ASSUMPTIONS UNDERLYING BEHAVIORAL LINKAGE REVISITED: A MULTIDIMENSIONAL APPROACH TO ASCERTAINING INDIVIDUAL DIFFERENTIATION AND CONSISTENCY IN SERIAL RAPE

By

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Abstract

ASSUMPTIONS UNDERLYING BEHAVIORAL LINKAGE REVISITED: A MULTIDIMENSIONAL APPROACH TO ASCERTAINING INDIVIDUAL DIFFERENTIATION AND CONSISTENCY IN SERIAL RAPE

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While investigative use of behavioral evidence to help link and solve serial offenses has been in use for centuries, the empirical and theoretical grounds for whether and how to use this evidence effectively has begun to emerge only in recent years. In order for behavioral crime linking to be validated, two base assumptions must be met: individual differentiation (i.e., that offenses committed by one offender will be distinctly different from those committed by another offender) and consistency (i.e., that a degree of similarity will be apparent across crimes committed by the same offender). The present study empirically tested (a) the potential for effectively differentiating between rape offense crime scenes using quantitative and qualitative distinctions within the behavioral dimensions of control, violence, and sexual activity, and (b) the extent to which redefining behavioral consistency more broadly to include dynamic trajectories of behavioral change may be more effective than limiting this definition to behavioral stability. Results of the individual differentiation analysis confirmed that sexual offenses can be successfully differentiated based on the specific degree and subtype of these behavioral dimensions present in each crime scene. In the subsequent analysis of consistency and behavioral trajectories within and across these dimensions, it was determined that while none of

the offenders exhibited complete consistency across behavioral dimensions, a subsample of offenders remained fully consistent in at least one. Furthermore, of those who were not consistent, the vast majority followed an identifiable trajectory of change. Findings are discussed in the context of psychological theories of behavioral consistency as well as practical aspects of advancing the utility of behavioral linkage.

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[1] Author's opinions, statements and conclusions should not be considered an endorsement by the FBI for any policy, program or service.

[2] The opinions, findings, and conclusions or recommendations expressed in this paper are those of the author and do not necessarily reflect those of the Department of Justice.

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CHAPTER I: Introduction & Scope of the Problem

Rape is an extremely serious violent crime that can cause severe damage to the victim both physically and psychologically. Moreover, it is a crime that creates significant public fear (Hanson & Morton-Bourgon, 2005), whilst also being one of the more difficult and costly crimes to investigate and prosecute (MacMartin & Wood, 2007; Munro & Kelly, 2009). Serial rape (i.e., two or more rape offenses that are perpetrated on different victims by the same offender/s) is an especially problematic crime that often aggravates public fear and concern. According to the Uniform Crime Report (UCR) by the FBI, in 2010 alone, there were 84,767 forcible rapes reported to the police in the United States. Recidivism rates reported in different studies vary substantially (ranging from 7 to 52% in some studies) due to mainly methodological differences, such as sample characteristics, definition of recidivism, and follow-up period (Beauregard, 2010;Langstrom & Grann 2000; Marshall & Barbaree, 1990; Prentky et al., 1997). Meta-analytical studies report between 11 and 19% sexual recidivism for treated participants and 17 to 32% for untreated participants (Alexander, 1999; Happ, 1995; Hanson & Morton-Bourgon, 2009), showing that, although a minority, a substantial proportion of known and previously incarcerated sexual offenders reoffend. This suggests that this is often not a single event crime, and that many offenders who commit a sexual offense do so on multiple occasions.

There are no known statistics on the average number of victims per serial rapist. However, Hazelwood and Warren (1989), for example, in their study, looked at a sample of 41 serial sexual offenders who together were responsible for at least 837 rapes – that amounts to an average of 20 victims per offender. Another study (Creager, 2003 as cited in McGowan, 2006) described a sample of federally charged offenders who admitted to as many as 30+ victims (per offender), having been initially arrested for only one offense. Although samples with such high

average numbers per series are likely to present a selection of extreme cases, the official statistics of rape incidence significantly underestimate its true prevalence, as according to Victimization surveys, only about 8% of rape victims report it to the police (Bartol & Bartol, 2008). These numbers suggest that there is a great need for more research that can aid in the investigative efforts and a timely identification and apprehension of these offenders.

One of the key issues in the investigation of serial rape is the timely recognition of the multiple crimes as being part of a series, a process called linking. While DNA and other physical evidence is the most reliable in linking serial crimes, such evidence is often absent from the crime scene (Grubin, Kelly & Brunsdon, 2001). Behavioral evidence (i.e., everything known about what the offender did from the type of victim and location of the crime he selected to weapon choice and the way the offender fled the scene), however, is always present and therefore may provide the investigator with the necessary behavioral indicators in order to link offenses (Salfati & Kucharski, 2005). The extent to which behavioral linking is feasible relies on two key hypotheses (Canter, 2000) both of which must be supported in order to conclude that behavioral crime linking is a valid and reliable investigative technique: (a) the *individual differentiation hypothesis* that states that the offenses of one offender will be distinctively different from offenses of other offenders, and (b) the *consistency hypothesis* that states that a degree of identifiable behavioral similarity across offense series will be evident.

Hence, the ultimate goal of the research on linking serial crimes is twofold in that we must not only establish that offenders behave consistently across the series but also that their consistent behavior is distinct from other offenders who commit the same type of crime (Bateman & Salfati, 2007).That is, if the consistent behaviors are also common to all offenders who commit these crimes then they can only be considered characteristic of this crime type in

general and are not useful in linking offenses of an individual series. Thus before testing whether an offender is consistent (i.e., if their different crime scenes can be linked to one another), it is crucial to decide what will be the *unit of analysis*. More specifically, one must identify the behavioral unit that will be expected to remain consistent across the series (e.g., *individual* behavior (e.g., binding), a particular *group* of behaviors (e.g., wounding behaviors), or the psychological *type* of behavior, or *theme* (e.g., controlling, violent); Salfati, 2008).

Few empirical studies have fully investigated the issue of the salient components of offending behavior that can be used reliably for linking individual crimes as part of a single series (Bennell, Mugford, Ellingwood, & Woodhams, 2014; Woodhams, Hollin, & Bull, 2007). Salfati (2008) highlighted that at present, more questions remain than we have answers to regarding the issue of the key behavioral components to be tested for consistency. While differentiating between offenses using specific individual behaviors opens the door to too many idiosyncrasies thus making any attempt of generalization impossible[3], using broad over-encompassing typologies is also problematic in that many offenses may not fit well into only one type (Terry, 2006). Canter et al. (2003) discussed the importance of considering the degree or level of violation as well as the type of violation as key dimensions in differentiating rapes. However, the *dimensional* differentiation of rape offenders' behaviors has not yet been fully tested empirically. Such approach may be more accurate and efficient in capturing the dynamics of rapists' behavior during each crime, and subsequently, lay a solid foundation for elucidating the progression of their behavior across series.

[3] As explained by Grubin et al. (2001), although highly unique (consistent) behaviors, such as always travelling to the crimes dressed as a woman or riding a bicycle, may be useful during an investigation, it is impossible to use these behaviors to create generalized models and recommendations for a standard proforma of crime scene information collection and recording of pertinent variables for the identification of consistency and linking because the list of possible idiosyncratic behaviors that any offender could exhibit is nearly endless.

In addition to identifying the most appropriate unit of analysis, another key methodological issue that has yet to be resolved is how to operationally define consistency to be able to fully capture the *dynamic* nature of behavioral patterns across crimes. Studies that examined behavioral consistency in sexual offenses (Canter et al., 1991; Grubin et al., 2001; Santtila, Junkkila, & Sandnabba, 2005) have all provided evidence that offenders are consistent to a degree in their offending behaviors, however, these levels of consistency are far from what is necessary for behavioral linking to be considered empirically validated and useful in practice. Recent studies (e.g., Hewitt & Beauregard, 2014; Leclerc et al., in press; Sorochinski & Salfati, 2010) highlight the importance of looking beyond stability of behavior and understanding the behavioral change patterns as a form of consistency.

Thus, as summarized in Figure 1, in order to effectively link crimes using behavioral evidence, two basic assumptions must be validated: individual differentiation and consistency. In addition to the direct relationship of these two assumptions to behavioral linking, they are also inter-related (as shown by the two-sided arrows) because individual differentiation must be shown both at the level of crime scene (i.e., differentiate one crime committed by offender A from another crime committed by offender B) and at the level of series (i.e., differentiate multiple crimes committed by offender A from multiple crimes committed by offender B), and the search for consistency is contingent upon the identification of those differentiating factors. The two foundational questions are at the basis of the behavioral linkage structure shown in Figure 1: (a) the question of unit of analysis, and (b) the question of whether a broader definition of "traceability" of a behavioral pattern is more fruitful than the limited definition of behavioral "stability". This project aimed to answer these questions and substantiate the two underlying hypotheses of behavioral linking – individual differentiation and consistency – in serial rape

offenses. The first part of the project (Study 1) reframed the previously identified types of rape as behavioral dimensions and used quantitative (degree of behavior present) and qualitative (style of behavior present) variants within those dimensions to differentiate between crime scenes. The second part (Study 2) aimed to test a redefined understanding of consistency in offending behavior where, instead of only looking for behavioral stability (i.e., where offenders are expected to exhibit the same behaviors from one crime to the next), a progression of behavior along identifiable trajectories (e.g., changing in degree through escalation, de-escalation or switching between subtypes of behavior) along the aforementioned behavioral dimensions is seen as a form of dynamic consistency that can potentially be utilized for linking crimes.

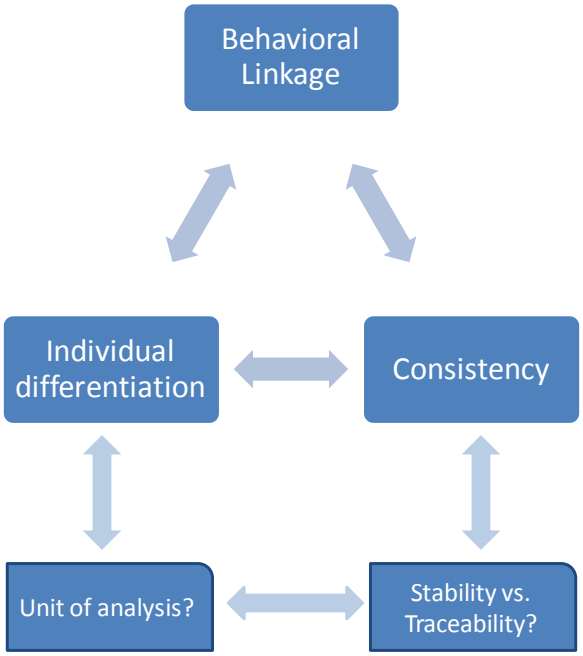


Figure 1. The conceptual structure that underlies behavioral linkage

CHAPTER 2: Literature Review

Individual Differentiation

Understanding the Unit of Analysis

Recent empirical studies on violent crimes, such as rape and homicide, have stressed the importance of moving from considering individual behavior to the psychological theme as the primary way of differentiating between offenders (e.g., Canter, 1994; Salfati, 2000; Salfati & Bateman, 2005; Salfati & Canter, 1999). The reasoning behind this, as summarized by Salfati (2008), is that individual behaviors (e.g., gagging the victim) are highly prone to situational factors, and may change from one crime scene to the next in a series, thus increasing the chances of 'linkage blindness' (Egger, 1990). A thematic approach, on the other hand, groups multiple behaviors that may have the same psychological meaning or use (e.g., using binding with one victim and gagging with another – both for the purpose of control), and thus, while each individual behavior may or may not be exhibited at a given crime scene, depending on the context, the overarching theme is hypothesized to remain stable. The question that needs to be addressed here, however, is whether multiple crime scenes that are unified by the same overarching theme may be differentiated into distinct series that have been committed by distinct offenders (i.e., whether a series of crimes that are classified into the same theme can be differentiated from another series that fits the same theme).

The importance of taking frequencies into account when attempting to differentiate between crime scenes has been highlighted in the literature as one of the first and most basic steps to be taken (Bateman & Salfati, 2007; Canter et al., 2004; Canter & Wentink, 2004; Salfati, 2003). More specifically, it has been argued that behaviors that are too common (e.g., occur in 50% or more of the sample) are not useful in differentiating between crime scenes when used

individually. Thus, it has been proposed that using a classification model where each type is comprised of multiple behaviors (of differing frequencies) unified by an overarching theme may be a better way of differentiating between offenses.. However, when it comes to serial offenses and the question of linking arises, using a thematic approach to differentiate between series may present the same issues as high frequency individual behaviors in differentiating between single crimes. That is, most commonly, models have been comprised of two themes in serial homicide (e.g., Horning et al., 2014; Salfati & Bateman, 2005) or three themes in serial rape (e.g., Canter et al., 1991) and crime scenes are classified into one of these themes with a subsequent analysis of whether offenders remain consistent in one theme across their crimes. The problem with this approach is that even if offenders truly were thematically consistent throughout their series (i.e., all their crimes could be classified into the same theme), linking the series of crimes and differentiating it from other series may not be possible in practice if roughly half the crimes committed by all offenders can be classified into that same theme, as the number of false positives would be too high. Thus, the key methodological question that needs to be answered in order to satisfy the two conditions of linking, namely, individual differentiation and consistency (Canter, 2000), is what the optimal *unit of analysis* should be. This unit of analysis must 1) allow for enough generality so as to not be too context dependent and thus remain consistent across series and 2) be specific enough in any given series to allow for the differentiation of one series from another.

Understanding Sexual Offenders' Behavior

In order to find the most appropriate unit of analysis within rape offenses, behaviors that are specifically relevant to rape must be explained. Rapists are a heterogeneous group of offenders, and they have been subcategorized based on a wide variety of factors, including age of

victim, sex of victim, sex of offender, age of offender (Robertiello & Terry, 2007). However, when it comes to the more specific classifications within these broad categories, rapists have most often been differentiated based on the primary motivation for their crime (e.g. Cohen et al., 1969; Groth, et al., 1977; Knight & Prentky, 1990). Indeed, most investigative typologies differentiate offenders based on the key "psychological needs" that the offender is aiming to satisfy during the commission of their crime, and whether the primary motivation was sexual or non-sexual. That is, an offender may be propelled by the need for asserting power and control, venting his anger, satisfying sexual urges, or realizing a sexual fantasy. Understanding these motivational components of the crime is important for effective interviewing and clinical work with the offenders as well as for "the societal perception of offender responsibility" (Reid, Beauregard, Fedina, & Frith, 2014, p. 203). At the investigative stage (i.e., prior to the capture of the offender), however, such aspects of the crime as the offender's "feelings of inadequacy" or "desire of dominance" (Roberiello & Terry, 2007, p. 510) are not easily observable and verifiable, nor useful for the primary analysis of the crime scene (Canter & Wentink, 2004; Canter et al., 2004; Salfati, 2008). Researchers within the Investigative Psychology paradigm (Canter, 1994) have instead emphasized the importance of using objectively observable crime scene behaviors and rigorous statistical methodologies for the identification of various types of sexual offences and offenders (Alison & Stein, 2001; Canter & Heritage, 1990; Canter et al., 2003; Hakkanen et al., 2004; Salfati & Taylor, 2006).

A detailed review of the literature identified three key recurring categories that have been consistently put forth as important in dealing with sexually violent offenses (Robertiello & Terry, 2007). As summarized in Table 1, these categories are: anger/aggression, power/control, and

sexual gratification. In more objectively defined terms, these three categories of rape and rapists' behaviors are: violence, control, and sexual activity.

Table 1

Categories of Rape Identified in Previous Literature

Studies	**Aggression/Violence**	**Power/Control**	**Sexual Gratification**
Motivation-based			
Proulx & Beauregard (2009)	angry		sadistic opportunistic
Cohen et al. (1969)	displaced aggression		sex-aggression diffusion
Groth et al. (1977) /Hazelwood & Burgess (2009)	anger-retaliation	power-assertive power-reassurance	anger-excitation
Groth & Birnbaum (1979)	anger rape	power rape	
Knight & Prentky (1990)	pervasive anger vindictive		non-sadistic sexual sadistic sexual
Reid et al. (2014)	aggression		sexual
Vettor et al. (2014)	anger	compensatory	sadistic
Behavior-based			
Alison & Stein (2001)	hostility	dominance	
Canter & Herritage (1990)	violence	criminality	sexuality
Canter et al. (2003)	hostility	control	involvement
Hakkanen et al. (2004)	hostility	criminality	involvement
Kocsis et al. (2002)	brutality	ritual	intercourse
Salfati & Taylor (2006)	violence	control	exploit

Terry (2006) noted that "although some rapists will fit into one of the [existing] typologies, most will be cross-classified into one or more categories" (p. 72), and Canter (2000) stated that "assigning criminals or crimes to one of a limited number of types will always be a gross oversimplification" (p. 31). Indeed, there are inherent issues in considering these as distinct types of rape offenses, however, in that, most often, some proportion of behaviors relevant to each of the above mentioned types or themes will be present in any given rape offense, creating overlap between categories and thus making the differentiation unreliable and lacking practical utility. For exmple, Mercado & Scalora (2001) argued that rapists can be differentiated by the level of aggression used (rather than whether or not aggression was present or absent). Sexual behaviors are an inherent part of any rape by its very definition, and therefore, again, the

differences between offenders are likely to appear in the *degree* or *kind* of sexual behaviors, and having sexuality as a distinct type of rape may not be as fruitful in differentiating offenses. Power or control have also been identified as key elements that are present to some degree across offenses (Terry, 2006), and especially are prevalent in serial crime (e.g., Canter et al., 2004). As illustrated in Figure 2, it may thus be more useful, instead, to approach these behavioral categories or domains as dimensions of each offense, and determine where each offender falls along these dimensions (i.e., each offense can be categorized in terms of the degree and/or style of control, violence, or sexual activity). In order to understand the dimensionality of these behaviors in sexual offenses, it is important to consider each of them in detail.

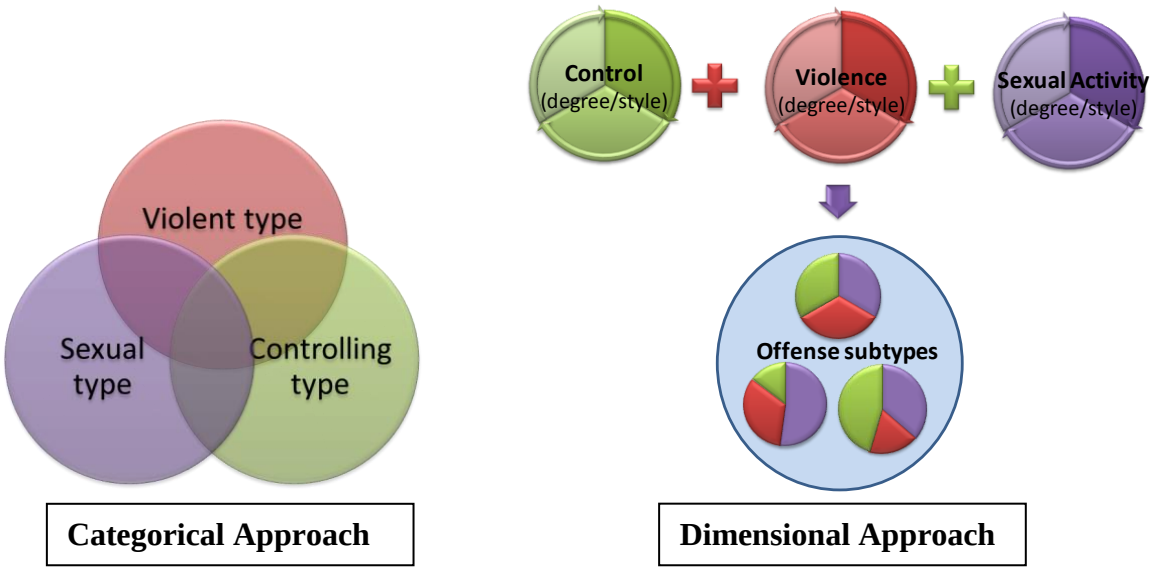


Figure 2. Categorical vs. Dimensional approach to differentiating sexual offenses

Control. Terry (2006) stated that "all rapes are inherently motivated by an element of power and control" (p. 74). Indeed this assertion is supported by the fact that most, if not all, currently existing[4] motivation-based typologies (e.g., Cohen, et al., 1969; Groth, et al., 1977; Groth & Birnbaum, 1979) as well as empirically-derived behavioral theme-based models (e.g.,

[4] Hazelwood and Burgess (2009) in their current edition of the rape investigation manual describe the typology devised by Groth et al. (1977) as the one that is currently in use by law enforcement.

Alison & Stein, 2001; Canter et al., 2003; Canter & Heritage, 1990; Salfati & Taylor, 2006) include control as one of their categories. Moreover, rape as an act in general is often seen, in and of itself, as an expression of power and control in certain situations (e.g., in war settings; Lees, 1996). Psychologically, rape of women by men has also been discussed in the feminist literature (e.g., Lea & Auburn, 2001; Lottes, 1988) as the ultimate means for men to exert their control over women. Thus, arguably, control is one of the key constructs in analyzing rape offenses. However, if controlling behaviors are stripped from the ephemeral and subjectively determined motive of establishing dominance over the victim and fulfilling a sense of power (Hazelwood, 2009), it becomes obvious that a rapist, regardless of his ultimate motivation, must engage in some form of controlling behaviors (e.g., threatening with a weapon, binding, gagging, etc.) in order to subdue the victim and accomplish the intended offense. Thus, using this group of behaviors as a distinct category that defines only one type of rapists may be futile. On the other hand, the particular degree or style of control that any given offender engages in – whether it is the minimum necessary to complete the act or going to great length of intricate bindings using special equipment, and anything in between – may vary significantly from one offender to the next, and may be an important aspect of determining individual differentiation amongst offenders. Specifically, control behaviors may be seen as both part of the offender's modus operandi (i.e., what is necessary to complete the offense; Hazelwood & Warren, 2003) as well as a manifestation of the offender's psychological need for control. Thus, an offender who only uses controlling behaviors as a means for subduing the victim is likely to engage in a different kind of control (i.e., instrumental) than an offender for whom control is the essence of the offense and who is, therefore, likely to go to great length in establishing his dominance (i.e., extreme control). Yet another type of control that has often been described in the literature as

part of the so-called blitz approach (Brannen & Salfati, 2008), is when an offender uses violence at the approach stage of the crime (e.g., hitting the victim on the head) to quickly incapacitate the victim.

Violence. Rape is a violent offense. Anger and aggression toward the victim that is exhibited by the offender in the course of a sexual offense has been proffered as one of the key motivational factors in rape (e.g., Cohen et al., 1969; Groth et al., 1977). Hazelwood & Burgess (2009) noted that knowing the specific level and type of physical force used by the offender is crucial to the accurate investigative analysis of a rape offense, and claimed that the degree of violence exerted by the offender is primarily determined by his motivation. Within the behavior-based classifications, violent behavior has also been identified as key in the way the offender acts on their victim (e.g., Canter et al., 2003; Salfati & Taylor, 2006). Salfati & Taylor (2006) identified a violence theme that was characterized by such behaviors as multiple wounds to the victim and presence of non-controlled violence. They also found, however, that sexually violent offenses (namely, rape and sexual homicide) can be situated on a continuum of the degree of violence employed by the offender during the offense. Whether aggression and anger are the primary motivators for the offenders or not, a degree of violence is inherent to rape, as even the least overtly violent offenders need to use certain amount of force in order to accomplish their act (Robertiello & Terry, 2007). Hazelwood (2009) describes the different degrees of physical force that may be employed by rapists of varying types. While the anger driven rapist (Groth et al., 1977) is the one that is said to employ moderate to brutal degrees of physical violence, the supposedly non-violent (or non-aggression motivated) rapists are still described as engaging in minimal to moderate levels of violence that include slapping, verbal violence, or tearing of clothing.

Aggression as a key underlying component of violent crimes, such as homicide and rape, has also long been differentiated in the literature into instrumental and expressive subtypes (Fesbach, 1964). These subtypes of aggression and violent behavior are differentiated by the goal that it serves for the offender (Salfati, 2000): expressive (or hostile) violence is directed toward physically harming the victim, whereas instrumental violence is used as the means to achieving an ulterior goal (e.g., using violence as a form of control in order to complete the rape or robbery). The Instrumental/Expressive classification model has been widely researched and validated in samples of homicides in the UK, Greece, Finland, Canada, and Korea (respectively, Salfati & Canter, 1999; Salfati & Haratsis, 2001;Santtila et al., 2001, Salfati & Dupont, 2006; Salfati & Park, 2007), as well as with US cases of serial homicide (Salfati & Bateman, 2005). Nonetheless, violence that occurs as part of a non-lethal sexual offense has never truly been dissected into specific behavioral subtypes. Identifying these subtypes of violent behavior within rape offenses may provide the basis for a more accurate qualitative differentiation between offenses. That is, while some violence will inevitably be present in most rape offenses, making violence as a type lacking differentiating capacity, it may be possible to distinguish between offenses based on *the kind* of violence the offender engaged in.

It is also important to recognize the role that situational factors (i.e., factors that are outside of offenders' control and are not part of the offenders' plan) may play in the presence or absence of violent behaviors during the sexual offense (Carr & VanDeusen, 2004; Coker, Walls, & Johnson, 1998; Hartwick, Desmarais, & Hennig, 2007; Porter & Alison, 2006; Scott & Beaman, 2004; Weaver et al. 2004; Wilcox, Jordan, & Pritchard, 2006). In some cases, situational factors such as victim's resistance may increase the degree of violence used by an offender in a given offense (Hewitt & Beauregard, 2014; Prentky, Burgess, & Carter, 1986).

Conversely, in some cases, active resistance that, purportedly, interferes with the offender's fantasy, may also deter an offender from proceeding with the rape (Hazelwood & Burgess, 2009).Overall, violent behaviors have been identified in the literature as integral to rape offense analysis; however, looking at violence as a distinguishing aspect of rapist type may not be a practical approach considering its pervasive presence across rape offenses. Instead, it may be more appropriate to identify the degree as well as the subtype (i.e., instrumental, expressive, situational) of violence present within the crime.

Sexual activity. As a motivational aspect of rape crimes, sexual gratification has been argued to not always be at the forefront. Terry (2006) notes that, broadly defined, rape motivations fall into two general motivational categories: sexual and non-sexual. Sexual motivations for rape are further subdivided into "exclusively sexual" (where the offender is seeking sexual gratification and uses as much physical force as is necessary to achieve it) and "sadistic" (where sexual gratification is contingent upon the infliction of pain and/or fear onto the victim). Hazelwood & Warren (2009) argued that sexual fantasies play a significant role in rape offenses as they are manifested in "signature behaviors" (i.e., a unique and distinctive subset of behaviors characteristic of a particular offender; Douglas & Mann, 1992) and can be used in differentiating as well as linking offenses. Behavioral classifications also most often include a theme that is characterized mainly by a variety of sexual acts performed by the offender (e.g. Canter et al., 2003; Salfati & Taylor, 2006).

Salfati (2003), in her analysis of homicide offenders' behaviors, highlighted the importance of distinguishing between those behaviors that define the offense as a whole (i.e., behaviors that were high frequency – generally prevalent across homicide offenses) and subgroups of lower frequency behaviors that differ from one behavioral theme to another and

thus can differentiate between subtypes of offenses. Similarly, here, it is important to recognize that sexual behaviors, such as vaginal intercourse, lie at the core of sexual offenses, while key distinctions may rest in the specific subtypes of sexual behaviors that the offender engages in. Thus, sexual actions, such as kissing or performing oral sex on the victim may constitute one subtype of sexual activity (i.e., "pseudo-pleasing"), while insulting and forcing the victim to perform oral sex on the offender may constitute a completely different subtype (i.e., "demeaning"). Alternatively, if vaginal intercourse is the only sexual behavior that the offender engaged in, it may signify an "instrumental" subtype of sexual activity characterized by the offender's need for basic physiological gratification.

Notably, regardless of whether sexual gratification is the primary motive (and the most prevalent overall behavioral theme), all rapes – by the very definition of the offense – include some form of sexual behaviors. Thus, differentiating various patterns of sexual behaviors that may differ in degree (i.e., multiple sexual acts vs. a single act) and type or style may be more useful than considering them as a broad category or theme.

It is important to note here that the sadistic rapist has often been given special attention and described in the clinical and investigative literature as a distinct type (e.g., Dietz, Hazelwood, & Warren, 1990; Knight et al., 1998; Proulx, Blais, Beauregard, 2007), and has been characterized as having intense and elaborate sexual fantasies focused on gaining sexual pleasure from the suffering and pain of his victims. In other words, the physical violence that this offender engages in is alleged to give him sexual pleasure. However, whether any given behaviors of a rapist were enacted for pleasure or other reasons is a subjective matter that may not be apparent unless the offender is interviewed. While sexual gratification is said to be the primary motive for this type of rapist, both aggression (violence) and control play a key role in defining his acts.

Hence, from a behavioral standpoint, sadistic behavior is not a distinct category of rape but rather constitutes an extreme end of a continuum at the intersection of violence, control, and sexual activity. That is, the sadistic rapist is characterized by a high degree of violence coupled with an elaborate pattern of sexual behaviors, as well as a high degree of control (i.e., falling at the higher end on all three behavioral dimensions noted here). Thus, using the dimensional approach (as illustrated in Figure 1) allows for distinguishing the, so-called, sadistic offenses from other rapes based on three key behavioral aspects of the offense (i.e., violence, control, and sexual activity), evaluating the quantitative and qualitative presence of behaviors from each of these dimensions (i.e., without the need of accounting for mixed types), while also avoiding the need for subjective inferences about the motive and sexual fantasies of the offender.

Summary of Individual Differentiation

In summary, both the motivationally and behaviorally oriented research on understanding the behavior of rapists discuss three key aspects of rape offenses that can be organized into three broad behavioral groups: violence, control, and sexual behaviors. However, there are inherent issues in considering these as distinct types of rape offenses, as some proportion of behaviors relevant to each of the above mentioned types or themes will be present in any given rape offense (Canter et al., 2003; Terry, 2006), creating overlap between categories and thus making the differentiation unreliable and lacking practical utility. What may be a more appropriate and useful approach is regarding these three behavioral aspects of rape as dimensions rather than categories and differentiating offenses based on the qualitative and quantitative distinctions within each. That is, categorizing some offenses as "Controlling type", others as "Violent type", and yet others as "Sexual type" results in inevitably having to account for the fact that the so-called "Controlling type" still engages in some violence and certainly exhibits sexual activity as

part of the offense. Instead, recognizing these aspects of rape as dimensions, allows for identification of the specific degree and/or type of control, violence, and sexual activity exhibited within the offense, thus producing the differentiation at a more refined level of specificity. This step is imperative not only for correctly differentiating between offenses, but also in order to determine the proper unit of analysis for use in identifying consistency within series and distinctiveness across series and, thereby, behaviorally linking serial sexual offenses.

Behavioral Consistency

It has been proposed that in order to utilize crime scene behaviors as a means of linking offenses, it must be established that some identifiable pattern of offending behavior remains stable across criminal events (Grubin et al., 2001). However, in order to understand criminal behavioral consistency it is necessary to first examine the evidence for cross-situational constancies in behavior in general, as it forms the theoretical basis for our expectation of consistency in criminal behavior. If there is no consistency in human behavior at all – there would be no reason to expect criminal offenders to display any evidence of consistency, however, since people in general are not found to behave at random (Woodhams, Hollin, & Bull, 2007), it is reasonable to expect some degree of consistency in offenders' behaviors as well. Moreover, the behaviors that are examined herein – violence, control, sexual actions – are part of the human behaviors repertoire, and, albeit extreme, they should be subject to the same psychological principles as any other behaviors, such as politeness, cleanliness, or punctuality. While consistency in behavior in general is most often tested using experimental methodologies that could not be used in studying criminal behavior (for obvious ethical reasons), the conclusions from these studies may inform the theory of criminal behavior and direct the search for behavioral consistency in crime.

Understanding Consistency and Change in Human Behavior

Criminal events are only part of the offenders' lives, and as such, fit into the larger picture of the offenders' narrative identities (McAdams, 1985). "Narrative identity is the internalized and evolving story of the self that a person constructs to make sense and meaning out of his or her life. The story is a selective reconstruction of the autobiographical past and a narrative anticipation of the imagined future that serves to explain, for the self and others, how the person came to be and where his or her life may be going." (McAdams, 2011, p. 99). Social psychologists (e.g., Andersen & Chen, 2002; Shauger & Schoeneman, 1979; Tice & Wallace, 2003) argue that one's self-concept is "relational" in that we draw our understanding of who we are from the past and current relationships with others in our lives and how we think they see us. Thus, if violent interpersonal events (i.e., crimes such as serial rape) make an important part of one's life, it is probable that they are also integral to their self-concept as a whole and may transcend far beyond the criminal episodes. That is, an offender's interpersonal style and behavioral trends across crimes may shadow his interpersonal style in other non-criminal social interactions. If a degree of consistency or an understandable progression over time is expected across the interpersonal interactions of the individual in general, then it should also be evident across his criminal interactions.

Andersen & Chen (2002) theorized that a sort of transference occurs during one's encounters with new persons during which the relationships with significant others in the life of an individual are mirrored in the new relations formations. Thus, in the context of criminal psychology, offenders' behavior during an interpersonal crime, such as rape, may be mirroring his habitual interaction with significant others in his non-criminal life. Canter and Youngs (2009) developed a Narrative Action System (NAS) model of offending style that relates offending

styles within a wide variety of crimes, ranging from burglary and stalking to rape and murder, to four core narrative styles that are manifested in the role that the offender assigns himself within the offense as well as the role that he assigns to the victim. Canter and Youngs showed that this model provides a useful basis for understanding the empirical patterns of offence actions across the full gamut of crime types. It is beyond the scope of the present study to determine whether and how the criminal behavior of the offenders parallels their non-criminal activities (e.g., whether they remain highly controlling or violent in how they interact with other people in non-criminal settings). However, understanding the consistency and evolvement of the offenders' behaviors within and across their criminal events is an important stepping stone in understanding criminal psychology and fits well into the study of social and interpersonal psychological processes of human behavior more generally. The psychological processes that are guiding one's behavior in the non-criminal life should be the same as those that operate during a criminal event, and, in this sense, research on the criminal part of the individual's life is simply another piece of the puzzle in the study of social psychology.

Canter (2000) outlined the underlying principle of offender profiling as the Actions to Characteristics (A → C) equation which states that an offender's actions at the crime scene will have some similarity or correspondence to the offender's characteristics (i.e., his/her self outside of the criminal event in question), thus enabling the investigator to make assumptions about the identity of the offender based on the analysis of actions they engaged in at the crime scene. Identifying the salient corresponding features of actions to characteristics is the ultimate goal of profiling and is yet to be reached. In the case of serial crime, the equation is stated as A → A→ A →C (Salfati & Bateman 2005) where the actions across all crime series should align to correspond to a set of offender's characteristics. The present study aims to determine the

A→ A → A correspondence. Once the consistency of actions across crime scenes is identified the next step will be to determine whether these translate into similarly consistent characteristics in the offender's non-criminal life and how these fit into their broader narrative identity.

