A MULTIFACTOR APPROACH TO RISK PREDICTION MODELING FOR JUVENILE SEX OFFENDERS

Ву

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ABSTRACT

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By

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Sexual offenses committed by juveniles are a growing concern for police, courts, and the public. Currently, many courts do not know how to appropriately handle juvenile sex offenders and are relying upon professional opinion or sexual offense risk assessment protocols. Existing risk assessment measures tend to focus on individual level factors (e.g. crime history, personality, attitudes, etc) or microsystem factors (e.g. interactions with parents, performance at school, etc.) and fail to include larger systemic factors such as socioeconomic status and neighborhood. This study looks at risk assessments, socioeconomic status, and distance to possible neighborhood protective and risk factors for 58 youth as they entered a county court system after being adjudicated for a sex offense. One-year follow up data was used to assess the incremental predictive validity of these factors. Results indicate that the Juvenile Sex Offender Assessment Protocol II (JSOAP II) and the Youth Level of Service/Case Management Inventory (YLS/CMI) are useful predictors of recidivism, as is the proximity to the nearest church. Socioeconomic status, operationalized as a neighborhood type index, formed via a cluster analysis of several census items, was found to mediate the relationship between the JSOAP II and recidivism, with the risk assessment measure only accurately predicting for one of three neighborhood types.

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Introduction

In the National Longitudinal Study of Adolescent Health, 4.7% of American youth sampled between 1994 and 2008 report either being physically forced or physically forcing someone else to have sexual intercourse against their will (Harris & Udry, 2011). Among those known to the police, juveniles account for more than one third of the perpetrators in sex offense cases against minors (Finkelhor, Ormrod, & Chaffin, 2009). Of the more than 4,037,000 offenses reported to the National Incident-Based Reporting System (NIBRS) in 2004, more than 14,000 involved a juvenile sex offender (Finkelhor, Ormrod, & Chaffin, 2009). While not a large proportion of all crime, sex crimes involving juvenile perpetrators represent a set of very serious offenses. Research on this population goes back only about the last 60 years, increasing in the 1980s as juvenile courts and treatment centers were faced with these youthful offenders and had limited knowledge regarding the best ways to handle them (Finkelhor, Ormrod, & Chaffin, 2009). Early thinking about this population was based primarily on our knowledge of adult sex offenders, although comparison studies found the groups to be too dissimilar to share conceptualizations regarding etiology, risk management, or treatment (Becker, 1998). Most of the extant literature has focused on individual characteristics of juvenile sex offenders, treatment issues, risk prediction, and recidivism rates (Becker, 1998). As explained below, relatively little research on sex offenders has been done that includes both individual and contextual variables.

Sixty nine percent (69%) of juvenile sex offenses occur in the home and 12 percent occur at school (Finkelhor, Ormrod, & Chaffin, 2009), compared to 31 percent of violent crimes

committed by adults occurring in/near the home and 15% occurring on school property (National Crime Victimization Study, 2002). Since such a large percentage of juvenile sex offenses occur in the home, this may suggest that context is of particular importance for these crimes. Perhaps there are certain characteristics of environments that lend themselves more easily to sexual offending. Juvenile sex offenders are also very likely to know their victim, with 25 percent of victims being family members and 63 percent being acquaintances. The best evidence indicates that only 7 percent of juveniles who commit sex offenses are female (Finkelhor, Ormrod, & Chaffin, 2009) and very little is known about them. For that reason, this study and the rest of this literature review focused only on male juvenile sex offenders unless otherwise stated.

The intention of the study reported here was to propose a more complete model of understanding juvenile sex offending and to begin to test the relationship between some elements of this model and recidivism. This proposed model aims to bridge the gap between our existing knowledge of the individual characteristics of juvenile sex offenders and the suspicion that offenses that are so frequently occurring in known places with known victims must also have environmental predictors. Understanding the contexts in which juvenile sex offenders live may provide opportunities for better intervention with offenders and also better targeted prevention efforts. The study reported here was aimed at beginning to fill the gap in the literature regarding the contextual forces that are predictive of repeat offending among male juvenile sex offenders.

This document first summarizes the existing literature on this topic and population. The literature review which follows was developed using searches through ProQuest on juvenile and adolescent sex offenders, crime theories, risk assessments (both general and sex specific), community structures and social disorganization. The following literature review begins by briefly outlining several general etiological of crime theories as they are applied to sex offending committed by juveniles. The theories that have been proposed in the past to explain crime are integrated with the research review. It should be pointed out that not all of the research on these topics is presented, as the newly proposed model for sexual offending will be the focus of this review. Second, the newly developed theory of juvenile sex offending is presented. This theory is broken down into its elements, first explaining the role of individual factors, family factors, surveillance, community risk and protective structures, and finally larger community and cultural norms. Third, the specific rationale for the study reported here is then detailed/ Finally, the methods, results, and discussion are presented.

