questions

The specific research questions are divided into three sections. In part these are based on

the literature examining serial offending and linkages. Some are also somewhat exploratory,

since this type of work is novel:

Objective 1: Offender and Offence Information

1) What is the age at first charge, age at first conviction, and age at time of index offence?

2) What types of offences are the offenders engaging in? Do they have other pre-index, index, or post-index charges and convictions?

Objective 2: Linkage Process

1) What is the length of time between the offences that are being linked in each potential linkage? For example, are recent offences being linked to older offences?

2) What information is used to link offences? If behavioural information is used, which behaviours are commonly used to link offences? Are distinctive and consistent factors used in linkages, as theoretically proposed as a basic assumption of linkage analysis?

Objective 3: Linkage Investigation and Barriers

1. Were the investigators for the offences from the same agency or from different agencies? Did the investigators contact each other regarding the potential linkages?

2. What is the current status of the linkages? If the offences were confirmed to be linked, how were they confirmed? If the linkages are still under investigation, why? Were there any barriers to investigating these linkages?

Methods

Sample

To reduce potential sample bias, series were randomly selected from ViCLAS. These series fulfilled specific criteria. First, series that were created between 2016 and 2020 were chosen for currency in practices. Second, each series included at least one sexual offence. Third, each series included at least one known (i.e., identified) male offender, allowing for collection of information regarding offender demographics and criminal history. Although information regarding age and criminal history of offenders is not necessarily used in the linkage process, it is important to understand the sample overall, and to record the offences they are committing. As

mentioned previously, some sexual offenders may engage in other offences, as well as sexual.
Thus, individuals should not be excluded from a potential linkage if they do not have prior
sexual offences. Therefore, gaining a better understanding of the offences that offenders are
committing is necessary to better understand offenders overall. Last, each series included at least
one potential linkage, because the goal of the study was to examine linkages for sexual
offenders. This means that each offender in the sample was included in a potential linkage by an
analyst at least once. Therefore, for the linkages in the current study, ViCLAS was often linking
a known offender to other offences in the database with unknown offenders.

Once a list of all series that fit the criteria was created by staff in ViCLAS, a random number
generator[2] was used for series selection, and due to time constraints, the final sample consisted of
57 series. The original study plan called for a larger sample, approximately 200 series over a 10-
year period with extensive coding of offence and offender information. However, due to the
COVID-19 pandemic restrictions and lockdowns, there was a reduced availability of time for
data coding; thus, the final sample consisted of 57 series.

The majority of series (77%) included only one potential linkage (i.e., an offender being
potentially linked to one other offence), but there were some series with multiple linkages (i.e.,
an offender being potentially linked to multiple different offences). Because each series can
contain multiple linkages, all of the linkages were included in the study. Thus, it is also
important to determine the number of total linkages overall in our sample. The current sample of
57 series contains 78 potential linkages. These 78 linkages were examined to determine the
behaviours that were used in potential linkages, and to describe linkage outcomes.

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[2] (https://www.random.org/)

Each potential linkage requires a response from the investigating agency. Once a potential linkage is identified, a potential linkage report is sent to the investigating agency and any other agencies that have jurisdiction over the cases identified in the linkage report. The agency then investigates the potential linkage and must send back a response to ViCLAS explaining the investigation and the outcome (i.e., the status of the linkage) of that investigation. These responses are captured in a systematic manner via a standardized form used by ViCLAS. In summary, for each possible linkage they receive, the investigators must provide a response, including details of their follow-up investigation into the possible linkage. If there are multiple unsolved cases identified in a potential linkage, then there are multiple response forms. As well, for any linkage, multiple reports can be submitted back to ViCLAS as the investigation continues. In the current sample, the number of follow-up reports per linkage ranged from 1 to 4. Overall, for all 78 potential linkages, there were 109[3] reports detailing investigative responses and findings. For the purposes of the current study and for analysis, the main focus was on the final response for each linkage (i.e., the current status of the linkage), meaning the total sample of linkage outcomes reported for the study is N = 78. It is important to note, the current sample includes series that remain under investigation; that is, although analyses and discussion in this thesis are partly based on confirmed cases, additional cases may be confirmed over time as investigations continue.

To summarize, the final sample consists of 57 series. Criminal history information is based on offenders (N = 57). Linkage process and outcomes, including the current status of each linkage, are based on the total number of linkages (N = 78) across those 57 series.

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[3] The outcomes for the total 109 reports are as follows: five (5%) confirmed by investigators, 61 (56%) returned as potential linkages, 18 (17%) investigated and determined not to be linked, 23 (21%) requested extensions, and 2 (2%) were unknown. Some of these changed due to further investigation, and others were changed by ViCLAS.

Procedure

Offender and offence data were originally obtained by the police for investigative purposes. The current study is based on file review and no personal identifiers were collected for the study. The author had no direct access to ViCLAS or any other police databases, rather the information required for the study was amalgamated by staff members. Information regarding linkages was gathered by ViCLAS, and information regarding offences (i.e., criminal history and recidivism) was gathered by a full-time researcher within the OPP.

Information for each series was then compiled into Word documents by the author and the full-time researcher with each containing chronological and detailed information about offences and the linkage process for the series. These Word documents were then reviewed by ViCLAS for accuracy, before being entered into coding forms. Coding forms were developed by the author and collaborating researchers with input from ViCLAS analysts in order to operationalize the information that was collected. These coding forms were first filled out on paper, and then later entered into an IBM SPSS 20.0 file. A comprehensive SPSS file containing information regarding offenders, offences, and linkages was created. Only police personnel and the author had access to the SPSS file. Study codes were utilized so that no identifying information was used in the SPSS file or in the coding forms, and all data was coded and stored at the police site (OPP). Findings are written and presented based on group data, so that no participants are identifiable at any point in this study.