Whether people display cross situational invariability is an issue which has received substantial consideration within the social and personality psychology literature (e.g. Furr & Funder, 2004; Mischel & Shoda, 1995; Pervin, 2002; Shoda, Mischel, & Wright, 1994). Mischel and Shoda (1995) proposed that each individual has a cognitive affective personality system that directly influences the manner in which the person exhibits behavior in a situation. Similarly, Shoda, Mischel, and Wright (1994) stipulated that it is neither the personal nor situational variables alone that account for behavior exhibited across situations, but rather the interaction between the two. Thus, when individuals encounter situations with similar psychological features, distinctive cognitive and affective states are experienced by the person, resulting in similar behavior being exhibited. Moreover, the authors concluded that the interplay between person and situation results in distinctive "behavioral signatures" (p. 675) which remain stable across situations that are interpreted as being psychologically similar by the individual. Fur and Funder (2004) found that greater situational similarity, whether subjective or objective, is related to greater behavioral consistency. In addition, Pervin (2002) suggested that the level of behavioral consistency in similar situations is dependent upon how often these situations arise (and thus, how often one has the chance to exhibit the associated behaviors). Trait theorists (Allport, 1937; Eysenck & Eysenck 1980; Zuroff, 1986) argued that traits naturally allowed for some responsiveness of behavior to situations, suggesting that behavioral consistency is not an absolute perfect behavioral sameness but rather that there is a relative-position consistency (i.e. that the degree to which certain behavior would be exhibited in different situations may vary, but

the relative position of one person to another in the manifestation of that behavior will remain the same).

There are inherent issues in trying to determine how similar or different a person (or an offender in the case of criminal behavior that is dealt with here) perceives any two (or more) situations as this brings in an element of subjectivity that cannot be resolved without input from the person whose behavior is being analyzed. Indeed, Woodhams, Hollin, and Bull (2008) failed to find any support for the correlation between situational similarity and behavioral consistency in serial rapes. The authors concluded that situational similarity, as defined by the researchers, may not be the same as the offender sees it and suggested that research should concentrate on finding behavioral indicators that can be analyzed for consistency regardless of situational constraints. Importantly, Allport (1937) argued that consistency does not necessarily mean the same behavior but rather that different behaviors could be consistent with each other if they were enacted in service of the same goal. Thus, as explained by Salfati (2008), an offender may bind the victim during one offense of his series and gag the victim during another offense, but he may still be considered consistent because both of these behaviors serve the same ultimate goal of control.

In the literature dealing specifically with aggression, Huesmann, Eron, Lefkowitz, and Walder (1984) proposed that each individual develops a characteristic level of aggressiveness that remains stable *across time and situations*. However, the propensity for violence, like all of human behavior, is suggested to operate on a continuum (Hirschi & Gottfredson, 1994), and for those who tend to act in a habitually aggressive manner, the form and amount of aggression exhibited can vary substantially (e.g. antisocial criminal behavior, minor traffic violations).Toch (1969), who studied violent behavior as it is learnt and manifested throughout the lifespan,

suggested that such behavior is rooted in well-learned, systematic strategies of violence that have proven to be effective in dealing with interpersonal conflict. Indeed, Toch postulated that the life histories of violent persons reveal surprising consistency in their approaches to interpersonal relationships. In all likelihood, these individuals learned in childhood that violence is an effective way of dealing with conflict; and see violence as a means to obtain rewards and avoid costs. Learned responses for social behavior in general, and for aggressive behavior in particular, are argued to be controlled by *cognitive scripts* (Huesmann et al., 1984). Cognitive scripts are stored in a person's memory and used as guides for behavior and social problem-solving, suggesting how one should respond to events, and what the likely outcomes of these responses are. Sherma, Nave, and Funder (2010) examined the associations between situational similarity, personality and behavioral consistency and found personality characteristics predicted behavioral consistency even after situational similarity was controlled for. As Paunonen (2001) put it "people […] possess certain stable and predictable behavior characteristics, characteristics that will endure far into the future, [and] this longitudinal behavior consistency goes much deeper than continuity based on simple situational invariance, being endemic to the human form." (p. 91).

Thus, while situational similarities and situational constraints may play a significant part in how consistently a person behaves, it is likely that a person's enduring cognitive scripts, or behavioral guides, will be manifested across those situations and it is only a matter of identifying the pattern of behavior that the scripts are dictating to the individual. Fleeson and Noftle (2008) argue that "the question is not whether behavior is consistent or not; rather, the question is which ways behavior is more consistent and which ways it is less consistent" (p. 1357). The authors further argue that while some sort of consistency is necessary to conclude that a behavior was

caused by personality rather than situation, the consistency does not have to be manifested in directly identical repetition of a given behavior, but rather can be manifested in complex patterns. That is, cross-situational consistency can be deduced from the unifying psychological meaning of the different behaviors exhibited, or from the relative degree of the behavior manifested by an individual in comparison to others across similar situations, or to the different behaviors of the same individual, and so on.

Likewise, individuals may remain consistent in either the *type* or the *degree* (or both) of a given behavior, or they may exhibit progress in the development of a behavior. Thus, for example, if we look at violence, an offender may exhibit more controlled "cold blooded" violence, or he may be highly expressive in the violent acts that he is exhibiting, however, the degree of violence exhibited in either of these types may vary in an identifiable pattern (e.g., escalation).

In sum, social and personality psychology literature provides an important basis for the understanding of consistency in criminal behavior. It has been argued that situational factors play an important role in how consistent one's behavior is, and various ways of looking at situational similarity and its perception have been proposed. However, due to the inherent difficulties in identifying how similar or different two crime situations are for an offender and because it is impossible to identify with any kind of certainty which behaviors were performed by the offender due to situational factors (unless the offender is interviewed, which is not possible at the stage when crime linkage would be performed), it may be more useful for the purposes of crime linkage to concentrate on the behavioral consistency that is not dependent solely on situational invariability. It is undoubtedly important to determine what the influential situational factors within a criminal event are and the role they play in determining an offender's behavioral

consistency. However, as the first step in the process, it must be determined what remains consistent across crimes *despite* possible situational influences. The changes in behavior that may be observed must first be identified and it must be determined whether these can be examined in terms of patterns. Only then can the underlying reasons for such changes (e.g., situational factors) really be determined and analyzed. While it is beyond the scope of the present study to identify the underlying personality features or cognitions that form the basis for the sought consistency, the present study aims to determine whether traceable behavioral patterns across a series could be indentified despite situational factors.

Behavioral Consistency and Linking in Serial Crime

The *Consistency Hypothesis*, as it applies to criminal behavior, was outlined by Canter (1994) and states that "the way an offender carries out one crime on one occasion will have some characteristic similarities to the way he or she carries out crimes on other occasions" (p.347). As explained by Woodhams and Toye (2007), "if offenders were not consistent in their criminal behavior, it would be impossible to assign crimes to a common offender on the basis of their behavioral similarity" (p.62). Thus, if empirical research is to aid law enforcement in identifying the salient crime scene features for linkage purposes, then understanding criminal behavioral consistency is crucial. While the reliance of investigators on behavioral cues for the purposes of linking crimes to a series has probably been present for a long time, its empirical validity has only recently started to be scrutinized. Investigative literature (e.g. Douglas & Munn, 1992; Holmes & Holmes, 1998; Keppel 1995, 2000) maintains that serial offenders exhibit highly consistent behaviors that manifest themselves in behavioral signatures that are both unique and stable and thus can be used to link series whilst also differentiating one series from another. Empirical evidence to back up such claims, however, has yet to be accumulated.

At present, there have been a total of 36 empirical studies that directly address the issue of linking serial crimes, including burglary, robbery, rape, arson, and homicide using behavioral evidence (see Table 2). Most of these studies have specifically focused on resolving the methodological dilemma of how to best use crime scene behaviors to link serial offenses. However, of these 36 studies, eleven involved series of sexual offenses (Bennell et al., 2009; Grubbin et al., 2001; Harbers, et al., 2012; Hewitt & Beauregard, 2014; Leclerc et al., in press; Kearns et al., 2011; Santtila et al., 2005; Winter, et al, 2012; Woodhams, et al., 2007; Woodhams, et al., 2008; Woodhams & Labuschagne, 2011).

Kearns et al. (2011) highlighted an important methodological concern relating to the number of crimes per series that is most often included in studies on linking (i.e., whether any reliable conclusions can be made regarding the general consistency of offenders' behavior based on the degree of similarity between two crimes from a series). Indeed, as can be seen in Table 2, over half of studies to date examined the possibilities of behavioral linking using only two crimes from a series – either two consecutive crimes (e.g., Davies et al., 2012; Tonkin et al., 2008; Woodhams & Toye, 2007) or a random pair of two crimes (e.g., Bennell & Canter, 2002; Bennell & Jones, 2005) from series – and determining the predictive validity of various methods in linking the two crimes together. Such approach may be problematic in that it does not allow for the examination of progression of consistency and change over time. The evidence is emerging, however, that offenders may become less consistent as their series progress (Kearns et al., 2011; Salfati et al., 2014), highlighting the importance of fully investigating behavioral patterns across a larger number of crimes within series.

Table 2

Linking and Consistency Literature Organized Based on the Unit of Analysis and Number of Crimes Examined

	Individual behaviors	**Groups of behaviors**	**Behavioral themes**	**Behavioral patterns**
Linking randomly selected crime Pairs	Bennell, Jones, & Melnyk, 2009; Tonkin, Santtila, & Bull, 2012; Tonkin, Woodhams, Bull, Bond, & Palmer, 2011; Woodhams, Hollin, & Bull , 2008;	Bennell & Canter, 2002; Bennell & Jones, 2005; Markson, Woodhams & Bond, 2010; Melnyk, Bennell, Gauthier, & Gauthier, 2011; Tonkin, Woodhams, Bull, Bond, & Santtila, 2012; Woodhams, Grant, & Price, 2007; Woodhams & Labuschagne, 2011;	Ellingwood, Mugford, Bennell, Melnyk, & Fritzon, 2013;	
Linking consecutive crime pairs	Deslauriers-Varin & Beauregard, 2013; Harbers, Deslauriers-Varin, Beauregard, Van der Kemp, 2012	Burrell, Bull, & Bond, 2012; Davies, Tonkin, Bull, & Bond, 2012; Tonkin, Grant, & Bond, 2008; Woodhams & Toye, 2007;		Hewitt & Beauregard, 2014; Leclerc, Lussier, & Deslauriers-Varin, in press; Lussier, Leclerc, Healey, and Proulx (2008);
Consistency or discrimina-tory power across 3 or more crimes	Bateman & Salfati, 2007; Salo, Siren, Corander, Zappala, Bosco, Mokros & Santtila, 2013	Bouhana, Johnson, & Porter, 2014; Green, Booth & Biderman, 1976; Grubin, Kelly, & Brunsdon, 2001; Winter, Lemeire, Meganck, Geboers, Rossi, & Mokros, 2012;	Canter, Heritage, Wilson, Davies, Kirby, Holden, et al., 1991; Fox & Farrington, 2014; Kearns, Salfati, & Jarvis, 2011; Salfati & Bateman, 2005; Salfati, Horning, Sorochinski, & Labuschagne, 2014; Santtila, Fritzon & Tamelander, 2004; Santtila, Junkkila & Sandnabba, 2005; Santtila, Pakkanen, Zappala, Bosco, Valkama, & Mokros, 2008;	Sorochinski & Salfati, 2010;

As shown in Table 2, previous literature has examined consistency in serial crime using either individual behaviors (e.g., approach method, victim type, binding, etc.), groups of

behaviors (either pre-selected by researchers or identified through cluster analysis – e.g., control behaviors, planning behaviors, etc.), or theory-driven behavioral themes (e.g., Expressive/Instrumental model, Interpersonal model). None of these approaches, however, yielded a fully satisfactory result in terms of great linking potential of consistent behavioral sets that are also well differentiated across series, and thus can be used reliably in the investigative process.

Consistency of individual behaviors. Five studies have examined consistency of individual behaviors (in serial homicide: Bateman & Salfati, 2007; in serial rape: Bennell et al., 2009; Harbers et al., 2012; Knight et al. 1998; Woodhams & Labuschagne, 2011). Bateman and Salfati (2007) provided the first empirical test of the consistency of so-called signature behaviors in serial homicide. The study found that out of the 35 serial homicide crime scene behaviors only 4 (11.42%; bringing a crime kit to the scene, destroying evidence, oral sex by the victim, and ligature use as a weapon) were found to be both unique (i.e. occurred in less than 50% of the sample) and consistently performed across the series of homicides by the same offender. Bateman and Salfati (2007) highlighted that the findings of inconsistency is interesting considering that the behaviors examined in this study are the same as those described within the literature discussing the signature approach (e.g. Douglas & Munn, 1992; Keppel, 1995, 2000), as being both consistent and differentiating.

Harbers et al. (2012) investigated the consistency of individual (signature) behaviors in serial rape offenses. While their findings indicated that certain behaviors (e.g., approach method, committing the crime inside, committing the crime in a residential area) are fairly consistent (Jaccard coefficients above 0.6), similarly to Bateman and Salfati's (2007) findings, the more consistent behaviors were also the high frequency behaviors. Bennell et al. (2009) and

Woodhams & Labuschagne (2011) who also investigated the consistency of individual behaviors in serial rape found that linked pairs were more similar on the presence of the behaviors analyzed than non-linked pairs. As noted above, however, looking at only two crimes from a series may not be sufficient to truly determine the degree of behavioral consistency over a series of crimes, and may be of questionable utility when later crimes from a series are analyzed. Additionally, these studies have not considered the frequencies of these individual behaviors, thus, their uniqueness and hence utility for linking cannot be properly assessed. As such, it can be concluded that individual behaviors are not highly promising in terms of identifying behavioral consistency and linking series.

Consistency of behavioral subgroups. Most commonly, behavioral consistency has been examined using the behavioral subgroup approach. When groups are determined using cluster analysis (e.g., Grubbin et al., 2001; Santtila, Fritzon, & Tamelander, 2005; Santtila, Junkkila, & Sandnabba, 2005; Woodhams et al., 2008; Woodhams & Toye, 2007), predictive accuracy of the clusters for determining pairs of linked crimes was found to be quite low (ranging from 26% to 32.7%). In addition, in 52% (arson; Santtila, Fritzon, & Tamelander, 2005) to 60% (rape; Santtila, Junkkila, & Sandnabba, 2005) of cases, a case that belongs to the same series will be present within the 10 most similar crimes.

When behavioral groups are selected by the researchers based on their categorical similarity (e.g., wounding, planning behaviors, postmortem behaviors), in paired offenses of serial homicide, 62.9% were found to be correctly linked using discriminant analysis (Santtila et al., 2008). When consistency over the first two crimes was analyzed, around 60% of offenders were found to be consistent in victim selection and 53.3% showed consistency in their planning strategies (Salfati et al., 2014), however, these levels dropped significantly when looked at over

three crimes (42.3% and 36% respectively), and, when looked at over the first four crimes, dropped even further for victim type (25%), remaining the same for planning. This gradual decrease in levels of absolute consistency further highlights not only the importance of including more than two crimes in the analyses (Kearns et al., 2011), but also the fact that it may be more fruitful to look for the behavioral progression or trajectories of change, rather than whether offenders' behaviors remain the same.

Consistency of behavioral themes. As has been highlighted earlier, much of the current literature on both classification and behavioral linking suggests that looking at psychological themes of behaviors may be a useful approach in analyzing criminals' behavior (Canter, 1994; Salfati, 2000, 2008; Salfati & Bateman, 2005; Salfati & Canter, 1999). Themes are developed using psychological theories and subsequently tested using empirical methods. Salfati and Bateman (2005) tested whether serial homicide offenders remained consistent in their behavioral theme being either Expressive or Instrumental (a framework previously tested in single homicide, Salfati, 2000). However, few offenders showed thematic consistency across their first three crimes in a series (only 13%-23%, depending on the classification criteria used). Importantly, over one third of crime scenes could not be classified as having a dominant theme using the classification criterion that has been found to be optimal in this type of research[5].

Another thematic framework, the Interpersonal Model (Canter, 1994), has been recently tested in serial homicides (Salfati et al., 2014) and in serial rapes (Kearns et al., 2011). The Interpersonal Model proposes that offenders' crime scene behaviors can be differentiated based on what role the offender enacts onto his victim. Three key roles proposed by Canter (1994) were: Victim as a Person – where the victim has a personal significance to the offender; Victim

[5] A theme is deemed dominant if there are at least twice as many behaviors from that theme present at the crime scene as from the other. See Trojan & Salfati, 2008 for a detailed review.

as a Vehicle – where the offender exploits the victim for getting what he wants (e.g. sex, money); and Victim as an Object – where the offender treats the victim as though they are an inanimate object doing things *to* the victim rather than *with* the victim. Salfati et al. (2014) tested this model in a sample of South African serial homicides, and found that only victim as vehicle and victim as object themes were evident (with 86% of crime scenes being classifiable into one of these two themes), and that 60% of offenders remained thematically consistent across their first three offenses and 45% remained consistent across their first four offenses. Kearns et al. (2011) tested the same framework in a sample of serial rapes. Results indicated that while the three themes were broadly present in the sample, only around 40% of offenders displayed thematic consistency across their first four crimes. Importantly, less than 5% of offenders exhibited behaviors from only one theme (i.e., most crimes scenes contained behaviors from multiple themes). Thus, overall, the modest consistency levels displayed in the behavioral theme across offense series together with the fact that studies find substantial crossover between themes (i.e. a significant proportion of crimes cannot be classified into a dominant theme and in those crimes that do have a dominant theme, behaviors from the other theme/s are still present) suggest that the thematic approach may not be the most efficient for discerning the issue of behavioral consistency for the purpose of linking crimes.

Behavioral patterns. Few studies have examined how offending behaviors may change across series. Lussier, Leclerc, Healey, and Proulx (2008) used transition matrices to estimate the probability of behaviors used in the first crime to be repeated in subsequent crimes of persistent sexual offenders. The authors looked at victim characteristics, such as age and relationship to offender, as well as crime characteristics such as force used and sexual intrusiveness (i.e., use of an array of sexual penetrative behaviors). Patterns of change were described in the form of

probabilities of switching from one sub-category (e.g., adolescent victim) to another (e.g., adult victim) within each variable analyzed. The findings suggested that changes in these behaviors occur in a fairly predictable manner as a function of the offender's level of self-control as well as situational constraints. It is important to note, however, that the purpose of this study was primarily to understand the broad development across the offender's criminal career rather than linking series.

In two subsequent studies (Hewitt & Beauregard, 2014; Leclerc et al., in press), researchers examined in more detail the patterns of escalation, de-escalation, and consistency in the violent and sexually intrusive behaviors of serial sex offenders (mainly child molesters) as they progress from one crime to the next. These studies found substantial "versatility" (Hewitt & Beauregard, 2014, p. 73) in sexual behaviors (i.e., offenders were often inconsistent in the behaviors they engaged in from one victim to the next). They also found indications that changes in these behaviors are predicted by situational factors, such as victim resistance. Overall, these studies made an important progress in the way behavioral evidence is examined across series of crimes. By moving away from looking strictly at the stability of given behaviors and instead examining such patterns as escalation and de-escalation within violent and sexual behavioral subgroups, they acknowledged the dynamic nature of behavioral manifestations across series and underscored the importance of understanding the *progression* as well as the stability of offenders' behavior. Of note, however, is the fact that these studies did not examine the overall behavioral trajectories across series, but only the transitions between consecutive crime pairs (e.g., escalating violence from first crime to second crime or from second crime to the third within the series, not an overall escalating pattern across series). This approach, although useful in determining specific behavioral changes that occur from one crime to the next within series,

does not allow for a fuller picture examination of an offender's overall behavioral trajectory. Identifying general behavioral trajectories is the necessary ground work for identifying the common characteristics of offenders that follow these trajectories.

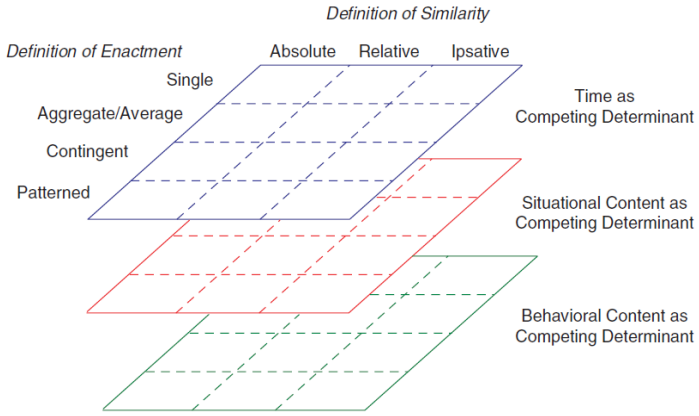
Sorochinski and Salfati (2010) examined behavioral consistency and behavioral change patterns across the first three offenses in homicide series. The components that entail the achievement of the offenders' ultimate goal (i.e., the successful completion of the homicide act) were divided into three subgroups (planning, wounding, and offender-victim interaction). The study identified the thematic differentiation in the behavioral manifestations of these goal components within the three behavioral subgroups, and uncovered the offenders' progression from using one behavioral theme to another within each behavioral subgroup. This study provided evidence that it is useful to look for behavioral consistency in terms of behavioral trajectories rather than isolated behaviors. That is, if an offender consistently changes their behavior in a particular direction (e.g., escalating in degree or switching from one behavioral sub-type to another) and this direction (i.e., trajectory) can be identified, then it may be possible to link multiple offenses to this offender despite the fact that his behaviors were not identical across the crimes.

In sum, the review of previous research on behavioral consistency shows that although a degree of consistency is present in offense series, it is insufficient for the reliable use of behavioral evidence for linking serial crimes. As it appears that offenders' behavior across series is dynamic and seldom remains fully stable from one crime to the next, understanding the inconsistency or change in the offenders' behavior and how this change can be framed into predictable behavioral trajectories is an important next step.

Reframing Behavioral Consistency

As can be seen from the above review, there is a general lack of agreement in the literature regarding the operational definition of behavioral consistency in serial crime. That is, many studies define consistency as complete stability of specific behaviors (or groups of behaviors) within pairs of linked crimes, whereas others define consistency as a proportion of crimes from the total series that can be generally classified into the same theme or type . If the general psychological literature discussed in the previous section is extended to criminal behavior, however, it appears that there is a need in redefining consistency more broadly as behavioral continuity and thus looking at not only the degree of stability but also understanding the consistent progression of behavior across series.

Fleeson and Noftle (2008), in their theoretical and methodological critique of the behavioral consistency literature as it pertains to understanding of personality, proposed a three-dimensional conceptualization of behavioral consistency (see Figure 3).



Note: Each layer represents one competing determinant of behavior and crosses three definitions of similarity with four definitions of enactment. Altogether this creates 36 different ways of defining consistency. Reprinted from "Where does personality have its influence? A supermatrix of consistency concepts" by W. Fleeson and E. E. Noftle (2008) *Journal of Personality 76,* p. 1367. Copyright 2008 by the Wiley Periodicals, Inc. Reprinted with permission.

Figure 3. Supermatrix of consistency as conceptualized by Fleeson & Noftle (2008).

The first dimension specifies the definition of behavioral enactment with four possible ways: single behaviors (i.e., where consistency is expected for the particular individual behavior in question), aggregate behaviors (i.e., averaging or grouping multiple behaviors together), contingent (i.e., where the enactment of a given behavior is conditional to the presence or absence of other specific factors) or patterns of behavior (i.e., where the type or degree of enactment of a given behavior may vary in a consistent and predictable way). The second dimension is the definition of similarity that can be either absolute (i.e., the exact same behavior and level of enactment is expected to be deemed consistent), relative (i.e., an individual may exhibit variations in the level of enactment of a given behavior, but their *positioning relative to others* remains the same – for example, an offender may exert more or less violence at any given crime, but he will always be more violent in comparison to other offenders in the same circumstances), or ipsative (i.e., individual may exhibit variations in the level of enactment of a given behavior, but it remains stable *relative to other behaviors of the same individual* – for example, an offender may exert more or less controlling behaviors, such as gagging or binding, depending on circumstances of the given crime, but he will always exhibit more controlling behaviors than violent behaviors). Finally, the third dimension includes three competing determinants, namely, situational (i.e., whether people are consistent across different situations), time (i.e., whether they are consistent over time, regardless of situational similarity), and behavioral content (i.e., whether the psychological meaning of the behavior remains the same).

This three-dimensional breakdown of consistency brings about the degree of detail and depth that the concept entails. Fleeson and Noftle developed this framework as a basis for understanding the multifaceted nature of behavioral consistency in the debate over the existence of personality in general. However, this framework is also extremely useful in grasping the

complexity of the concept and in organizing previous studies on the matter as well as understanding where the gaps in knowledge are as it applies specifically to criminal behavior.

Table 3 re-organizes the studies cited in Table 2 (above) on linking serial crimes according to the type of consistency they investigate within the Fleeson & Noftle (2008) framework. Even at first glance, it becomes obvious that a great number of ways of approaching the study of behavioral consistency have yet to be looked into in terms of the consistency of criminal behavior. Of particular importance is the fact that the vast majority of studies searched for static consistency (i.e., in either single or aggregate (grouped) behaviors) and only four studies (Hewitt & Beauregard, 2014; Leclerc et al., in press; Lussier et al., 2008; Sorochinski & Salfati, 2010) looked at consistency in terms of behavioral patterns.

Table 3

Types of Consistency Analyzed in Criminal Behavior Consistency & Linking Literature

	Absolute			Relative			Ipsative		
	Time	Situation	Behavior	Time	Situation	Behavior	Time	Situation	Behavior
Single		Bateman & Salfati, 2007; Bennell et al., 2009; Woodhams & Labuschagne, 2011	Harbers et al., 2012; Salo et al., 2013					Bennell & Canter, 2002; Delaureiers-Varin & Beauregard, 2013	
Aggregate	Markson et al., 2010	Bennell & Jones, 2005	Burrell et al., 2012; Wooodhams et al., 2007; Woodhams & Toye, 2007; Fox & Farrington, 2014; Green et al., 1976	Tonkin et al., 2011; Tonkin et al., 2012	Canter et al. 1991	Santilla et al., 2008; Salfati & Bateman, 2005; Winter et al., 2012	Davies et al., 2012	Bouhana et al., 2014; Santtila et al., 2004 ; Melnyk et al., 2011	Ellingwood et al., 2013; Kearns et al. 2011; Salfati et al. 2014; Santtila et al., 2005
Contingent		Woodhams et al., 2008							Grubin et al. 2001
Pattern						Sorochinski & Salfati, 2010		Hewitt & Beauregard, 2014; Leclerc et al., in press; Lussier et a al., 2008	Present Project

Based on the reviewed literature, in order to address the two key questions of linking noted earlier – those of individual differentiation and consistency – it is hypothesized here that the best starting point would be to look at the patterns (dimension 1) within behavior content (dimension 3) relative to other crimes within the same series (dimension 2). That is, looking for consistent patterns of behavior within meaningful groups of behaviors – violence, control, and sexual activity – and how these patterns can be used to link crimes within series whilst also differentiating the series from one another. This particular combination is chosen as a starting point here based on the previous studies reviewed above, specifically, those showing that looking at individual behaviors or groups of behaviors in isolation does not provide fruitful results in the study of behavioral consistency. Moreover, in order to delve into the more complex issues of how situational factors may affect the offenders' behavior during each crime, it is necessary to first determine the core behavioral structure that may remain identifiable despite situational constraints and only then look at how it is affected by situational factors as well as the temporal factors. In other words, while it is clear from both the general personality and social psychological research that situational and temporal factors may influence the extent of consistency and change in a person behavior across multiple events, before examining in detail exactly how these factors affect behavior, it is necessary to first examine whether traceable behavioral trajectories can still be identified in spite of these influences. Thus, the present project focused on the possibility of identifying these traceable trajectories across series. Integrating the other key competing determinants of consistency – situational content and time – will thus be the next step in the study of behavioral consistency in serial crimes and will be further considered in the Discussion (Chapter 9).

Summary and Focus of the Present Project

In order to use behavioral evidence for linking serial crimes, two conditions must be satisfied: (a) the unit of analysis that is used (i.e. how behavior is measured) must be unique enough to allow for the differentiation of one series from another and (b) this unit of analysis remains consistent enough to allow for the linking and identification of a series.

To date, research on linking series of crimes has not yet been able to identify this optimal unit of analysis that would satisfy both of the above conditions. Understanding the dimensionality of behavioral manifestation is an important step toward a fuller conception of behavioral consistency as a whole and may be especially useful in the understanding of consistency in criminal behavior. For example, it has been argued in the literature that serial offenders generally exhibit some form of controlling (or organized) behaviors in order to complete their act (e.g. Canter et al., 2004), and thus looking at control behaviors as either present or absent only may not be as useful in finding consistency that is also practical for differentiating one series from another. On the other hand, looking at control as a dimension that can vary in both type and level can provide enough detail for differentiation whilst also helping identify potentially fluctuating patterns of behavior where the offender may lose control (Hickey, 2006) or vice versa, become more controlling as his series progresses.

Studies that specifically examine behavioral consistency in serial crime in general and serial rape in particular find that consistency levels are relatively low, especially when more than two crimes from a series are analyzed. The general psychological literature suggests that looking for consistent patterns (i.e. progression of behavior along a certain dimension) rather than absolute consistency may be a fruitful approach. Thus, reframing our understanding of what constitutes consistency in crime series as a dynamic pattern rather than static behavioral

matching may be the key for making empirical progress in the use of behavioral evidence for linking crimes. Using the right unit of analysis, it may be methodologically possible to develop an empirical model that would identify consistent patterns of behavior within each series whilst also distinguishing one series from another.

The present research project is a methodological reconceptualization of the basic constructs that underpin behavioral linking in serial crime. Specifically, as has become apparent from the review of the literature pertaining to classification and differentiation of rape offender's behavior, it is necessary to examine behaviors that are associated with the previously identified motivation types as well as crime scene themes in rape offenses in a *revised dimensional approach* rather than categorically – as all or none types (Study 1). Once differentiation along the behavioral dimensions is established, it can be used in a *reframed approach to consistency as a dynamic process* to improve our understanding of how offenders' behavior progresses across series, and whether behavioral trajectories can be used in lieu of behavioral stability to establish crime linking (Study 2).

CHAPTER 3: Aims & Hypotheses

Study 1 – A Dimensional Understanding of Sexual Offenders' Behavior

In order to substantiate the first key hypothesis that underlies behavioral linkage, namely, the *individual differentiation hypothesis* (as outlined in Chapter 1), Study 1 of this project aimed to determine whether control, violence, and sexual activity in rape offenses can be better understood dimensionally, rather than as distinct offense types. For each of the three key behavioral aspects of rape (Control, Violence, Sexual Activity), the study aimed to:

1. Identify the qualitative (subtype) distinctions between groups of offenses. Specifically:
    - Control – the following subtypes of control have been hypothesized to emerge: *Instrumental control* – where control serves the ultimate purpose of accomplishing the offense (Salfati, 2000); *Violent/blitz control* – where the offender uses violence to quickly incapacitate the victim, consistent with what has been described in the literature as "blitz attack" (Brannen & Salfati, 2008); *Extreme control* – where the offender goes to great length in exerting control over the victim that goes beyond what would be necessary to complete the attack.
    - Violence – the following subtypes of violence have been hypothesized to emerge: *Instrumental violence* – where violence serves as the means to accomplishing the offense; *Expressive violence* - where an offender engages in gratuitous violence throughout the offense (Salfati, 2000); *Situational violence* – where an offender engages in an act of violence in response to

unpredictable circumstances (e.g., victim resistance; Hewitt & Beauregard, 2014)

- Sexual Activity – the following subtypes of sexual activity have been hypothesized to emerge: *Pseudo-pleasing* – where the offender engages in sexual acts, such as "foreplay" and seemingly tries to "please" the victim (Canter et al., 2003); *Demeaning* – where the offender engages in sexual acts that have been discussed in the literature as aimed to degrade and demean the victim (e.g., anal intercourse; Hazelwood & Burgess, 2009); *Instrumental* – where the offender engages in few additional sexual behaviors beside vaginal intercourse, suggesting basic sexual gratification as the main focus of the attack.

2. Identify the quantitative (degree) distinctions between offenses.
    - It was hypothesized that a quantitative classification of offenses into a Low, Moderate, and High degree of Control, Violence, and Sexual Activity will emerge based on the number of elements of each that the offender used during an offense.

Study 2 – Dynamic Behavioral Consistency

In order to substantiate the second hypothesis that underlies behavioral linking, namely, the *consistency hypothesis* (as outlined in Chapter 1), Study 2 aimed to test the utility of the dimensional approach to behavioral classification of rape offenses (using control, violence, and sexual activity dimensions identified in Study 1) in detecting consistency as well as to determine the extent to which specific behavioral change trajectories could be identified in addition to consistency. More precisely, the study aimed to:

1. Determine whether offenders remain consistent or follow an identifiable quantitative and/or qualitative behavioral trajectory in the dimensions of control, violence, and sexual activity (as identified in Study 1). Specifically:

    - It was hypothesized that while a number of offenders will remain consistent in their use of control, violence and sexual activity in transitioning *from one crime to the next* within series, others will exhibit an identifiable progression of behavior along these dimensions.
    - It was also hypothesized that *overall* behavioral trajectories of consistency and change over multiple crimes in the series could be identified in each behavioral dimension.

2. Identify the cross-dimensional relationships between behavioral trajectories across crimes in the series (i.e., determine how consistency or change within one behavioral dimension correlates with changes or consistency in the other two).

    - This part of the study was exploratory in nature, and therefore no specific predictions were made as to how the trajectories will correlate across dimensions.

CHAPTER 4: General Methodological Approach

Facet Theory Approach to Research

Facet theory (FT) is "a unique approach to integrating theory construction, research design, choice of observations, data analysis, and interpretation, which often leads to the formulation of behavioral laws." (p. 13; R. Guttman & Greenbaum, 1998). The facet theory approach to research is particularly useful in framing the present project because it allows for sophisticated, multidimensional analysis of complex behavioral data that is rooted in and guided by a theoretical framework. Limor and Levy (1992) wrote:

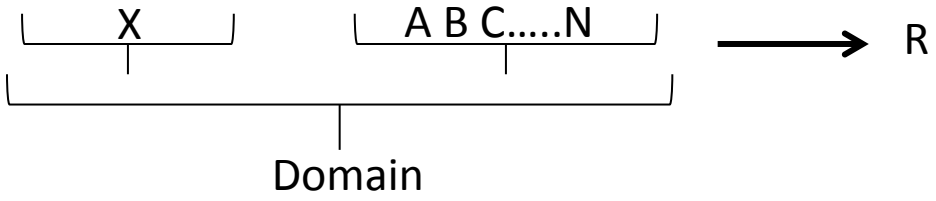
> "[Facet theory] focuses on definitions of the area under study, stresses the concepts involved and their interrelationships, and only then attempts to express them quantitatively. Facet theory is basically a qualitative research method that can handle input variables of all sorts, including ordinal and even nominal variables. It is particularly concerned with answering the following twofold question: What is the conceptual structure of the area under investigation, and what is the expected structure of the set of variables and the rationale for this structure? The objective is to formulate laws that will describe the behavior in question in an orderly way. This much must be done before the data are gathered. (p. 69)

Thus, it is important to understand that the empirical testing that is conducted within the FT approach to research is grounded in the theory and conceptualization of predefined relationships expected to arise, and as such is a hypothesis testing framework whereby the interpretation of the analysis results can only be seen as meaningful if the expected pattern of relationships in the data was predefined prior to undertaking the analysis.