Literature Review

Current Research on the Etiology of Juvenile Sex Offending

The literature regarding juvenile sex offending is quite scarce overall, but especially so in certain topics. In a Proquest search for juvenile or adolescent sexual offending, 68 studies were found that analyzed the characteristics of offenders and their offending situations. Of these 68, 59 focused exclusively on individual characteristics or individual-microsystem interactions. Eight studies discussed the microsystem factors related to juvenile sex offending. One study looked at an international sample of juvenile sex offenders, but still focused on individual factors and indvidual-microsystem interactions. No studies were found that discussed larger macrolevel factors as they relate to juvenile sex offending. Fourty-two studies were found that discussed individual treatment programs or treatment plans. Only three of these studies involved random assignment to treatment programs. Twelve published studies and an additional 14 dissertations or theses were found that looked at risk factors for committing sexual offenses as a juvenile. The remaining literature discussed policy and registration issues. This leaves several large gaps, namely extra-individual theories of the etiology of sexual offending and randomized trials of treatment programs. Throughout this literature there are two main areas of consensus:

1) Juvenile sex offenders are different from both other types of juvenile offenders and from adult sex offenders (e.g Lawing, Frick, & Cruise, 2010; Nisbet, Smallbone, & Wortley, 2010; Miner & Munns, 2005).

2) The etiology of offending appears to have both individual personality causes and larger contextual causes, although the contextual causes are less clear and have been

studied less (e.g. Martin & Pruett, 1998; Davis & Leitenberg, 1987; Seto & Lalumiere, 2010).

The following literature review provides an overview of the theories used to explain the etiology of juvenile sex offending and highlights areas of consensus as well as several areas of disagreement. It should be recalled that this review is not be entirely inclusive of theories of crime etiology in general, but instead focuses only on theories as they are applied to juvenile sex offending. This section begins with the individual factors that are suggested to be related to juvenile sex offending and move toward relationship factors (such as peers and families) before moving to the larger community or social norm factors. Lastly, this section details some noted critiques of the extant theories that the study reported here aims to improve upon.

Individual level models. As with many first attempts at understanding a problem, the focus of many of the early theories on the etiology of juvenile sex offending focused on individual characteristics. Clinical research studies have been done to analyze the individual characteristics of offenders and their offenses. There is a fairly large body of research on individual factors of general juvenile offending, mostly surrounding individual risk assessments, as detailed in meta analyses by Schwalbe (2007), Loeber and Farrington (1999), Cottle, Lee, and Heilbrun (2001), and Simourd and Andrews (1994). Schwalbe's meta-analysis (2007) looked at 28 studies of the predictive validity of juvenile delinquency risk assessments (that is, all of the risk assessment predictive validity studies available in the literature, without time constraints). Alternatively, Loeber & Farrington (1999) looked at all reported juvenile offender risk assessment instruments in the literature and compiled a comprehensive review of the risk

factors that were found to be present for general juvenile offenders. Cottle and colleagues (2001), reported on their meta-analysis of 23 published studies of juvenile offender risk assessments, and found that the factors predicting recidivism fell into eight groups: demographic information, offense history, family and social factors, educational factors, intellectual and achievement scores, substance abuse history, clinical factors, and formal risk assessment. This meta-analysis included all studies from 1983 to 2000, totaling 23 studies representing 15,265 juveniles. Simourd and Andrews (1994) included 60 studies from 1964 to 1994 in their meta-analysis of factors predicting recidivism for juvenile delinquents and found many of the same categories: social class, family structure or parental problems, personal distress, minor personality variables, parent-child relations, educational difficulties, temperament or conduct problems, and antisocial peers or attitudes. These meta-analyses suggested that risk assessments for juvenile offending should capture both static and dynamic factors (unchanging historical factors and changeable treatment factors). Although these studies capture some extra-individual factors, the vast majority of factors related to general juvenile offending are based on individual differences. For example, prior criminal history, personality, substance abuse, and use of free time are found to be related to general juvenile offending in these meta-analyses. Extra-individual factors tend to focus on interactions between the juvenile and other people or structures, such as relationships with parents, having delinguent friends, or having school behavior problems.

Research regarding juvenile sex offenders specifically is less common, but again mostly focused on individual factors. Hanson (1998) reviewed the literature regarding sex offender risk assessment (pertaining only to adults), and described, similar to Schwalbe (2007) in his

review of general juvenile offender risk assessments, the three approaches to risk assessment: guided clinical judgment, pure actuarial assessment, adjusted actuarial. Hanson also reported that there are several factors that can be seen as related to recidivism (sexual and nonsexual) for adult sex offenders: sexual preference for children, deviant sexual preferences, prior sex offenses, failure to complete treatment, antisocial personality disorder, any prior offense, young age, never married, having unrelated victims, and having male child victims. Hanson (1998) also put out a call, now more than 12 years ago, to move toward the assessment of more dynamic factors. In a more recent and larger study, Hanson and Morton-Bourgon (2009) reviewed 118 studies of the predictive validity of risk assessment instruments for adult sex offenders. This review included searching several online databases (with no date constraints) as well as "file drawer searching" by sending letters to known sex offender researchers looking for unpublished studies and resulted in studies from 16 different countries. They looked at standardized differences between deviant (recidivating) and non-deviant (non-recidivating) on the risk assessment measure and found that actuarial measures designed for sexual recidivism, mechanical measures for sexual recidivism (those with explicit predetermined methods for calculating the total score), and actuarial measures for general recidivism were the most accurate predictors (with a difference between the standardized scores of at least .62).