Ethical approval was provided by Brock University. As well, the author entered into a Research Agreement with the OPP, which supported the data collection under the Freedom of Information and Protection of Privacy act (FIPPA). Additional background security checks were completed to support access to the data.

Measures/Variables

The two main sources of information for this study are the Canadian Police Information Centre (CPIC) and ViCLAS. CPIC is an electronic database that contains national criminal records and includes information relevant to charges and convictions. Information about offender age, criminal history, recidivism, and types of offences were obtained from CPIC. ViCLAS contains standardized linkage reports created by ViCLAS analysts that include information about offenders, offences, victims, crime scene information, and how that information was used by analysts to make potential linkages. A final summary report is created by ViCLAS analysts summarizing the information they used to make potential linkages between cases and this report was utilized for the current study. All linkage information was obtained from ViCLAS and these reports. Information regarding linkage investigations and responses/outcomes was obtained from standardized response forms sent to ViCLAS from the investigators for each linkage. These forms include a standardized response section, as well as written information and explanations from police regarding linkage investigations. Additional follow-up communication between ViCLAS and investigators was also available via analyst file notes.

Offender and Offence Information

Charges and convictions were categorized into the following categories: Non-violent (e.g., property offences), violent (e.g., assault), breach/failure (e.g., failure to comply with probation orders), child pornography (e.g., accessing child pornography), non-contact sex offences (e.g., luring), contact sex offences (e.g., sexual assault), and criminal harassment/threats (e.g., utter threats to cause death or bodily harm). The information was collected both based on the offender (i.e., the number of offenders that committed each type of offence) and based on the offence (i.e., number of offences for each offence type). Offence information was collected for the index offence, criminal history, and recidivism. Age information was collected at the time of

index offence, first charge, and first conviction. Criminal history was defined as any offence that occurred prior to the index offence date (pre-index), whereas recidivism was defined as any offence that occurred after the index offence date (post-index). For the purposes of this study, the index offence was defined as the offence that acted as the impetus for the linkage (i.e., the offence that the analyst was focusing on to potentially link to other offences). Regarding the index offence as it was recorded in ViCLAS, the majority (65%) involved contact sexual offences against adults, 32% involved contact sex offences against a child (i.e., anyone under the age of 18) and 4% of index offences were documented as luring offences.

Time between Offences

Time between the offences in each potential linkage was determined by using an online time and date calculator[4].

Information used to make Linkages

Information used to make linkages was coded based on the following four categories: 1) offender behavioural factors (e.g., approach to victim), 2) crime scene/geographical factors (e.g., location of offence), 3) temporal factors (e.g., the time of day the offence occurred), and 4) any additional offence factors. The 'additional offence factors' category encompassed factors such as vehicle information (e.g., make, colour), offender physical demeanour (e.g., closely following the victim), offender name (e.g., an alias the individual may have been using), and victim activity (e.g., what the victim was doing at the time of offence). These categories were created based on the information that was available in the linkage reports. Due to time constraints from the COVID – 19 pandemic, some specific behaviours were not included. General behavioural categories were coded as there was not enough time to include each specific behaviour. However, behavioural factors were further split into the following categories:

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[4] https://www.timeanddate.com/date/duration.html

1) offender description (e.g., physical description)

2) victimology (e.g., victim age or gender)

3) offender sexual behaviour (e.g., specific sexual acts)

4) victim-offender relationship (e.g., stranger, acquaintance)

5) offender approach to victim (e.g., befriending)

6) offender verbiage (e.g., what the offender said to the victim)

Of the behavioural factors, we were able to further examine victim-offender relationship and the offender approach to victim by describing the variables in detail in the original data file, and then grouping them based on common themes. Other specific behaviours were described in detail in the original data file; however due to time constraints, only victim-offender relationship and offender approach were further examined in this thesis. After examining the detailed descriptions, victim-offender relationship was coded to specify if the victims and offenders in the sample knew each other in any capacity, or if they were strangers. Offender approach to victim was split into the following categories (based on previous research on offender approaches): 1) con approach (e.g., befriending the victim, contacting victim through internet), 2) surprise approach (e.g., disorients and surprises the victim), and 3) blitz (e.g., extreme immediate force). Because these factors can be used in combination to link offences in each potential linkage, the information used to make linkages was coded dichotomously (0 = *no*, 1 = *yes,* 99 = *unknown*). For calculating proportions, behaviours were split into two categories, consistent and distinctive. Consistent behaviours are those that tend to be consistent across offences (based on previous literature). The following variables were considered consistent: approach to the victim, crime scene/geographical factors, and temporal factors. Distinctive factors are those that may be rare or unique to a specific offender. Distinctive factors were split into the following categories:

offender description, sexual behaviour, verbiage, victimology, offender vehicle, and offender

physical demeanour. It should be noted that we did not calculate which behaviours were most

consistent or distinctive in the current study; rather, we split the behaviours into categories that

could theoretically be considered consistent or distinctive. These categories were also created

after the data was collected; thus, the behaviours were not split into these categories in the

original linkage summary reports and were instead created for analytical purposes.

Law Enforcement Agency

Linkage reports from ViCLAS were coded to determine if investigators for the offences

in each linkage were from the same agency or from different agencies (1 = *same agency*, 2 =

different agencies, 99 = *unknown*). These reports specifically state the name of the agency that

was investigating the offences in each potential linkage.