FT defines a specific way of approaching a research problem, defining concepts, stating the hypothesis, arranging and analyzing the data. The first step in this process is identification or formulation of *facets*. Facet is "a set of attributes (variables) that together represent underlying conceptual and semantic components within a content universe" (p. 17; R. Guttman & Greenbaum, 1998). In other words, facets are variables that have a common underlying meaning and come from a specific (in this case) behavioral domain. Once the facets that form the behavioral domain of interest are identified, they are organized into a *mapping sentence*. A mapping sentence is "a verbal statement of the domain and of the range of a mapping including verbal connectives between facets as in ordinary language" (p. 413; Shye, 1978). The mapping sentence organizes the facets into a structural hypothesis (Shye, Elizur, & Hoffman, 1994) that serves as the definitional and conceptual base for the problem to be studied. It must include three components: 1- the population, 2- the content facets, and 3- the range of responses, thus forcing the researcher to identify and explain the theoretical constructs of the research question as well as the types of observations that are needed to test it (R. Guttman & Greenbaum, 1998).

It is important to note that the conceptualization of domains, facets, and the mapping sentence used in the present study is in line with the way these concepts have been used in the Investigative Psychology (IP) research area (Bohm & Alison, 2001; Canter & Youngs, 2009; Dancer, 1990; Guttman & Greenbaum, 1998, Porter & Alison, 2001; Taylor, 2002), but differs somewhat from these concepts as described by Guttman in his original works. Whereas Guttman intended for the mapping sentence to allow for any given combination of items every time a person is tested, the IP use of the mapping sentence defines a finite set of responses where once a crime receives a certain score, it cannot have any other score, thus each crime can have only one profile.

Figure 4 below represents the conceptual model of the structure of a mapping sentence. The X designates the population of persons under study (or population of interest) and, together with the *content facets* (ABC….N), it forms the domain. The range (R) is the specified set of possible responses (or scores) that are relevant to the investigation. The *domain* is "the Cartesian product of all the facets used to depict the study, combined with the description of the population to be observed" (p. 17; Guttman & Greenbaum, 1998).



Note: Adapted from "Lawful roles of facets in social theories" by S. Levy (1985), in D. Canter (Ed.), *Facet theory: approaches to social research*, p. 73. Copyright 1985 by Springer-Verlag. Reprinted with permission.

Figure 4. Mapping sentence components

One of the key objectives and products of the FT approach is the identification and establishment of behavioral patterns and regularities with the subsequent goal of developing laws of behavior (Guttman & Greenbaum, 1998). This approach was adapted in the present study due to its particular advantages described above and its suitability for accomplishing the research aims that have been posed here, specifically, in identifying the quantitative and qualitative patterns of offenders' behaviors within specific behavioral facets.

Defining the Behavioral Dimensions

In line with the facet theory approach, the three crime behavior dimensions of violence, control, and sexual activity that are comprised of a variety of facets described below have been predefined here based on the previous literature in the area of study of sexual offenders' behavior (as described in Chapter 2).

Control. The dimension of control is comprised of behaviors that had been described in the literature (see Table 1) as being characteristic of various rapist types. These can be organized into four elements: (a) verbal - where an offender controls the victim through verbal threats; (b) weapon - where the offender uses a weapon (e.g., a gun or knife) to threaten and thus control the victim; (c) physical - where the offender uses special tools, such as bondage or gagging, to control the victim; and (d) violent - where the offender resorts to physical violence (e.g., manual beating or using blunt force to incapacitate the victim) as a way of gaining victim's compliance.

The range of control strategies utilized by the offender during a given crime can be organized into a mapping sentence as described above. Here it is used to represent how the above described elements of the control facet fit within the offense behaviors. In addition, it specifies a "common range" of control whereby all possible relationships between elements are accounted for, thus forming a structural hypothesis. Figure 5 presents the mapping sentence for the domain of control. The mapping sentence outlines four aspects of control behavior, where verbal, weapon, physical and violent facets involve a dichotomy of action (i.e. present/not present).

The hypothesized scale of control has an additive (quantitative) feature ranging from very low control (i.e., where all elements have been coded as absent) to high levels of control (where all elements have been coded as present) over the victim. Thus, differentiation in the degree of control used by the offender is possible using the number of control elements that the offender engaged in (e.g., someone who used one element is exhibiting low control, whereas someone who used two or three elements is showing moderate control, while the use of all four elements of control constitutes a high degree).

An offender's (x) pattern of control behaviors at the crime scene (y) is characterized by the extent to which he uses

Content Facet		*Range Facet*
Verbal Weapon Physical Violent	control actions →	Low (absent) High (present)

Figure 5. CONTROL dimension mapping sentence

The hypothesized qualitative (subtype) differences between crimes are expected to emerge through the presence of different combinations of actions. Specifically, the use of a weapon to threaten and force victim into initial compliance together with binding to complete the rape is consistent with the hypothesized instrumental style of control. Alternatively, using violence as the primary means of control is consistent with a violent/blitz type of control. An extreme type of control is expected to emerge through the combination of at least three control modes (e.g., verbal, physical, and violent).

Violence. Previous studies of sexual offending (see Table 1) describe the use of violence by various rapists at the different stages of the crime (i.e., during the approach, during the actual assault, and at the end - prior to leaving or disposing of the victim). Thus, an offender may be violent throughout the offense or he may (a) only resort to violence in the beginning to incapacitate the victim, (b) engage in violence during the actual assault act (e.g., the so-called, sadistic rapist), or (c) only appear violent at the end. Moreover, an offender may use exclusively (a) manual violence, or may (b) use a weapon, such as a knife or a blunt instrument, which may result in more severe injury and is also considered a more severe crime by the law enforcement (i.e., assault vs. assault with a weapon). The actual extent of injury to the victim has not been examined as part of the violence domain here due to the subjective nature of determining the

severity of injuries that the victim suffered (in addition to the fact that there are individual differences in how the body reacts to wounding if the number or even mere presence of visible bruises are taken as an indication of injury severity). However, the presence of violence at only one point during the crime as opposed to multiple points during the offense as well as the use of weapon at any or all episodes of violence serves here as an indication of a range for this domain in an objective way. Figure 6 organizes into mapping sentence the scope of violence domain as it was looked at in this study.

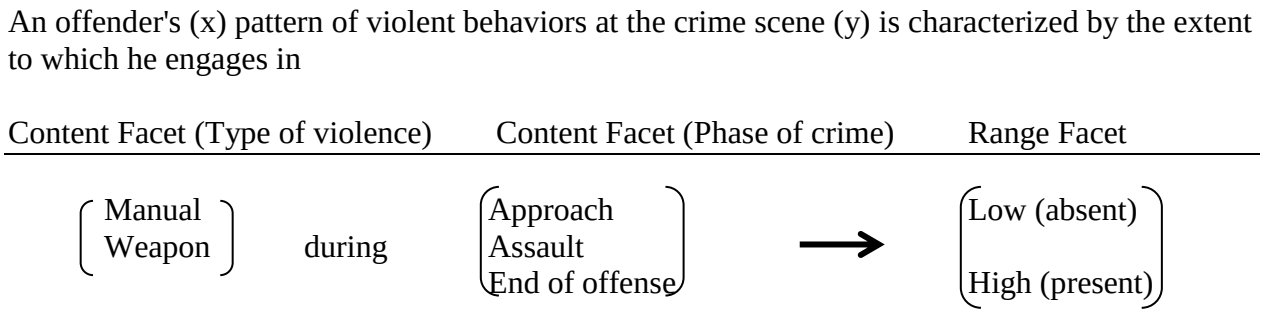


Figure 6. VIOLENCE dimension mapping sentence

The hypothesized quantitative scale of violence can be seen as a 3 x 2 (stage x type) matrix, indicating the degree of violence present throughout the offense, ranging from very low violence, where the offender refrains from using overt violence at any stage of the offense), to moderate levels, where the offender engages in violence at one or two stages of the offense, or uses both manual and weapon at any one stage of the offense, to high levels of violence, if the offender uses multiple wounding ways at each stage.

Different subtypes of violence are also expected to emerge. Specifically, when the offender only engages in minimal violence at the beginning of the offense to subdue the victim, this is consistent with an instrumental subtype of violence (i.e., violence used as a means to control and allow for the completion of the offense). Alternatively, when an offender who

engages in multiple acts of violence throughout the offense (i.e., during approach, assault, and at the end of the offense) this is consistent with an expressive use of violence (Salfati, 2000). Furthermore, situational violence is hypothesized to be evident from isolated violent outbursts appearing after the start of the offense (i.e., use of weapon violence at the assault or end of offense stages).

Sexual activity. The complexity of sexual activities that the offender engages in with the victim during a rape offense has often been ascribed in the clinical and investigative literature to the degree and richness of fantasy involved (Hazelwood & Burgess, 2009; Hickey, 2006). Moreover, different types of offenders within the existing typologies (see Table 1) are said to differ in this complexity of fantasy and henceforth of sexual behavior. Authors have also hypothesized that the sexual fantasy of an offender may evolve throughout a series (Douglas & Munn, 1992). A detailed analysis of the various behaviors that have been described in the literature as important resulted in the following elements to be analyzed: (a) the use of sexual verbiage (i.e., whether the offender complements the victim sexually or uses profanity to insult her); (b) presence of "foreplay" sexual activity – such acts have often been described to distinguish a subtype of rapists who fantasize that the rape is in reality a consensual act (e.g., power-reassurance rapist in Groth et al., 1979); (c) penetrative sexual acts; (d) forcing victim participation (ranging from verbal scripts to active involvement, such as forcing her to perform oral sex); and (e) the use of foreign objects or anything other than the penis to penetrate the victim.

Figure 7, presented below, organizes these facets into a mapping sentence. This mapping sentence represents the six sub-facets of sexual activity (verbal, pseudo-intimacy, penetration, victim participation, use of props). The complexity of the sexual activity exhibited by an

offender herein can range in degree from minimal where the offender was unsuccessful in his attempt to rape the victim, to moderate, where the offender engaged in two or three sexual behaviors (e.g., kissing and penetration) to highly intricate where the offender engages in multiple sexual acts during the offense.

An offender's (x) pattern of sexual activity behaviors at crime scene (y) is characterized by the extent to which he engaged in

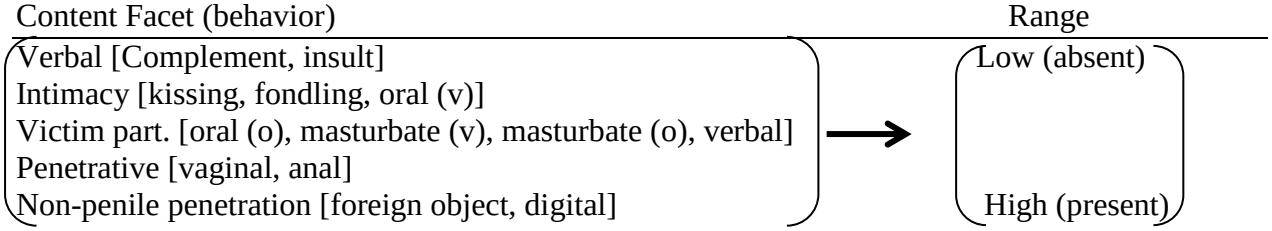


Figure 7. SEXUAL ACTIVITY mapping sentence

Importantly, distinct subtypes of sexual activity were expected to emerge. Specifically, offenses characterized by the presence of "foreplay" (e.g. kissing, fondling) in addition to penetration, would constitute a "pseudo-pleasing" subtype of sexual activity. Alternatively, an offense characterized by forced victim participation and anal penetration is hypothesized to represent a demeaning subtype of sexual activity. Further, an offense characterized by vaginal penetration in the absence of other sexual behaviors, may constitute an "instrumental" sexual activity style (i.e., where the only purpose of the attack is basic physiological gratification).

Statistical Approach to Qualitative & Quantitative Differentiation

In addition to specifying the initial framework for formulating and defining the research problem, FT approach identifies several non-parametric multidimensional analysis techniques that are particularly suitable for complex behavioral and psychological data. These analyses include Partial Order Scalogram Analysis with Coordinates (described in detail in a later section)

along with several others (e.g. Smallest Space Analysis, Multiple Scalogram Analysis) that can help overcome the problems inherent to real world non-parametric data that are nearly impossible to solve using conventional statistical approaches.

In the present study, a Partial Order Scalogram Analysis with Coordinates (POSAC; Shye, 1985) was used to identify the behavioral differentiation in degree and style within the three behavioral dimensions of rape offenses, namely, violence, control, and sexual activity.

POSAC is a nonparametric multidimensional scaling technique that allows for a comparison between the profiles of individuals, or cases on multiple variables simultaneously (Shye et al., 1994). In addition to comparing cases on a qualitative dimension by creating profiles of scores across variables, POSAC assumes that there is a meaningful order to the variables, creating a quantitative scale in relation to the cumulative score of variables for each profile. The possibility of analyzing both qualitative (subtype) and quantitative (degree) differences between cases across a behavioral dimension makes it particularly appropriate for the current study. POSAC has been used previously within the social scientific and investigative psychology research (see Bohm & Alison, 2001; Dancer, 1990; Guttman & Greenbaum, 1998, Last & Fritzon, 2005; Porter & Alison, 2001; Taylor, 2002 for some examples) and has been propagated as a particularly useful technique for studying complex behavioral issues because of its ability to take into account multiple variables simultaneously and because of its sensitivity to both quantitative and qualitative differentiation. For example, Last and Fritzon (2005) used POSAC to identify a scale of expressiveness in homicides. While most homicides can be broadly differentiated into expressive or instrumental, Last and Fritzon used POSAC to devise a more sensitive differentiation measure that looks at one of the broader types in more detail. Similarly, in the present study, POSAC was used to delineate quantitative and qualitative differences

between crime scenes on three broad behavioral dimensions: control, sexual activity, and violence.

In POSAC, numeric profiles are created using the scores each crime scene received based on the presence (2) or absence (1) of the variables that comprise the behavioral dimension in question (e.g., the control dimension is comprised of four variables: verbal, weapon, physical, and violent, thus, a case where only verbal and physical control were present would receive a numerical profile of 2121, whereas a case where weapon and physical control were present would receive a profile of 1221, and so on).These profiles subsequently are represented as points in a geometrical space. The location of the points is based upon both the order of the profiles (i.e., quantitative differences) as well as the types (i.e., qualitative differences), as shown in Figure 8.

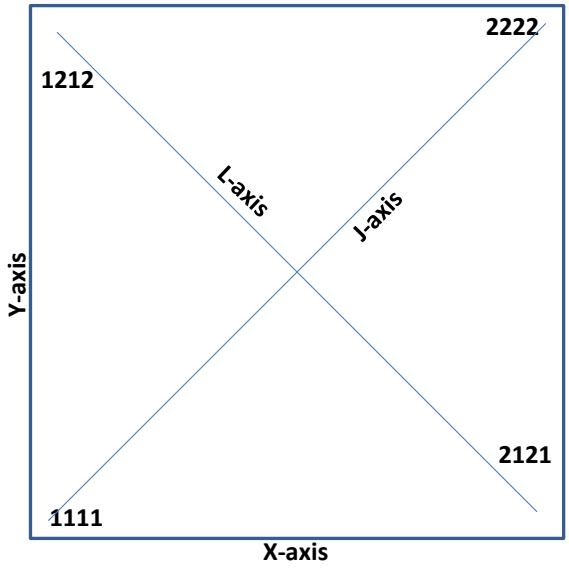


Figure 8. Ordering of profiles in a POSAC plot.

The ordinal (degree) differences are represented along the joint (*J*-) axis of the POSAC plot (Shye et al., 1994) running from bottom left to top right corner of the plot. The profile with the lowest possible score (i.e., crime scenes where all control variables, for example, were scored

as 1-absent, resulting in a profile of 1111) appears at the bottom left corner of the plot and the profile with the highest possible score (i.e., crime scenes where all variables in question were scored as 2-present, resulting in a profile of 2222) appears in the top right corner of the plot. The rest of the profiles are ordered along this axis such that the ones with a lower score (e.g., 1112) appear lower than those with a higher score (e.g., 1122). Profiles can only be 'ordered' quantitatively and considered comparable if the higher profile has the same present variables as the lower profile and an additional present variable that is not present in the lower profile (i.e., 1122 is comparable and higher than 1112 because it has the element present in the lower profile and one additional element; on the other hand, 1122 is not comparable to 1211 because, even though it has more present elements in total, the lower profile has an element present that is absent in the higher profile). In addition, because profiles with the same numeric score could have a different composition, the un-ordered (subtype) differences are represented along the lateral (*L*-) axis, running from top left to bottom right corner of the plot. Thus, as shown in Figure 8, profiles that have the same score (e.g., same level of control) that are composed of different elements (e.g., 2121 – verbal and physical present vs. 1212 – weapon and violent present) appear on the same distance from the top (i.e., top right corner where the highest profile is, along the J-axis) of the plot, but are situated in opposing corners from each other (i.e., along the L-axis). These profiles are considered to be "incomparable" because, although their quantitative score is the same, they are composed of different elements, and thus, are qualitatively different (i.e., constitute different "types"). The purpose of the analysis is to see how the data fit this hypothetical matrix within a geometrical space, whether the majority of cases can be ordered quantitatively, and whether the quantitatively incomparable types constitute

those that were previously hypothesized (see "Aims and Hypotheses", Chapter 3) based on the outlined theory.

The results of a POSAC consist of a main plot that contains all profiles and individual plots for each variable that was included in the analysis. The individual plots have the exact same configuration of points as the main plot, but show the score (present/absent) that each profile received on that variable. The overall interpretation of the analysis involves the identification of regions on the plot where all (or most) cases have the same score. Because the expected relationships between facets of each domain (i.e., the specific subtypes that are expected to emerge) are predefined based on the outlined theory, the patterns identified within the POSAC can be interpreted as meaningful if they are in line with the specified hypotheses.

Partitioning of the regions is determined by the statistical software (HUDAP; Amar & Toledano, 2009) used to perform the analysis and is based on the coefficient of monotonicity[6] that is calculated for each variable (Shye et al., 1994). Partitioning can be made along either of the universally known X or Y axes as well as along the J or L axes described above. A partitioning along X or Y axis signifies a scale being formed, and when multiple variables have a similar partition, types emerge (e.g., all crime scenes that include physical control also have weapon control and form together the Instrumental type of control).

In addition to being able to use POSAC for differentiating crime scenes along the qualitative and quantitative dimension, Figure 9 represents an example of how POSAC may be used to determine series consistency or behavioral change. The series marked green on the plot consists of five crimes and each of them is situated further to the right and upward (along the J

[6] The coefficient of monotonicity is a measure of the extent to which the partition is an accurate representation of the distinction between cases. A coefficient of 1 demonstrates a perfect partition—where all cases with the same variable score are on one side of the partition line. As the coefficient decreases so does the validity with which the partition line is a true discriminator between cases. A coefficient above .8 is generally considered as acceptable (Shye et al., 1994).

axis). Such pattern would suggest a quantitative change or escalation (e.g., increase in violence). The next series, marked red, is represented by a single dot on the plot which means that the profiles for all four crimes within that series had the exact same configuration of presence and absence of the analyzed behavioral elements, signifying complete consistency. Finally, the orange series in the top part of the plot would suggest that the offender is changing the type of behavior exhibited (e.g., different kind of sexual activity), while remaining consistent in the degree of the behavioral manifestation (i.e. all crimes are at the same level along the J axis, but on different positions along the L axis). The additional partitioning specifications that will be described in detail in the results section of Study 1 (Chapter 5) allow for the determination of the kinds of changes in subtype that occur in a given series.

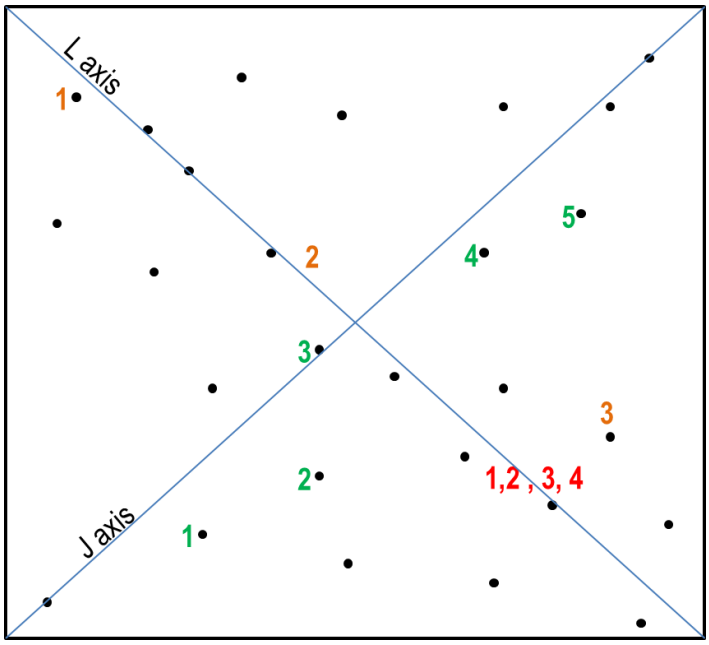


Figure 9. Model of how Partial Order Scalogram Analysis with Coordinates (POSAC) plot may be used for identification of behavioral trajectories within series

CHAPTER 5: Study 1 – A Dimensional Understanding of Sexual Offenders' Behavior: Qualitative and Quantitative Differentiation

Overview

The identification of the most appropriate behavioral unit of analysis lies at the basis of being able to use behavioral evidence for linking serial crimes. Importantly, this unit of analysis must efficiently differentiate between offenses before its consistency is tested for the purposes of linking. As has been outlined in the literature review (Chapter 2), in serial rape, three subgroups of offenders' behaviors, namely, Violence, Control, and Sexual Activity, have been consistently discussed in the literature as key in this type of offence (see Table 1). Although these behavioral categories have been proffered as differentiating between types of rapists, studies consistently find that most rape offenders are likely to engage in behaviors from each of these categories at least to some extent, thus making a categorical approach impractical for differentiation and subsequent linking. In order to avoid the recurring issue of "mixed types" in the empirical attempts of classifying sexual offenses, it is necessary to examine the use of control, violence and sexual activity behaviors by the offenders dimensionally. Therefore, it has been proposed that reframing these categories as dimensions of rape offenders' behaviors and distinguishing between offenses quantitatively (based on the specific degree of behavior present) and qualitatively (based on the specific subtype of behavior present) may be more efficient, and subsequently lay the foundation for determining the extent to which offenders remain consistent or progress in an identifiable trajectory along these dimensions. Specifically, as outlined in Chapter 3, in this study: (a) a number of qualitative subtypes are hypothesized to emerge within each of the behavioral dimensions (control: *instrumental*, *violent/blitz*, *extreme*; violence: *instrumental*, *expressive*, *situational*; and sexual activity: *pseudo-pleasing*, *demeaning*,

instrumental), and (b) distinct quantitative differentiation into *low*, *medium*, and *high* degree of enactment were hypothesized to emerge within each dimension.

Method

Data

The dataset used for this project consisted of 30 rape series, all committed by male offenders acting alone who together were responsible for a total of 192 distinct assault incidents (each assault incident corresponds to a single crime scene). Figure 10 shows the distribution of crimes per offender. The mean number of offenses per series was 6.4 (SD = 3.14), and the mode was 4[7]. Of the 192 incidents, 51 (26.5%) constituted attempted sexual assaults and the remaining 73.5% constituted completed sexual assaults[8].

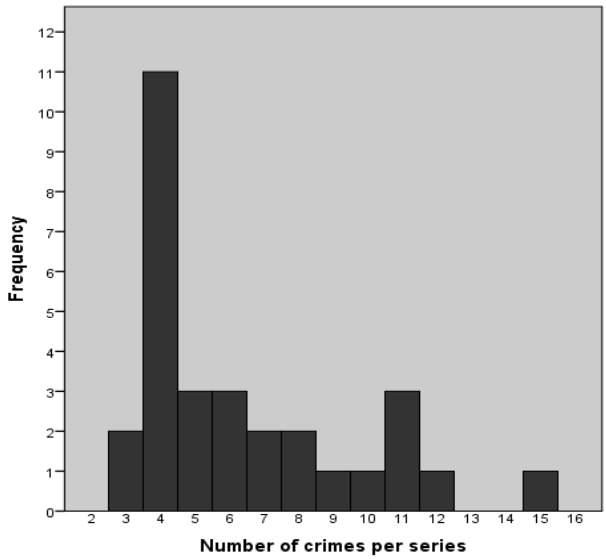


Figure 10. Distribution of the number of crimes per series in the sample

[7] Because the number of crimes per series varied from 3 to 15, the assumption of independence is likely to be violated when all crimes of a series are included in a classification analysis. To test whether disproportionate weighing of some series may have affected the model, an additional analysis was conducted with only 4 crimes per series. This analysis yielded the same differentiation pattern in all three behavioral dimensions, therefore, the analysis including the full dataset is presented below.

[8] According to the National Center for Victims of Crime, sexual assault is defined as "an act of forcing another person into sexual activity against his or her will. Sexual assault takes many forms, including rape or attempted rape, as well as any unwanted sexual contact" (NCVC, 2012). The present sample included series composed of a variety of sexual acts. As the present study was not concerned with the legal differentiation between rape and sexual assault, the terms are used interchangeably.

The data for this research were taken from closed, fully adjudicated state and local cases of serial rape that were contributed from law enforcement agencies from around the country for the purpose of research. All identifiers, including names of victims, suspects, offenders, officers, department, correctional agencies, were removed. Only aggregate data are reported on.

Demographics. Nearly all of the victims were female (98.4%) and their age ranged from 7 years old to 91 years old (M = 33.5, SD = 21.19; Median = 25). Of those whose race or ethnicity was known (n = 170; 88.5%) 123 were Caucasian (64.1%), 16 (8.3%) were African-American, 16 (8.3%) - Hispanic, 12 (6.3%) - Asian. All of the offenders were male, and their age ranged from 16 to 44 years (M = 27, SD = 7.8). Of the offenders, 14 (46.6%) were Caucasian, 9 (30%) were African American, 5 (16.6%) - Hispanic, 1(3%) - Asian and 1 (3%) were of other ethnic origin. Almost a third (9; 30%) of the offenders were laborers, 6 (20%) were unemployed, 5 (16.6%) were students, 1 (3 %) was professional/white collar, 2 (6%) had multiple or other occupation and the occupation was not known for 7 (23.3%) of offenders. Offenders were known to have a criminal record in 11 (36.6%), however, for the rest of the cases, it was not known whether the offender had a criminal record or not. In most cases (n = 171; 89.1%) the offenders were strangers to the victims, 3.6% were acquaintances, one victim was friends with the offender and one was family related. The relationship between victim and offender was unknown in 6.3% of cases.

Data Coding

Variables that are used in this study were coded using the Homicide Profiling Index, Revised for Use with Rape (HPI-R©, Salfati, 2010). The HPI-R was specifically devised for use with police files. The HPI-R contains 312 variables, and includes 27 different subgroups of variables that can be divided into 6 general sections: 1) case file contents, 2) pre-crime

behaviors, 3) crime scene behaviors, 4) post-crime behaviors, 5) victimology, and 6) offender background. The majority of the variables follow a dichotomous scoring scheme (i.e., 0 = absent, 1 = present). The HPI-R also contains categorical variables (e.g. type of strangulation, offender-victim relationship), measurement variables (e.g., weight of victim/offender, distance between the offender's residence and crime scene), and descriptor variables (i.e., coders write detailed descriptions of certain crime scene behaviors). This coding dictionary has been thoroughly tested for use with a variety of violent crime cases, including single and serial homicide and rape (Salfati & Osborne, 2011). The procedure of training for use of the HPI-R coding dictionary involves three phases that include coding, inter-rater agreement tests, followed by thorough discussion of discrepancies until an overall inter-rater agreement reaches close to 90%. The full procedure of training and testing of coders who took part in coding the cases used in the present study is thoroughly described in Salfati (2005) and Salfati & Osborne (2011).This dictionary has already successfully been used in a number of earlier studies (i.e. Kearns & Salfati, 2014; Salfati & Bateman, 2005; Salfati et al., 2014; Sorochinski & Salfati, 2010).

Results

The aim of the study was to determine whether serial rape crime scenes can be differentiated based on the subtype and the degree of control, violence, and sexual activity exhibited by the offender. Specific subtypes within each of the above behavioral dimensions were hypothesized to emerge (i.e., control – instrumental, violent, extreme; violence – instrumental, expressive, situational; sexual activity – instrumental, demeaning, pseudo-pleasing) and the degree of the displayed behavior within each dimension was expected to separate out into low, medium, and high levels.

Control Behavioral Dimension

The control behavioral dimension was comprised of four elements: verbal, weapon, physical and violent control. The frequencies of occurrence of these behavioral elements are presented in Table 4.

Table 4

Frequencies of behavioral elements within each behavioral dimension (N = 192)

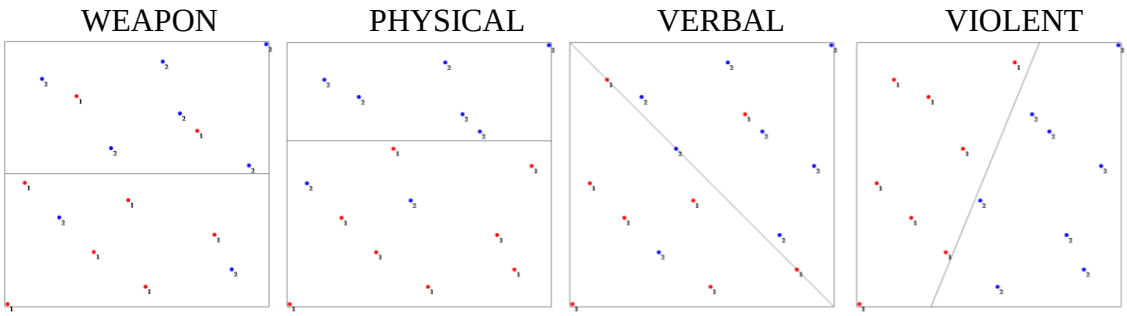
Behavior	***n* (%)**
Control	
Weapon	101 (52.6)
Physical	83 (43.2)
Verbal	113 (58.9)
Violent	91 (47.4)
Violence	
Approach-manual	87 (45.3)
Approach-weapon	4 (2.1)
Assault-manual	59 (30.7)
Assault-weapon	12 (6.3)
End of offense-manual	9 (4.7)
End of offense-weapon	3 (1.6)
Sexual Activity	
Verbal	54 (28.1)
Intimacy	75 (39.1)
Victim participation	46 (24.0)
Penile penetration	105 (54.7)
Non-penile penetration	17 (8.9)

Figure 11a-b presents the two-dimensional solution for the POSAC of these control elements, in which 192 crime scenes are represented as 16 distinct profiles based on the presence or absence of the four control elements analyzed (i.e., across the 192 crime scenes, there were 16 distinct configurations of the above mentioned control elements), such that the profile (point) with the highest score (2222 – all variables were present) appears at the upper right corner of the plot and the profile with the lowest score (1111 – all variables absent) appears at the bottom left

corner, and the rest of the profiles are scattered in-between these two points[9]. The goodness of fit in POSAC is reported in the form of CORREP - a coefficient that indicates the percentage of profile-pairs that are CORrectly REPresented in the map based on their observed frequencies (Borg & Shye, 1995). CORREP equals 1 if there is a map with all profiles-pairs (i.e., distances between the profiles) correctly represented. In the present analysis, the CORREP coefficient was .923[10], which means that 92.3% of profile-pairs were correctly represented in the POSAC plot.

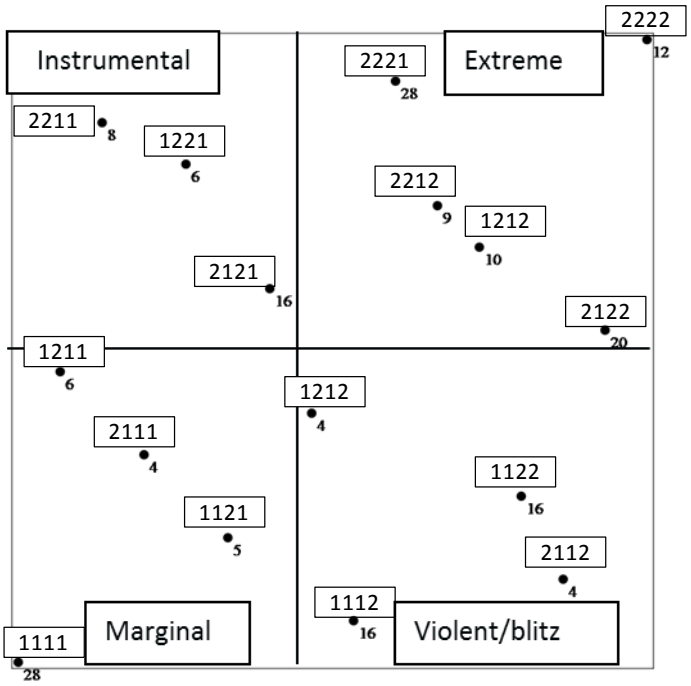
Qualitative (subtype) classification. The item plots that appear in Figure 11a show the configuration of the presence and absence of each separate variable within the 16 identified profiles and is used to determine the subtypes of control. Weapon control partitions along the Y axis and so does the Physical control – that is, in most cases where a weapon was used to control the victim, physical restraints have also been used. The common partitioning of these two variables (i.e., co-occurrence of the variables in the same profiles) suggests the formation of a potential subtype of control. Further, Violent control partitions along the X axis, suggesting another distinct subtype of control. Verbal control partitions along the J axis, which suggests that verbal control appears mainly in addition to other types of control – toward the high end of the quantitative scale.

[9] See Tables 21-22 in Appendix B for a detailed breakdown of X, Y, J, & L co-ordinates of each profile and the corresponding monotonicity coefficients.
[10] CORREP1 (proportion of comparable pairs correctly represented) was equal to .923 and CORREP2 (proportion of incomparable pairs correctly represented) was equal to .789.



Note: the numbers on the item plots represent the presence (2) or absence (1) of the given item in each profile.

11-a - Control Item plots



Note: The numbers under each point represent the frequencies of crime scenes represented by the respective profile. The composition of the profiles is shown in the outlined boxes where the order of elements is as follows: Weapon, Physical, Verbal, Violent (1 = absent, 2 = present).