This line of research has indicated that most juvenile sex offenders are male, act alone in their offenses, and primarily have younger children as victims (e.g. the Office of Juvenile Justice Bulletin comprehensive report on Juvenile Sex Offenders by Finkelhor, Ormrod, & Chaffin, 2009). They tend to be socially isolated from their peers and are described as loners who lack social skills necessary to develop relationships (Ford & Linney, 1995). They tend to be

relatively shy, timid, and withdrawn, and are typically more behaviorally compliant than other types of offenders (DeNatale, 1989)

Another key individual factor found for juvenile sex offenders has been empathy. It is thought to be an important personality characteristic to understand when working with JSOs. Curwen (2003) used the Interpersonal Reactivity Index (IRI) to assess empathy in JSOs and found that sexual violence was related to empathy. Diverting blame for the offense and endorsing violence was related to discomfort in emotional situations. A second study using this same measure (IRI) also found that JSOs scored significantly lower on empathy than nonoffenders (Burke, 2001). Alternatively, Monto et al. (1994) found that there was no significant difference on an empathy questionnaire between JSOs and non-offenders in a study of 82 male JSOs and 108 male non-offenders.

Several other personality characteristics have been examined for juvenile sex offenders. van Wijk et al. (2005) found that violent sex offenders were significantly more extroverted and impulsive. They also displayed higher 'lack of conscience' and neuroticism scores than other non-sexual offenders. Sex offenders also had higher IQ scores than non-sex offenders and had lower school drop-out rates. They reported significantly more problems with peers. There were no significant differences in scores of bullying victimization or self esteem (van Wijk et al., 2005). Also, victims were likely to be family members, especially when the victim was younger than the offender (Gibson & Vandiver, 2008).

A history of sexual victimization has been noted in many studies to be related to juvenile sex offending (Farris, 2007). Juvenile sex offenders with a history of sexual victimization tend to

have more victims than juvenile sex offenders without a history of victimization (Farris, 2007). Juvenile sex offenders with a history of sexual victimization were also found to have more victims who were four or more years younger than them and higher internalizing tendencies (including depression, social anxiety, and withdrawal), than juvenile sex offenders without a history of victimization (Farris, 2007).

Several juvenile sex offender typologies have been suggested based on individual characteristics. One such typology suggested that juvenile sex offenders may be divided into two subtypes: Generalists and Specialists based on their history of antisocial behavior (Wolf, 2008; Seto & Barabee, 1997). Other typologies have been suggested, classifying offenders based on type of sex crime (e.g. Ford & Linney, 1995), victim characteristics (e.g. Fehrenbach, et al., 1986), history of criminal behavior (e.g. Butler & Seto, 2002), or deviant sexual interests with or without aggression (e.g. Becker, 1988). There have also been typologies developed that suggest that it is not the offenders themselves that make a difference, but instead their pathway to sexual offending, either through sexual deviance or antisocial criminality (Prolix, 2000).

Additional personality factors or behaviors noted as being risk factors for committing future sex offenses include pervasive anger, history of conduct disorder, school behavior problems, and antisocial behaviors (Prentky & Righthand, 2003; Andrade, Vincent, & Saleh, 2006; Van Wijk, Vermeiren, Loeber, Hart-Kerkhoffs, & Dorlelijers, 2006). There are also several attitude based risk factors regarding the youth's understanding and reaction to his or her sex offense (Prentky & Righthand, 2003).

From this information about the individual factors that are common for juvenile sex offenders, two theories regarding the etiology of offending have been proposed. First, Social Learning theory has been suggested to explain the etiology of juvenile sex offending (Bandura, 1986; Ryan, 1997). Social Learning Theory has proposed that the basic principles of classical conditioning are at play if a child engages in early sexual behavior (possibly as a result of sexual victimization), and that future offending behavior may be learned through observation or imitation or may be reinforced through sexually exploitive relationships with adults or older children. This suggests that one of the main reasons why juveniles may offend sexually is due to their history of sexual victimization. Although social learning occurs through a dynamic process, it is still an individual level explanation of juvenile sex offending behavior due to its focus on the development of individual thought/behavior patterns while largely neglecting environmental influences outside of the observation or engagement in early sexual behavior. Ryan (1997) further applied learning theory by suggesting that deviant sexual or neglect experiences in a juvenile's past may lead to sexual offending behavior because these past experiences lay the groundwork for how the child understands appropriate behavior, thinking, or emotional reactions in future experiences. Additionally, it has been suggested that there may be key learning events that may take place in a juvenile's life that may affect later sexual offending in addition to victimization (Wolf, 2008). These factors include exposure to pornography, family history of criminality, a chaotic home environment, delinquent peers, and witnessing or experiencing physical abuse (Burton & Meezan, 2004). Again, this theory relates to an individual differences perspective because it focuses on the development and learned behavior of the individual youth, ignoring the greater socio-environmental context.