Contact between Investigators

Contact between investigators was coded to examine if investigators for each offence had

been in contact regarding the potential linkages (0 = *no*, 1 = *yes,* 2 = *additional contact,* 99 =

unknown). For the purposes of this study, investigators were considered to have been in contact

with each other regarding the potential linkages if their report to ViCLAS explicitly stated they

were in contact. If the report was detailed but made no mention of contact between investigators,

it was coded that there was no contact between investigators. If the report was unclear, it was

considered unknown whether investigators contacted each other, and if there was any additional

contact between investigators, it was coded as 'additional contact'. The 'additional contact'

category was then examined further to determine what occurred with that specific linkage (e.g.,

the investigator may have contacted other investigators for input).

Current Linkage Status

The current status of each linkage was also coded from reports returned to ViCLAS from

investigators; the status of each linkage was explicitly stated on the form and categorized as

follows: 1) linked (i.e., investigation confirmed that the offences were committed by the same offender), 2) not linked (i.e., offences were investigated and it was determined the cases were not linked), 3) potential linkage (i.e., remain as potential linkages – unable to be confirmed at this time, and investigation may be ongoing), 4) extension request (i.e., investigators requested an extension to continue investigating the potential linkage), and 5) unknown (i.e., missing information). The specific rationale for each linkage status was also coded and then grouped based on common themes; this information is presented in the results section.

Inter-rater Reliability

A full-time researcher with the police service assisted in coding. For some of the work, this individual did the majority of the coding, due to provincial restrictions related to COVID-19. This meant that the planned inter-rater reliabilities were not conducted. Regarding criminal history, recidivism, and offender age, the author and full-time researcher coded six series jointly, then the author coded the majority (89%) of the rest. The full-time researcher randomly selected approximately half (41%) to recode. There were few discrepancies (5) and they were discussed and resolved via consensus.

Regarding the linkage information, a little more than half (54%) of the series were jointly coded by the full-time researcher and the author, and then the full-time researcher coded the rest. The author randomly selected and reviewed a sample (40%) of those and found no discrepancies. As mentioned previously, the Word documents that were compiled to provide a chronological summary for each series were reviewed by ViCLAS for accuracy before the information was coded, thus, any discrepancies or errors would have already been addressed by ViCLAS prior to coding.

Overview of Analyses

Descriptive statistics, including skewness and kurtosis, histograms, boxplots, and Q-Q plots were examined, and the data was checked for outliers. Descriptive data for the variables of interest are presented throughout the thesis. The majority of the sample was under the age of 40, and outliers were usually related to older age (i.e., close to or above 60). Due to the possibility of the outliers affecting average age, the median age was also reported. Regarding the average amount of time between linkages, the majority of offences in each linkage occurred within 0-4 years of each other; however, there were some outliers and a large range, thus the median was also reported. Data regarding the information that is used to link offences and the information regarding linkage investigations was descriptive and recorded using frequency calculations. To compare how often behaviours were used to make linkages to 50% (chance), proportions were compared through MedCalc's Comparison of Proportions Calculator[5]. 50% was chosen as the threshold because anything higher than 50% indicates use of the factor most of the time, while lower than 50% indicates non-use. Proportions were compared to the 50% threshold using a chi-square-test for proportions. Effect size for the proportions test were also reported and calculated based on the chi-square and the sample size. r was used as an effect size and was calculated using an online effect size calculator[6] and converted from the chi-square. Small, medium, and large effect sizes are .10, .30, and .50, respectively (Cohen, 1988).

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[5] https://www.medcalc.org/calc/comparison_of_proportions.php
[6] Campbellcollaboration.org

Results

Objective 1: Offender and Offence Information

Age

Information relating to age at charge or conviction was missing in 8 cases (14%). With

the extensive index information available via ViCLAS, age information was available for all 57

offenders in relation to the index offence. The average age at index offence is 34 ($SD = 13.9$,

range = 15-76, median = 29). For 11 offenders, age information was available for both first

charge and first conviction. For these 11 offenders, average age at first charge was 27 ($SD = 6.9$,

range = 18-39, median = 29), and average age at first conviction was 30 ($SD = 5.2$, range = 23-

40, median = 31). For the rest (37 offenders), age information was only available for either first

charge, or first conviction, but not both. For the 18 offenders in the sample where information

was available for charges but not convictions, the average age at first charge was 34 ($SD = 15.7$,

range = 17-75, median = 29.5). For 19 offenders in the sample, age information was available for

first conviction, but not first charge; the average age at first conviction for these offenders was

24 ($SD = 10.1$, range = 16-59, median = 21). Additionally, combined age was calculated for

those that had missing data for either first charge or first conviction. When age was available for

first charge, that number was used; however, if that information was not available, age at first

conviction was used. For these 37 offenders, average age at first charge/first conviction was 29

($SD = 13.8$, range = 16-75, median = 25).

Offence Information (Offenders)

Offence information reported for offender and offence type for pre-index, index, and

post-index charges and convictions is included in Tables 1, 2, and 3, respectively. Approximately

half of the sample had a criminal history prior to the index offence, mainly for non-violent

offences. Most offenders in the current sample had index charges and convictions for contact sex

offences against adults. Approximately half of the offenders in the current sample went on to commit offences after the index offence; these mainly consisted of charges and convictions for breaches and failures to appear in court.