11-b - Control main plot with outlined regions

Figure 11a-b. Crime scene differentiation within Control behavioral dimension using Partial Order Scalogram Analysis

Figure 11b shows the main plot of control behaviors that combines the item partitions to form an overall understanding of this behavioral dimension. An overall structure that is consistent with the following broad differentiation of cases was identified: Marginal control where the offender exhibited only a single element of "non-violent" control (i.e., either verbal,

weapon threat or using physical restraints), Instrumental control where offenders used a weapon and/or physical means (e.g., binding) to gain compliance of the victim, Violent/Blitz control where offenders necessarily used violence to control the victim, and Extreme control where the offenders engaged in a broad range of control behaviors. Thus, as expected, an overall qualitative differentiation of the hypothesized subtypes of control that the offender used during an offense was identified. Once this structure was identified, it was possible to determine how many crime scenes fell into each style (i.e., the proportion of crime scenes represented by the profiles within each of the identified styles). Interestingly, verbal control appeared to be a supplemental factor rather than appearing in only one control style – in other words, verbal control was generally displayed by offenders only in addition to other methods of control.

In order to determine the number of crime scenes that are characterized by each of the identified control subtypes, the total number of crime scenes represented by the POSAC profiles (see Figure 11b) within each subtypes was summed up. As shown in Table 5, the largest proportion of crime scenes are characterized by Extreme control (41.1%). Marginal control style characterized 21.9% of crime scenes. Nearly 21% of crime scenes were classified as Violent/blitz control and 16.1% - Instrumental control.

Table 5

Frequency (%) of Control Subtypes

Style	Frequency (%)
1 Marginal control	42 (21.9)
2 Violent/blitz control	40 (20.8)
3 Instrumental control	31 (16.1)
4 Extreme control	79 (41.1)

Quantitative (degree) classification. In addition to the qualitative differentiation, a quantitative dimension (from low in the bottom left corner of the plot to extreme in the upper

right corner of the plot) was evident from the POSAC (Figure 11b). In the next step, crime scenes were classified in terms of quantity or degree of control. A measure of quantity of control for each case was derived from the J score associated with its profile. The J score represents the position of that profile along the J (quantitative) axis. Similarly to the way the X- and Y-co-ordinates are used to plot the locations of the profiles along these axes, the J-co-ordinate determines the relative position of the profile along the quantitative scale. Figure 12 shows the distribution of J-scores for the 16 POSAC profiles of the control dimension as well as the corresponding number of behaviors present. Based on the clear stepwise increase in the distribution (i.e., with the presence of every additional element in the profile, a substantial leap in *J*-score is observed thus delineating the distinct levels of control present), profiles with scores of 60 or less were categorized as Low control, scores between 80 and 110 were categorized as Medium control, and scores of 140 and above were categorized as High control. Additionally, crime scenes where none of the behaviors were present (the lowest profile – 1111, J-score = 0.0) and those where all of the behaviors were present (the highest profile – 2222, J-score = 200) are reported separately as they appear distinct in the distribution in terms of how different the score they received was from the next profile[11]. As can be seen from Table 6 that summarizes the frequencies of crime scenes classified as None, Low, Moderate, High, and Max on the quantitative measure for each behavioral subgroup, 33 (17.2%) crime scenes were characterized by low control, 52 (27.1%) of crime scenes were characterized by moderate control level and 68 (35.4%) fell into the high control category with an additional 11 (5.7%) exhibiting the maximum control.

[11] See Appendix A for an ad-hoc discussion of the methodological and practical considerations in categorizing the degree difference and using J-scores vs. number of specific elements to designate quantitative differences.

Table 6

Frequency (%) of Degree/Quantity Measure for Each Behavioral Subgroup

	None	Low	Moderate	High	Max
Control	28 (14.6)	33 (17.2)	52 (27.1)	68 (35.4)	11 (5.7)
Violence	76 (39.6)	67 (34.9)	43 (22.4)	5 (2.6)	1 (0.5)
Sexual Activity	51 (26.6)	52 (27.1)	67 (34.9)	20 (10.4)	2 (1.0)

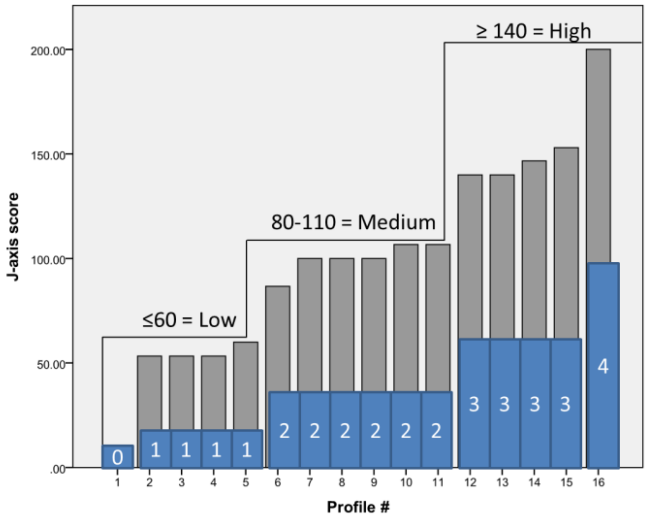
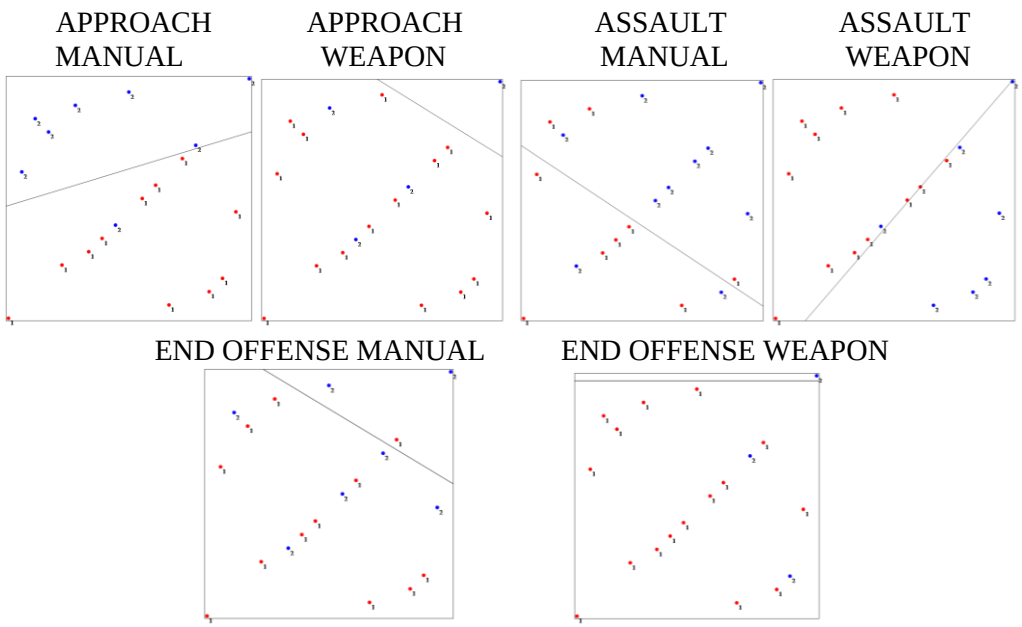


Figure 12. Quantitative differentiation of control into Low, Medium, and High degree based on profile J-score

Summary of control dimensional differentiation. In sum, as hypothesized, a number of distinct subtypes of control were identified as present in the sample of serial rape crime scenes. In addition to the expected instrumental, violent, and extreme control subtypes, a marginal control subtype was also identified in the sample. Further, a quantitative distinction between crime scenes based on the degree of control present was also found. Importantly, the vast majority of offenses (85.4%) had at least one control behavior present, Together with the finding that the largest proportion of crime scenes are characterized by high control level, this confirms not only that control is one of the key aspects of rape offenses, but also that it must be examined dimensionally rather than in all-or-none fashion.

Violence Behavioral Dimension

The violence dimension is comprised of six elements related to when during the offense the violence occurred (i.e., during approach, during assault, or at the end of offense) and whether it was manual or using a weapon (i.e., 3 stages x 2 methods). The frequencies of occurrence of each element in the sample are shown in Table 4 (above). A two dimensional POSAC solution of these six violence behaviors shows 19 distinct profiles that represent the 192 crime scenes in the sample (Figure 13a-b), ranging from the lowest – where no violence was present throughout the offense (profile – 111111) to the highest possible level – where both manual and weapon violence was exhibited by the offender throughout the offense (profile – 222222)[12]. In the present analysis, the CORREP coefficient was .939, which means that 93.9% of profile-pairs were correctly represented in the POSAC plot[13].

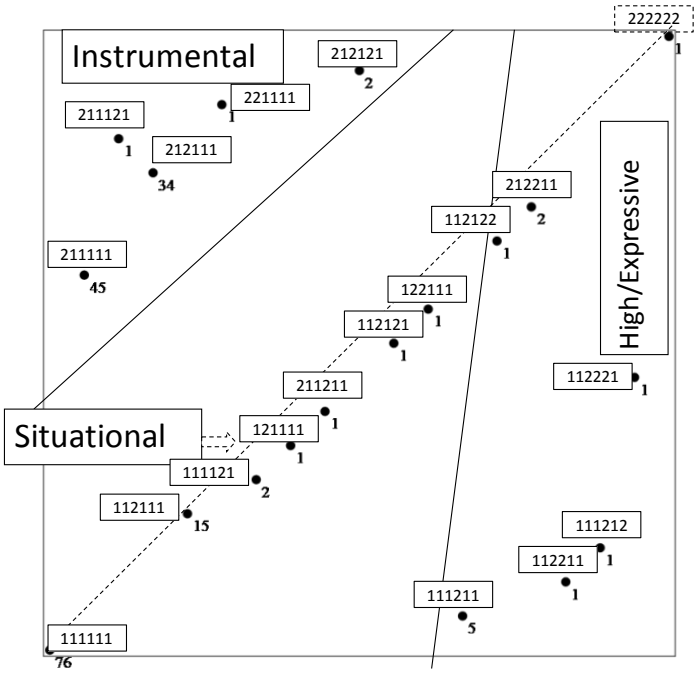


Note: the numbers on the item plots represent the presence (2) or absence (1) of the given item in each profile.

13-a – Violence Item plots

[12] See Tables 23-24 in Appendix B for a detailed breakdown of X, Y, J, & L co-ordinates of each profile and the corresponding monotonicity coefficients.

[13] CORREP1 (proportion of comparable pairs correctly represented) was equal to .944 and CORREP2 (proportion of incomparable pairs correctly represented) was equal to .911.



Note: The numbers under each point represent the frequencies of crime scenes represented by the respective profile. The composition of the profiles is shown in the outlined boxes where the order of elements is as follows: Approach-Manual, Approach-Weapon, Assault-Manual, Assault-Weapon, End of offense-Manual, End of offense-Weapon (1 = absent, 2 = present).

13-b - Violence main plot with outlined regions

Figure 13a-b. Crime scene differentiation within Violence behavioral dimension using Partial Order Scalogram Analysis

Qualitative (subtype) classification. The item plots (Figures 13a) show the presence and absence of each individual behavior in the profiles and were used to identify the subtypes of violence present. Manual violence at the approach stage of the offense partitions along the Y axis and includes profiles at the upper right part of the plot. In contrast, weapon violence during the assault partitions diagonally along the L (qualitative) axis. Together, these results suggest that offenses where manual violence was used during approach (i.e., blitz violence to quickly subdue the victim) are distinct from those where the offender used a weapon to harm the victim at the actual assault stage. Interestingly, the other four violence variables partition along the J (quantitative) axis, with manual wounding during the assault occurring in the upper right half of the plot, manual violence at the end of offense occurs in the upper right corner, and the use of

weapon at the approach as well as at the end of the offense characterize only the extreme cases (top right profile where all of the violence elements that were included in the analysis were present). Using these partitions, as hypothesized, three key subtypes of violence were identified, as depicted on Figure 13b. Specifically, as expected, the use of violence in rape offenses appears to correspond to the known violence types, previously identified in the literature (e.g., Salfati, 2000): instrumental (characterized by blitz violence in the beginning of the attack in order to quickly subdue the victim) and expressive (gratuitous violence throughout the offense intended to harm the victim). Moreover, a cluster of profiles, aligned along the center diagonal of the plot, from lower left to upper right corner (i.e., along the J-axis) have been termed "situational violence" subtype. These profiles include an increasing number of violent outbursts, and after a case by case examination of the offenses (using the available detailed case descriptions) that correspond to these profiles, it was determined that these are crime scenes where the offender used force to overcome victim resistance or in unforeseen circumstances such as the sudden appearance of a friend or neighbor of the victim.

Table 7 summarizes the number of offenses (see Figure 13b) that correspond to the profiles in these subtypes. Interestingly, over half of the offenses were classified as situational (50.5%), while most of the rest were classified as Instrumental (43.2%), with only a minority being classified as Expressive (5.7%). It is important to note that, of the crime scenes that were classified as exhibiting situational violence, most (n=76) did not have any violence present, thus, suggesting that overall, violence is not highly characteristic of non-lethal sexual offenses (in this sample). This also highlights the importance of understanding the quantitative continuum of violence, as suggested previously by Salfati and Taylor (2006).

Table 7

Frequency (%) of Violence Subtypes

Style	Frequency (%)
1 Situational	97 (50.5%)*
2 Instrumental	83 (43.2%)
3 Expressive	11 (5.7%)

*N.B. Of those, in 76 (39.6%) there was no physical violence present.

Quantitative (degree) classification. The quantitative differentiation in violence into degree categories of low, medium, and high was derived using the J-scores obtained from POSAC of the violence behavioral dimension. As can be seen in Figure 12, similarly to the control dimension, the categories are distinguished by a sharp increase in J-score that also corresponds to the increase in the number of behaviors present. As seen in Table 6 (above), a total of 67 (34.9% of offenses were characterized by low violence (violence exhibited only at one point during the offense), 43 (22.4%) were characterized by moderate degree of violence (violence exhibited at two points during the offense or multiple modes of wounding – manual and weapon – used), and only 5 (2.6%) of offenses were characterized by a high degree of violence, with an additional 1 (0.5%) offense that included the maximum level of violence (i.e., both manual and weapon violence used throughout the offense). As noted earlier, 76 (39.6%) of offenses did not have any overt violence present at any point during the offense.

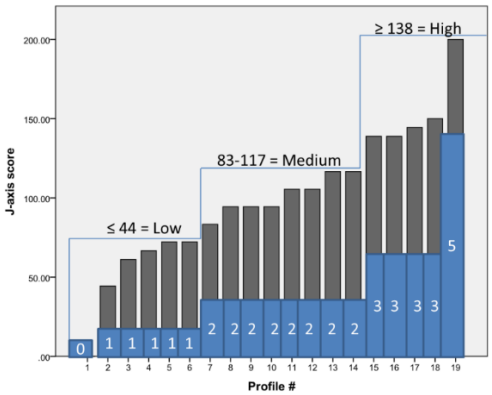


Figure 14 Quantitative differentiation of violence into Low, Medium, and High degree based on profile J-score

Summary of violence dimensional differentiation. In summary, the hypothesized distinction into subtypes within violence behavioral dimension has been identified. The commonly known types of violence – expressive and instrumental – were evident in a minority of the cases, while in the majority of cases, violence appeared to be situationally based. The fact that so few crime scenes were classified as exhibiting expressive violence may suggest that, at least in the present sample, anger (commonly associated with gratuitous violence being exhibited by the offender) was not the driving factor in most offenses. Further, in examining the degree of violence present in these offenses, it was found that the vast majority of offenses in this sample of rapes ranged from no violence to moderate degree of violence with only a minority of cases showing high levels of violence. This is interesting in that, as noted in the literature review, aggression and violence have been put forth as one of the key motivational factors in rape offenses (e.g., Knight & Prentky, 1990), while, at least in the present sample, violence levels appear to be fairly low and mainly situational. This highlights the importance of examining violence in the context of the offense (Hewitt & Beauregard, 2012).

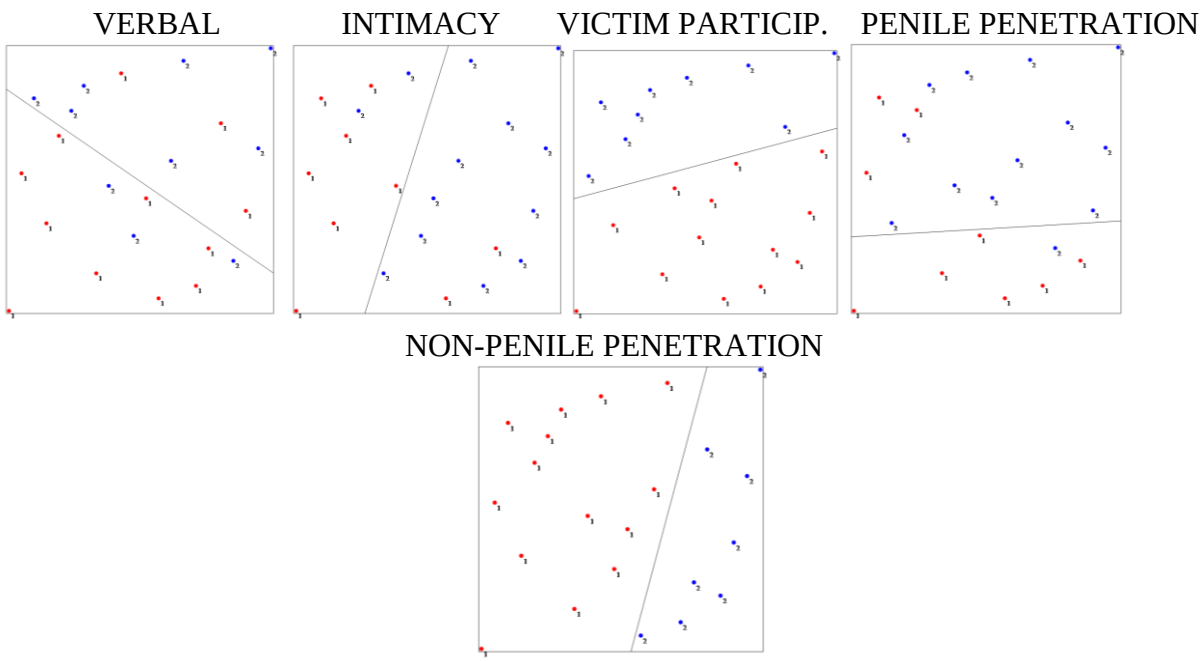
Sexual Activity Behavioral Dimension

Sexual activity is the most complex of the behavioral dimensions and is comprised of five elements: verbal (i.e., complements or other sexually explicit verbiage), intimacy (i.e., kissing, fondling, oral sex by offender), victim participation (i.e., offender demanded that victim performs certain acts, such as oral sex or masturbation), penile penetration (including vaginal and anal penetration), and non-penile penetration (i.e., insertion of foreign objects or digital penetration). The frequencies of occurrence of each element in the sample are shown in Table 4 (above). Figure 15a-b shows the two-dimensional representation of POSAC of the sexual activity dimension in which the 192 crime scenes are represented by 22 qualitatively distinct profiles

based on the presence or absence of the five behavioral elements. Similarly to the other two behavioral dimensions, the profiles are distributed on the plot so that the profile where none of the elements were present (i.e., profile of 11111) appears in the lower left corner of the plot and the profile where all of the elements are present (22222) appears in the top right corner[14]. In the present analysis, the CORREP coefficient was .954[15], which means that 95.4% of profile-pairs were correctly represented in the POSAC plot.

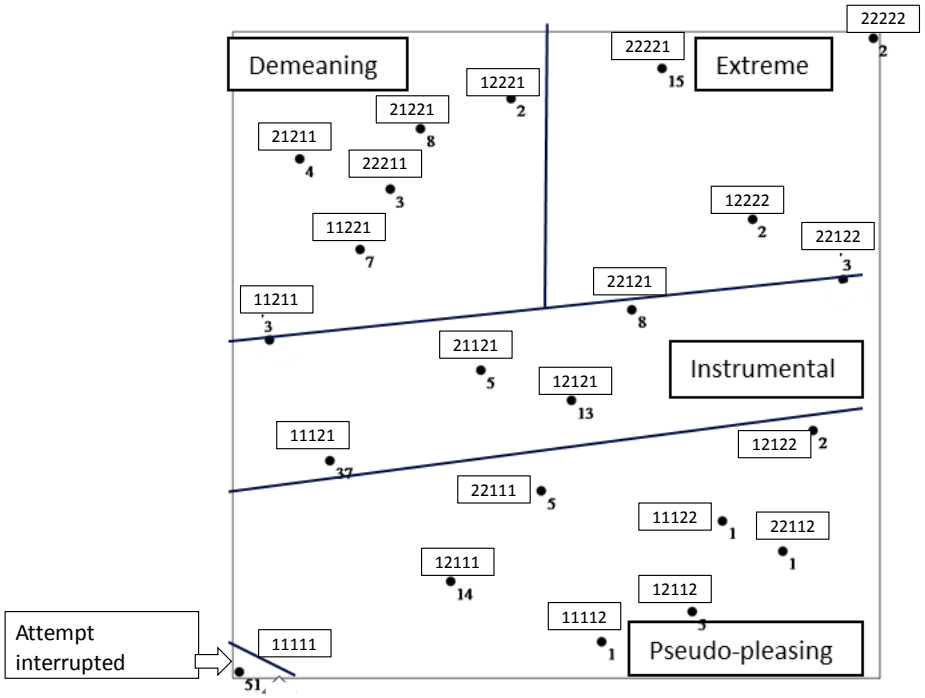
Qualitative (subtype) classification. Individual item plots (Figure 15a) show the presence and absence of each variable across the 22 profiles, and were used to identify the distinct subtypes of sexual activity. Intimacy as well as non-penile penetration partition along the X-axis, such that profiles where these behaviors were present appear on the left-hand side of the plot. In contrast, victim participation partitions along the Y-axis and is present in the upper part of the plot, while penile penetration occurred in about two thirds of the profiles on the plot, thus, confirming that this is a core behavior common to most completed sexual assaults. Verbal sexual activity partitions across the J-axis (diagonally), and appears to be generally present only in conjunction with other sexual actions.

[14] See Tables 25-26 in Appendix B for a detailed breakdown of X, Y, J, & L co-ordinates of each profile and the corresponding monotonicity coefficients.
[15] CORREP1 (proportion of comparable pairs correctly represented) was equal to .977 and CORREP2 (proportion of incomparable pairs correctly represented) was equal to .867.



Note: the numbers on the item plots represent the presence (2) or absence (1) of the given item in each profile.

15a. Sexual Activity POSAC Item plots



Note: The numbers under each point represent the frequencies of crime scenes represented by the respective profile. The composition of the profiles is shown in the outlined boxes where the order of elements is as follows: Verbal, Intimacy, Victim Participation, Penile Penetration, Non-Penile Penetration (1 = absent, 2 = present).

15b. Sexual Activity main plot with outlined regions

Figure 15a-b. Crime scene differentiation within Sexual activity behavioral dimension using Partial Order Scalogram Analysis

Based on these partitions, the following four subtypes of sexual activity were identified (as shown in Figure 15b): Pseudo-pleasing (in the lower part of the plot), where the offender attempted to "please" the victim, includes intimacy and non-penile penetration behaviors, demeaning (in the upper left part of the plot), where the offender tried to degrade the victim, includes victim participation in addition to penile penetration, instrumental (middle part of the plot), where the main goal of the offense appears to be sexual gratification, characterized exclusively by penile penetration, and finally, extreme fantasy subtype includes a wide variety of sexual behaviors, and may signify a highly evolved sexual fantasy enactment by the offender. Importantly, verbal sexual activity, similarly to verbal control, appears to be a supplementing element, being present across subtypes and only in addition to other sexual behaviors, particularly toward the quantitatively higher end of the plot. Of note also is the fact that the lowest profile (11111 in the lower left corner of the plot) was not included in any one of the subtypes because this profile encompasses cases of failed attempts and it is impossible to determine what kind of sexual activity the offender intended to undertake in these cases.

Table 8 summarizes the classification results across the sexual activity subtypes, based on the number of cases encompassed by the profiles (see Figure 15b) in each subtype. Of those crime scenes where sexual activity was present, it appears that the largest proportion (n=63; 32.3%) of crime scenes were classified as instrumental, while the rest were nearly equally divided between pseudo-pleasing (n=29; 15.6%), demeaning (n=27; 14.1%), and extreme/fantasy (n=22; 11.5%).

Quantitative (degree) classification. In addition to the subtype classification, crime scenes were differentiated quantitatively, based on their respective J-scores and the associated number of present behaviors (see Figure 16). Offenses where one of the variables was present (J-

scores below 62) were classified as low degree sexual activity, offenses with two or three variables present (J-scores 75-99) were classified as moderate, and offenses where 4 of the variables were scored as present were classified as high degree (J-scores above 150). As summarized in Table 6, 52 (27.1%) of offenses were categorized as the low sexual activity, 43 (22.4%) – as moderate sexual activity, and 20 (10.4%) – as high, with an additional 2 (1%) exhibiting the highest presence of sexual activity (i.e., all behaviors present). A little over a quarter (n=51, 26.6%) of the offenses in this sample represent failed attempts that had no sexual activity present.

Table 8

Frequency (%) of Sexual Activity subtypes

Style	Frequency (%)
1 Nonsexual/attempt	51 (26.6%)
2 Pseudo-intimate	29 (15.6%)
3 Instrumental	63 (32.3%)
4 Demeaning	27 (14.1%)
5 Extreme/fantasy	22 (11.5%)

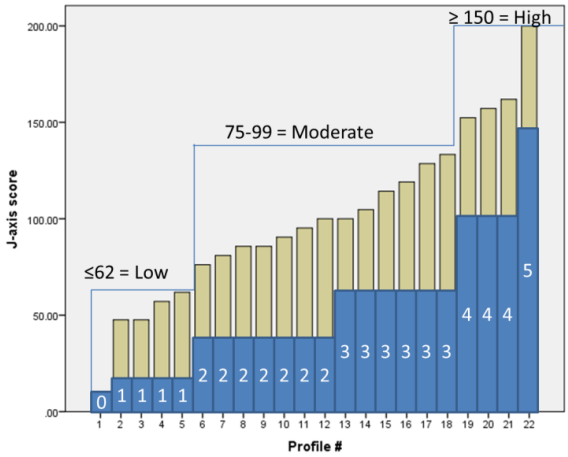


Figure 16. Quantitative differentiation of sexual activity into Low, Medium, and High degree based on profile J-score

Summary of sexual activity dimensional differentiation. In sum, as hypothesized, sexual assault crime scenes could be differentiated based on the subtype of sexual activity exhibited by the offender. Specifically, four distinct subtypes were evident: instrumental, pseudo-pleasing, demeaning, and extreme/fantasy (while this subtype has not been part of the initial hypotheses, it appears to be distinct from the other subtypes, being characterized by the presence of a wide variety of sexual acts, it is consistent with the literature (e.g., Douglas & Munn, 1992; Hickey, 2006) that identifies a subgroup of offenders whose behavior at the crime scene evidences a highly evolved sexual fantasy). Importantly, the largest proportion of offenses, however, was characterized by the instrumental sexual activity type. This is interesting because it suggests that nearly a third of the crimes in sexual assault series are generally driven by basic sexual gratification rather than a particular sexual fantasy. Moreover, less than half (41.2%) of the crime scenes could potentially qualify as having "signature" type behaviors, theorized by the investigative literature (e.g., Hazelwood & Burgess, 2009) to define the serial sexual offense.

It is important to note, that while quantitative differentiation of sexual activity appears to be possible, it may not be as informative in practice as the specific subtype of sexual activity because each of the elements included in the analysis here comprises multiple variables (e.g., intimacy includes kissing, fondling, oral sex by offender), and using these behavioral variables in an additive (quantitative) manner may be an oversimplification that would not be useful in meaningfully differentiating between offenses.

Discussion

The present study aimed to determine whether the commonly identified (Alison & Stein, 2001; Canter & Herritage, 1990; Canter et al., 2003; Cohen et al., 1969; Groth et al., 1977; Knight & Prentky, 1990; Salfati & Taylor, 2006) categories of rape behaviors – control,

violence, and sexual activity – can be better understood dimensionally, rather than as distinct offense types. It was hypothesized that, rather than being classified as predominantly controlling, violent, or sexual, each rape offense could be more accurately classified as presenting (a) a certain degree and (b) a certain style within each of the above mentioned behavioral dimensions. Such fine-tuning of the differentiation process is necessary before any serial crime linking can be performed as the success of behavioral linking is contingent upon the accuracy and appropriateness of the behavioral unit of analysis used for classification and differentiation of each individual crime scene in the series (Salfati, 2008).

Consistent with previous literature, it was found that control is the key feature in this type of offense (e.g., Terry, 2006). Indeed, the vast majority of offenders exert at least some level of control with a large proportion of offenders (over 40%), exhibiting high control level, utilizing multiple methods of control during the offense. Thus, regardless of whether power and control are the motivating force behind the offender's actions, it is important to recognize that controlling behaviors are an integral part of the offense. Understanding how serial offenders use control across their series – i.e., whether they remain consistent in the level of control across offenses or follow a certain trajectory of change (e.g., escalate or de-escalate) – will be an important issue for future studies of behavioral linking.

Although the widely known instrumental and expressive subtypes of aggression (Salfati, 2000; Salfati & Canter, 1999; Santtila et al., 2001) were evident in the present analysis of violent behavior, only a proportion of offenses could be classified into one of these types. In fact, violence in the present sample of serial rape offenses was found to be generally in the low levels and most often situationally dependent. This finding is in contrast with the motivation-based studies that have identified aggression and violence as one of the more prevalent and pivotal

driving forces behind rape offenses (e.g., Groth et al., 1979; Prentky & Knight, 1990). On the other hand, this finding is consistent with other behavioral studies (e.g., Hewitt & Beauregard, 2014; Sorochinski & Salfati, 2010) that highlight the importance of analyzing the violence aspect of rape offenses in situational context. Moreover, Salfati and Taylor (2006) proposed that behavioral violence operates on a continuum across violent sexual offenses, highlighting not only the importance of considering rape and sexual homicide as variants of a single category of crime, but also that offenders may move along this continuum. Thus, another important aspect of future investigation in serial crime is how the use of violence during one offense is related to whether the offender will exert violence in the subsequent offense within series (e.g., determining whether the offender who used violence in response to victim's active resistance during an offense will result in the offender adopting violence as a behavioral strategy in subsequent crimes, regardless of victim, or whether he is going to de-escalate (i.e., decrease the level of violence in subsequent crimes, finding other non-violent modes of regaining control).

The sexual activity styles that were hypothesized and identified in the analysis, specifically, pseudo-pleasing, demeaning, and instrumental, broadly shadow the Interpersonal Model (Canter, 2000) – a crime classification system that is based on the understanding the victim-offender interaction and the role that the offender "assigns" to his victim (as evidenced by his behaviors and how he treats the victim during the crime). The model defines three specific roles: victim as a person—where the victim has a personal significance to the offender, victim as a vehicle—where the offender exploits the victim to get what he wants (e.g. sex, money), and victim as an object—where the offender treats the victim as though she is an inanimate object, doing things *to* the victim rather than *with* the victim (Canter, 2000). Sexual activity behaviors constitute only a part of the offender-victim interaction during the crime; however, the pseudo-

intimate sub-type of sexual activity, identified in the present analysis, corresponds to the "victim as person role", the instrumental sub-type corresponds to the "victim as vehicle role", and finally the demeaning sub-type of sexual activity appears to correspond to the "victim as object role". An additional sub-type of sexual activity identified here dubbed "extreme/fantasy" is characterized by the presence of a wide variety of sexual behaviors that suggest an enactment of a highly evolved sexual fantasy (as theorized in the motivational literature, e.g., Douglas & Munn, 1992). Whether offenders remain consistent in the subtype of sexual activity they engage in at the crime scene, or whether they switch between types in a predictable manner, must be examined for the full understanding of serial rape and how these behaviors can be used for linking.

Importantly, one conclusion that follows from the present analysis is that control and violence behavioral dimensions may be best understood quantitatively (i.e., in terms of the degree of the behavior employed), while analyzing sexual activity quantitatively may not be as useful and it should be examined qualitatively – in terms of the specific subtype exhibited. Indeed, while qualitative subtypes (i.e., expressive and instrumental) were present in control and violence behavioral dimensions, these accounted for only a proportion of crime scenes. In the control dimension, the other two subtypes – marginal and extreme – are more quantitative in nature as they include crime scenes with either very little (i.e., only one element) control or nearly all possible ways of control, suggesting that a quantitative differentiation may be more meaningful and practically useful. In the violence dimension, the largest proportion of crime scenes fell into the situational subtype, which, in and of itself may be difficult to use for the purposes of differentiation as well as subsequent understanding of consistency or behavioral trajectory, and thus, looking at the degree of violence present and whether that remains the same

or changes across series may be, again, more meaningful in practical terms. This may be the case because control and violence behaviors, as such, serve a subsidiary role in this crime (i.e., they are part of the modus operandi and assist in enabling the offender to successfully commit the sexual offense), while the sexual element is indeed what reflects individual differences in the offenders' personal agenda (Hazelwood & Burgess, 2009) and differentiates between the offenses on a more psychological level. An important next step in this line of research is to determine whether common combinations of the levels of control and violence and sexual activity subtype exist. That is, it is necessary to determine whether, for example, offenses characterized by pseudo-pleasing type of sexual activity most commonly exert high levels of control and low levels of violence, while those characterized by demeaning sexual activity type, exert higher levels of violence and low control. Understanding these overall patterns is key for the fuller appreciation of how these three behavioral dimensions interact during an offense, and whether these can be combined into a broader inclusive classification model. An ad-hoc analysis of the combined cross-dimensional classification was, therefore, conducted and is detailed in Chapter 6.

The present study is an important stepping stone in furthering the understanding of the behaviors of serial sexual offenders and identifying the most salient unit of analysis for studying these crimes. It appears that using a dimensional approach to classifying offenses within the relevant behavioral subsets of control, violence, and sexual activity is effective in differentiating the rape offenses empirically, and eliminates the presence of "mixed" or "hybrid" types that have been one of the key methodological issues highlighted in previous classification models (e.g., Kearns et al., 2011; Salfati & Bateman, 2005). Further, the next stage of this line of research is to identify how offenders manifest these behaviors across series. In Chapter 7, the consistency as

well as change trajectories along these behavioral dimensions across series were examined both within each individual dimension (control, violence, and sexual activity) as well as in combination, in order to determine whether the behavioral trajectories along each of the dimensions are independent of each other or interdependent.