Second, Burk and Burkhart (2002) and Marshall and Marshall (2000) suggested that attachment theory may be used to understand the etiology of sexual offending, building on the ideas of Bowlby (1969). Burk and Burkhart (2002) suggested that early life experiences establish internal representations of what is "normal" and experiences of neglect or sexual victimization may result in children having difficulty forming relationships later in life and may thus act out in sexually deviant behavior. Additionally, Marshall and Marshall (2000) suggested that early attachment problems caused by life stressors may lead to a primary reliance on sexualized coping (both masturbatory and with others). They suggested that sexualized coping may provide an escape for children with high-risk family situations and the poor quality attachments associated with them. Marshall and Marshall went on to suggest that sexualized coping is learned through behavioral conditioning, starting with masturbation and leading to inappropriate fantasies and actions. Burk and Burkhart (2002) expanded upon this idea, adding that Marshall and Marshall (2000) missed a link in the thinking-behavior chain where there is a psychological context which "potentiates the likelihood of engaging in sexually controlling/abusive behavior" (p. 489). They suggested that the severity of the attachment disruption in a child's life leads to low self esteem and similarly related "negative self-states" which then result in a vulnerability toward using "externally based self-regulatory strategies" (p.491). They then suggested that sexual offending is one type of possible self-regulatory strategies and it may be individual differences or experiences that dictate which strategy insecurely attached children are drawn toward. Burk and Burkhart (2002) further hypothesized that severe insecure attachments make youth especially likely to rely on externalized and controlling interpersonal strategies to cope with their internal stress and when that is combined

with early exposure to sexual behavior or sexualized coping mechanisms, sexually deviant behavior becomes the self-regulatory mechanism of choice. Again the application of this theory to juvenile sex offending comes from an individual differences approach. This suggests that individual attachment statuses (although they are created through familial relationships) and coping strategies result in sexual offending behavior, again largely ignoring other social or environmental factors.

Microsystem models. Beyond individual factors, peer relationships have often been found to be related to juvenile offending, as are relationships between youth and parents (Schwalbe, 2007). Although these are extra individual factors, they have often been conceptualized in terms of the individual, such as evaluating the family via ratings of the interactions between the youth and parents rather than evaluating the entire family's functioning. Peer offending has been conceptualized more on a microsystem level, with research focusing much attention on exposure to delinquent peers (Schwalbe, 2007).

Apart from individual characteristics, there are some microsystem factors that have been found to be common for juvenile sex offenders (JSOs). It is suggested that male JSOs behave differently in social settings from other youth generally and other types of male juvenile offenders. In a study of 32 male JSOs and 82 other types of offenders, Buttler and Seto (2002) found that JSOs were not significantly different from non-sex offenders in childhood conduct problems or current behavioral adjustment or antisocial attitudes/behaviors. They also found that youth who committed sex-only offenses had fewer conduct problems, better pro-social attitudes and current adjustment than non-sexual offenders. However, Leguizamo,(2000)

showed that JSOs in a residential treatment setting had greater psychological dysfunction and poorer social functioning than non-sex offenders. The Denver Neighborhoods Study, based on a sample of 78 JSOs, 156 non-sex offenders, and 80 non-offenders, found that JSOs perceived themselves to be more isolated from peers, families, and schools than non-sex offenders and non-offenders (Miner & Munns, 2005). Hanson (1998) reported in a review of adult sex offender risk assessment literature, that offenders who actively engage with prosocial influences are less likely to recidivate than those who reject help.

Juvenile sex offenders have also been found to be different from non-sexual offenders and non-offending youth in the areas of school and peers. Juvenile sex offenders were found to report greater feelings of normlessness in the school context than non-offending youth (Miner and Munns, 2005), although they often have fewer behavior problems than other types of delinquent youth (Wilder, 2004). They also reported greater disturbances in peer relationships, lower school grades, and fewer prosocial (non-delinquent) peers than non-offending youth (Ronis & Borduin, 2007). These findings were the same across multiple types of juvenile sex offenders, regardless of their age or their victim's age.

In school settings, differences may also be seen between JSOs, other offenders, and non-offending youth. One study found that a larger proportion of JSOs attended special education classes than non-sex offenders (van Wijk et al., 2005). Male juvenile sex offenders and non-sex offenders were also found to have more normlessness in school than nondelinquents, with JSOs having more peer normlessness than non-sex offenders and nonoffenders in the Denver Neighborhood Study mentioned previously (Miner & Munns, 2005).

Although more school and peer normlessness was found, JSOs typically have fewer official school-related behavioral issues than non-sex offending youth (Tomatis, 2007). Goldner, Peters, Richards, and Pearce (2011), found that youth who spent more time with their parents, in school, and outside in private space were less likely to be exposed to violence, while time spent with older peers was associated with increased risk. As each of these studies suggest, microsystem factors such as peers, classrooms, and families are important socializing factors for youth and are included in much of how adolescents spend their time. This suggests that in order to fully understand adolescent offending, microsystem factors such as these need to included.