Table 1

Number of Offenders with Pre-Index Charges and Convictions

Offence Type	Charges	Convictions
Non-Violent	22 (39%)	15 (26%)
Violent	17 (30%)	11 (19%)
Breach/Failure	18 (32%)	11 (19%)
Child Pornography	0	0
Non-contact Sex	5 (9%)	2 (3.5%)
Contact Sex	14 (25%)	7 (12%)
Harassment/Threats	14 (25%)	5 (9%)
Total (any prior offences)	29 (51%)	22 (39%)

Table 2

Number of Offenders with Index Charges and Convictions

Offence Type	Charges	Convictions
Non-Violent	5 (9%)	1 (2%)
Violent	15 (26%)	6 (11%)
Breach/Failure	10 (18%)	4 (7%)
Child Pornography	1 (2%)	1 (2%)
Non-contact Sex	5 (9%)	2 (6%)
Contact Sex	38 (67%)	9 (16%)
Harassment/Threats	5 (9%)	1 (2%)
Total	42 (74%)	12 (21%)

Table 3

Number of Offenders with Post-Index Charges and Convictions

Offence Type	Charges	Convictions
Non-Violent	10 (18%)	4 (7%)
Violent	6 (11%)	4 (7%)
Breach/Failure	21 (37%)	6 (11%)
Child Pornography	0	0
Non-contact Sex	1 (2%)	1 (2%)
Contact Sex	7 (12%)	1 (2%)
Harassment/Threats	3 (5%)	0
Total (any new offences)	26 (46%)	9 (16%)

Offence Information (Offences)

Information regarding average number of offences (organized by offence type) for pre-index, index, and post-index charges and convictions is reported in Tables 4, 5, and 6, respectively. The majority of offences occurring prior to the index offence were for breaches/failures to appear in court, as well as non-violent offences. The majority of index offences were contact sex offences against adults, and the majority of offences after the index were for breaches/failures.

Table 4

Average Number of Pre-Index Charges and Convictions by Offence Type

Offence Type	Charges			Convictions		
	M	*SD*	Range	*M*	*SD*	Range
Non-Violent	3.4	7.3	0 - 31	1.56	3.9	0 - 20
Violent	1.5	4.3	0 - 28	0.63	2.2	0 - 12
Breach/Failure	3.3	9.1	0 - 50	1.32	3.9	0 - 24
Child Pornography	0	0	0	0	0	0
Non-Contact Sex	0.12	0.47	0 - 3	0.05	0.29	0 - 2
Contact Sex	0.63	1.9	0 - 13	0.25	0.89	0 - 6
Harassment/Threats	0.39	1.2	0 - 7	0.11	0.36	0 -2

Table 5

Average Number of Index Charges and Convictions by Offence Type

Offence Type	Charges			Convictions		
	M	*SD*	Range	*M*	*SD*	Range
Non-Violent	0.11	0.36	0 - 2	0.02	0.13	0 -1
Violent	0.44	0.91	0 - 4	0.16	0.59	0 - 4
Breach/Failure	0.3	0.82	0 - 4	0.11	0.41	0 - 2
Child Pornography	0.04	0.27	0 - 2	0.02	0.13	0 - 1
Non-Contact Sex	0.19	0.72	0 - 4	0.04	0.19	0 - 1
Contact Sex	1.04	1.3	0 - 8	0.16	0.37	0 - 1
Harassment/Threats	0.3	1.2	0 - 8	0.02	0.13	0 - 1

Table 6

Average Number of Post-Index Charges and Convictions by Offence Type

Offence Type	Charges			Convictions		
	M	*SD*	Range	*M*	*SD*	Range
Non-Violent	0.6	1.88	0 - 12	0.18	0.78	0 - 5
Violent	0.21	0.7	0 - 4	0.07	0.26	0 - 1
Breach/Failure	1.44	3.4	0 - 21	0.35	1.4	0 - 9
Child Pornography	0	0	0	0	0	0
Non-Contact Sex	0.02	0.13	0 - 1	0.02	0.13	0 - 1
Contact Sex	0.39	1.3	0 - 8	0.02	0.13	0 - 1
Harassment/Threats	0.12	0.54	0 - 3	0	0	0

Overall, approximately half of the offenders in the sample were charged with offences both pre and post index. The majority of pre-index and post-index charges and convictions were for non-violent offences, whereas the index offence mainly consisted of charges for sexual offences.

Objective 2: Linkage Process

What is the length of time between the two offences that are being linked?

Average number of days between the two offences that were being linked was calculated. Because the majority of the sample (77%) included only one potential linkage and only a few series included multiple linkages, it was not appropriate to average across all linkages. Therefore, the most representative time between cases being linked (based on 77% of the sample with one

potential linkage) ranged from 0 days to 21 years ($M = 3$ years, $SD = 4.7$ years, median = 1.6 years).

How are the offences originally being linked?

Across all linkages in the sample (N = 78), the information used to make linkages included behavioural factors (96%), crime scene/geographical factors (94%), temporal factors (26%), vehicle information (15%), offender physical demeanour (18%), offender name (5%), and victim activity (3%).

The behavioural factors were further examined, and the results are provided in Figure 1.

Figure 1

Behavioural Factors Used to Make Linkages
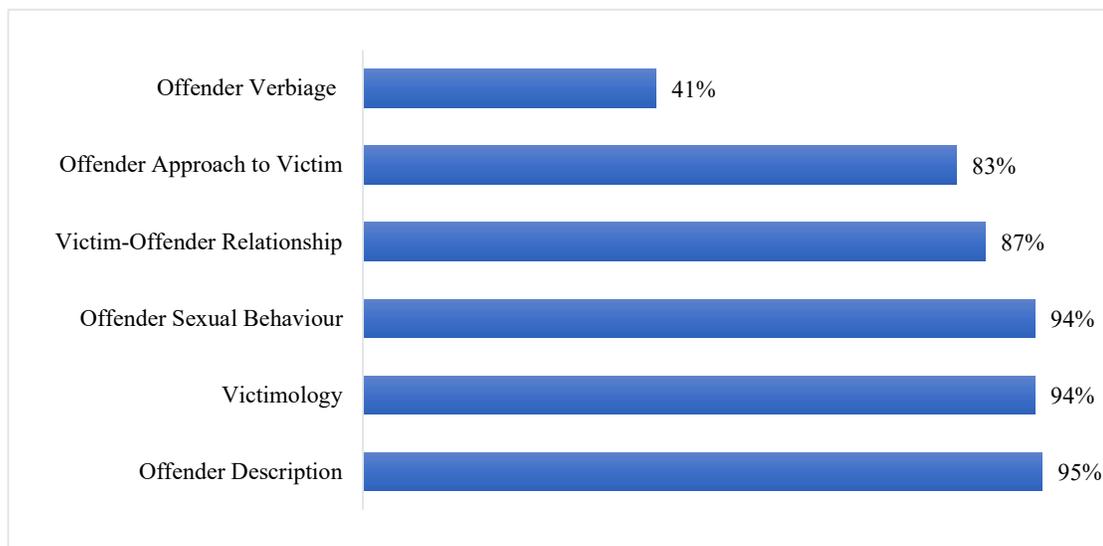
Note. Overall percentages in the figure exceed 100% as multiple behavioural factors can be used to link offences in each potential linkage.