CHAPTER 6: Ad-hoc analysis of cross-dimensional crime classification

Overview

Study 1 (Chapter 5) aimed to explore the issues of crime scene classification and showed that sexual offenders' crime scenes can be differentiated based on the specific *degree* of control, violence, and sexual activity they employed during the offense as well as based on the specific *subtype* of control, violence, and sexual activity they engaged in during the offense. Further, the study concluded that control and violence are best understood quantitatively (in terms of the degree employed) while sexual activity is most meaningfully differentiated qualitatively (in terms of the subtype employed). However, this study only examined the differentiation within each separate behavioral dimension. In order to further understand the dynamics of the sex offenders' behavior and ascertain the most appropriate unit of analysis for use in behavioral linking, it is important to examine how these behavioral dimensions are combined in an offense, and whether common combinations could be identified into a broad cross-dimensional classification scheme. For example, it may be possible that the demeaning sexual activity subtype is most commonly associated with a low degree of control and moderate degree of violence, while pseudo-pleasing sexual activity is more commonly associated with high control and low violence. If such common combinations are identified, they could then be tested for consistency to determine whether offenders always employ the same *combination* of control, violence, and sexual activity. Previously developed classification schemes (See Table 1) include an over-encompassing description of each type (i.e., one that includes a combination of how the offender would approach the victim, the type of behaviors he would engage in during the offense, etc.), thus, it was deemed important to test whether combining the classifications from each behavioral dimension identified in Study 1 would produce a reliable broad classification scheme.

Based on the results of the quantitative and qualitative crime scene differentiation within each behavioral dimension – control, violence, and sexual activity – the present ad-hoc analysis aimed to test the interaction between these behavioral dimensions. It was hypothesized that the degrees of control and violence, and the subtype of sexual activity employed by the offenders during an offense will co-occur in specific patterns, allowing for the identification of particularly common combined quantitative(control and violence)/qualitative (sexual activity) types.

Method

Data

The same 30 series that included 192 distinct sexual assault offenses, previously described in Chapter 5, were used in this analysis. Each of the 192 crime scenes was classified based on the degree of control and violence (none, low, medium, high; see Table 4) and the subtype of sexual activity (pseudo-pleasing, instrumental, demeaning, extreme/fantasy; see Table 7).

Statistical Procedure for Identifying Common Types

In order to identify the combined classification patterns across the behavioral dimensions, a configural frequency analysis (CFA) was used. CFA is an exploratory data analysis technique that allows for the identification of patterns or combinations of scores that are particularly common (*types*) as well as those that are particularly uncommon (*antitypes*) in the data beyond what would have been expected by chance (von Eye, 1990). In the present study, CFA was used to determine the most common combinations of control and violence degree and sexual activity subtypes. The base model used for the analysis outlines an expected independence of variables and thus constitutes the null hypothesis (i.e., that there are no meaningful associations between variables and that all combinations are equal to chance). Therefore, a poor fit of the base model

is expected if common associations (types) are present in the data. The base model selected for the analysis did not differentiate between predictor and criterion variables because the key question was not whether one of the behavioral dimension scores could predict the other, but rather what the common behavioral combinations at a serial sexual offense crime scene are. The analysis was performed using the FORTRAN CFA program (von Eye, 2000).

Results

The aim of this sub-study was to identify the association between the degree of control and violence and the subtypes of sexual activity employed by the offenders, and determine whether common combined types can be used to classify offenses. A CFA was conducted using the categorical variables of degree of control (CD) and violence (VD), and the qualitative categorical variable of sexual activity (SS). Control and violence variables were coded as 1 = none, 2 = low 3 = moderate, and 4 = high. Sexual activity variable was coded as 1 = attempt interrupted, 2 = pseudo-pleasing, 3 = instrumental, 4 = demeaning, 5 = extreme/fantasy. The log-linear base model of independence for the identification of common combined types was as follows: $\log m = X\lambda$. Here, m is the array of model frequencies, X is the design matrix, and λ is the parameter vector. The base model outlines an expectation of equal number of cases for each possible combination of categories (i.e., the analysis compares the actual combinations of scores to what would have been expected by chance, and the chance expectation is that all combinations will have an equal frequency), thus, if the base model does not fit the data well (i.e., goodness-of-fit is poor) then significant types (i.e., combinations of scores that are significantly more common than what would be expected by chance) are expected to emerge. The χ^2-test and the Bonferroni procedure of α protection were used (von Eye, 1990). The goodness-of-fit of the above base model was poor (G^2 = 424.67; $df = 79$; $p < 0.0001$), therefore types were expected

to emerge. Table 9 presents the CFA results where the observed frequencies of configurations are reported and the types (or configurations that are significantly more frequent than would have been expected by chance) are highlighted. A total 48 combinations with a frequency of at least 1 were observed, and five statistically significant types emerged (i.e., combinations of scores that were significantly more common than what would have been expected by chance). Interestingly, with the exception of the "failed attempt" type (i.e., the 111 combination, or where the offender completely failed to exert any level of control or violence and was unable to engage in any kind of sexual activity – observed in 22 cases), all of the significant types included a high degree of control, confirming that control is a key behavioral dimension in completed sexual offenses. Specifically, the most common combination was where control was high, violence was low, and sexual activity was instrumental (observed in 16 cases), followed by a type of high control, low violence, and demeaning sexual activity type (observed in 10 cases), and two additional types where control was high, sexual activity was instrumental and violence was either high or none at all (9 cases each).

However, these statistically significant types may not be considered a useful or meaningful classification because three of the types include the same degree of control, the same subtype of sexual activity combined with every possible level of violence, thus from a practical standpoint, the combined types cannot differentiate between offenses. Furthermore, together, these types account for a meager 22.9% of the sample with the rest of the combinations being fairly idiosyncratic and occurring in one to six cases within the sample.

Table 9

CFA Configurations & Types for Control Degree (CD), Violence Degree (VD), and Sexual Activity Style (SS)

Configuration (CD VD SS)	Frequency	χ^2	P	Type
111	**22**	**160.067**	**< 0.000001**	**Type**
113	2	0.067	0.79625343	
121	2	0.067	0.79625343	
131	1	0.817	0.3661566	
133	1	0.817	0.3661566	
211	5	2.817	0.09329002	
212	3	0.15	0.69853538	
213	6	5.4	0.02013675	
214	2	0.067	0.79625343	
221	2	0.067	0.79625343	
222	4	1.067	0.30169963	
223	1	0.817	0.3661566	
231	5	2.817	0.09329002	
232	2	0.067	0.79625343	
233	2	0.067	0.79625343	
244	1	0.817	0.3661566	
311	1	0.817	0.3661566	
312	4	1.067	0.30169963	
313	6	5.4	0.02013675	
314	2	0.067	0.79625343	
315	4	1.067	0.30169963	
321	4	1.067	0.30169963	
322	3	0.15	0.69853538	
323	5	2.817	0.09329002	
324	5	2.817	0.09329002	
325	5	2.817	0.09329002	
331	4	1.067	0.30169963	
332	1	0.817	0.3661566	
333	1	0.817	0.3661566	
335	4	1.067	0.30169963	
343	3	0.15	0.69853538	
411	1	0.817	0.3661566	
412	2	0.067	0.79625343	
413	**9**	**18.15**	**0.00002042**	**Type**

Configuration (CD VD SS)	Frequency	χ^2	P	Type
414	4	1.067	0.30169963	
415	3	0.15	0.69853538	
421	2	0.067	0.79625343	
422	6	5.4	0.02013675	
423	**16**	**77.067**	**< 0.000001**	**Type**
424	**10**	**24.067**	**0.00000093**	**Type**
425	2	0.067	0.79625343	
431	2	0.067	0.79625343	
432	5	2.817	0.09329002	
433	**9**	**18.15**	**0.00002042**	**Type**
434	3	0.15	0.69853538	
435	3	0.15	0.69853538	
443	1	0.817	0.3661566	
445	1	0.817	0.3661566	

Note: The expected (by chance) frequency for all combinations was 2.4, thus, the identified (highlighted) types constitute a statistically significant deviation from what would have been expected by chance.

Discussion

The aim of this ad-hoc analysis was to determine whether a meaningful cross-dimensional classification will emerge when the degree of control and violence employed by the offender during his offense is analyzed in combination with the subtype of sexual activity he engaged in. While the analysis revealed several statistically significant common types, less than a quarter of the sample was classifiable into those types and they could not be organized into a meaningful classification system, suggesting that this is not a useful way of analyzing these offenses. While this could possibly be due to the fairly low sample size, it also suggests that the use of individual behavioral dimensions and either quantitative or qualitative sub-classifications within those may be a more useful approach than attempting to combine them together. This is also consistent with a previous study investigating serial homicide offenses (Sorochinski & Salfati, 2010) that also concluded that dividing offenders' crime scene behaviors into smaller subsets and differentiating within those is more effective than searching for broad over-

encompassing types. Further, the fact that the combinations of behavioral subtypes found here are so numerous highlights the point that using broad offense types may not paint the full picture, and is both methodologically and conceptually problematic.

Based on the results from Study 1 (Chapter 5) and the ad-hoc analysis in this chapter, it is possible to conclude that the most appropriate *unit of analysis* to be scrutinized for consistency and trajectories of change is the intra-dimensional *quantitative* classification of control and violence employed by offenders during their crimes as well as the intra-dimensional *qualitative* classification of sexual activity into distinct subtypes. The extent to which offenders remain consistent or follow an identifiable behavioral trajectory within and across these dimensions was examined next in Study 2 (Chapter 7).

CHAPTER 7: Study 2 - Dynamic Behavioral Consistency: Understanding the Behavioral Trajectories of Serial Sex Offenders

Overview

As has been highlighted in the literature review (Chapter 2), previous empirical studies that examine behavioral consistency in serial crime in general and serial rape in particular, find that consistency levels are insufficient for reliable behavioral crime linking, especially, when more than two crimes from a series are analyzed. A reframed understanding of what constitutes consistency in crime series as a *dynamic pattern* rather than static behavioral matching has been proposed as key for making empirical progress in the use of behavioral evidence for linking crimes.

The basis for an empirically sound analysis of consistency is the identification of the most appropriate behavioral unit of analysis (i.e., what will be expected to remain consistent or change in an identifiable trajectory). In Study 1 (Chapter 5) and in the subsequent ad-hoc analysis (Chapter 6), it was determined that a useful way of differentiating between rape offenses is within three broad dimensions of sexual offenders' behaviors, namely, violence, control, and sexual activity. Specifically, it was concluded that the control and violence are most meaningfully differentiated *quantitatively* (into none, low, moderate, and high degree) and sexual activity is most appropriately differentiated *qualitatively* (into pseudo-pleasing, instrumental, demeaning, and extreme/fantasy subtypes).

While Study 1 examined differentiation between individual crime scenes, the next step in understanding serial rape offenses and establishing the grounds for behavioral linkage is to investigate the behavioral traceability (consistency and behavioral change trajectories) across offense series. In order to fully investigate how the offenders behavior progresses along the three

behavioral dimensions, it is necessary to not only examine whether they remain consistent or change in a particular direction (e.g., escalate, de-escalate, or switch between specific subtypes) from one crime to the next in the series (as has been done in, e.g., Hewitt & Beauregard, 2014), but also whether an overall behavioral trajectory could be identified, and how these trajectories from the three distinct behavioral domains correlate with each other (i.e., whether the way offender's behavior changes in one behavioral dimension is related to behavioral changes in the other two dimensions).

As outlined in detail in Chapter 3 (Aims and Hypotheses), Study 2 aimed to determine whether offenders remained consistent or followed an identifiable quantitative (in control and violence) and qualitative (in sexual activity) behavioral trajectory exhibited across their series. It was hypothesized that (a) in addition to complete consistency (i.e., stability), identifiable behavioral trajectories will be seen in the way offenders transition *from one crime to the next*, and (b) that *overall* behavioral trajectories of consistency and change over multiple crimes in the series could be identified in each behavioral dimension. Additionally, the study aimed to identify the cross-dimensional relationships between behavioral trajectories across crimes in the series, that is, to determine how consistency or change within one behavioral dimension correlates with changes or consistency in the other two.

Method

Data

In order to be able to examine the pattern of behavioral consistency or change across the series, a subsample of the data used in Study 1 (Chapter 5) was used. Because series varied significantly in length, it was necessary to select a fixed number of crimes in the series to compare. While the mean number of crimes per series was 6.4 (SD = 3.14), the distribution is

highly skewed (see Figure 10), and therefore, the mode was used to determine the most appropriate cutoff. The largest proportion of series had four crimes (*n* = 11; 36.67%). Thus, to maximize the number of series that could be included in the study, the first four crimes in each series were analyzed for consistency and behavioral trajectories. Two series that consisted of three crimes were, therefore, excluded from the analysis. This resulted in a total sample of the 28 series and a total of 112 crime scenes.

Demographics[16]. Nearly all of the victims were female (98.4%) and their age ranged from 7 years old to 90 years old (M = 32.29, SD = 20.19; Median = 25.5). Most victims were Caucasian (n = 70, 62.5%), 7 (6.3%) were African-American, 9 (8.0%) - Hispanic, 10 (8.9%) - Asian, and the ethnicity was not known for 13.4% of the victims. All of the offenders were male, and their age ranged from 16 to 40 years (M = 26.85, SD = 7.49). Of the offenders, 13 (46.4%) were Caucasian, 8 (28.6%) were African American, 5 (17.9%) - Hispanic, 1(3.6%) - Asian and 1 (3.6%) were of other ethnic origin. Offenders were known to have a criminal record in 10 (35.7%), however, for the rest of the cases, it was not known whether the offender had a criminal record or not. In most cases (n = 95; 84.8%) the offenders were strangers to the victims, 6 (5.4%) were acquaintances, one victim was friends with the offender and one was family related. The relationship between victim and offender was unknown in 6 (5.4%) cases.

[16] Victim demographics information is presented on the partial sample of 112 victims that was used in the present analysis. These demographics do not differ from the full dataset of 192 victims from the 30 series (used in Study 1).

Results

Aim 1: Determine whether offenders remain consistent or follow an identifiable quantitative (in control and violence) and qualitative (in sexual activity) trajectory.

The first aim of the present study was to determine whether offenders remain consistent or follow an identifiable trajectory within each of the behavioral dimensions of control, violence, and sexual activity. Based on the conclusions in Study 1 regarding the optimal way of distinguishing between rape offenses, the control and violence behavioral trajectories across series were analyzed quantitatively (or in terms of degree) and sexual activity – qualitatively (or in terms of subtypes). This was accomplished in two steps: (a) as has been done in previous studies (Hewitt & Beauregard, 2014; Leclerc et al., in press; Lussier et al., 2008) the specific progression of offenders' behaviors from one crime to the next was identified in three crime transitions (i.e., from crime 1 to crime 2, from crime 2 to crime 3, and from crime 3 to crime 4); and (b) a more descriptive analysis of the overall trajectories across series was conducted to determine whether, over the first four crimes in the series, offenders remained consistent in the specific degree (in control and violence) and subtype (in sexual activity) of the behaviors exhibited, or, alternatively, whether his behavior progressed along each of these behavioral dimensions in an identifiable trajectory.

Aim 1a – Crime to crime transitions. In order to determine how the offenders in this sample progressed from one crime to the next in their series, and whether the proportion of complete consistency (i.e., stability) remains the same across transitions, in line with previous studies (Hewitt & Beauregard, 2014; Leclerc et al., in press; Lussier et al., 2008), transition matrices were constructed for the first four crimes (three transitions – from crime 1 to crime 2, from crime 2 to crime 3, and from crime 3 to crime 4) in the 28 series of the sample. Transition

matrices have been described as "a grid where the offender's behavior against victim$_x$ is cross-tabulated with the offender's behavior against victim$_{x+1}$" (Leclerc et al., in press). Based on these cross-tabulations, it is possible to determine the number of offenders who remain consistent in going from one crime to the next and those whose behavior changes in a particular direction (i.e., in case of *quantitative* trajectories, the degree of the exhibited behavior within each dimension can either escalate or de-escalate, and in case of *qualitative* trajectories, the offender's likelihood of switching from one subtype to another can be determined).

Control transitions. Table 10 presents the transition matrix (i.e., probabilities[17]) of behavioral change or consistency in the offenders' *degree of control* as they progress from one crime to the next in their series. The transition matrix is constructed in such a way that the consistent transitions appear along the shaded diagonal in the table (i.e., these are the transitions where offenders engaged in the same level of control from one crime to the next), those transitions that appear below the diagonal (lower left side) can be termed 'de-escalating' (i.e., these are the transitions where an offender's level of control decreased from one crime to the next), and finally, those transitions that appear above the diagonal (i.e., upper right side), can be termed 'escalating' (i.e. in these transitions, the offenders increased their level of control from one crime to the next).

As can be seen in Table 10, there appears to be high variability (range = 0.00-0.90) in the overall probabilities of transitioning from one crime to the next in terms of the degree of control employed by the offender. Of those offenders who did not exert any control in their first crime in the series (n = 5) 60% escalated to either low or moderate degree of control in their second

[17] Probabilities are represented as proportion of offenders who remained consistent in this transition, ranging from 0 – when none of the offenders who started off with a particular degree remained consistent in that degree for their next crime, to 1 – when all of the offenders who started off with a particular degree remained consistent in that degree for their next crime.

crime, and of those who started off with a low degree of control (n = 7) 57% escalated to moderate or high in the second crime. This is interesting in that it may be evidence of the offender learning from their past experience, in line with findings from previous studies on serial homicide (Sorochinski & Salfati, 2010). Of those who start with moderate control (n = 6), 67% remained consistent in the next crime, and of those who start with high control (n =10), 90% remained consistent in the next crime. Thus, offenders who start off with higher control are much more likely to remain consistent than those who start off with low control levels.

Table 10

Crime transitions in the degree of control used by the offender

To From	None	Low	Moderate	High
None	T_1 = 0.40 (2) SE=.22 T_2 = 0.20 (1) SE=.18 T_3 = 0.28 (2) SE=.17	T_1 = 0.40 (2) SE=.22 T_2 = ----- (0) T_3 = 0.14 (1) SE=.13	T_1 = 0.20 (1) SE=.18 T_2 = 0.60 (3) SE=.22 T_3 = 0.43 (3) SE=19	T_1 = ----- (0) T_2 = 0.20 (1) SE=.18 T_3 = 0.14 (1) SE=.13
Low	T_1 = 0.14 (1) SE=.13 T_2 = 0.25 (1) SE=.22 T_3 = 0.33 (1) SE= .27	T_1 = 0.28 (2) SE=.17 T_2 = 0.50 (2) SE=.25 T_3 = 0.33 (1) SE=.27	T_1 = 0.14 (1) SE=.13 T_2 = ----- (0) T_3 = 0.33 (1) SE=.27	T_1 = 0.43 (3) SE=.19 T_2 = 0.25 (1) SE=.22 T_3 = ----- (0)
Moderate	T_1 = 0.17 (1) SE=.15 T_2 = 0.17 (1) SE=.15 T_3 = ----- (0)	T_1 = ----- (0) T_2 = 0.00 (0) T_3 = 0.13 (1) SE=.12	T_1 = 0.67 (4) SE=.19 T_2 = 0.50 (3) SE=.20 T_3 = 0.50 (4) SE=.18	T_1 = 0.17 (1) SE=.15 T_2 = 0.33 (2) SE=.19 T_3 = 0.38 (3) SE=.17
High	T_1 = 0.10 (1) SE=.09 T_2 = 0.33 (4) SE=.13 T_3 = ----- (0)	T_1 = ----- (0) T_2 = 0.08 (1) SE=.08 T_3 = 0.30 (3) SE=.15	T_1 = ----- (0) T_2 = 0.15 (2) SE=.13 T_3 = 0.10 (1) SE=.09	T_1 = 0.90 (9) SE=.09 T_2 = 0.46 (5) SE=.14 T_3 = 0.60 (6) SE=.16

Note: *N* = 28 for all transition. Proportions are displayed with the sample size included in parentheses. T_1, transition from victim #1 to victim #2; T_2, transition from victim #2 to victim #3, T_3, transition from victim #3 to victim #4. Standard Error (SE) was calculated using the LEM software (Vermut, 1997).

In the second transition (i.e., from crime 2 to crime 3 in the series), of those offenders who did not employ any control in their second crime of the series (n = 5), 80% escalated to at least a moderate control degree in crime 3, and of those who have a low (n = 5) or moderate (n = 6) degree of control in the second crime, 50% remained consistent, 33% escalated and 17% de-escalated. If their level of control was high during the second crime (n = 12), 50% of offenders remained consistent, while 50% de-escalated in their third crime.

In going from crime 3 to crime 4 in the series, of those offenders who did not employ any control in the third crime (n = 7), 72% escalated, and of those who had low degree of control (n = 3) in crime 3, a third remained consistent, a third escalated and a third de-escalated. Offenders whose degree of control was moderate in the third crime (n = 8), 57% remained consistent, and 28% escalated, and of those who had a high degree of control in the third crime (n = 10), 60% remained consistent, and the rest de-escalated.

While the marginal frequencies (and subsequently, the high standard error rates) in each transition do not allow for any firm conclusions in regard to the specific level to level, offense to offense, comparisons, as shown in Figure 17 that summarizes the overall proportions of consistency, escalation and de-escalation patterns for each transition, offenders are most consistent in transitioning from their first to the second crime (60.7%). As highlighted above, most of the consistent offenders in this first transition (76.5%) started off with moderate to high levels of control. Offenders were least consistent in their second transition (from second to third crime; 39.1%). A McNemar's test that assesses the significance of difference between correlated proportions[18], such as in the case when both proportions come from the same sample, revealed that this difference was not statistically significant ($p = 0.11$; 1-tailed) .However, given the low sample size, the power in the analysis was very low ($\pi = .26$), suggesting that the difference may become significant with a larger sample. If that were the case, it may be evidence of learning and choosing the most adaptive strategy for achieving their goal (Canter & Youngs, 2003; Sorochinski & Salfati, 2010). It is important to reiterate, however, that examining adjacent crimes transition matrices does not allow for an understanding of behavioral continuity across series in that it is impossible to determine whether those offenders who remained consistent in

[18] The McNemar's test is applied to a 2 x 2 contingency table of a dichotomous variable (in the present study, consistent vs. changing) with two test events (e.g., transition 1 and transition 2) within the same sample. The test determines whether the marginal frequencies in the rows and columns are equal.

the first transition, for example, are the same offenders who remained consistent in the second and third transitions, or whether offenders who escalated during the first transition continued to escalate in the subsequent crimes.

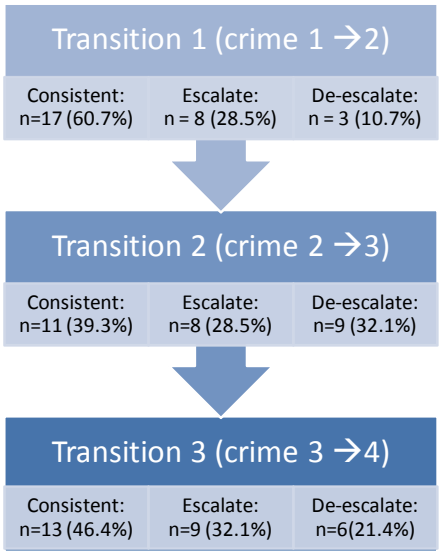


Figure 17. Summary of control crime to crime transition patterns.

Violence transitions. Table 11 shows the transition matrix of behavioral change or consistency in the offenders' degree of violence as they progress from one crime to the next in their series. Overall, probabilities ranged from 0.0 to 0.80.

Notably, in the first transition (from crime 1 to crime 2), offenders showed the highest levels of consistency: offenders who did not exert any violence in the first crime (n = 15) remained consistent in the second crime 67% of the time, those who employed a low degree of violence in the first crime (n = 8), remained consistent 75% of the time. Of those offenders who exerted a moderate level of violence (n = 5), 80% remained consistent in the second crime.

In transitioning from crime 2 to crime 3, of those offenders who did not exert any violence in the second crime (n = 11), the vast majority (73%) escalated to at least a low level of violence. Offenders who exhibited a low level of violence in the second crime (n = 12) remained

consistent in 42% of cases, while in 50% they de-escalated to using no violence. Of those offenders who employed a moderate degree of violence in the second crime (n = 5), 60% remained consistent and the rest – de-escalated.

Table 11

Crime Transitions in the Degree of Violence Used by the offender

To From	None	Low	Moderate	High
None	T_1 = 0.67 (10) SE=.12 T_2 = 0.27 (3) SE=.13 T_3 = 0.56 (5) SE=.17	T_1 = 0.33 (5) SE=.12 T_2 = 0.64 (7) SE=.15 T_3 = 0.44 (4) SE=.17	T_1 = ----- (0) T_2 = 0.09 (1) SE=.09 T_3 = ----- (0)	T_1 = ----- (0) T_2 = ----- (0) T_3 = ----- (0)
Low	T_1 = 0.13 (1) SE=.12 T_2 = 0.50 (6) SE=.14 T_3 = 0.23 (3) SE=.12	T_1 = 0.75 (6) SE=.15 T_2 = 0.42 (5) SE=.14 T_3 = 0.38 (5) SE=.13	T_1 = 0.13 (1) SE=.12 T_2 = 0.08 (1) SE=.08 T_3 = 0.23 (3) SE=.12	T_1 = ----- (0) T_2 = ----- (0) T_3 = 0.15 (2) SE=.10
Moderate	T_1 = ----- (0) T_2 = ----- (0) T_3 = 0.33 (2) SE=.19	T_1 = 0.20 (1) SE=.18 T_2 = 0.20 (1) SE=.18 T_3 = 0.33 (2) SE=.19	T_1 = 0.80 (4) SE=.18 T_2 = 0.80 (4) SE=.18 T_3 = 0.33 (2) SE=.19	T_1 = ----- (0) T_2 = ----- (0) T_3 = ----- (0)
High	T_1 = ----- (0) T_2 = ----- (0) T_3 = ----- (0)	T_1 = ----- (0) T_2 = ----- (0) T_3 = ----- (0)	T_1 = ----- (0) T_2 = ----- (0) T_3 = ----- (0)	T_1 = ----- (0) T_2 = ----- (0) T_3 = ----- (0)

Note: *N* = 28 for all transition. Proportions are displayed with the sample size included in parentheses. T_1, transition from victim #1 to victim #2; T_2, transition from victim #2 to victim #3, T_3, transition from victim #3 to victim #4. Standard Error (SE) was calculated using the LEM software (Vermut, 1997).

Finally, in the third transition, of the offenders who did not exert any physical violence in the third crime (n = 9), 56% remained consistent in the fourth crime, while the rest escalated to low violence degree. Those who used a low degree of violence in the third crime (n = 16) remained consistent in 42% of cases, while in 35% they escalated. In cases where violence was moderate in the third crime (n = 5), 60% of offenders de-escalated and 40% remained consistent.

In sum, as shown in Figure 18 that summarizes the patterns of consistency and change for each transition, it appears that in the early part of the series (i.e., first and second crimes in the series), offenders are most likely to remain stable in their levels of violence regardless of the initial degree (71.4%), suggesting that this initial degree of violence may be indicative of the offenders' overall relative aggression levels (Heusmann et al., 1984) as opposed to situational adaptation. The proportion of offenders whose violence remained stable for the second and third

transitions (42.9% in each transition) went down compared to the first transition, and this difference was statistically significant, based on the McNemar's test for correlated proportions (p = 0.011; 1-tailed). Thus, offenders who start off their series with a consistent level of violence, in the latter two transitions appear to be most likely evidencing a situationally dependent change (e.g, offenders may have had the necessity to change their low violence degree in response to the situational factors, such as victim resistance). This finding also suggests that consistency is not an all or none phenomenon (i.e., an offender/series is not either consistent or inconsistent, but rather, may manifest consistency at one point, but begin changing at another point).

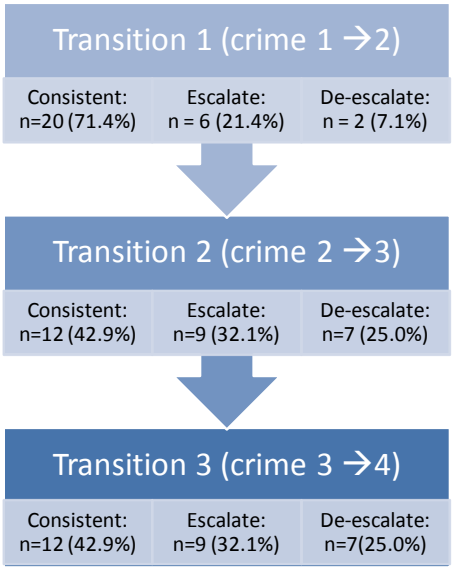


Figure 18. Summary of violence crime to crime transition patterns.

Sexual Activity transitions. In accordance with findings from Study 1 (Chapter 4), sexual activity behavioral trajectories were examined in terms of subtypes (or qualitatively). These subtypes are as follows: Pseudo-pleasing – the offender attempted to "please" the victim, Demeaning – the offender tried to degrade the victim, Instrumental – characterized by basic sexual gratification, Extreme Fantasy –includes a wide variety of sexual behaviors, and may

signify a highly evolved sexual fantasy enactment by the offender. For a detailed description of how these styles have been derived see Chapter 5.

Thus in this behavioral dimension, the transition matrix (shown in Table 12) represents the switching patterns from one subtype of sexual activity to another in transitioning from crime to crime in the series.

Table 12

Crime Transitions in the Subtype-Switching of Sexual Activity Used by the Offender

To From	Attempt Interrupted	Pseudo-pleasing	Instrumental	Demeaning	Extreme fantasy
Attempt Interrupted	T_1 = 0.33 (2) SE=.19 T_2 = 0.17 (1) SE=.15 T_3 = 0.38 (3) SE=.17	T_1 = 0.17 (1) SE=.15 T_2 = ----- (0) T_3 = 0.13 (1) SE=.12	T_1 = 0.17 (1) SE=.15 T_2 = 0.50 (3) SE=.20 T_3 = 0.25 (2) SE=.15	T_1 = 0.17 (1) SE=.15 T_2 = 0.17 (1) SE=.15 T_3 = 0.13 (1) SE=.12	T_1 = 0.17 (1) SE=.15 T_2 = 0.17 (1) SE=.15 T_3 = 0.13 (1) SE=.12
Pseudo-pleasing	T_1 = 0.14 (1) SE=.13 T_2 = 0.40 (2) SE=.22 T_3 = 0.50 (1) SE=.35	T_1 = 0.29 (2) SE=.17 T_2 = ----- (0) T_3 = 0.50 (1) SE=.35	T_1 = 0.14 (1) SE=.13 T_2 = 0.40 (2) SE.22 T_3 = ----- (0)	T_1 = 0.14 (1) SE=.13 T_2 = 0.20 (1) SE=.18 T_3 = ----- (0)	T_1 = 0.29 (2) SE=.17 T_2 = ----- (0) T_3 = ----- (0)
Instrumental	T_1 = 0.20 (2) SE=.13 T_2 = 0.22 (2) SE=.14 T_3 = 0.44 (4) SE=.17	T_1 = 0.10 (1) SE=.09 T_2 = 0.11 (1) SE=.10 T_3 = 0.22 (2) SE=.14	T_1 = 0.60 (6) SE=.15 T_2 = 0.33 (3) SE=.16 T_3 = 0.33 (3) SE=.16	T_1 = 0.10 (1) SE=.09 T_2 = 0.11 (1) SE=.10 T_3 = ----- (0)	T_1 = ----- (0) T_2 = 0.22 (2) SE=.14 T_3 = ----- (0)
Demeaning	T_1 = ----- (0) T_2 = 0.60 (3) SE=.22 T_3 = ----- (0)	T_1 = 0.50 (1) SE=.35 T_2 = ----- (0) T_3 = 0.25 (1) SE=.22	T_1 = ----- (0) T_2 = ----- (0) T_3 = 0.50 (2) SE=.25	T_1 = 0.50 (1) SE=.35 T_2 = 0.20 (1) SE=.18 T_3 = 0.25 (1) SE=.22	T_1 = ----- (0) T_2 = 0.20 (1) SE=.18 T_3 = ----- (0)
Extreme fantasy	T_1 = 0.33 (3) SE=.27 T_2 = ----- (0) T_3 = 0.20 (1) SE=.18	T_1 = ----- (0) T_2 = 0.33 (1) SE=.27 T_3 = 0.20 (1) SE=.18	T_1 = 0.33 (1) SE=.27 T_2 = 0.33 (1) SE=.27 T_3 = 0.20 (1) SE=.18	T_1 = 0.33 (1) SE=.27 T_2 = ----- (0) T_3 = 0.20 (1) SE=.18	T_1 = ----- (0) T_2 = 0.33 (1) SE=.27 T_3 = 0.20 (1) SE=.18

Note: N = 28 for all transitions. Proportions are displayed with the sample size included in parentheses. T_1, transition from victim #1 to victim #2; T_2, transition from victim #2 to victim #3, T_3, transition from victim #3 to victim #4. Standard Error (SE) was calculated using the LEM software (Vermut, 1997)

As can be seen in Table 12, there was very little consistency overall in offenders' sexual activity subtype as they transitioned from one crime to the next. The highest degree of consistency is observed in the instrumental subtype of sexual activity where of those offenders who started off instrumental (n = 11), 55% remained consistent, of those who engaged in instrumental subtype of sexual activity in their second crime (n = 10), 33% did the same in the third (n = 8), and 33% remained consistently instrumental in their third transition. In terms of the other subtypes of sexual activity, there appears to be a tremendous degree of idiosyncrasy in how offenders transition from one crime to the next, making it impossible to identify any common trends.

In summary, the low level of consistency and the high variability in how offenders transitioned from one crime to the next in their sexual activity patterns suggest a substantial susceptibility of this behavioral subgroup to experimentation on the part of the offender and is in contrast with previous literature that identified sexual behaviors as being part of the offenders' 'signature' that remains extremely stable over time (e.g., Douglass & Munn, 1992). Alternatively, the inclusion of interrupted attempts in this analysis may have influenced the low levels of consistency in the subtype of sexual activity exhibited from one crime to the next. A failed attempt lacks any sexual activity and thereby it interrupts the possible behavioral trajectory. It is methodologically impossible to exclude these offenses from the transitional analysis because the analysis is specifically designed to examine behavioral patterns in consecutive crimes. However, it may be important to look at only the actual present sexual activity subtypes when overall trajectories are examined.

Summary of crime to crime transitions. The analysis of crime to crime transitions revealed interesting patterns in control and violence behavioral dimensions that may be

particularly useful for understanding the progression of offenders' behaviors between crimes and may provide evidence as to the psychological reasons for behavioral change in these behavioral dimensions (i.e., learning in control, situational constraints in violence) that are consistent with previous literature. While the small sample size does not allow for strong conclusions to be made based on the observed trends, the key conclusion that this analysis highlights is that consistency levels, at least in the violence dimension (and potentially in the control dimension as well), vary within series (i.e., offenders may be consistent early on in the series, but then become less consistent in subsequent crimes), and therefore, limiting the analysis of consistency to crime pairs (as has been the common practice in many previous studies; See Table 2), may not provide an accurate estimate of true behavioral consistency or change across series. Surprisingly, in sexual activity behavioral dimension, offenders appear to be extremely idiosyncratic in their subtype switching patterns, suggesting that, at least in this sample, offenders were likely to experiment with the subtypes of sexual activity from one crime to the next.

Aim 1b – Overall behavioral trajectories. As has been discussed in the literature review (Chapter 2), while understanding the transitions between each consecutive crime pair brings insight into exactly when and how offender's behavior may change within series, such analysis does not allow for an understanding of the overall pattern across series. Thus in the next step of the analysis, a broader descriptive analysis was undertaken in order to determine the overall trajectory within the behavioral dimensions of control, violence, and sexual activity across the first four crimes in each series.