Family dysfunction and violence seems to be prevalent among juvenile sex offenders (Blaskeet et al., 1989). Families of juvenile sex offenders have been found to tell more lies/myths and engage in more culturally taboo behaviors than the families of non-offending youth with conduct disorders (Baker, Tabacoff, & Eisenstadt, 2003). In a comparison of families of juvenile sex offenders and families of non-offending youth, juvenile sex offenders reported their families as less cohesive, less expressive, less interdepend, less involved with active recreation activities, and showing higher levels of control than non-offending youth's families (Bischof, Stith, & Whitney, 1995). Wieckowski, et al. (1998) found that youth in a residential treatment center for sexual offending were more likely to come from "multiproblem families" with histories of abuse in childhood and exposure to pornographic materials. More generally, caregiver instability/deficiency and maltreatment have also been suggested to have an impact on later sex offending by youth. Daversa (2005) employed the Multidimensional Assessment of Sex and Aggression (MASA) on a sample of 329 JSOs and found that physical and sexual abuse

in early childhood were linked to socially incompetent behavior and future sex offending in adolescence. Parent ratings using the Behavior Assessment System for Children (BASC) did not appear to differentiate sex offending populations from non-sex offending youth (Tomatis, 2007) although behavioral differences were noted when using other data sources.

Although some juvenile sex offending etiology theories begin to include microsystem factors, there were no etiology theories found that specifically deal with the microsystem factors of juvenile sex offenders. There are several studies regarding general criminality that focus on microsystem factors. For example, Wong (2011) in a study of Canadian families found that a family where there was a divorce and/or single parenting was significantly correlated with juvenile delinquency. Wong further suggested that there may be a reciprocal effect of delinquency increasing family stress which may lead to martial separation or divorce. Other types of parental stress, such as parental incarceration, has also been shown to be related to aggressive behavior and formal delinquency (e.g. Wildeman, 2010). An additional family predictor of delinquency is exposure to family violence (e.g. Spaccarelli, Coatsworth, & Bowden, 1995). This has been applied specifically to juvenile sex offenders, where exposure to violence, especially sexualized violence, is a known risk factor for sexual offending (e.g. Blaske, Borduin, Henggeler, & Mann, 1989).

Several studies have also suggested that educational issues have connections with delinquency, outside of the youth's actual school achievements. Family support for education was shown to be a significant predictor of future delinquency by Yoshikawa (1994) in a longitudinal study of Head Start youth. Others have also found that positive school

environments can mediate the effects of a poor family situation, but when family and school issues exist in concert, the effects are amplified, often resulting in juvenile delinquency (Hoffmann & Dufur, 2008).

Other factors related to low-income areas such as poor education opportunities have repeatedly been shown in the literature to be related to criminal offending. Lynam and colleagues found that individual behavioral traits such as impulsivity were exacerbated when youth lived in poor neighborhoods, suggesting an individual/microsystem interaction (2000). Social disorganization theory proposes that lack of neighborhood cohesion and overall disregard for neighborhood structures is a predictor of crime, as are further discussed in the later section on integrative theories (Sampson & Groves, 1989).

Macro-system models. Larger community or neighborhood factors have long been proposed to have an effect on crime in general and thus it makes sense to predict that they may have a role in the etiology of sex offenses committed by juveniles as well. Social networks are often thought to be related to neighborhood crime rates, with areas that have strong social networks having more social cohesion and neighborhood supervision, leading to less crime (Browning, Feinberg, & Dietz, 2004). Browning and colleagues (2004) also found that communities with strong social networks not only better supervise their neighborhoods, possibly preventing crime, but also that social networks increase collective efficacy, encouraging the belief that the community can stop crime. This may suggest that there are neighborhood factors that are related to surveillance that may prevent offending initially or may prevent repeat offending.

Socioeconomic status has been included in our understanding of crime in a variety of ways. Elliot and Ellingworth (1996) used the 1992 British Crime Survey and 1991 census data to explore the relationship between male unemployment and crime in the United Kingdom. They found a significant relationship (p<.10) between male unemployment and property crime, but no relationship between male unemployment and crimes against people. They then included 13 other ecological variables including income, household ownership, structure, age, and ethnicity of geographic regions (unit size not reported), finding low significance and R²s. most likely due to multicollinearity. Accounting for this, they removed some variables and found a significant relationship with these socioeconomic indicators and property crime. A similar study in Brazil analyzed social disorganization (operationalized as socioeconomic disadvantage, residential stability, and prevalence of female headed households) as it relates to crime, social cohesion, and perceived risk of victimization (Villarreal & Silva, 2006). They found that greater cohesion was not related to lower levels of crime (counter to social disorganization theory) but was associated with a higher perceived risk of victimization. Socioeconomic disadvantage was found to be the most important predictor of crime. This study did not include any individual level factors of actual offenders, but relied upon opinions of the community at large regarding likelihood of victimization. Tentis (2000) also applied ecological theory to violent crime in Wisconsin and Minnesota, looking at overcrowding (via both population density and people per home), community deterioration, unemployment, racial makeup, and percent of children not living with both parents. She found positive correlations between these aspects of the exosystem and violent crime reports.