Offender approach and victim-offender relationship were further examined to determine the frequency of specific behaviours used in linkages. Of the linkages where offender approach was used, the most common approach was a con approach (71%), followed by a surprise

approach (32%), and blitz (3%). Of the linkages where the victim-offender relationship was considered, the victim and offender were strangers the majority of the time (97%), and rarely acquaintances (3%).

Are distinctive and consistent factors used in linkages?

To examine whether each coded factor was consistently used in the linkage process, we compared the frequency of use to chance level (50%). The 50% level was chosen as a comparator because a frequency that was significantly less than 50% would suggest lack of use while a frequency that was significantly higher than 50% would indicate that it is used more than chance. As can be seen in Table 7, of the consistency variables, behavioural and geographical factors were used more often than would be expected by chance ($ps < .01$). Temporal factors were used significantly less often than chance level. Half of the distinctiveness variables (shown in Table 8) were used significantly more than would be expected by chance ($ps < .01$). Vehicle and physical demeanour were used significantly less than chance, whereas verbiage was used less than chance, but this was not significant. Regarding effect sizes, geography, offender description, sexual behaviour, victimology, and vehicle all had a large effect size ($>.50$) while there was a medium effect size for the rest of the variables.

Table 7

Proportions of Consistent Factors used in Linkages

Category	Variable	X^2	p-value	Usage (%)	r
Behaviour	Offender Approach	18.94	<0.001	83%	.49
Geography	e.g., Location of offence	37.21	<0.001	94%	.69
Temporal	e.g., time offence occurred	9.47	0.002	26%	.35

Note. Usage of factors was compared to 50%.

Table 8

Proportions of Distinctive Factors used in Linkages

Category	Variable	X^2	*p*-value	Usage (%)	*r*
Behaviour	Offender Description	39.357	<.001	95%	.71
	Sexual Behaviour	37.212	<.001	94%	.69
	Verbiage	1.266	0.261	41%	.13
	Victimology	37.212	<.001	94%	.69
	Vehicle	21.638	<.001	15%	.53
	Physical Demeanour	18.942	<.001	18%	.49

Note. Usage of factors was compared to 50%.

Overall, behavioural and geographical factors were often used to make linkages. Further, the use of consistent and distinct factors within those categories are often used more than chance. Vehicle, physical demeanour, and verbiage were used less often than chance.

Objective 3: Linkage Investigation and Barriers

Were the investigators for the offences from the same agency or from different agencies? Did the investigators contact each other regarding the potential linkage?

In the current sample, investigators were from the same agency in 72% (*n* = 56) of linkages, whereas in 28% (*n* = 22) of linkages, the investigators were from different agencies. As part of the examination of the linkage report from ViCLAS, the investigators were known to have been in contact with each other in 23% (18 cases) of linkages, with that percentage being stable whether the investigators were from the same agency (23%) or different agencies (23%). In 71% (55) of cases, investigators were not in contact with each other. In four instances (5%), it was unknown whether investigators were in contact, and in one case, the investigator for the

offence was in contact with a different investigator (i.e., not the original investigator from the potential linkage).

What is the current status for these linkages?

At the time of writing, 4 (5%) of the ViCLAS series include linkages that were confirmed to be linked. Of interest, this included multiple unsolved cases being potentially linked to an identified offender – that is, multiple cases may have been resolved within the series. There were 63 (81%) series remaining as potential linkages – that is, the investigators were not able to fully confirm a linkage at the time of their report to ViCLAS, and in some of these cases, investigations were ongoing. In 9 (12%) cases, the series of potential linkages created by ViCLAS were investigated by police and it was determined that these cases were not linked. In one (1%) case, no feedback was returned to ViCLAS, therefore, the current status of this case is unknown. There is also one (1%) case that was returned requesting further extension.

Confirmed Linkages

These linkages were mainly confirmed by a combination of DNA, name searches, offender behaviour (including MO), and offender description. In one instance, multiple unsolved cases were linked by ViCLAS to a known offender, which were then later confirmed as being linked via DNA. Additionally, many of these linkages involved extensive police investigation and included a number of potential barriers, including the age of the original offence; at times, the original offences included in the linkage were decades old. For example, in one case, a historical sexual assault was reported to the police. After receiving the information about the possible linkage, investigators contacted the victim and although the individual no longer wished to pursue the case after initially participating, the investigator was able to interview the offender who then confessed to the offence and the linkage was confirmed.

Remaining Potential Linkages

The majority of the series remain as potential linkages, which may be due to potential investigative barriers. Many series (56%) remain as potential linkages as the investigation did not lead to closure of the case. In some cases, there is limited information available for the investigation (e.g., lack of physical evidence, length of time since offence occurred). Approximately half (57%[7]) remain as potential linkages due to factors impacting the victim. Often, the victim specifically stated they did not want to continue with the investigation after initially reporting. Other factors include the victim not responding to investigators, the victim moving away, or the victim not remembering details about the assault. In one case the investigation is currently ongoing, therefore the linkage remains as potential at the time of writing. Additionally, 16% of the cases that remain as potential linkages were returned with no explanation; thus, it is unknown why these remain as potential linkages at this time.