***Control & Violence trajectories*.** The quantitative trajectories of behavioral consistency and change within control and violence behavioral dimensions were coded by analyzing the overall progression of scores across the first four crimes in the series.

The analysis resulted in the identification of eight behavioral trajectories: three consistent trajectories divided by the degree in which the offender remained consistent – (a) *consistently low*, (b) *consistently moderate*, or (c) *consistently high* – coded when all four crimes in a series remained within the same degree; (d) *escalating* – coded when the degree increased at any point within the first four crimes and never decreased back; (e) *de-escalating* – coded when the degree decreased at any point within the first four crimes and never increased back; (f) *high-spike* – coded when there was an escalation at crime 2 or 3 that then de-escalated – e.g. if the first two crime scenes were coded as moderate, third crime – high, and fourth moderate again; (g) *low-spike* – coded when there was a de-escalation at crime 2 or 3 that then escalated back; and (h) *inconsistent* – coded when the degree of the behavior increased and decreased from crime scene to crime scene without a discernible pattern. Figure 19 shows the visual representation of these trajectories.

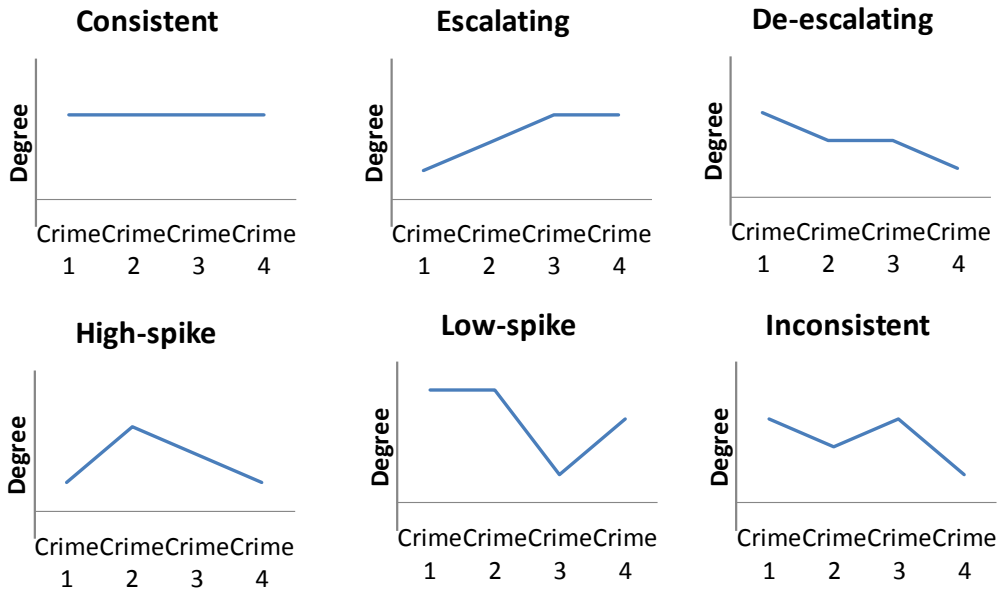


Figure 19. Visual representation of behavioral trajectories in Control and Violence dimensions.

Table 13 presents the frequencies of the identified trajectories of consistency and change in control and violence.

Table 13

Behavioral Trajectories in Control and Violence Behavioral Domains across Series (N = 28)

Trajectory	Control *n* (%)	Violence *n* (%)
Consistently low	0 (0)	2 (7.1)
Consistently moderate	2 (7.1)	3 (10.7)
Consistently high	5 (17.9)	0 (0)
Escalate	4 (14.3)	8 (28.6)
De-escalate	3 (10.7)	5 (17.9)
High spike	5 (17.9)	6 (21.4)
Low spike	5 (17.9)	1 (3.6)
Inconsistent	4 (14.3)	3 (10.7)

Control. Of the 28 offenders analyzed in this sample, seven (25%, CI[19] = 10.7-42.9%) were consistent in the level of control they used across the first four crimes in their series. Of these, five offenders employed a consistently high level of control and the other two – a consistently moderate level of control. Importantly, the majority of offenders (n = 17; 60.7%; CI = 42.9-78.6%) followed a discernible trajectory of change in the degree of control they exhibited over the first four crimes in their series, highlighting the importance of going beyond the identification of behavioral stability. Finally, four (14.3%; CI = 3.6-28.6%) offenders appeared to be inconsistent in the degree of control they employed across their series.

Violence. In the violence behavioral dimension, few of the offenders in this sample showed complete overall consistency in terms of the degree of violence used over the first four crimes in their series, with three offenders using a moderate degree of violence across their series and two offenders exerting consistently no violence (overall, 17.9%; CI = 3.7-32.2%). However,

[19] The reported CI corresponds to 95% confidence intervals for proportions that were calculated using the bootstrap sampling method for 1000 samples.

nearly a third of offenders (n = 8; 28.6%) exhibited an escalating violence trend. This is comparable to previous findings in the literature (e.g., Hazelwood et al., 1989 found that about a quarter of their sample of serial rapists escalated in the amount of violence used throughout their series). An additional 17.9% (n = 5) de-escalated in the degree of violence they used throughout their series and the same number exhibited a "high-spike" pattern, which is likely to be the result of a situational use of violence at one point during the series. Finally, three offenders (10.7%; CI = 0-21.4%) exhibited inconsistency.

In sum, as has been the case in previous studies, it appears that only a minor proportion of offenders show complete consistency in either control or violence level employed across their crime series. Further, none of the offenders exhibited a consistently low control and none exhibited a consistently high level of violence, again confirming the previous conclusion that control is the defining factor in this type of offense while violence is mainly used situationally in this type of crime. It is also important to note that, while some previous studies report higher levels of consistency in violence and control behaviors (e.g., Bennell et al., 2009; Deslauriers-Varin & Beauregard, 2013; Harbers et al., 2012), as highlighted in the literature review (see Chapter 2), these studies only examined consistency in linked pairs of crime. As shown here, when only two crimes from a series are examined, the levels of consistency may be as high as 90% during some transitions, however, when consistency is examined across four crimes in the series, these levels are reduced substantially, underscoring that offenders should not be regarded as either consistent or inconsistent based on a pair of crimes from their series. Indeed, offenders may exhibit consistency at one point during the series, but change at another point. However, the majority of offenders followed an identifiable trajectory in the way they changed the level of

control or violence employed, highlighting that it is crucial to be able to detect and analyze these trajectories of change in order to utilize behavioral evidence for linking crimes.

Sexual activity trajectories. To identify the overall trajectories of consistency and change within the sexual activity dimension, those crimes within series that constituted an interrupted attempt were excluded from the analysis. That is, if the first and third crimes in the series were classified as instrumental, for example, and the second and fourth crimes were coded as interrupted attempt, the series was coded as consistent instrumental because this is the only sexual activity subtype that was known to have been exhibited by this offender[20].

Even with this exclusion of attempted assaults, the variability in sexual activity across series was substantial and resulted in a total of nine coded behavioral trajectories. Notably, "consistent" trajectories were coded if all *present* sexual activity was in that subtype (i.e., notwithstanding the interrupted attempts). Further, behavioral change trajectories that were identified in the sexual activity dimension were characterized by switching between two subtypes (i.e., if all the sexual crime scenes fell into one of two subtypes): pseudo-pleasing/instrumental, demeaning/instrumental extreme/instrumental, and pseudo-pleasing/extreme. Inconsistent style trajectory was coded when more than two styles were present within the series. Table 14 summarizes the frequencies of consistency and change trajectories in this behavioral dimension.

[20] While the limitations of such an approach are obvious in that it may miscalculate the frequencies of certain trajectories, it was deemed appropriate for the purposes of this exploratory analysis. The interruption of an attempt is situationally determined (i.e., most commonly, occurs outside of offender's control or intent). as has been discussed in the literature review (Chapter 2). At this early stage, it is important to identify what remains constant despite situational constraints. Only once this is accomplished can we determine the role of the situational influences in offenders' behavioral trajectory across series.

Table 14

Behavioral Trajectories in Sexual Activity Behavioral Domain across Series (N = 28)

Trajectory	Frequency (%)
Consistent Instrumental	5(17.9)
Consistent Pseudo-intimate	1 (3.6)
Consistent Demeaning	3 (10.7)
Consistent Extreme-fantasy	1 (3.6)
Pseudo-pleasing/Instrumental	6 (21.4)
Demeaning/Instrumental	2 (7.1)
Extreme/Instrumental	2 (7.1)
Pseudo-pleasing/Extreme	3 (10.7)
Inconsistent	5 (17.9)

Overall, when the interrupted attempts are not taken into account, over a third of the offenders (*n* = 10; 35.7%; CI = 17.9-53.6%) in this sample were consistent in the sexual activity exhibited across their first four crimes with half of those being consistently instrumental. Nearly half of the offenders (*n* = 13, 46.4%; CI = 28.6-64.3%) switched between two subtypes of sexual activity across their series, and 5 (17.9%; CI = 5.4-32.1%) offenders exhibited an inconsistent behavioral trajectory in the sexual activity dimension.

In sum, a proportion of offenders (17.9 – 35.7%) were found to exhibit consistency within each of the behavioral dimensions across the first four crimes in their series. Additionally, specific trajectories of change were identified in each of the dimensions for most offenders (46.4-71.4%), and a minority of offenders was found to exhibit an inconsistent behavioral pattern within each domain (10.7-17.9%).

Statistical Coincidences or Actual Patterns?

Given the low sample size, it is important to determine whether the obtained trends are different from the probability of them occurring by chance. With four possible choices of degree (in control and violence – none, low, medium, high) or style (in sexual activity – instrumental,

pseudo-pleasing, demeaning, fantasy), across four crime events, the number of possible permutations (i.e., combinations of choices, given that the order of occurrences is important and all choices are available every time), is 256 (n choices in r events = $n^r = 4^4 = 256$). Of those, 62 (24.2%; CI = 19.1-29.5%) are patterns that would be considered inconsistent in the present definition (i.e., where the offender changed the direction of behavior more than twice, such as going from low control in crime 1, to medium in crime 2, to low in crime 3, to high in crime 4). The probability of a complete consistency patterns (i.e., where the degree of control or violence or the style of sexual activity are the same across four crimes) is 4/256 = 0.015 (1.5%; CI = 0.39-3.1%). The probability of obtaining any other pattern (i.e., what is considered to be a trajectory of change in the present study) is, therefore, 74.3% (CI = 67.6-78.7%).

In comparing these calculations to the obtained results, it becomes apparent that the proportion of offenders who exhibited complete consistency exceeds what could have been expected by chance (whereas the upper CI boundary for expected by chance consistency is 3.1%, the lower CI boundary of observed consistency ranges from 3.7% for violence to 17.9% for sexual activity). However, in practical terms, the observed levels of complete consistency are insufficient for relying strictly on that in attempting to link crime series (i.e., even though statistically, these levels may be significant, the practical significance is minute).

An examination of the identified proportions of inconsistency as well as trajectories suggests that these do not exceed what could have been expected by chance, given the limited sample size (i.e., while the actual observed proportions are lower than the 19.1% CI boundary, chance cannot be ruled out based on the CIs for the observed proportions). Thus here, the factual presence of patterns is inconclusive based on the present sample. That is, it cannot be conclusively stated that those offenders who do not exhibit complete consistency follow a

trajectory of change that is not random. Nonetheless, the present results raise important methodological and theoretical questions for consideration (e.g., how does one differentiate between an inconsistent pattern of the same offender and expected inconsistency in non-linked crimes? How specific should the hypothesized trajectories be in order to conclusively rule out chance occurrences? Can all possible meaningful trajectories of offending behavior ever be accounted for and identified into a finite model for practical use in linkage?). These will be further elaborated on in the final discussion section (Chapter 10).

Summary of Aim 1 Results

The first aim of this study was to examine violent sexual offenders' trajectories of consistency and change in three key behavioral dimensions: violence, control, and sexual activity, both in terms of transitioning from one crime to the next within the series as well as overall, across the first four crimes in the series. The results confirmed that while only a proportion of offenders exhibit full consistency both in transitioning from one crime to the next as well as overall across multiple crimes in their series, most offenders show an identifiable behavioral trajectory. While the identified trajectories cannot be conclusively distinguished from chance occurrences given the limited sample, it is theoretically improbable that offenders' behavior from one crime to the next is occurring completely randomly. These findings substantiate the importance of extending the analysis of consistency beyond complete similarity between crimes and determining the ways in which offenders' behaviors may progress and change throughout the series. Further, in comparing the results from the first part of this analysis (i.e., consistency between consecutive crimes) and the second part (i.e., overall patterns across four crimes), it becomes apparent that they complement each other in helping paint a fuller picture of offending behavior. For example, it appears that while offenders in the present sample

are most consistent in their degree of violence early on in the series, they are not likely to be continually consistent as their series progresses. Additionally, when sexual activity subtypes are examined in consecutive crimes within series, a very muddy picture emerges due to the presence of interrupted attempts within the series, but when an overall pattern across series is analyzed in terms of only the completed sexual assaults, there seems to be a level of consistency that is comparable to other behavioral dimensions.

The next step of the analysis was to determine how these trajectories interact across behavioral domains in order to gage a fuller understanding of whether the changes in one behavioral dimension correlate with changes or consistency in the other behavioral dimensions.

Aim 2: Identify the cross-dimensional relationships between behavioral trajectories across crimes in the series

The second aim of this study was to identify how the overall trajectories within each dimension correlate with each other (i.e., whether consistency or specific trajectory in one dimension would be associated with consistency or a particular trajectory in the other two dimensions). In order to identify this cross-dimensional interaction of behavioral trajectories, the number of categories in each dimension was reduced to three broad categories: 1-consistent, 2-identifiable change trajectory (includes escalation, de-escalation, high and low spike trajectories in control and violence, and switching between two subtypes in the sexual activity dimension), and 3-inconsistent[21]. Table 15 summarizes the frequencies of these recoded categories for each behavioral dimension.

[21] This was done in order to reduce the high number of idiosyncratic patterns that would result from cross-tabulating the three dimensions that each includes 8 to 9 possible trajectories in a fairly small sample of 28 series.

Table 15

Broad Consistency/Change Trajectory Frequencies (%) within Each Behavioral Domain

Trajectory	Control	Violence	Sexual Activity
1 Consistent	7 (25.0)	5 (17.9)	10 (35.7)
2 Trajectory	17 (60.7)	20 (71.4)	13 (46.4)
3 Inconsistent	4 (14.3)	3 (10.7)	5 (17.9)

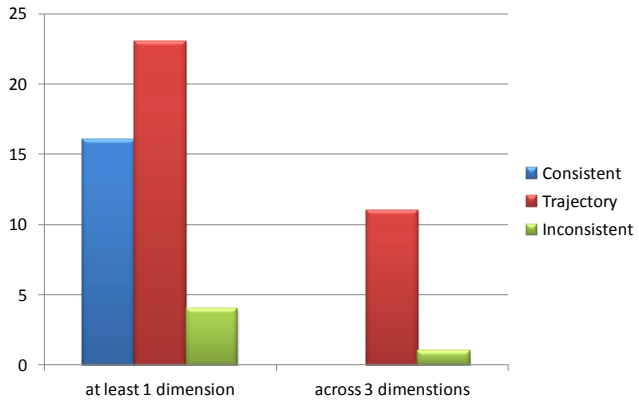
A cross-tabulation of within-domain behavioral trajectories (summarized in Table 16) shows the overall correspondence between consistency, trajectory of change, and inconsistency in the first four crimes of the series across the three behavioral dimensions of control, violence, and sexual activity. For ease of understanding, Figure 20 shows the comparison between the number of offenders who exhibited consistency, trajectory of change or inconsistency in *at least one* behavioral dimension, and the number of offenders who exhibited these patterns *across all three* behavioral dimensions of control, violence, and sexual activity. In examining this graph, it becomes apparent that progression of behavior is most characteristic of these offenders, and is the most common trend, whether a single behavioral dimension is examined or across dimensions. Importantly, a detailed examination of these overall patterns revealed that none of the offenders were consistent across all three behavioral dimensions; however, as many as 16 (57.1%) offenders in the sample were consistent in *at least one* of the dimensions. This finding is in line with Sorochinski and Salfati (2010) study of behavioral patterns of serial homicide offenders and suggests that searching for consistency in specific smaller behavioral domains is more productive than looking for consistency across a large number of offending behaviors together. Furthermore, statistically, this is also a reasonable conclusion, considering that the proportion of offenders who exhibit complete consistency in any one behavioral dimension is fairly low (17.9-35% in the present sample), an expectation of consistency across all dimensions is nearly unattainable. However, the chances of finding at least one behavioral dimension to be

exhibited consistently by any given offender are much higher (51.9-85.2%)[22]. In addition, 11 (39.3%) offenders exhibited an identifiable trajectory of behavioral change *across all three* behavioral dimensions, which exceeds the expected chance level for such occurrence (CI = 21.4-57.1% for observed proportion vs. CI = 0-11.1% for expected proportion), and 1 offender was inconsistent in his behaviors across dimensions.

Table 16

Cross-Domain Behavioral Trajectories

Sexual Activity	Consistent			Trajectory			Inconsistent		
Violence	Consistent	Trajectory	Inconsistent	Consistent	Trajectory	Inconsistent	Consistent	Trajectory	Inconsistent
Control									
Consistent	**0**	2	0	0	2	0	1	2	0
Trajectory	2	3	0	0	**11**	0	1	0	0
Inconsistent	1	0	2	0	0	0	0	0	**1**



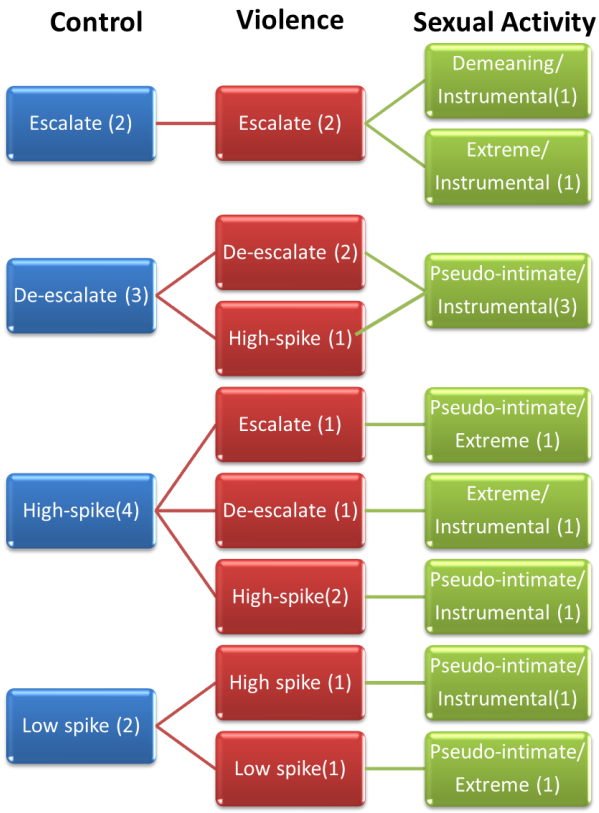
Note: The "at least 1 dimension" graph shows the number of offenders that were classified as consistent (blue), following a trajectory of change (red), or inconsistent (green) in one or two (i.e., at least in one but not in all three) of the analyzed behavioral dimensions (control, violence, or sexual activity). The "across 3 dimensions" shows the number of offenders that exhibited the same broad pattern across all three behavioral dimensions.

Figure 20. Comparison between examining behavioral patterns in one vs. all three dimensions

In order to better understand the specific trajectories of the 11 offenders whose behaviors followed a change trajectory in every dimension, an exploratory qualitative in-depth examination of their behavioral pathways was conducted. As can be seen in Figure 21, control and violence

[22] Given the three possible outcomes presented here – consistency, trajectory or inconsistency – for three behavioral dimensions, there are 19/27 chances of having consistency in at least one of the dimensions.

trajectories of these offenders were 'in-sync' in seven of the 11 series. That is, if there was an escalation of control – violence also escalated, if control de-escalation was observed – violence also de-escalated, and so on.



Note: Numbers in brackets represent frequencies

Figure 21. Cross-domain trajectories of offenders whose behaviors changed in each domain throughout series.

This finding may suggest that violence and control are often fused and used, perhaps, interchangeably within those offenses (i.e., violence as a means to control and extreme control as a way of displaying violence). Additionally, all of the offenders whose control de-escalated, followed a pseudo-pleasing/instrumental subtype-switching pattern in sexual activity. However, those offenders whose control had either a high or a low spike in the series – varied in their corresponding trajectory of violence and sexual activity. This may be problematic for the

purposes of understanding the offenders' overall behavioral trajectories, and highlights the importance of examining the situational factors that played a role in these offenders' behavioral change patterns. However, for the purposes of linking crimes, this may suggest that concentrating on only one of the behavioral dimensions and identifying the offender's behavioral trajectory within each separately may be a more efficient way than looking across behavioral dimensions.

Finally, as mentioned above, only one offender was found to exhibit complete inconsistency in all three behavioral domains (see Table 15). The qualitative information available on the full series of that offender (8 crime scenes) was examined in detail in order to determine whether the offender became more consistent in his later crimes. However, it was found that this particular offender actually remained inconsistent throughout the length of the series which may constitute a trajectory type in and of itself, or it is possible that in such case, behavioral linking may not be an option.

Summary of Aim 2 results

In sum, the examination of the associations between consistency and change trajectories across the behavioral dimensions of control, violence, and sexual activity in the first four crimes of the sexual offender's series revealed that the majority of offenders exhibit consistency in at least one behavioral dimension, but none of the offenders remained consistent in all behavioral dimensions simultaneously. This finding suggests that there is a greater likelihood of identifying consistency when smaller behavioral domains are examined and is consistent with previous studies. Further, a detailed examination of behavioral patterns of those offenders who did not exhibit consistency in either behavioral dimension across their series, revealed that, similarly to what was found in Chapter 5 regarding the combined dimensional differentiation, here too, it

could be argued that it may be most fruitful to examine each dimension separately in search for a distinct trajectory as opposed to combining the behavioral dimensions together.

Discussion

The identification of some form of behavioral consistency is the prerequisite for behavioral linking of serial crimes (Canter, 1994). Research on behavioral consistency in serial crime has, for the most part, examined stability, where the offender's behaviors throughout their series are hypothesized to remain invariable or fit the same general type or theme (e.g., Bateman & Salfati, 2007; Salfati & Bateman, 2005). Although in this line of research, a proportion of offenders are generally found to behave consistently, a large group of offenders are found to be inconsistent, thus, limiting the possibilities of using behavioral evidence for linking crimes. However, if consistency is understood as dynamic rather than static, and behavioral trajectories of those offenders who are not fully consistent are also examined and understood, the use of behavioral linkage can be empirically supported. Hence, the present study aimed to examine the behavioral trajectories across series of sexual offenses within and across the behavioral dimensions of violence, control, and sexual activity. The present study's results revealed a number of distinct trajectories of consistency and change within each of the analyzed behavioral domains. As in previous studies, only a proportion of offenders were found to exhibit complete quantitative or qualitative *consistency* (i.e., stability) in either of the behavioral domains. Of note is the fact that none of the offenders were consistent across their control, violent and sexual behaviors all at once, however, over half of the offenders were consistent in at least one of these behavioral dimensions. Moreover, when offenders were not consistent, the vast majority followed a specific *trajectory* of change within each behavioral domain, thus confirming that the search for consistency in serial crime should not stop at exact matching, but rather should go into

more depth in analyzing the trajectories of behavioral change. Additionally, when offenders did not remain consistent in either of the behavioral dimensions, it seems that the most efficient way is to then look for specific trajectories within, rather than across, the behavioral domains. These findings confirm the notion that examining offenders' behaviors within smaller behavioral domains rather than broad types may be more efficacious for the purpose of identifying behavioral consistency and subsequent crime linking (Sorochinski & Salfati, 2010). The offender who employs a consistent degree of control may be "experimenting" in the kinds of sexual behaviors that he exhibits, and an offender whose violent behavior escalates may very well de-escalate in control while remaining consistent in his sexual acts. This conclusion is also consistent with Leclerc et al. (in press) who, in their study of behavioral transitions from one crime to the next in violence and sexually intrusive behaviors within series of sexual offenses, report a "lack of synchronicity" (p.20) in offenders' behaviors across the various behavioral subgroups.

Notably, the fact that only one of the twenty-eight series analyzed was truly inconsistent across behavioral domains represents a major improvement over any of the previous attempts at identifying behavioral consistency in serial crimes (e.g., Bateman and Salfati, 2007; Grubin et al., 2001; Kearns et al., 2011; Salfati & Bateman, 2005; Sorochinski & Salfati, 2010) and is, again, in line with the premise that consistency needs to be looked at in terms of continuity rather than strictly as an exact behavioral match. Again, however, with the limited size of available data, the identified patterns can only be seen as tentative trends for further testing. A key question that arises is whether these identified trajectories may be mere coincidence and thus are not meaningful. While generalization of the specific trajectories found in this exploratory analysis may not be possible at this stage, the conclusion that can be drawn from the present

results, however, is that there is a potential for identifying meaningful behavioral trajectories in those series where offenders do not exhibit stability, supporting the need to refine the definition of consistency to include traceability.

It is important to note that this study limited the investigation of consistency and trajectories of behavioral change to the first four crimes in the series. While in practical terms, understanding the offending patterns in the early part of the series may be the most important (and, at times, sufficient), from a more theoretical perspective of understanding the consistency and change in human behavior, in order to fully gauge the progression of offending behavior in serial crimes, it is important to consider the longer series in more detail. Thus, Chapter 8 details an ad-hoc analysis of the rest of offenders' behavioral transitions (i.e., transitions from crime 5 through crime 12) in the longer series of the sample. In addition, when only the four crimes of each series are analyzed, it is crucial to determine whether offenders whose series continued further are different (e.g., less consistent) than those where offenders were caught after the four crimes. Thus, Chapter 8 also presents a comparison of overall trajectories identified in the present study between those series that consisted of a total of four crimes and those series for which the four crimes constituted the start of the series.

The present study also highlighted that the presence of interrupted attempts within series have a significant impact on how an offender's behavior may progress and how it can be analyzed. This study, however, did not fully investigate the way these failed attempts may have impacted the overall trajectory of change within the offense series. Such detailed analysis of how past failure to complete the crime may influence offenders' behavior in subsequent offenses is one important line of research in the efforts of contextualizing the consistency and change in serial offenders' behavior. Specifically, it is important to investigate the extent of behavioral

change in control and violence (i.e., the behavioral dimensions that facilitate the completion of the sexual assault) between the crime directly preceding the failed attempt and the crime directly following it in order to ascertain whether the offender made an effort of re-strategizing his behavior in response to the failure (thus substantiating the hypothesis of learning as the underlying factor in behavioral change). Alternatively, an offender's return to the same behaviors in the crime following the failed attempt would signify that he may have a more rigid conception and repertoire of crime behaviors. An ad-hoc analysis presented in Chapter 9 addressed these issues.

CHAPTER 8: Ad-hoc Analysis of Behavioral Trajectories in Long Series

Overview

As has been highlighted in the literature review (Chapter 2), the majority of empirical studies that investigate consistency and linking in serial crimes, limit their analysis to identifying the extent to which pairs of crimes from the same series are more similar than crimes from different series (see Table 1). However, while such approach may provide evidence for the linking capabilities of certain statistical approaches, it does not add to the full understanding of behavioral consistency and the development of offender's behavior across series.

The social psychological theorists contend that experience with a particular situation is conducive to higher behavioral consistency (Hettema and Van Bakel, 1997), and the more frequently one engages in a particular behavioral strategy, the more likely they are to exert the same strategy in a similar situation (Greene, 1989). Thus, it is reasonable to hypothesize that those offenders who succeed in committing a larger number of offenses before they get caught should exhibit a greater degree of consistency toward the later crimes in their series due to an increased experience as well as a greater frequency of crimes where they had the opportunity to engage in a particular behavior. Conversely, Salfati et al. (2014), in their examination of behavioral consistency in homicide series, found that consistency levels decreased when a greater number of crimes in a series were analyzed. They hypothesized that such decrease could be explained by the offender staying within his comfort zone in the early part of the series, and as he becomes more confident, he may start experimenting and exploring other behavioral strategies. This study, however, only examined the levels of consistency in the first two, three, and four crimes within series (finding that levels of consistency are lowest when consistency over four crimes is examined), but it did not fully explore the offenders' behavioral trajectories

across the longer series. As has been shown in Study 2 (Chapter 7), offenders may be evidencing adaptation and learning in these first four crimes of the series, and it is possible that they only become more consistent in the later part of the long series (in line with the "experience hypothesis"). In order to fully investigate the behavioral trajectories of offenders in the longer series and determine whether offenders became more or less consistent as their series progressed, the present ad-hoc analysis extended the findings from Study 2 (Chapter 7) to examine the crime to crime transitions in the series that ranged in length from 5 to 12 crimes.

Furthermore, another competing hypothesis in regards to consistency and series length that has direct practical implications for the applicability of behavioral linking is that offenders succeed in escaping justice for longer periods and committing a larger number of offenses specifically because they are less consistent to begin with, and hence, their crimes remain unlinked delaying the investigative process. Indeed, Woodhams & Labuschagne (2011), in their comparison between solved crime pairs and unsolved crime pairs (linked via DNA), found that the solved crime pairs were slightly but significantly more behaviorally similar than the unsolved ones. Thus, because for the investigative purposes, the timely recognition of several crimes as being part of a series is important as early on in the series as possible, the extent to which overall consistency and change across four crimes in the series (identified in Study 2) differed between shorter series and longer series was also analyzed in further detail.

In sum, the present ad-hoc analysis intended to broaden the understanding of how consistency and behavioral change are manifested in longer crime series, and whether series length was a significant factor in the level of identifiable consistency early on in the series. In particular the study aimed to:

1. Examine the specific progression of offending behaviors in the degree of control and violence, and the subtype of sexual activity in the later part of the series (in series that consisted of five or more crimes).
2. Examine the extent to which offenders who committed longer series were less likely to be consistent in the early part of their series than offenders with shorter series.

Method

Data

The 28 series that were used for the investigation of consistency and behavioral trajectories in Study 2 (Chapter 6) were divided into short series (n = 11; those series that consisted of a total of four crimes), and long series (n = 17; those series that consisted of 5 to 12 crimes[23]).

Results

Aim 1: Examine the specific progression of offending behaviors in the degree of control and violence, and the subtype of sexual activity in the later part of the series (in series that consisted of five or more crimes).

For the analysis of progression of offenders' behavior in the late part of their series, the subsample of long series that consisted of 5 or more crimes were used. The same analytical procedure of constructing transition matrices, described in detail in Study 2 (Chapter 7), was used to determine the extent to which offenders remained consistent or changed their degree of control and violence and subtype of sexual activity in going from one crime to the next across

[23] Because only one series in the sample consisted of more than 12 crimes, it was decided to make 12 the cutoff point for the transitions analysis (i.e., the proportions of offenders making any given transition cannot be calculated with a sample of one, therefore, the cutoff for length of series was established where at least two offenders had this transition).

crime transitions # 4 (T_4 – from crime 4 in the series to crime 5) through #11 (T_{11} – from crime 11 in the series through 12).

Table 17

Crime Transitions in Degree of Control Used by Offenders between Crimes 5-12 of Their Series

To / From	None	Low	Moderate	High
None	T_4 = ----- (0)	T_4 = ----- (0)	**T_4 = 0.66 (2)**	**T_4 = 0.33 (1)**
	T_5 = ----- (0)	T_5 = ----- (0)	T_5 = ----- (0)	T_5 = ----- (0)
	T_6 = ----- (0)	T_6 = ----- (0)	T_6 = ----- (0)	**T_6 = 1.00 (3)**
	T_7 = ----- (0)	T_7 = ----- (0)	**T_7 = 1.00 (1)**	T_7 = ----- (0)
	T_8 = ----- (0)	T_8 = ----- (0)	T_8 = ----- (0)	T_8 = ----- (0)
	T_9 = ----- (0)	T_9 = ----- (0)	T_9 = ----- (0)	T_9 = ----- (0)
	T_{10} = ---- (0)	T_{10} = ---- (0)	T_{10} =----- (0)	T_{10} = ---- (0)
	T_{11} = ---- (0)	T_{11} = ---- (0)	T_{11} = ---- (0)	T_{11} = ---- (0)
Low	T_4 = ----- (0)	T_4 = ----- (0)	**T_4 = 0.50 (1)**	**T_4 = 0.50 (1)**
	T_5 = ----- (0)	**T_5 = 0.33 (1)**	T_5 = ----- (0)	**T_5 = 0.66 (2)**
	T_6 = ----- (0)	T_6 = ----- (0)	T_6 = ----- (0)	**T_6 = 1.00 (1)**
	T_7 = ----- (0)	T_7 = ----- (0)	T_7 = ----- (0)	T_7 = ----- (0)
	T_8 = 0.50 (1)	T_8 = ----- (0)	**T_8 = 0.50 (1)**	T_8 = ----- (0)
	T_9 = ----- (0)	T_9 = ----- (0)	T_9 = ----- (0)	**T_9 = 1.00 (1)**
	T_{10} = ---- (0)	T_{10} = ---- (0)	T_{10} = ---- (0)	**T_{10} = 1.00 (1)**
	T_{11} = ---- (0)	T_{11} = ---- (0)	T_{11} = ---- (0)	T_{11} = ---- (0)
Moderate	T_4 = ----- (0)	**T_4 = 0.17 (1)**	**T_4 = 0.50 (3)**	**T_4 = 0.33 (2)**
	T_5 = 0.20 (1)	T_5 = ----- (0)	**T_5 = 0.40 (2)**	**T_5 = 0.40 (2)**
	T_6 = ----- (0)	T_6 = ----- (0)	**T_6 = 0.50 (1)**	**T_6 = 0.50 (1)**
	T_7 = ----- (0)	**T_7 = 0.50 (1)**	**T_7 = 0.50 (1)**	T_7 = ----- (0)
	T_8 = ----- (0)	T_8 = ----- (0)	**T_8 = 1.00 (1)**	T_8 = ----- (0)
	T_9 = ----- (0)	**T_9 = 0.50 (1)**	**T_9 = 0.50 (1)**	T_9 = ----- (0)
	T_{10} = ---- (0)	T_{10} = ----- (0)	**T_{10} = 1.00 (1)**	T_{10} = ---- (0)
	T_{11} = ---- (0)	**T_{11} = 1.00 (1)**	T_{11} = --- (0)	T_{11} = ---- (0)
High	T_4 = ----- (0)	**T_4 = 0.33 (2)**	**T_4 = 0.17 (1)**	**T_4 = 0.50 (3)**
	T_5 = 0.40 (2)	T_5 = ----- (0)	T_5 = ----- (0)	**T_5 = 0.60 (3)**
	T_6 = 0.20 (1)	T_6 = ----- (0)	**T_6 = 0.40 (2)**	**T_6 = 0.20 (1)**
	T_7 = 0.17 (1)	**T_7 = 0.17 (1)**	T_7 = ----- (0)	**T_7 = 0.63 (4)**
	T_8 = ----- (0)	**T_8 = 0.25 (1)**	T_8 = ----- (0)	**T_8 = 0.75 (3)**
	T_9 = ----- (0)	T_9 = ----- (0)	T_9 = ----- (0)	**T_9 = 1.00 (3)**
	T_{10} = ---- (0)	T_{10} = ---- (0)	**T_{10} = 0.66 (2)**	**T_{10} = 0.33 (1)**
	T_{11} = ---- (0)	T_{11} = ---- (0)	T_{11} = ---- (0)	**T_{11} = 1.00 (1)**

Note: Proportionss are displayed with the sample size included in parentheses. T_4, transition from crime 4 to crime 5 in the series (N = 17); T_5, transition from crime 5 to crime 6 (N = 16); T_6, transition from crime 6 to crime 7 (N = 11); T_7, transition from crime 7 to crime 8 (N = 9); T_8, transition from crime 8 to crime 9 (N = 7); T_9, transition from crime 9 to crime 10 (N = 6); T_{10}, transition from crime 10 to crime 11 (N = 5); T_{11}, transition from crime 11 to crime 12 (N = 2).