Several studies also looked at the social/community structures in a neighborhood as they relate to crime. Troy and Grove (2008) found that crime rates mediated how parks were perceived by the surrounding community, namely that areas of high crime saw parks as being centers of crime and unsafe areas. Anderson and West (2006) found a nearly opposite result, suggesting that people value parks more if they live in a highly crowded or high crime neighborhood. This controversy points to the need for more research on the connections between social structures such as parks and crime, but nonetheless suggests that parks are in important aspect of the exosystem and matter to community members. Additionally, Roncek and Faggiani (2005) found that in the Cleveland area, proximity to public high schools resulted in a higher crime rate, regardless of the size of the school. This parallels findings of Roncek and LoBosco (1983) regarding schools and crime. Wilcox, Quisenberry, and Jones (2003) also found that the presence of businesses, parks, and playgrounds increased individual perceptions of community danger.

These studies suggested that exosystem factors such as indicators of socioeconomic status, neighborhood racial makeup, unemployment, age and presence of community structures are related to crime. This suggested that our understanding of crime and our model of predicting repeat offending may be made more robust by incorporating these factors. There were no studies found that look at exosystem social structures as they relate to juvenile sex offending specifically. This is a significant gap in the literature that the study reported here aims to make a first step in filling.

Several theories of crime etiology that include larger macro-system factors have been proposed in the literature. Functionalism, born of the ideas of Emile Durkheim and furthered upon by Robert Merton, suggests that the division of labor creates specific functions performed by individuals which in turn, creates solidarity among citizens (Wallace & Wolf, 2005; Fargais, 2004; Khromina, 2007). These specific functions are then beneficial for some but also may have negative effects for others. Applied to juvenile delinquency, crime of this sort serves a function for both the offenders and for society as a whole, where politicians and communities rely on crime to unite them for or against causes and to set boundaries for others. The youth who commit crime do so because it serves a function for them in their larger ecological context, perhaps by providing money, or security, or status.

Conflict theory, as proposed by Max Weber and later Randall Collins, states that social life is shaped by social conflict among people or groups over power and economic resources (Khromina, 2007). Also, this conflict results in a hierarchy of people or groups and those in power have disproportionate resources or influence over those with less power. Applied to juvenile delinquency, conflict theory would suggest that juveniles are in competition but are of lower power than groups such as schools (often unqualified and under funded), and adults (who have power due to their age status in the United States). This lack of power for juveniles is caused by their limited rights due to their age status, their lack of legitimate employment opportunities (partially also due to age status, but also due perhaps to the current economic climate), and in many large cities, concerns for physical safety. Conflict theory would therefore suggest that juveniles act out criminally as a way to elevate their social roles and gain power to improve their plight (Knoester, 2005; Khromina, 2007). This theory can also be applied to

smaller scale social group conflicts between juvenile peers and their individual interests or social standings.

Greater underlying culture or norms of a community have largely been ignored in research regarding juvenile offenders, since accounting for them often requires cross-cultural studies. There have been a few cross-cultural studies of crime in general, finding some cultural differences in causes of criminal behavior (e.g. Pfeffer, Cole & Kayode, 1998; Ouimet, 1999; Lambert & Jiang 2006). This study did not be use a cross-national or cross-cultural sample, as it is within one Midwestern US county. For the purposes of the proposed study, macrosystem factors are presumed to be no different across subjects and are not be measured. It should be noted, however, that larger cultural norms regarding what types of sexual behavior are acceptable, which are taboo, and how such taboo behaviors are handled may play a role in the etiology of offending, as are discussed in the new model of juvenile sex offending that are presented in the next section.

Other community factors, outside of culture, may also play a role in the etiology of offending and are available to be measured via public data sources such as the census. Throughout this debate regarding the etiology of juvenile sex offending, scholars have agreed that the relationship between poverty, social ties, and crime is anything but clear (e.g. Villarreal & Silva, 2006). The study reported here aims incorporate individual level factors (crime history, age, attitudes and beliefs), microsystem (household make up, peer involvement, and behavioral problems at school), and exosystem factors (socioeconomic status, employment, and social structures (proximity to schools, churches, police stations, parks, etc)) to better understand the

factors that lead to repeat offending by juvenile sex offenders. This allows for both individual and contextual factors to be considered as they relate to male juvenile sex offending.

In addition to what is known about the single level characteristics of juvenile sex offenders, a few theories have been proposed to integrate multiple levels and better understand the etiology of offending. While these theories make a good attempt at increasing our understanding of the numerous factors that affect offending, they are still limited in their empirical testing. The next section discusses these theories and the limitations.

Integrative Explanations. Several theories have been applied to juvenile sex offending in an effort to better understand the etiology. All of these theories appear to be born of different disciplines and then are applied to this phenomenon rather than being driven by the phenomenon. While there is some literature available that applies these theories to the problem of juvenile sex offending, little research is done that tests these theories empirically. Often research on juvenile sex offenders is riddled with sampling problems due to using convenience samples of youth detained in residential treatment facilities. Of the 26 studies found that looked at the risk factors for juvenile sex offenses, only two reported to use samples of every youth adjudicated for a sex offense in that particular location. The remaining 24 were based on samples of youth detained in residential treatment, referred from neglect or foster care systems, or referred for mental health assessments. Of the 27 studies found that discuss juvenile sex offender treatment, 17 were theoretical and provided no actual data. Of the remaining studies, only one used random assignment into treatment programs. These youth are likely to be higher risk than youth who remain in community treatment programs. Thus,

research on juvenile sex offenders who are detained should be examined carefully, as its generalizability may be limited. Even with this note of caution, the theories outlined below are promising first steps toward an integrated multilevel theory of the etiology of juvenile sex offending.