Not Linked

Of those cases that were investigated and determined not to be linked, the majority of the time it was because offender description could not be confirmed across offences, or because another offender was identified and confirmed to have committed the offence; thus, it was concluded that the cases were not linked.

Discussion

The current study had three objectives; 1) to examine criminal history and age information for offenders in the sample, 2) to gain a better understanding of behaviours used in potential linkages, and 3) to examine linkage outcomes and potential investigative barriers. Overall, age and criminal history for the offenders in the sample is consistent with previous

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[7] These percentages exceed 100% because multiple factors can be listed as reasons for the current status of potential linkages in the system.

research on sexual offenders. Further, behavioural and geographical factors were often used to make linkages in the current study. Additionally, the majority of linkages remain as potential linkages at the time of writing, potentially due to investigative barriers.

Objective 1: Offender and Offence Information

Overall, offender characteristics in the current study were consistent with previous research. As mentioned, offenders tend to begin committing sexual offences around the ages of 28 to 32 (Beauregard & Martineau, 2017; Deslauriers-Varin & Beauregard, 2014; Hewitt & Beauregard, 2014; Woodhams & Labuschagne, 2012). In the current study, when information was available for both first charge and first conviction, average ages at first charge and first conviction were 27 and 30, respectively. For the index offence (where age information was available for all offenders in the sample), average age was 34 and the median age was 29.

Regarding criminal history, half of the individuals in the current sample were charged with an offence prior to the index offence. The sample mainly had pre-index charges and convictions for non-violent offences, breaches/failures, and violent offences, although a quarter of offenders had pre-index charges for contact sex offences. This is consistent with previous literature which states that individuals who commit sexual offences tend to have extensive criminal histories (Deslauriers-Varin & Beauregard, 2014) in addition to potentially some prior sexual offences (Beauregard & Martineau, 2017).

Regarding index offences, it is not surprising that the majority (67%) of the sample had charges for contact sex offences. As mentioned previously, ViCLAS mainly contains sexual and violent offences. Given that the index offence for the current study was defined as the offence that was used in the ViCLAS linkage, it follows that sexual charges were common for the index offence. Notably, almost half of the current sample committed new offences after the index

offence with these post-index charges relating to non-violent offences (18%) or breaches and failures (37%); however, some individuals also went on to commit sexual offences. When looking at average number of offences in the current sample, a similar pattern emerges in that the pre-index charges and convictions are mostly for non-violent offences and breaches/failures, the majority of index offences are for contact sex offences, and the post-index offences are mainly for breaches and failures, with fewer sex offences.

These findings are consistent with previous research on recidivism rates for sexual offences, which states that individuals who commit sex offences may not always reoffend sexually (Harris & Hanson, 2004). Additionally, the majority of the individuals in the current sample were under the age of 40; given that, compared to older offenders, younger sex offenders are more likely to reoffend sexually (Harris & Hanson, 2004), the finding that some individuals in the current sample reoffended sexually is also consistent with the literature. It is also possible that individuals did commit more sexual offences prior to and after the index offence, but that they were not charged or convicted, or the offence was not reported. It is generally accepted that actual criminal history and recidivism rates are unknown, with numbers likely higher than reported in research (Abbott, 2020; Harris & Hanson, 2004; Schlesinger et al., 2010). Thus, the results of this study reflect the information that was available to the researchers at the time of writing. Although analysts are not necessarily using this information to make potential linkages, gaining a better understanding of the extent of offender behaviour will nevertheless be useful for the process as a whole. Additionally, because analysts are often analyzing unknown or stranger offences, they are often not utilizing specific offence histories or recidivism rates to make their linkages; thus, analysts will not include or exclude individuals from an analysis for this reason,

and the linkage process remains unbiased. This information does, however, highlight the importance of tools like linkage analysis.

Objective 2: Linkage Process

The second objective was to examine time between offences, and the information that was used in potential linkages. In the current sample, there was a large range of time between the two offences that were being linked by analysts in each potential linkage. As noted in the results, the range was between 0 days and 21 years. Although the average time between offences was generally around 3 years, the large range indicates that sometimes analysts are linking two offences that occurred on the same day, whereas other times they are linking two offences that occurred 21 years apart. This means that, at times, analysts are linking recent cases to older cases, some that are decades old. A benefit of linkage units and databases is that older cases are still being examined and reviewed by analysts and have the potential to be solved after time has passed. Notably, in the current sample, one of the confirmed linkages was for a case that occurred over a decade ago, which indicates that the linkage process and ViCLAS are actively aiding in the investigation and identification of individuals who commit serial sex offences.

The information used to make linkages in the current study is consistent with previous research. In the current study, crime scene/geographical factors and behavioural factors were used to make linkages the most often. Similarly, the study conducted by Santtila and colleagues (2004) found that successful car crime linkages relied on participants focusing on fewer specific variables, and in particular, temporal and spatial information. However, temporal information was not used as often in the current study. It may be the case that different crime types tend to be linked in different ways and by using different factors. With sexual offences, a victim may be able to provide more details about the offender's behaviour, whereas this information may not be available in car crime linkages (where victims are perhaps rarely witness to the event).