Control degree transitions. Table 17 presents the transition matrix (i.e., probabilities) of behavioral change or consistency in the offenders' *degree of control* as they progress from one crime to the next in their series within the later part of their series. The number of series analyzed

for each transition differed because of the variability in series length and the exact N for each transition is indicated below the table.

A detailed examination of the transition matrix revealed that, in the later part of the series, while overall consistency levels varied substantially (0-100%), control degree appeared to be particularly consistent for offenders who used moderate to high levels of control (similarly to the trends identified in the earlier part of the series as described in Study 2). In contrast to the earlier crime transitions in the series where at least some offenders were found to exert consistently low levels of control, none of the offenders had consistently no control in the later crime transitions, and only one offender was consistently employing a low degree of control in a single transition (from crime 5 to crime 6). This may provide support to the hypothesis that offenders become more experienced and efficient in controlling the victim and henceforth also become more consistent as their series progress.

Violence degree transitions. The violence degree crime to crime transitions are presented in Table 18. Here again, the overall levels of consistency varied greatly (0-100%). Importantly, in contrast to the findings regarding crime transitions in the earlier part of the series (reported in Study 2) where most offenders were consistently employing none to low levels of violence (especially in going from first to second crimes), in the later part of the longer series, more offenders exerted moderate to high levels of violence and they were more likely to remain consistent in those higher levels. This is interesting because it suggests that there is an overall shift in offenders' behavior to become more violent as the number of crimes in the series increases. Thus, while Study 1 found that, in totality, sexual offenses in this sample were characterized by fairly low levels of violence, offenses characterized by the higher levels of violence appear to be situated in the later part of the longer series. In addition, the fact that a

large proportion of offenders were consistent in these later crime transitions supports the hypothesis that offenders become generally more consistent toward the later crimes in long series.

Table 18

Crime Transitions in Degree of Violence Used by Offenders between Crimes 5-12 in Their Series

To From	None	Low	Moderate	High
None	**T_4 = 0.50 (2)** **T_5 = 0.67 (2)** T_6 = ----- (0) **T_7 = 1.00 (1)** **T_8 = 1.00 (1)** **T_9 = 1.00 (1)** T_{10} = ---- (0) T_{11} = ---- (0)	**T_4 = 0.50 (2)** **T_5 = 0.33 (1)** T_6 = ----- (0) T_7 = ----- (0) T_8 = ----- (0) T_9 = ----- (0) T_{10} = ---- (0) T_{11} = ---- (0)	T_4 = ----- (0) T_5 = ----- (0) **T_6 = 0.33 (1)** T_7 = ----- (0) T_8 = ----- (0) T_9 = ----- (0) T_{10} = ---- (0) T_{11} = ---- (0)	T_4 = ----- (0) T_5 = ----- (0) **T_6 = 0.67 (2)** T_7 = ----- (0) T_8 = ----- (0) T_9 = ----- (0) T_{10} = ---- (0) T_{11} = ---- (0)
Low	**T_4 = 0.25 (1)** **T_5 = 0.25 (1)** **T_6 = 0.50 (1)** T_7 = ----- (0) **T_8 = 1.00 (1)** T_9 = ----- (0) T_{10} = ---- (0) T_{11} = ---- (0)	**T_4 = 0.25 (1)** **T_5 = 0.25 (1)** T_6 = ----- (0) T_7 = ----- (0) T_8 = ----- (0) T_9 = ----- (0) T_{10} = ---- (0) T_{11} = ---- (0)	**T_4 = 0.25 (1)** **T_5 = 0.25 (1)** **T_6 = 0.50 (1)** T_7 = ----- (0) T_8 = ----- (0) **T_9 = 0.50 (1)** T_{10} = ---- (0) T_{11} = ---- (0)	**T_4 = 0.25 (1)** **T_5 = 0.25 (1)** T_6 = ----- (0) T_7 = ----- (0) T_8 = ----- (0) **T_9 = 0.50 (1)** T_{10} = ---- (0) T_{11} = ---- (0)
Moderate	T_4 = ----- (0) **T_5 = 0.20 (1)** T_6 = ----- (0) **T_7 = 0.25 (1)** T_8 = ----- (0) T_9 = ----- (0) T_{10} = ---- (0) T_{11} = ---- (0)	T_4 = ----- (0) T_5 = ----- (0) **T_6 = 0.33 (1)** T_7 = ----- (0) **T_8 = 0.50 (1)** T_9 = ----- (0) T_{10} = ---- (0) **T_{11} = 0.50(1)**	**T_4 = 0.67 (4)** **T_5 = 0.80 (4)** **T_6 = 0.67 (2)** **T_7 = 0.50 (2)** **T_8 = 0.50 (1)** **T_9 = 1.00 (1)** T_{10} = ---- (0) **T_{11} = 0.50(1)**	**T_4 = 0.33 (2)** T_5 = ----- (0) T_6 = ----- (0) **T_7 = 0.25 (1)** T_8 = ----- (0) T_9 = ----- (0) T_{10} = ---- (0) T_{11} = ---- (0)
High	T_4 = ----- (0) **T_5 = 0.50 (1)** T_6 = ----- (0) T_7 = ----- (0) T_8 = ----- (0) T_9 = ----- (0) T_{10} = ---- (0) T_{11} = ---- (0)	**T_4 = 0.33 (1)** T_5 = ----- (0) T_6 = ----- (0) **T_7 = 0.25 (1)** **T_8 = 0.33 (1)** T_9 = ----- (0) T_{10} = ---- (0) T_{11} = ---- (0)	T_4 = ----- (0) T_5 = ----- (0) **T_6 = 1.00 (1)** T_7 = ----- (0) T_8 = ----- (0) T_9 = ----- (0) **T_{10} = 0.67(2)** T_{11} = ---- (0)	**T_4 = 0.67 (2)** **T_5 = 0.50 (1)** T_6 = ----- (0) **T_7 = 0.75 (3)** **T_8 = 0.67 (2)** **T_9 = 1.00 (2)** **T_{10} = 0.33(1)** T_{11} = ---- (0)

Note: Proportions are displayed with the sample size included in parentheses. T_4, transition from crime 4 to crime 5 in the series (N = 17); T_5, transition from crime 5 to crime 6 (N = 16); T_6, transition from crime 6 to crime 7 (N = 11); T_7, transition from crime 7 to crime 8 (N = 9); T_8, transition from crime 8 to crime 9 (N = 7); T_9, transition from crime 9 to crime 10 (N = 6); T_{10}, transition from crime 10 to crime 11 (N = 5); T_{11}, transition from crime 11 to crime 12 (N = 2).

Sexual activity subtype transitions. As can be seen in Table 19 that shows the transitions of sexual activity subtypes between crimes in the later part of the series, similarly to what was found in the early transitions, there appears to be little consistency in crime to crime transitions along this behavioral dimension.

Table 19

Crime Transitions in Subtype-Switching of Sexual Activity between Crimes 5-12 in Their Series

To From	Attempt Interrupted	Pseudo-pleasing	Instrumental	Demeaning	Extreme fantasy
Attempt Interrupted	**T_4 = 0.38 (3)** **T_5 = 0.67 (2)** T_6 = --- (0) **T_7 = 0.33 (1)** **T_8 = 1.00 (2)** T_9 = --- (0) T_{10} = --- (0) T_{11} = --- (0)	T_4 = ----- (0) T_5 = 0.00 (0) T_6 = ----- (0) T_7 = ----- (0) T_8 = ----- (0) T_9 = ----- (0) T_{10} = ---- (0) T_{11} = ---- (0)	**T_4 = 0.38 (3)** T_5 = ----- (0) **T_6 = 0.20 (1)** **T_7 = 0.67 (2)** T_8 = ----- (0) **T_9 = 1.00 (1)** **T_{10} = 1.00(1)** T_{11} = ---- (0)	**T_4 = 0.13 (1)** **T_5 = 0.33 (1)** **T_6 = 0.40 (2)** T_7 = ----- (0) T_8 = ----- (0) T_9 = ----- (0) T_{10} = ---- (0) T_{11} = ---- (0)	**T_4 = 0.13 (1)** T_5 = ----- (0) T_6 = ----- (0) T_7 = ----- (0) T_8 = ----- (0) T_9 = ----- (0) T_{10} = ---- (0) T_{11} = ---- (0)
Pseudo-pleasing	T_4 = ----- (0) **T_5 = 1.00 (1)** T_6 = ----- (0) T_7 = ----- (0) T_8 = ----- (0) T_9 = ----- (0) T_{10} = ---- (0) T_{11} = ---- (0)	**T_4 = 0.33 (1)** T_5 = ----- (0) T_6 = ----- (0) T_7 = ----- (0) **T_8 = 1.00 (1)** T_9 = ----- (0) **T_{10} = 0.50(1)** T_{11} = ---- (0)	**T_4 = 0.67 (2)** T_5 = ----- (0) T_6 = ----- (0) T_7 = ----- (0) T_8 = ----- (0) T_9 = ----- (0) T_{10} = ---- (0) **T_{11} = 1.00 (1)**	T_4 = ----- (0) T_5 = ----- (0) T_6 = ----- (0) **T_7 = 1.00 (1)** T_8 = ----- (0) T_9 = ----- (0) **T_{10} = 0.50(1)** T_{11} = ---- (0)	T_4 = ----- (0) T_5 = ----- (0) T_6 = ----- (0) T_7 = ----- (0) T_8 = ----- (0) T_9 = ----- (0) T_{10} = ---- (0) T_{11} = ---- (0)
Instrumental	T_4 = ----- (0) **T_5 = 0.22 (2)** **T_6 = 0.50 (2)** **T_7 = 1.00 (1)** T_8 = ----- (0) **T_9 = 1.00 (2)** T_{10} = ---- (0) T_{11} = ---- (0)	T_4 = ----- (0) **T_5 = 0.11 (1)** T_6 = ----- (0) T_7 = ----- (0) T_8 = ----- (0) T_9 = ----- (0) T_{10} = ---- (0) T_{11} = ---- (0)	**T_4 = 1.00 (4)** **T_5 = 0.44 (4)** T_6 = --- (0) T_7 = --- (0) **T_8 = 0.67 (2)** **T_9 = 1.00 (1)** T_{10} = --- (0) T_{11} = --- (0)	T_4 = ----- (0) T_5 = ----- (0) **T_6 = 0.25 (1)** T_7 = ----- (0) T_8 = ----- (0) T_9 = ----- (0) T_{10} = ---- (0) **T_{11} = 1.00(1)**	T_4 = ----- (0) **T_5 = 0.11 (1)** **T_6 = 0.25 (1)** T_7 = ----- (0) **T_8 = 0.33 (1)** T_9 = ----- (0) T_{10} = ---- (0) T_{11} = ---- (0)
Demeaning	T_4 = ----- (0) T_5 = ----- (0) **T_6 = 1.00 (1)** **T_7 = 0.33 (1)** T_8 = ----- (0) T_9 = ----- (0) T_{10} = ---- (0) **T_{11} = 1.00(1)**	T_4 = ----- (0) T_5 = ----- (0) T_6 = ----- (0) T_7 = ----- (0) **T_8 = 0.50 (1)** T_9 = ----- (0) T_{10} = ---- (0) T_{11} = ---- (0)	T_4 = ----- (0) T_5 = ----- (0) T_6 = ----- (0) **T_7 = 0.33 (1)** T_8 = ---- (0) T_9 = ----- (0) T_{10} = ---- (0) T_{11} = ---- (0)	**T_4 = 1.00 (2)** T_5 = ----- (0) T_6 = ----- (0) **T_7 = 0.33 (1)** T_8 = ----- (0) T_9 = ----- (0) T_{10} = ---- (0) T_{11} = ---- (0)	T_4 = ----- (0) **T_5 = 1.00 (1)** T_6 = ----- (0) T_7 = ----- (0) **T_8 = 0.50 (1)** T_9 = ----- (0) T_{10} = ---- (0) T_{11} = ---- (0)
Extreme fantasy	T_4 = ----- (0) T_5 = ----- (0) T_6 = ----- (0) T_7 = ----- (0) T_8 = ----- (0) T_9 = ----- (0) T_{10} = ---- (0) T_{11} = ---- (0)	T_4 = ----- (0) T_5 = ----- (0) T_6 = ----- (0) T_7 = ----- (0) T_8 = ----- (0) **T_9 = 0.50 (1)** T_{10} = ---- (0) T_{11} = ---- (0)	T_4 = ----- (0) T_5 = ----- (0) T_6 = ----- (0) T_7 = ----- (0) T_8 = ----- (0) T_9 = ----- (0) T_{10} = ---- (0) T_{11} = ---- (0)	T_4 = ----- (0) T_5 = ----- (0) **T_6 = 1.00 (1)** T_7 = ----- (0) T_8 = ----- (0) T_9 = ----- (0) T_{10} = ---- (0) T_{11} = ---- (0)	T_4 = ----- (0) T_5 = ----- (0) T_6 = ----- (0) T_7 = ----- (0) T_8 = ----- (0) **T_9 = 0.50 (1)** **T_{10} = 1.00(1)** T_{11} = ---- (0)

Note:Proportions are displayed with the sample size included in parentheses. T_4, transition from crime 4 to crime 5 in the series (N = 17); T_5, transition from crime 5 to crime 6 (N = 16); T_6, transition from crime 6 to crime 7 (N = 11); T_7, transition from crime 7 to crime 8 (N = 9); T_8, transition from crime 8 to crime 9 (N = 7); T_9, transition from crime 9 to crime 10 (N = 6); T_{10}, transition from crime 10 to crime 11 (N = 5); T_{11}, transition from crime 11 to crime 12 (N = 2).

Offenders are most commonly engaging in instrumental sexual activity after a failed attempt in their previous crime, and are also generally more likely to remain consistent in crime transitions if they engage in instrumental sexual activity (a finding that is in line with what was observed in the early part of the series). However, overall the high degree of switching between subtypes from crime to crime highlights the importance of examining the overall trends in this behavioral dimension, especially due to the presence of interrupted attempts within series. That is, in analyzing crime to crime transitions, it is impossible to exclude the interrupted attempts because the transition chain would then be broken; however, if the overall offense series are analyzed, and only those offenses that actually included sexual activity subtype are taken into account, it is possible to identify greater consistency levels and an understanding what the likely trajectories of change are, as has been shown in Study 2.

Summary of Aim 1 results. The first aim of this ad-hoc analysis was to examine the behavioral consistency and change of control, violence, and sexual activity in the way offenders transitioned from crime to crime in the later part of their (long) series. The findings suggest that in the later part of the long series, offenders are more likely to exhibit consistently moderate to high levels of control and less likely to have two consecutive offenses where control was low or completely lacking. Furthermore, offenders were also found to exhibit overall higher levels of violence in the later part of long series and remain consistent in these (moderate to high) levels. These findings support the notion that as offenders become more experienced (i.e., in longer series) they are more likely to remain consistent, at least in terms of control and violence, in transitioning from one crime to the next, but the levels of enactment in these behavioral dimensions is likely to be high, and in comparison to the findings from Study 2 that investigated

these patterns in short series, suggests that most offenders who go on to commit a large number of crimes will escalate in their control and violence at some point in their series.

In terms of sexual activity, the analysis of crime to crime transitions in the later part of series, similarly to what has been found in the earlier part of (and in shorter) series, does not seem to be very informative in terms of behavioral trajectories. That is, little consistency is seen between consecutive offenses in the series in the subtype of sexual activity that the offenders exhibit.

Aim 2: Examine the extent to which offenders who committed longer series were less likely to be consistent in the early part of their series than offenders with shorter series.

The second aim of this ad-hoc analysis was to compare the overall consistency levels in the early part of longer series to the consistency levels found in short series. Table 20 groups the overall behavioral trends of consistency, change trajectory, and inconsistency across four crimes found in Study 2 (summarized in Table 15) based on the length of series.

Table 20

Comparison between Long and Short Series in the Frequencies of Consistency, Changing Trajectories, and Inconsistency in the (First) Four Crimes of the Series

Series length	Long (5 + crimes total)			Short (4 crimes total)			Fisher exact test
Beh. Dimension	*Consistent*	*Trajectory*	*Inconsistent*	*Consistent*	*Trajectory*	*Inconsistent*	
Control degree	4	10	3	3	7	1	$p = .999$ *ns*
Violence degree	2	12	3	3	8	0	$p = .324$ *ns*
Sexual activity subtype	7	7	3	3	6	2	$p = .874$ *ns*

A Fisher exact test was performed for each behavioral dimension of control, violence, and sexual activity comparing the number of consistent, changing in an identifiable trajectory, and inconsistent series. This test is specifically devised for use with small samples (i.e., where expected cell frequencies are below 5) and is preferred to chi square test that would otherwise be

used in this case because it operates under the assumption that the margins of observations are fixed to what is present in the data, and thus provides the exact probability of deviation from the null hypothesis as opposed to the estimated approximation that is provided in a chi square analysis (with the assumption of a large enough dataset). As summarized in Table 19, none of the chi-squares were statistically significant, suggesting that there was no discernible difference between the short and long series in terms of the levels of overall consistency or change in the first four crimes of the series. Thus, at least in this sample, offenders who committed longer series did not differ in their level of consistency from those who were apprehended after a total of four crimes. Due to the small sample size, it is not possible, however, to conclusively reject this hypothesis, and will require further replication before firm conclusions could be drawn.

Discussion

While theories and hypotheses with regard to the relationship between series length and degree of observed behavioral consistency have been discussed in the literature (e.g., Canter & Youngs, 2003; Woodhams et al., 2007), it has received limited empirical attention in the behavioral linking research to date. The present ad-hoc analysis aimed to investigate this relationship in two ways: first, by analyzing in detail the crime to crime transitions in the later part of the long series, and second, by comparing the levels of consistency and change between short series and the beginning of long series. The study revealed that, in the later part of long series, offenders who exhibit moderate to high degrees of control most commonly remain consistent in transitioning between consecutive crimes, and they are generally less likely to exhibit consistently low control in these later crimes of the series. This is in line with the hypotheses that experience (Hettema & Van Bakel, 1997) and frequency of repetition (Greene, 1989) may play a role in the level of consistency. It may also suggest that as offenders become

more experienced they are less likely to fail in establishing a fairly high degree of control in consecutive crimes. In regards to violence, it was found that in the later part of the series offenders are more likely to exhibit consistently higher level of violence than those identified in the early crime to crime transitions. This may indicate an overall trend toward violence escalation in longer series. This finding is interesting when looked at in conjunction with the conclusions from Study 2 that showed overall consistently low levels of violence, especially in the first crime transition, and the likely situational use of violence in the second and third transition. This may suggest that the situational use of moderate to high violence resorted to in those early transitions becomes *habitually* higher (and hence consistent) in the later part of the long series. Thus, it appears that, at least in terms of the degree of control and violence, certain differences in the way these behaviors are manifested are apparent when the later part of the series is analyzed, highlighting the need for further investigation of the full length of offense series.

In contrast, when the early part of the long series were compared to the short series, it was found that offenders in the present sample were not significantly different in the likelihood of exhibiting an overall consistent pattern of behavior, changing their behavior in an identifiable trajectory (e.g., escalation, de-escalation, spikes – in control and violence, or switching between subtypes – in sexual activity – as described in detail in Study 2), or behaving inconsistently. While all of the series in the present sample were solved, in light of the lack of significant differences in overall consistency, the fact that some offenders were apprehended after four crimes while others have gone on to commit as many as 15, may be an important issue for further investigation to determine what plays a key role, in relation to behavioral choices and consistency, in the likelihood that a series will be solved sooner rather than later.

CHAPTER 9: Ad-hoc Analysis of Behavioral Patterns Following a Failed Sexual Assault Attempt

Overview

The investigation of consistency and change trajectories across series of sexual assaults in control, violence, and sexual activity (Study 2) included the attempted sexual assaults within series. It was found that, especially in the case of sexual activity behaviors, including these interruptions limits the possibility of understanding the specific progression of behavior between consecutive crimes within series because it is impossible to know what sexual activity behaviors the offender intended to engage in. On the other hand, excluding these events completely also limits the possibility of fully establishing behavioral continuity across series because they constitute part of the series and as such could influence the subsequent offense behavior. The study highlighted the importance of examining in further detail the behavioral patterns of control and violence exhibited by offenders following a failed attempt. Such an examination may shed light onto whether offenders make adjustments to their behavior in response to the situational failure, and whether individual differences in how their behaviors change may be apparent.

Thus, the present ad-hoc analysis aimed to investigate these issues in further detail, specifically focusing on determining whether offenders remain consistent or change their control and violent behaviors in crimes directly preceding and following the failed sexual assault attempt.

Method

Data

Of the 28 series that were included in the analysis of consistency in Study 2, 18 included at least one failed sexual assault attempt (i.e., where the offender was unable to engage in any

sexual activity behaviors) within the first four crimes in their series. Thus, a subsample that included these 18 series was used in the present analysis. Of those, eight series included one interrupted attempt in their first four crimes, nine series had two interrupted attempts, and one series had three. In five series, the interrupted attempt was the first crime in the series, and of those, in three cases this was the only attempt. In the remaining 13 – the attempts were between crimes two and four. To exclude the possibility of disproportionate weighing of series with multiple attempts, only one observation was recorded for each series (i.e., if there was an attempt in the first crime and in the third – the control and violence progression was recorded from crime 2 to crime 4).

Procedure

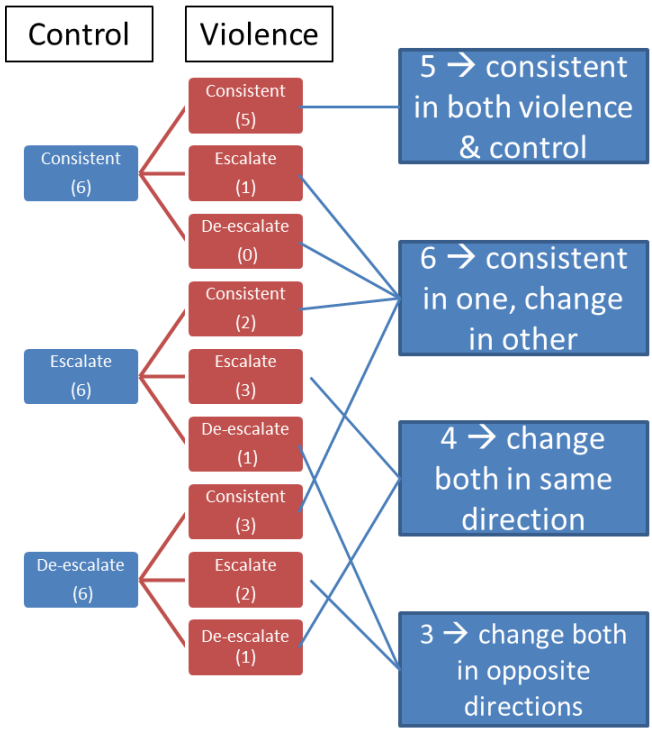
For each series, the degree of control and violence present in the offense directly preceding and the offense directly following a failed attempt were included in the analysis. In cases where there were two consecutive failed attempts, the offense preceding the first attempt and the offense following the second were included in the analysis. In the three cases where the failed attempt was the first and only crime in the series, because the offenders still managed to exert at least a low level of control or violence during those failed attempts, their degree of control and violence during the failed attempt was compared to the crime following it[24].

Consistency was coded if the degree of violence or control remained the same in the two crimes surrounding the failed attempt; *escalation* was coded if the degree of violence or control was higher in the offense following the attempt than it was in the offense preceding the attempt, and *de-escalation* was coded if the degree of violence or control was lower in the offense following the attempt than it was in the offense preceding the attempt.

[24] Because the sample is small, to be able to include as many observations as possible, this was deemed appropriate for the purposes of this exploratory analysis.

Results

The aim of this ad-hoc analysis was to identify whether offenders were consistent in the degree of violence and control used in their crime regardless of a failed attempt or if they changed their control and violence levels in response to the previous situational failure. As summarized in Figure 22, the offenders in the present sample can be divided into four subgroups in terms of how they adapted to the past situational failure to complete the attack.



Note: Numbers in brackets represent actual number of series where this pattern was observed.

Figure 22. Consistency and change in control and violence in response to failed sexual assault attempt.

Specifically, five (27.8%) offenders remained consistent in the degree of both control and violence in their offense before and after the failed attempt; six (33.3%) remained consistent in either control or violence while changing their behavior in the other dimension (e.g., consistent in violence while escalating in control); four (22.2%) offenders changed their behavior in both

violence and control in the same direction (i.e., escalated in both violence and control, or de-escalated in both violence and control); and three (16.7%) offenders changed their behavior in both violence and control in opposite directions (i.e., those who escalated in control – de-escalated in violence, and vice versa).

Discussion

Salfati (2008) highlighted the importance of considering crime series in their entirety regardless of the legal definitions of the crimes that constitute the series (e.g., going from attempted sexual assault, to rape, to sexual homicide) as it is key to understanding the progression of offender's behavior. The present ad-hoc analysis aimed to supplement the findings regarding the trajectories of behavioral consistency and change in series that included failed attempts of sexual assault in order to determine whether offender's behavior in the crime that followed the attempt changed or remained consistent in comparison to the crime preceding the attempt. The analysis revealed that there are individual differences in the offenders' behavioral patterns following a failed attempt in terms of the degree of control and violence observed. Specifically, four patterns were identified: (a) *rigid* – where complete consistency in both violence and control were observed, thus, these offenders remained invariable in their behavior and did not attempt to change the degree of used control or violence to make sure that the subsequent attack is successful; (b) *strategic* – where offenders remained consistent in one of the dimensions, while changing in the other – these offenders made adjustments to the degree of either violence or control while keeping the other one constant in the crime following the attempt. Interestingly, of these offenders, all but one remained consistent in their violence degree and changed the degree of control, again highlighting the key role that control plays in these crimes. The third pattern of behavior observed following the failed attempt was (c) *frustration* –

a change in both the degree of control and the degree of violence in the same direction – these offenders, most commonly (in three out of four cases) escalated in both control and violence in response to the previous failed attempt, which may be evidence of increasing frustration (Hickey, 2006) as a results of failing to satisfy their sexual needs; and finally the fourth pattern was (d) *switching gears* – a change in both control and violence in opposite directions – these are offenders who make adjustments to their behavior in switching between the levels of control and violence, suggesting that they may view these two aspects of the offense as interchangeable. The fact that two thirds of the offenders did make adjustments to the degree of either violence, control, or both in the crime following the interrupted attempt substantiates the hypothesis that learning based on previous experience may affect the offenders' behavioral patterns across series.

These differences in how offenders react and adjust to the situational factors affecting their criminal path are in line with what has been proposed as the interaction process between the influence of the situation and the differences in personality (Bartol & Bartol, 2008; Fleeson & Noftle, 2008), and suggest that while situational factors are important to take into consideration when determining *why* the offender's behavior may have changed, the key individual differences relevant to both the theory and the practice of behavioral linkage may lie in *how* the offenders' are dealing with the situation. In other words, the emphasis should not be on whether the situational factors affected the individual or not, but in the way the effect is manifested in offenders' decision-making process of how to re-strategize their behavior. This analysis also further supports the importance of analyzing crime series in detail and including the attempted assaults in the behavioral analysis (as suggested by Salfati, 2008). Furthermore, fully expanding on such analysis by including other crimes that an offender may have committed (e.g., robberies

or thefts that were committed between the sexual assaults), and determining how the offender's experiences during those crimes may have affected their behavior in the other crimes, can bring valuable insights into the understanding of behavioral continuity across the full criminal path.

CHAPTER 10: General Discussion & Conclusions

Overview of Findings

Behavioral linking is one of the central parts in the investigative process when faced with a possible series of offenses (Grubin et al., 2001; Salfati & Kucharski, 2005). Although findings from the recent studies (as reviewed in Chapter 2) are promising for the future of behavioral linking, several important limitations were identified in how the key issues of individual differentiation and consistency in serial crime have been addressed to date that impede the fruitful development of this line of research. Researchers in the Investigative Psychology and linking fields (e.g., Alison et al., 2001; Canter et al., 2004; Salfati, 2008; Woodhams et al., 2007) have stressed the importance of establishing valid and reliable methodological baselines for answering the questions underlying behavioral linkage (i.e., how to best differentiate between crime series, and how to define and identify behavioral consistency across crime series) to help move the field forward both in terms of understanding where it lands itself within the greater theory of human behavior and in terms of evidence-based practical applications. Thus, the present project aimed to methodically readdress the basic constructs that underlie behavioral linkage using a redefined dimensional approach to differentiation of sexual offenders' crime scenes as well as a reformulated definition of consistency as dynamic behavioral trajectories.

Individual Differentiation

The first part of this project specifically addressed the question of the most appropriate unit of analysis to be utilized in differentiating sexual offenses. As has been highlighted in the literature review, studies that investigate sexual offenses, commonly distinguished between offenses using broad categories of controlling, violent, and sexual (see Table 1) types/themes. The recurring problem in those studies is that of overlap between categories (as has been

highlighted in Figure 2) with a large number of offenses having to be categorized as "mixed" or "hybrid" types thereby limiting the utility of the classification and consequently hindering the possibility of determining the extent to which offenders remain consistent across crimes in a series. Thus, in order to substantiate the first key hypothesis that underlies behavioral linkage, namely, the *individual differentiation hypothesis* (as outlined in Chapter 1), Study 1 of this project aimed to determine whether control, violence, and sexual activity in rape offenses can be better understood dimensionally, rather than as distinct offense types. For each of the three key behavioral aspects of rape, the study examined the hypotheses that quantitative (degree) distinctions between crime scenes will be evident as well as qualitative (subtype) distinctions.

The results of Study 1 substantiated these hypothesized differentiating methods, confirming that each sexual offense crime scene could be classified as having a particular degree and being characterized by a particular subtype of control, violence and sexual activity. One especially important conclusion that followed from this study was that the dimensions of control and violence may be best understood and differentiated quantitatively. This is in line with previous literature pointing to the fact that violence in sexual offenses may be best understood as operating on a quantitative continuum (e.g., Salfati & Taylor 2006) and that the degree of control plays a pivotal role in this type of offenses (Terry, 2006). Conversely, sexual activity was found to be most meaningfully differentiated into qualitative subtypes of instrumental, pseudo-pleasing, demeaning, and extreme/fantasy. These subtypes are in line with previously discussed motivation-based and behavior-based typologies (summarized in Table 1), but because the proposed framework teases apart the different aspects of offense behavior, the differentiation into these subtypes is focused only on the sexual activity facet, and thus it may provide the necessary degree of specificity allowing each crime scene to be appropriately classified.

Overall, the differentiation findings within each of the behavioral dimensions here are consistent with many aspects of previous literature and theory, whilst also providing an improvement on previous classification attempts in the degree of specificity of the differentiation as well as in that both the qualitative and the quantitative aspects of differentiation are taken into account. Previous behavior-based (e.g., Kearns et al., 2011; Salfati & Bateman, 2005, Sorochinski, Salfati, & Labuschagne, 2014) as well as motivation-based (e.g., Groth et al., 1979; Keppel & Walter, 1999) studies of crime scene classification consistently encountered the issue of overlap between types or themes, with a fairly large proportion of crime scenes being non-classifiable (or hybrid), and even those crime scenes that could be classified into a dominant theme still had a substantial number of behaviors from the other theme present (e.g., Kearns et al., 2011; Salfati & Bateman, 2005). With the dimensional approach used here, 100% of crime scenes can be allocated into a specific level and style for each of the examined behaviors.

Importantly, in an ad-hoc analysis (Chapter 6), the possibility of putting the dimensions of control, violence, and sexual activity back together into a single combined classification system (with broad types that include a degree of control and violent and a subtype of sexual activity) was tested. The study revealed that offenders used a wide variety of combinations of these behavioral dimensions and the few common subtypes that were identified accounted for only a minor proportion of crime scenes and did not provide a meaningful differentiation. Therefore, it was concluded that using the dimensional approach to classification, with specific subtypes and degree of presence within (rather than across) behavioral domains allows for more flexibility in individually differentiating crime scenes, whilst also avoiding the formation of mixed types, and thus laying a solid foundation for subsequent consistency analysis in serial crime.

Behavioral Consistency

The second part of this project addressed the question of extending the operational definition of consistency to include "traceable" change – identifiable behavioral trajectories – in addition to behavioral stability that is commonly used as an indicator of consistency in serial crime. While the number of studies empirically testing aspects of behavioral consistency in serial crime (summarized in Table 2) has grown in recent years, this body of literature is still comparatively slim and the issue of how to most appropriately define consistency to optimize the possibility of behaviorally linking crimes has not been fully addressed. Furthermore, the review of the literature highlighted that, while the most common approach to date has been the identification of stability of certain behavioral features (or subgroups of behaviors) within pairs of linked crimes, this may not be the most effective nor the most informative approach to understanding consistency especially in the context of behavioral continuity and change across series. Several recent studies (Hewitt & Beauregard, 2014; Leclerc et al., in press; Sorochinski & Salfati, 2010) have begun testing the notion of expanding the search for consistency in identifiable trajectories of change. However, to date, there has been no full examination of how these trajectories can be best identified across series using the most appropriate unit of analysis.

Study 2 therefore aimed to identify the consistency and behavioral change trajectories in the degree of control and violence and the subtypes of sexual activity (identified in Study 1) as manifested across rape offense series. The study examined the patterns of offenders' behaviors along these dimensions in the way they transition from one crime to the next in the series as well as the overall progression across first four crimes in the series. It appears that using these two ways of examining offenders' behavior provides complementing insights into how their behavior evolves. For example, it was determined that offenders who engage in moderate or high degree

of control, most commonly, remain consistent in the first two consecutive crimes. But only a quarter of offenders in the sample remained consistent in their degree of control when looked at across the first four crimes, suggesting that while they may exhibit consistency at a certain point in the series, they are also highly likely to deviate from the initial level as the series progress. This finding further highlights the methodological importance of going beyond the examination of consistency within pairs of crimes and extending the analysis to include multiple crimes from the series.