Developmental psychopathology theory has suggested that psychopathology is a product of multiple factors including family and youth characteristics and the environment. This theory also suggests that these multiple factors may act as either risk or protective factors and may have unstable roles, changing over time (Cicchetti & Rizley, 1981). Developmental psychopathology theory states that children have to navigate through many developmental tasks during life, and interference with the mastery of those tasks, such as family disruption or sexual victimization, may affect the ability to progress through future tasks. This would suggest that for juvenile sex offenders, there may be interruptions in early life that may lead to offending behavior due to the inability to progress through developmental tasks like building social skills and an understanding of community norms.

Ecological Systems Theory has also been suggested to explain juvenile sex offending (Bronfenbrenner, 1977). This theory traces back to Urie Bronfenbrenner, who applied concepts from biological ecology to the study of human behavior. He suggested that in order to fully understand behavior one must understand the influence of factors at multiple levels. In short, both the organism and the context matter. He suggested that we are all embedded in multiple formal and informal settings, which we interact with and are affected by.

Elliot, Ageton, and Canter (1979) suggested an integrated theory of delinquency, where there are multiple pathways to delinquency, with the first path involving weak integration into and commitment to the social order. They suggested that youth in this situation who have delinquent peer groups accessible then conform to that pattern of behavior. The second path to delinquency suggested that youth who become delinquent begin with strong bonds to the conventional social order, but at some point those bonds weaken and it is the weakening that results in youth exploring alternative methods of achieving their goals.

Similarly, social disorganization theory, originally proposed by Shaw and McKay (1942), in its more modern versions encouraged the inclusion of ecological factors such as socioeconomic composition, high population turnover, and population heterogeneity of communities in our understanding of criminal behavior, however it does tend to minimize or even ignore individual level factors (Bursik, 1988; Sampson and Groves, 1989; Gonzales, et al, 2011; Byrnes et al, 2011). Social disorganization theory tied these ecological factors to crime but suggested that under certain conditions institutions that traditionally assist in creating internal community social control (businesses, places of religion, community centers, etc) "are difficult to establish when many residents are 'uninterested in communities they hope to leave at the first opportunity" (Bursik, 1988, p. 521). Under such circumstances, social networks are in a continual state of change and make relationship development difficult, and heterogeneity impedes communication between residents (McPherson et al, 2006; Upton & Mansell, 2011).

A noted critique of the social disorganization model of understanding crime is that it often focused only on single level data and aggregates of such, often offering no solution for

crime reduction (e.g. Brantingham and Brantingham, 1981; Cohen and Felson, 1979). Historically, social disorganization theory failed to acknowledge the dynamic characteristics of neighborhoods and the individual and microsystem differences of people (Bursik, 1988). Shaw and McKay (1942) offered little suggestion for how to operationalize their idea of social disorganization. This has been yet another critique of the theory. It seems that Shaw and McKay attempted to use social disorganization both as an outcome (increased crime) and as a predictor, suggesting that crime, in and of itself, is disorganization, but greater community disorganization also creates more crime. This created great confusion for those trying to test this theory.

More modern conceptualizations of social disorganization theory have suggested that the breadth and strength of neighborhood social networks are closely related to the propensity to supervise residents and create informal methods of intervening when behavior is deemed inappropriate (Greenberg et al., 1982). This theory, like ecological theory, acknowledged that the family and peers are key influencers in the socialization process (Bursik, 1988). Additionally, ethnographic work, based on social disorganization theory, has suggested that exosystem structures such as institutions of education must be considered as a part of the context of a neighborhood in order to understand processes related to criminal behavior including self regulation (Schwartz, 1987). This theory has been applied to crime to explain how individual criminal behavior is influenced by the interactions of factors at other ecological levels (Vila, 1990). With this chronic single level focus, it seems that our understanding of crime is severely limited. This single level focus is reflected in the risk assessment literature, as is discussed in the next section.

Braithwaite (1989 and 1992) incorporated some micro and macro level factors regarding the ecological organization of communities, but did not include the variations that time may bring into these factors in his conceptualization of the etiology of crime. His "regenerative shaming" theory of crime suggested that crime can be prevented through close knit communities judiciously shaming people who commit acts outside of what is acceptable. Braithwaite drew closely from the business world, suggesting that communities could settle disputes through established techniques that would shame people into never committing another crime. Agnew (1992) and Elliot, et al. (1979) began to explore how individual factors develop over time in response to micro and macro level factors, but they ignore many ecological factors that relate to crime. The model by Elliot et al (1979) brought together strain, social learning, and social control theories in an attempt to avoid the class biases that were a critique of the former theories. Elliot's theory proposed that social bonds and attenuation experiences as well as delinquent learning and performance structures lead to crime. This theory suggested that crime occurs when a person is not properly integrated into or committed to the social order of his/her community or when a person who once was strongly bonded with his/her community experiences negative events (attenuation experiences) that diminish those bonds while also being exposed to delinquent peers. While this theory moved beyond previous theories to include ecological factors such as community involvement and peer groups, it still fails to account for the other possibly relevant parts of the community, such as family, schools, and neighborhood characteristics. Agnew's General Strain Theory (1992) built upon the ideas of Merton (1938), Cohen (1955), and Cloward and Ohlin (1960), focusing on strain defined as relationships that prevent people from achieving both immediate and long term goals or that