Additionally, because their sample focused on car crime linkages, it may be the case that behavioural information was not as salient as it might be in sexual offences. This interpretation is supported by the analysts surveyed in the Burrell and Bull (2011) study. They noted that sexual offences may contain more distinctive and MO behaviours compared to other types of offences, and that these behaviours may be useful for linkages. Overall, the results of the current study are also consistent with the study conducted by Burrell and Bull (2011); the analysts in their survey noted that they often use temporal and spatial information to link offences in addition to behaviour. Although temporal trends were used infrequently in the current study, geographical/crime scene (i.e., spatial) factors were often used to make linkages. Again, it may be the case that the offence type affects the information that can be used to link offences. In their study, they surveyed analysts that mentioned a variety of crime types (e.g., burglary, sex offences, car crimes) whereas the potential linkages made by the ViCLAS analysts in the current study were focused on sexual offences (as that was part of the criteria for the study). Further, potential linkage summary reports were utilized in the current study, which provide a general overview of the information analysts used. It is likely that the full report includes more detailed information about the factors that are used to link offences.

The results of the current study are also consistent with the study conducted by Davies (2018). The analysts interviewed in their study mentioned that they often used geographical information and offender approach to link offences, which is supported with the results of the current study. The analysts in their study noted that in particular, offender approach may be consistent because it is an aspect that is under the offender's control and less likely to be affected by other factors. They also mentioned that, specifically when using a con or deceptive approach, an offender may need to exhibit adequate social skills to successfully employ this approach; thus,

this is also something that can contribute to consistency in behaviour across offences. Though

the current study did not review consistency across offences, when specific linkage behaviours

were examined, using a con approach with the victim was the most common approach type. This

is consistent with the previous literature in which a con approach is commonly used by

individuals who commit sexual offences to approach victims (Beauregard & Martineau, 2012;

Chopin & Beauregard, 2018; Hewitt & Beauregard, 2014). Given that the theme of control

seems to be stable across offences (Grubin et al., 2001) and tends to be part of the offender's

signature (Douglas & Munn, 1992), it is not surprising that this approach was common in the

current sample and that it was often used to link offences.

Additionally, although previous research suggests that individuals who commit non-

homicidal sexual offences tend to offend against people they know (Beauregard & Martineau,

2017), the fact that the offender and victim in the current sample were often strangers is

expected. As mentioned previously, the current sample includes a known offender; this means

that this individual is being potentially linked to other offences in the system where the offender

was unknown at the time. Thus, given that the offender's identity is unknown in these potentially

linked cases, it is expected that the offender was often unknown to the victim and that they were

strangers.

As expected, analysts made use of both consistent and distinct factors. Of the consistent

variables, behavioural information and geographical factors were used significantly more often

than chance and were used in almost every linkage. However, temporal factors were used to link

offences in less than half of the potential linkages (27%). Regarding distinctive information, in

the current study the use of all distinctive variables other than verbiage significantly differed

from chance. Offender description (95%), sexual behaviour (94%), and victimology (94%) were

all used significantly more often than chance level. This finding makes sense as these factors are likely available and contain salient information regarding the offence or offender. Notably, verbiage, offender vehicle information, and offender physical demeanour were used to make linkages less often than at chance level. This finding may be due to the fact this information is not always available (e.g., the offender does not speak during the offence, or does not have a vehicle). Overall, the results of the current study support previous self-reports from analysts regarding the linkage process and suggest that consistency and distinctiveness of behaviour are considered when identifying potential linkages.

Objective 3: Linkage Investigation and Barriers

The third objective of the study was to review linkage status and potential barriers to investigating the linkages. In the current sample, the majority of investigators for each potential linkage were from the same agency. This finding is not surprising when considering the fact that, relative to individuals who commit other offences (e.g., property), most sex offenders commit offences fairly close to their home (Beauregard et al., 2005). Thus, it makes sense that the offences in most of the potential linkages would fall under the same jurisdiction and that the same agency would investigate them. Even when investigators are from the same agency, it is still beneficial for ViCLAS to link offences and therefore facilitate communication between investigators. As mentioned previously, ViCLAS analysts are often linking recent offences to cold cases, and investigators for these cases can change over time. Additionally, within larger police services, offences can occur in different detachments. As such, it is important for ViCLAS to link these offences together and to facilitate the communication between investigators, even if investigators are from the same agency.

In terms of contact between investigators, the majority of the time investigators did not contact each other regarding potential linkages. However, the numbers in the current study may

not reflect the actual rate of contact as some investigators may not have specifically noted in their report to ViCLAS that they contacted other investigators. Additionally, officers can gain information about a potentially linked case using police record management systems, including full investigative file control systems, all without specifically contacting another investigator. Further, if an investigator is notified that someone is viewing their case, it is possible that the investigators may contact each other via other means and not specify it in their report. Contact between investigators may also be something that is most commonly done as a first step in older cases, where information may not be readily available.

Regarding linkage outcomes, although only a small number of linkages were confirmed at the time of writing, regardless of how they were confirmed, the linkages were facilitated by ViCLAS. The potential linkages helped identify salient behaviours or factors that police could then use to investigate and subsequently confirm the offences. At times, multiple unsolved cases were linked to an offender and then later confirmed, which means multiple cases were resolved within the same series. Regarding the linkages that were not confirmed (i.e., not linked), the most common reasons were due to another offender being identified as having committed the offence, or the offender's description could not be confirmed by investigators. This is consistent with the reasons reported by the analysts in the study by Davies (2018); they also reported that investigators would reject potential linkages due to the lack of similarity between offender descriptions.

Overall, however, the majority of the linkages in the current study remain as potential linkages at the time of writing. These are not rejected linkages; instead, they could not be confirmed at the time of writing, and as such, remain as potential. A lack of confirmed linkages is not always indicative of incorrect linking; rather, it may be the case that linkages cannot be

officially confirmed due to a lack of evidence or lack of charges and convictions (Davies et al., 2021; see also Yokota et al., 2017). Given that stranger offences can be harder to solve (Beauregard & Martineau, 2017; Slater et al., 2014), and the current sample contained mostly stranger offences, it may be the case that a larger number of offences will remain as potential linkages, particularly due to investigative barriers that may have an impact on linkage outcomes.