When the trajectories in the degree of violence are analyzed, it was found that offenders are most commonly consistent in the first two crimes of their offense series, regardless of the initial level (i.e., those who started off with low violence – remained in the low violence degree for the second crime, those who started with moderate violence remained moderate, etc.). However, nearly a third of the sample was found to escalate in their violence at some point during the first four crimes in the series, which is in line with previous research on violence (e.g., Hazelwood et al., 1989; Hewitt & Beauregard, 2014) and may highlight the proneness of this behavioral dimension to situational factors. Importantly, while offenders who committed short or long series generally did not differ in the first four crimes, when the later part of the long series was analyzed (Chapter 8), it was found that offenders' levels of violence were more likely to be higher (in fact, very few offenders engaged in no or low violence in these later crimes of long series) and consistently so, suggesting that the situational use of high degrees of violence that may have occurred earlier in the series, becomes more habitual and, thus, consistent as the series progress. Alternatively, in line with the motivation-based literature (e.g., Cohen et al., 1969), the sex-aggression fusion becomes more prominent as the series progress and offenders may exhibit a higher degree of violence as part of the sexual assault to satisfy their sexual needs.

In examining the behavioral patterns within sexual activity dimension, it was found that the presence of interrupted attempts severely handicaps the methodological possibilities of analyzing the specific transitions from one crime to the next in this behavioral dimension (this limitation and possibilities for future investigation will be further discussed below). When interrupted attempts (i.e., where offenders failed to engage in any sexual activity behaviors) are not taken into account, over a third of offenders remain consistent across their first four crimes in the series. Offenders who were not consistent, for the most part switched between two subtypes of sexual activity. These findings are in line with the conclusions of Hewitt & Beauregard (2014) and Leclerc et al. (in press) that many serial offenders appear versatile in the kinds of sexual activity they engage in with the victims across the series. Furthermore, three of the four switching patterns observed included instrumental sexual activity (that consisted of vaginal penetration and was deemed to be indicative of basic need for sexual gratification) as one of the two types and one of the more "fantasy-driven" types (i.e., pseudo-pleasing, demeaning, or extreme) as the other type. This may be indicative of experimentation within this behavioral subgroup, as theorized by Canter and Youngs (2003) and as has previously been found in Sorochinski and Salfati (2010), or it may indicate an evolution of the offender's fantasy over the series (Douglas & Munn, 1992). Alternatively, it may be the case, as hypothesized by Hewitt and Beauregard (2014), that in some offenses, offenders were unable to engage in the full gamut of sexual activity they had initially planned due to situational interference. Further investigation of factors that may influence the way offenders change their behavioral trajectory within this dimension may be necessary to fully substantiate these hypotheses. However, in line with previous studies (e.g., Bateman & Salfati, 2007), it is clear that, in contrast to what the early

investigative literature (e.g., Dietz et al., 1990; Ressler et al. 1986) had suggested, offenders are not highly consistent in the sexual fantasy-related, or "signature" behaviors.

In order to gain a fuller understanding of the way offenders behavioral patterns are manifested, Study 2 also examined the combined progression of offenders' behavior *across* the three dimensions of control, violence, and sexual activity. The results revealed that offenders were much more likely to exhibit consistency at the single behavioral dimension level than at the overall crime scene behavior level. That is, over half of the offenders were consistent in at least one of the behavioral dimensions over the first four crimes in their series, but none were consistent across all three dimensions. Furthermore, when the trajectories of change were examined in those series where offenders did not exhibit consistency in any of the dimensions, it was found that these trajectories are also best understood when considered individually rather than in combination. These findings are in line with the Leclerc et al.'s (in press) conclusions that there is often a lack of synchronicity in the various subgroups of offending behaviors, and again highlight the importance of choosing the most appropriate behavioral unit for analyzing offenders' behavioral continuity. Finally, using the reframed definition of consistency that included behavioral trajectories, only one series in this sample was found to exhibit complete inconsistency, which constitutes a substantial improvement on previously identified levels of behavioral consistency across series (e.g., Bateman & Salfati, 2007; Grubin et al., 2001; Kearn et al., 2011; Salfati & Bateman, 2005). Together, these findings suggest that the quantitative (control and violence) and qualitative (sexual activity) differentiation within behavioral dimensions, identified in Study 1, is a useful *unit of analysis* for crime scene classification, and can also become a promising way for the identification of *behavioral traceability* (consistency and behavioral trajectories) across series. Furthermore, the ad-hoc analysis (Chapter 9)

conducted to examine the way failed attempts of sexual assault may contribute to how offenders change their control and violent behavior in the following crimes suggests that identifying individual differences in the way offenders respond to situational factors may be promising for establishing individual differentiation between series.

Theory and Practice of Behavioral Linkage

Theoretical Contribution

The successful application of behavioral linkage is rooted in the ability to extend the theories and empirical knowledge regarding distinctiveness and continuity of human behavior in general to the specific case of offenders' behavior in serial crime. Chapter 2 discussed the social and personality psychology theories that give basis to the behavioral linkage research and it is important to consider how the findings of this project fit into the broader theoretical framework and the extent to which they can help move the field forward.

In the psychological literature examining continuity of human behavior, it has been hypothesized that variability may represent a consistent individual difference (Berdie, 1969; Fleeson, 2001). Further, the consistency matrix proposed by Fleeson and Noftle (2008) for the study of personality, as discussed in Chapter 2, suggested that consistency in an individual's behavior can take a wide variety of forms, including consistent progression and identifiable patterns in addition to stability, and the extent to which it is identified depends on such factors as time, situation, and psychological meaning of the behavior. The present project adds empirical evidence to this multidimensional conception of consistency in several ways. First, the fact that, in absence of complete stability, meaningful behavioral trajectories were evident in the way

offenders' behavior changed across series within each of the analyzed behavioral dimensions[25] suggests that consistency – defined more broadly as traceability – can be identified and can enrich our understanding of behavioral continuity. Second, it was found that most offenders, while exhibiting stability in one behavioral dimension across series, also exhibit a change pattern in the other. This confirms the notion that there are intra-individual differences in the way this behavioral continuity is manifested depending on the specific aspect of behavior that is analyzed. That is, Fleeson and Noftle (2008) suggested that one of the "competing determinants" (p. 1364) of consistency is behavioral content, meaning that consistency can be manifested differently by the same person (either as stability or as change along a specified dimension) depending on the particular behavior investigated. This idea (and the evidence identified here to support it) is pivotal for advancing the research on behavioral linking because it suggests a need to shift the focus from determining *which* of the relevant behaviors are consistent across series and which are not to determining *how* consistency is manifested in *each* of the various relevant behaviors. Furthermore, it highlights the importance of dissecting the totality of behaviors manifested during an offense into distinct behavioral dimensions (e.g., control, violence, sexual activity in sexual offenses) and examining how offenders may exhibit consistency within each of those dimensions rather than broadly identifying the proportion of offenders who behave in a stable pattern across their series overall (e.g., in a broad behavioral theme that includes the full range of relevant behaviors).

Third, the finding that levels of consistency and change within the violence behavioral subgroup varied depending on which part of the series was examined (i.e., violence degree was

[25] While chance occurrence of the observed trajectories could not be ruled out given the small sample size, the observed trajectories are theoretically substantiated and may be considered as the basis for subsequent confirmatory analysis where the specifications for expected trajectories can help reduce the margin of error, thereby increasing the chances of determining more conclusively whether the observed patterns are indeed non-random.

found to remain consistent in the first two crimes of the series, then a change of degree in a particular direction occurred, and then, in the later part of long series, the behavior became more consistent again, but at a higher overall degree), provides further evidence for the dynamic, interactive and complex nature of consistency (as outlined by Fleeson & Noftle, 2008; see Figure 3). Indeed, it appears that in order to fully map the manifestation of consistency in an individual's behavior, one must take into account not only how this consistency can be affected at any one point (e.g., by situational factors, as shown in the ad-hoc analysis in Chapter 9, examining the behavioral change following a failed sexual assault attempt), but also how this effect can transform the individual's consistency and relative level of behavioral enactment at a later stage. Thus, what seems to happen in the case of violence across series, for example, is that it can be divided into three segments: (a) while offenders start their criminal path (in the context of present series) at a relatively stable level of aggression (in line with Huessman et al., 1984), (b) their violent behavior may change in an identifiable trajectory (e.g., escalate in response to situational constraints; Coker, Walls, & Johnson, 1998), and (c) subsequently become stable again but at a higher degree of enactment. If the question of consistency is viewed as categorical – present/absent – then, the violent behavior would be viewed as simply *inconsistent*. However, if the multidimensional understanding of consistency is implemented, then violent behavior is seen as *consistently transforming*.

The notion of redefining consistency as a dynamic understanding of behavioral continuity also has implications for the theory of offender profiling as outlined by Canter (1994; 2000). Indeed, the possibility of offender profiling rests on the hypothesis that behavioral consistency exists between the actions committed by the offender at the crime scene (A) and his characteristics (C) (that also translate into his actions outside of the crime) – the A→C, or the

Canonical Equation of profiling (Canter, 2000). This equation has an additional level in the case of serial crime in that the consistency of actions across crimes is hypothesized to also be consistent with the offender characteristics (Salfati & Bateman, 2005) – the A→A→A→C equation. The present study aimed to determine this A→A→A correspondence and concluded that the A's may not necessarily have to be exactly the same to be linked together into an identifiable series. Thus, if it is shown here that this part of the equation may, in fact, be more correctly symbolized as (for example) "A→a→$_a$" or "a→A→A" (as another example), and in addition to that, the actions should actually be analyzed in smaller clusters of "A's", each of which is likely to present its own trajectories, then the way the consistency with the characteristics (C) could best be identified and understood should also be re-examined.

It is possible that offenders who follow specific trajectories within specific behavioral dimensions at their crime scenes also have a particular evolvement in terms of the characteristics (e.g., their interaction style with individuals in the non-criminal life), while there is a level of consistency in other key characteristics. It may also be the case that those *offenders who change* in a particular trajectory across behavioral dimensions (as has been the case for part of the sample in the present study) differ on particular characteristics from *offenders who remain consistent* in at least one dimension across crimes (and further distinctions may be apparent between groups of offenders based on the specific behavioral trajectories they employ within each behavioral dimension). Furthermore, as has been shown in Chapter 9, there are individual differences in how offenders' behavioral pattern changes (or remains consistent) following a failed sexual assault attempt, and these differences may also correspond to differences in offenders' characteristics. In this case, the hypothesized relationship between criminal actions (A) and offender characteristics (C) in serial crime may need to be reformulated as the

relationship between *trajectories of actions* (T^A) and offender characteristics (C). In other words, the trajectories in which offenders' actions progress across their series may be more indicative of their characteristics than the actions themselves. This premise is in line with what has been identified as the relationship between dispositional and situational influences on human behavior, specifically, that, in the presence of situational factors, the key individual differences (governed by personality) lie, not in whether these factors will have an impact on a person's behavior, but in the various ways that individuals adjust to these factors (Bartol, C. R. & Bartol, A. M., 2008).

In their concluding statements, Fleeson and Noftle (2008) insisted that a "full discussion of the meaning, types, and organization of types of consistency" (p. 1383) can be beneficial for the field of personality psychology. The present study provided evidence that such multifaceted discussion of consistency is also crucial for solidifying the theoretical and empirical grounds of behavioral linking and profiling in serial crime.

Practical Implications

While the understanding of individual differentiation and behavioral consistency in the context of theories of human behavior is important for developing and validating the grounds on which behavioral linkage builds, the ultimate goal of this line of research is to be able to apply it during the investigative process. Thus, it is important to consider the extent to which findings from the present study can inform the practice of behavioral linking. Previous literature (e.g., Canter et al., 2003; Robertiello & Terry, 2007; Terry, 2006) has highlighted the difficulties in classifying sexual offenses into rigid types. Indeed, the findings from the present study showed that offenses differed widely in the way the quantitative (control and violence) and qualitative (sexual activity) aspects of the three key behavioral dimensions came together within each offense. This suggests that it may be advisable to refrain from making broad conclusions as to

the motivation or the general behavioral theme when investigating these crimes. Instead, the present findings emphasize the importance of a refined level of considerations in the analysis of sexual offending behavior, both in terms of differentiating their offenses within small and concrete behavioral dimensions, and in terms of the way the offenders' behavior may change within each of the dimensions over their series.

Furthermore, previous studies on linking crimes have generally based their recommendations to law enforcement for determining whether two crimes are linked (Bennell, Mugford, Ellingwood, & Woodhams, 2014) on the extent of similarity between the crimes in question. Based on the present examination of behavioral change trajectories within specific dimensions of behavior across crime series, these recommendations can be extended.

As summarized in the decision tree diagram below (see Figure 23), the present findings suggest that the *first step* in the linking process should be to look at whether the crime scenes have consistency (aka stability) in at least one of the behavioral domains. If there is no consistency in any of the behavioral domains, then, in the *next step*, specific behavioral trajectories need to be analyzed in order to determine the likelihood of the series being linked. It is important to note that because of the limited data in this study, the trajectories identified here can only be viewed as examples or trends for further examination and cannot be considered as conclusive expected patterns of behavior that are applicable in practice. Nonetheless, the potential for finding such trajectories, as demonstrated in the present exploration, suggests that determining behavioral stability cannot be seen as the final or only stage for deciding whether multiple crimes constitute a series.

Finally, if it is found that there is neither consistency nor an identifiable trajectory of change, unfortunately, at this stage, the behavioral evidence cannot be conclusively used to

determine whether the crimes in question are part of the same series. In other words, it seems that, at this time, behavioral evidence can only be used to identify linked series, but not to exclude linkage.

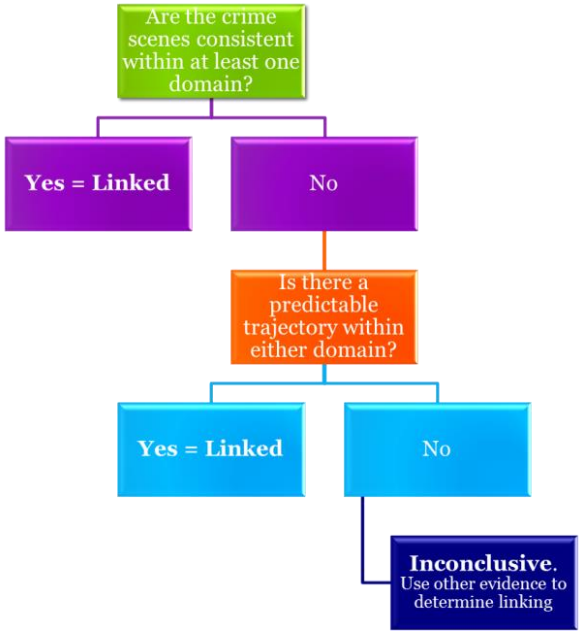


Figure 23. Investigative decision-making tree when using behavioral evidence to link crimes

Such a conclusion is problematic because it implies that even distinctly behaviorally different offenses could have been committed by the same offender, thus undermining the extent to which behavioral linking could be practically useful. While studies that compare linked crime pairs to unlinked crime pairs (i.e., pairs of crimes that are known to not have been committed by the same offender; e.g., Bennell & Canter, 2002; Bennell & Jones, 2005; Markson, et al, 2010; Tonkin, et al., 2012) generally find that linked pairs are more similar than unlinked on a given set of elements, the present findings suggest that at least a minority of crime series may be characterized by a complete lack of consistency or even discernible trajectory of change across their crimes. A further detailed examination of exactly how series characterized by inconsistency

differ from unlinked crimes may be necessary to determine with any degree of certainty that apparently dissimilar crimes were not committed by the same offender.

In recent years, behavioral linking evidence, in addition to being used during the investigative process, has also been brought to court (e.g., State v. Fortin I, 2000; State of California v. Prince, 2007). In cases where sufficient direct (e.g., DNA) evidence is present to convict the offender of only one (or several) of the crimes he is suspected of committing, an expert may testify that the crimes, where there is not enough physical evidence, can be conclusively (behaviorally) linked to those where there is, and, thus, that whoever committed one of these crimes has also committed the others. Researchers (e.g., Ormerod, 1999; Risinger & Loop, 2002; Salfati, 2014; Salfati & Curmi, 2014) have raised concerns regarding such premature use of behavioral linking, emphasizing that the reliability and validity of the technique has yet to be fully established before any such consequential use of it can be implemented. The current findings, while adding support to the fundamental assumptions validating the use of behavioral evidence, also highlight that there is still much to be done in terms of fully developing, testing, and fine-tuning the technique before it can be considered reliable in an investigation or in the court.

Another aspect of importance that needs to be addressed in relation to the present findings is that the proposed detailed examination concentrating on the way behavioral change may be viewed as a form of dynamic consistency exhibited by offenders across series may be practically useful when an investigator is faced with a limited number of crimes and needs to determine whether they should be investigated as part of a single series. However, in the case of crime analysis that aims to identify possible links between crimes in a large database of unsolved cases such examination of trajectories may not be practically feasible because it would require

the analyst to examine every possible combination of crimes in search of potential trajectories. Thus, in this type of crime linkage analysis, the only possibility is to concentrate on the subsample of offenders who remain truly stable in at least one aspect of their criminal behavior. Nonetheless, the existence of these trajectories signifies that similarity-based crime linking is limited in its ability to detect and identify series because those series that are characterized by behavioral change will necessarily be overlooked.

Limitations & Future Research Directions

This project is not without limitations. Most importantly, the data used in this project were collected from police files that were not purposely compiled for research purposes and that differ significantly in the amount and quality of information that they contained. Certain behaviors, such as, for example, verbal control, may not have been recorded in the file, and could have been coded as absent while in reality they were present but left out of the case description. Additionally, the sample is fairly small and may not be fully representative of the population of serial sexual offenses. Therefore, it is important to replicate both parts of this project – individual differentiation within behavioral dimensions and identification of behavioral trajectories along these dimensions in series – with a larger dataset in order to establish its reliability and generalizability. Specifically, the exploratory nature of the study in terms of the identifiable trajectories within the behavioral dimensions examined does not allow for firm conclusions to be made as to whether these are the only possible trajectories and whether these trajectories are generalizable to the population of sexual offenders at large, limiting the conclusions to stating that the potential for identifying meaningful trajectories of behavioral change where stability is not found exists. Using the trends that were identified in the present study, a confirmatory analysis will have more power to test the more specific hypotheses that can be formed based on

the findings here. One of the key questions that will have to be answered in subsequent studies is whether it is at all feasible to identify and capture all possible patterns (i.e., whether there are limits to the number of trajectories that offenders could follow across their series), while still keeping their number to a reasonable and practically useful one.

Furthermore, in terms of individual differentiation, while the present study attempted to fine tune the unit of analysis in order to find the most salient way of differentiating crime scenes using behavioral evidence, there was not enough data to test the degree to which belonging to the same series could be predicted using the proposed differentiation framework (i.e., differentiation between series as opposed to between crime scenes). Thus, in order to determine whether any of the present conclusions can be substantiated, a further examination using a large dataset is necessary.

This study aimed at understanding specifically the behaviors of serial sexual offenders. However, testing the dimensional differentiation within the single rape offenses as well as comparing these to behaviors of serial rapists would further our understanding of the differences and similarities across these two categories of sexual crimes. In addition, previous studies have suggested that certain distinctions exist between rapists who target mainly adult victims and child molesters (e.g., Bartosh, Garby, Lewis, & Gray, 2003; Lussier, LeBlanc, & Proulx, 2005; Prentky, Lee, Knight, & Cerce, 1997). The present study did not differentiate between offenses based on the age of the victim, and it may be important for future studies to investigate whether behavioral trajectories of these groups of offenders differ significantly and thus should be studies separately. Furthermore, while the present study focused on how consistency and behavioral change trajectories are manifested in serial sexual offenses, behavioral linking extends to other types of crimes, including arson, burglary, robbery, and homicide. Thus, an examination of

which behavioral dimensions could be most efficient in differentiating these crimes and how behavioral trajectories are manifested in those is also crucial.

Although the study's findings confirmed the previously emphasized situational impact on behavioral consistency, and established that individual differences may be apparent in how offenders' adjust their behavior following a failure to complete the sexual assault, the analysis was exploratory in nature and a further investigation into these issues is warranted. A further investigation into the consistency of these adjustments within series that included more than one attempt is important to determine whether the response patterns can be viewed as another manifestation of behavioral consistency and thus used as part of behavioral linking process. In addition, determining whether the particular place of the failed attempt in the timeline of the series makes a difference in how offenders will adjust their behavior may also be important to investigate (e.g., it may be the case that if the failed attempt happens earlier in the series the offenders use different adjustment strategies than when it happens later because, by then, they are more set in their ways). It may also be important to determine whether series that did not include any failed attempts significantly differ from those that did in the degree of consistency observed. This will help establish whether behavioral change in the series is more apparent specifically when circumstances affect the ability of the offender to reach his goal, or if certain offending behavior is more generally prone to being in flux (e.g., due to the desire for experimentation).

It has also been suggested (e.g., Greene, 1989; Woodhams et al., 2007) that the temporal period (in series of crime, referring to the time lags between offenses and the overall time over which the series spans) may also influence the extent to which offenders remain consistent or change their behavior. This change in behavior may be influenced by situational factors outside

of the crime series in addition to what occurs during the actual crimes as well as by the more general effects of maturation on offenders' behavior. Indeed, personality and developmental psychologists (e.g., Biesanz, West, & Kwok, 2003) argue that individuals tend to be less behaviorally consistent at a younger age (i.e., during peak developmental transition stages, such as adolescence and young adulthood). The relationship between the degree of behavioral consistency in serial crime and offender age is key not only in terms of understanding the potential reasons for lesser or greater consistency within series, but also in terms of substantiating the A →C equation of profiling (as described above). Thus, if it can be shown that the more consistent offense series are committed by older offenders whereas the series characterized by behavioral change across dimensions are more likely to be committed by younger offenders, this would provide empirical support to the above stated equation and be of key practical importance for law enforcement because it may provide information about the offender (i.e., his age) that can help narrow down the suspect pool and focus the investigative efforts in a certain direction[26].

Conclusion

In conclusion, while investigative use of behavioral evidence to help link and solve serial offenses has been in use for a long time, the empirical and theoretical grounds for whether and how to use this evidence effectively has begun to emerge only in recent years. The theoretical framework, as described by Canter (2000), proposed that in order for behavioral crime linking to be validated, two base assumptions must be met: individual differentiation and consistency. The two key questions that underlie these assumptions, as outlined in Chapter 1, are: (a) what is the

[26] An attempt to conduct this analysis using the present sample was made. No relationship between offenders' age and the degree of consistency exhibited was identified. These findings, however, due to the limitations of the data – the lack of a sufficient comparison group of juvenile serial sexual offenders – cannot be considered informative on this issue, and therefore they were not included in the manuscript.

most appropriate behavioral unit – *unit of analysis* – that can best differentiate crime scenes, and (b) what is the most efficient way of defining the consistency of this unit – *stability or traceability* – that will maximize the potential for identifying series. Revisiting Figure 1 that summarized this basic underlying structure of behavioral linkage, the theoretical and empirical examination of the above questions in the present project, allows for substituting the question marks in the base fields with the following answers (see Figure 24): (a) the unit of analysis that may be most appropriate for differentiating between crime scenes (at least in the case of sexual offenses as analyzed here) is the quantitative and qualitative distinctions within behavioral dimensions, and (b) in order to fully capture the consistency of behavior across series, it must be analyzed in terms of behavioral trajectories of change in addition to behavioral stability.

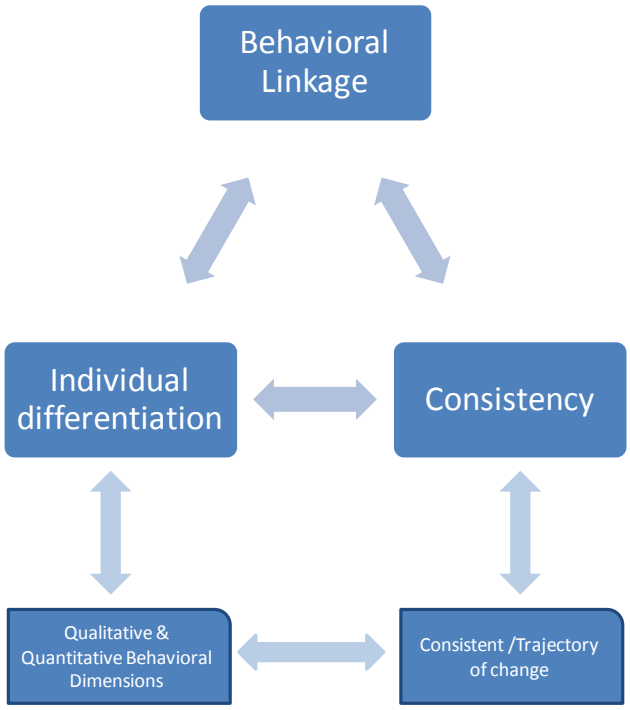


Figure 24. Conceptual structure that underlies behavioral linkage – revisited

APPENDIX A

Quantitative Differentiation – by Behavior vs. by J-score

As described in Chapter 4, Partial Order Scalogram Analysis with Coordinates (POSAC) allows for the identification of a quantitative scale along which the case profiles are situated on the plot. The quantitative scale is based on the J-score that is assigned to each profile in accordance with its configuration of present and absent elements and its geometrical position relative to other profiles. In order to identify distinct degrees of behavioral enactment within violence, control, and sexual activity, the J-scores of each profile were plotted (as shown in Figures 10, 12, and 14). Within each distribution, the largest gaps between scores were considered to be the appropriate cut-off between levels (none, low, medium, high, and max).

In order to determine the loss in correctly representing the order relations between the profiles when these are put into the larger categories of None, Low, Medium, High, the number of pairs of profiles that have a different category allocation was divided by the number of pairs that received different J-scores (and thus are ordered differently). Thus, in the Control dimension, there were 16 profiles with 10 different J-scores, resulting in a total of 112 differently ordered pairs, while with the 16 profiles reduced to four categories, there are 89 differently ordered pairs. Therefore, 89/112 = 0.79 – meaning that 79% of order relations are retained when the individual profile scores are categorized into None, Low, Medium, and High control degree. In the violence dimension, the same calculation with 19 profiles (13 different scores) yielded the following fraction: 123/164 = 0.75 – meaning that in the violence dimension, 75% of order relations are retained when the profiles are categorized. Thus, when categories of None, Low, Medium, or High degree are used instead of J-scores to determine the level of violence or control, at least three quarters of the order relations are retained. Although some of the specificity is lost, using the J-scores as a continuous variable to determine the degree of a given

behavior is impractical because the differences in scores are ambiguous (i.e., it would still be necessary to set cut-offs for how big of an increase is needed for one to conclude that there is escalation, for example), and a range of scores would still need to be calculated to determine what can be considered consistent.

While J-scores have previously been used to identify quantitative differences between profiles within POSAC (e.g., Last & Fritzon, 2005), the practical applicability of such approach to differentiating crime scenes into identifiable levels within the behavioral dimensions seems questionable as it would require the law enforcement agencies to actually have to conduct a multidimensional statistical analysis in order to find out what the ordinal score in control, violence, or sexual activity of any given crime would be. It may be much more practical to know a specific number of present elements that can help differentiate the behavioral dimensions into levels. Incidentally, the gaps in J-scores that were used here to categorize the change of degree also corresponded to the increase in the number of present elements, with one notable exception: within the violence dimension, there was a substantial difference in J-scores between profiles 2 (*J*-score = 44.44) and 3 (*J*-score = 61.11), both of which contained one present element, while the difference between profiles 6 (*J*-score = 72.22) and 7 (*J*-score = 83.33) that differed in the number of present elements (1 vs. 2) appears to be smaller. However, the meaningfulness of this score difference is questionable, and therefore it was concluded that the number of behaviors may be a more useful and practically applicable way of differentiating between crime scenes in terms of the quantitative measure along each behavioral dimension. Thus, considering that each increase in categorization also corresponds to an increase in the number of behaviors present, when categories are compared to behavioral count, there is no practical loss in order relations accuracy.

Furthermore, while there seems to have been a substantial increase in the J-score between the profiles classified as "high" and those classified as "maximum" within each behavioral dimension. The subsequent analyses of cross-dimensional classification (Chapter 6), as well as consistency (Chapters 7 and 8), collapsed these two categories because the number of crime scenes that could be classified into "maximum" degree was very small and it was decided that including them within the "high" degree classification is more useful.

APPENDIX B – POSAC Plot Co-ordinates and Coefficients of Monotonicity

Table 21

POSAC of control behavioral dimension – Axes co-ordinates by profile

Id	Profile	Score	Freq	X-axis	Y-axis	J-axis	L-axis
1	2 2 2 2	8	12	100.00	100.00	200.00	100.00
2	2 2 1 2	7	9	66.67	73.33	140.00	93.33
3	2 1 2 2	7	20	93.33	53.33	146.67	140.00
4	2 2 2 1	7	28	60.00	93.33	153.33	66.67
5	1 2 2 2	7	10	73.33	66.67	140.00	106.67
6	2 1 1 2	6	4	86.67	13.33	100.00	173.33
7	2 1 2 1	6	16	40.00	60.00	100.00	80.00
8	1 1 2 2	6	16	80.00	26.67	106.67	153.33
9	2 2 1 1	6	8	13.33	86.67	100.00	26.67
10	1 2 2 1	6	6	26.67	80.00	106.67	46.67
11	1 2 1 2	6	4	46.67	40.00	86.67	106.67
12	1 2 1 1	5	6	6.67	46.67	53.33	60.00
13	2 1 1 1	5	4	20.00	33.33	53.33	86.67
14	1 1 1 2	5	16	53.33	6.67	60.00	146.67
15	1 1 2 1	5	5	33.33	20.00	53.33	113.33
16	1 1 1 1	4	28	.00	.00	.00	100.00

Note: Profile composition represents the presence (2) and absence (1) of each of the elements in the analysis of Control behavioral dimension in the following order: Weapon, Physical, Verbal, Violent.

Table 22

Coefficient of weak monotonicity between each observed Control element and the factors

Element	J	L	X	Y
Weapon	.93	-.50	.66	.93
Physical	.86	-.93	.23	.98
Verbal	.95	.01	.87	.81
Violent	.65	.98	.98	-.11

Table 23

POSAC of Violence behavioral dimension – Axes co-ordinates by profile

Id	Profile	Score	Freq	X-axis	Y-axis	J-axis	L-axis
1	2 2 2 2 2 2	12	1	100.00	100.00	200.00	100.00
2	2 1 2 2 1 1	9	2	77.78	72.22	150.00	105.56
3	1 1 2 2 2 1	9	1	94.44	44.44	138.89	150.00
4	1 1 2 1 2 2	9	1	72.22	66.67	138.89	105.56
5	2 1 2 1 2 1	9	2	50.00	94.44	144.44	55.56
6	1 1 1 2 1 2	8	1	88.89	16.67	105.56	172.22
7	1 1 2 2 1 1	8	1	83.33	11.11	94.44	172.22
8	1 1 2 1 2 1	8	1	55.56	50.00	105.56	105.56
9	1 2 2 1 1 1	8	1	61.11	55.56	116.67	105.56
10	2 1 2 1 1 1	8	34	16.67	77.78	94.44	38.89
11	2 1 1 1 2 1	8	1	11.11	83.33	94.44	27.78
12	2 2 1 1 1 1	8	1	27.78	88.89	116.67	38.89
13	2 1 1 2 1 1	8	1	44.44	38.89	83.33	105.56
14	2 1 1 1 1 1	7	45	5.56	61.11	66.67	44.44
15	1 1 1 1 2 1	7	2	33.33	27.78	61.11	105.56
16	1 1 1 2 1 1	7	5	66.67	5.56	72.22	161.11
17	1 2 1 1 1 1	7	1	38.89	33.33	72.22	105.56
18	1 1 2 1 1 1	7	15	22.22	22.22	44.44	100.00
19	1 1 1 1 1 1	6	76	.00	.00	.00	100.00

Note: Profile composition represents the presence (2) and absence (1) of each of the elements in the analysis of Violence behavioral dimension in the following order: Approach-Manual, Approach-Weapon, Assault-Manual, Assault-Weapon, End of Offense-Manual, End of Offense-Weapon.

Table 24

Coefficient of weak monotonicity between each observed Violence element and the factors

Element	J	L	X	Y
Approach-Manual	.94	-.99	.14	1.00
Approach-Weapon	.95	.30	.93	.76
Assault-Manual	.91	-.46	.81	.82
Assault-Weapon	.91	1.00	1.00	-.09
End Offense-Manual	.94	.33	.94	.71
End Offense-Weapon	.99	.94	1.00	.59

Table 25

POSAC of Sexual Activity behavioral dimension – Axes co-ordinates by profile

Id	Profile	Score	Freq	X-axis	Y-axis	J-axis	L-axis
1	2 2 2 2 2	10	2	100.00	100.00	200.00	100.00
2	2 2 2 2 1	9	15	66.67	95.24	161.90	71.43
3	1 2 2 2 2	9	2	80.95	71.43	152.38	109.52
4	2 2 1 2 2	9	3	95.24	61.90	157.14	133.33
5	1 2 2 2 1	8	2	42.86	90.48	133.33	52.38
6	2 1 2 2 1	8	8	28.57	85.71	114.29	42.86
7	2 2 1 2 1	8	8	61.90	57.14	119.05	104.76
8	1 2 1 2 2	8	2	90.48	38.10	128.57	152.38
9	2 2 1 1 2	8	1	85.71	19.05	104.76	166.67
10	2 2 2 1 1	8	3	23.81	76.19	100.00	47.62
11	1 1 2 2 1	7	7	19.05	66.67	85.71	52.38
12	1 2 1 1 2	7	5	71.43	9.52	80.95	161.90
13	2 1 1 2 1	7	5	38.10	47.62	85.71	90.48
14	2 2 1 1 1	7	5	47.62	28.57	76.19	119.05
15	1 1 1 2 2	7	1	76.19	23.81	100.00	152.38
16	1 2 1 2 1	7	13	52.38	42.86	95.24	109.52
17	2 1 2 1 1	7	4	9.52	80.95	90.48	28.57
18	1 1 1 2 1	6	37	14.29	33.33	47.62	80.95
19	1 2 1 1 1	6	14	33.33	14.29	47.62	119.05
20	1 1 1 1 2	6	1	57.14	4.76	61.90	152.38
21	1 1 2 1 1	6	3	4.76	52.38	57.14	52.38
22	1 1 1 1 1	5	51	.00	.00	.00	100.00

Note: Profile composition represents the presence (2) and absence (1) of each of the elements in the analysis of Sexual Activity behavioral dimension in the following order: Verbal, Intimacy, Victim Participation, Penile Penetration, Non-penile Penetration

Table 26

Coefficient of weak monotonicity between each observed Sexual Activity element and the factors

Element	J	L	X	Y
Verbal	.97	-.50	.82	.95
Intimacy	.93	.63	.99	.62
Victim Participation	.94	-.97	.51	1.00
Penile Penetration	.92	-.54	.72	.90
Non-penile Penetration	.84	.98	1.00	.14

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