The results of this study suggest that barriers play a significant role in the success of linkages and can make it difficult to investigate (and confirm) a potential linkage. For instance, length of time since the offence occurred can potentially be a barrier to investigating linkages. In the current study, there was a large range of time (between 0 days and 21 years) between the two offences that were being linked by analysts in each potential linkage. It may be more difficult to investigate those offences that occurred decades apart. There may be some unavoidable barriers to investigations (such as a lack of forensic evidence), but some barriers may impact sexual offences more than other offences. Within the current sample, some victims often did not want to continue with an investigation and, as such, the cases remain in the system as potential linkages. The reluctance to continue with sexual assault investigations is understandable and well-documented in the literature. Rape myths and victim blaming attitudes are common and can often deter individuals from reporting their assaults to police (Prochuk, 2018). Women are often blamed for their own assault and feel guilt and shame regarding what happened to them (Johnson, 2012). The stress of reporting the assault and not being believed, or the possibility of the report not resulting in a conviction are often significant stressors (Prochuk, 2018). When an individual decides to report their assault to the police, the investigation is often a lengthy process that requires a significant contribution from the victim, and it is traumatic and difficult for individuals to relive their trauma (Prochuk, 2018). This could potentially explain why victims in

the current sample often did not want to proceed with investigations or did not respond to investigators after initially reporting the offence. Additionally, as noted, some of the offences included in the linkages in the current study were decades old; it can be difficult to revisit something traumatic, especially after a significant amount of time has passed (Prochuk, 2018). Further, in some instances in the current sample, the victims had moved away, which could cause a significant financial burden if they were asked to return and participate in the investigation. It may be the case that these barriers are impacting the outcome of linkages, regardless of the information that analysts use to link these offences.

Moreover, perhaps there is something that can be done regarding investigations into sexual assaults that can help lessen the burden and the time commitment for the victim. It is beyond the scope of this study to suggest alternative techniques to investigating sexual offences; however, in Prochuk's (2018) study, women who had previously reported their sexual assaults to police suggested some alternatives and ideas to improve the investigation process. They indicated that the length of the investigation and lack of information regarding their options was a significant stressor. Several of the participants in their study suggested an alternative to the reporting process where victims do not need to repeat the details of their assault to different people at multiple time points. Overall, they suggested that victim services and trauma-informed individuals should be available during the reporting process, and that having the option to speak to a female officer would be helpful. There are already existing units that work within and alongside police to engage with victims of crime (and specifically survivors of sexual assault), and the results of this study support the ongoing need for these programs and services.

Limitations and Suggestions for Future Research

The main limitations for the current study are the small sample, and the number of linkages that remain as potential at the time of writing. Although this allowed for an initial exploration of investigative barriers, it was not possible to account for all of the factors and barriers that may impact linkage investigations and outcomes. As such, it is possible that other factors that were not mentioned in this study may impact linkage outcomes. When studying linkages, it is important to examine linkage outcomes in addition to reviewing the reasons for the outcomes. In the current study, the majority of potential linkages were not deemed to be linked. However, when further examining why they were not linked, it was clear that many factors may contribute to a lack of confirmed linkages, which may not be due to linkage errors; rather they may be due to external factors. Future research could potentially include a larger sample of series over a longer period of time to examine linkage outcomes and barriers over time. Further, future research should focus on the possibility that barriers are impacting linkage outcomes as it is difficult to determine the precise impact on linkage outcomes without further investigation. Additionally, it would be beneficial for researchers to review cases that are known (i.e., confirmed) to be linked, and to determine how those linkages were made. Another factor to consider is that the linkages in the current study may be updated as investigations continue, and it would therefore also be beneficial to review the data at a later date. The results of this study have implications for future training strategies as well; future research could investigate the best strategies for returning detailed feedback to ViCLAS analysts so that the investigation into cases and the impact of investigative barriers on linkages can be further examined.

Additionally, the categories that analysts used to make linkages were fairly broad in the current study as smaller categories were too small and infrequent for analysis. The linkage

process typically involves analysts making decisions from large amounts of information. Because the current study reviewed a summary of how the offences were linked, specific information regarding how analysts made all of their decisions was not available. Given previous theories regarding how individuals make judgements and decisions (e.g., attribution theories), future research could review the linkage process in-depth by examining analyst decision-making in practice. Further, although specific behaviours were included in the linkage summary reports and were originally included in data collection, they were not included in the current results. This was due to pandemic restrictions and time constrains. Thus, future research would benefit from further breaking down the behavioural categories and reviewing specific behaviours to gain a better understanding of the precise behaviours used in linkages. This would also allow for examination of the factors that are most consistent or distinct across offences. Further, the current study did not differentiate between the information that was not used to make a linkage because it was not present during the offence, compared to information that was present during the offence but that the analyst chose not to include. Future research would benefit from determining whether certain information is excluded from linkages because analysts believe it is not relevant, or if information is not being included in linkages because it is not occurring during an offence.

Summary and Conclusion

This appears to be the first study to examine a sample of potential linkage reports to determine how linkages are being made and confirmed in practice. Prior to this study, it was not clear what information was used to make or confirm actual linkages as linkage reports were not used or not available for research. The information and results provided in the current study are a first step to better understanding linkages and outcomes. The results of this study can also help

us gain insight into individuals who commit sex offences. Additionally, this study aids in our

understanding of how investigative barriers may impact linkage outcomes and how these might

be addressed and further investigated. Overall, the findings from this study add to our knowledge

of the contributions made by violent crime analysts and the value of offence databases for the

investigation and identification of serial offenders.

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