result in the inability to leave potentially painful situations. Agnew suggested that strain in these forms may result in negative emotions and delinquency may then result as a way to deal with these emotions or as a way to obtain the goal or remove oneself from the painful situation that was involved in the initial strain. This theory, similar to Elliot, moved beyond individual thinking and incorporates some aspects of peer relationships into our understanding of delinquency, but it still failed to incorporate the larger community structures that encompass a person and may also result in delinquency. Sampson, Raudenbush, and Earls (1997) built upon these preexisting ideas, hypothesizing that collective efficacy or social cohesion among neighbors along with their willingness to intervene on behalf of a common goal was linked to reducing crime. They showed the importance of one aspect of communities, suggesting that individual level only theories are not adequate. However, Sampson and colleagues' theory only accounts for community level factors and does not account for the individual risks and differences of offenders.

Developmental psychologists often look more at the etiology of antisocial behavior than the etiology of crime (although the two are thought to be closely related). Moffitt (1993) and Patterson and colleagues (1989 and 1992) included demographic factors as well as some micro and macro factors, but ignored many environmental factors that may be related to criminal opportunities. All of these theories of crime target specific areas of the ecological risk factors facing youth, but none include individual, microsystem and exosystem levels.

Again, little has been done to incorporate these extra-individual factors into crime prediction modeling, as this section shows. The existing research tends to focus on single level

factors and fail to apply a multilevel model to understanding crime. Such correlational research has found that youthfulness, male gender, early crime involvement, poverty, inequality, disrupted families, and inadequate socialization are associated with crime (e.g. Blau & Schwartz, 1984; Gottfredson & Hirschi, 1990; Land et al., 1990, Reiss & Roth, 1993).

The Proposed Model of Juvenile Sex Offending Etiology

Given the rather scattered assortment of etiology explanations available in the literature, a comprehensive model is proposed for the study reported here, which attempts to integrate much of the existing literature. For the purposes of this model, it is believed that the same factors that lead to initial sex offending by juveniles also lead to repeat offending by juveniles. The only difference suggested between initial offending predictors and repeat offending predictors are factors that are affected by treatment programs. For the study reported here, all youth received the same treatment program, so this model is expected to explain the predictors of both initial offending and repeat offending.

As much of the literature noted, there are individual characteristics that are risk factors or predictors of sexual offending committed by juveniles. These individual risk factors include a lack of social skills, lack of empathy, distorted thought patterns, callousness, and a lack of accountability for one's actions.

Beyond these individual factors are microsystem factors, or interactions with people and institutions that affect the youth on a daily basis. This model suggests the factors of importance in this regard include social isolation, having delinquent peers, and having a lack of free time activities. Family norms are also important microsystem factors. These include

having poor relationships between the youth and his mother or father, history of neglect or family violence, inadequate supervision by parents, and a lack of communication about norms and expectations. School interactions are also included in microsystem factors and include issues with teachers, poor academic performance, bullying victimization, and a lack of social cohesion among same age acquaintances. It is suggested that power inequalities may lead to sexually deviant behavior.

Exosystem factors, or community structures and media, may also play a role in juvenile sex offending. These include social norms about sexual education or sexual risk taking among area peers/neighborhood/school acquaintances, violent or pornographic media exposure, portrayals of deviant power relationships in the media, and social normlessness or a lack of cohesion among the local community. A lack of local surveillance for sexually deviant behaviors (both by formal police entities and informal parental or community adults) may also be related to reports of sexual offending. It is unclear if surveillance only mediates the relationship between offending occurring and being known to authorities or if surveillance may also mediate the relationship between risk factors and offending to begin with.

Macrosystem factors include larger cultural and social norms. While these are presumed to be equal across participants in this study, these factors may affect offending in a variety of ways. Given that there are power dynamics at play in sexual offending, cultural or social norms about peer and romantic/sexual relationships and sexual consent may have an effect on how youth conceptualize what is a "normal" relationship and therefore may be related to offending. Also, larger norms about what is and isn't acceptable to discuss in family

and school settings may result in a lack of knowledge or taboo regarding behavior that may then lead to offending.

Study Rationale

The study reported here aims to combine what is known about the individual characteristics of juvenile sex offenders (through both a general and a sex offense specific risk assessment measure) with what is known to be influential in the etiology of crime. Since neither individual nor contextual factors alone offer particularly powerful explanations, it is hoped that examining their combination offers a more complete picture. Understanding juvenile sex offenders in a more holistic way may not only result in better understanding of risk for recidivism, but may also add to our understanding of community functioning and allow primary prevention strategies to be better targeted to areas with the most need. Obviously, the attainment of this rather lofty goal is beyond the scope of any individual study, the study reported here is intended to be a small first step in examining multiple levels of factors considered in juvenile sex offender risk assessment. This study includes individual factors via traditional general delinquency and sex specific risk assessments, microsystem factors (such as self reports of interactions with parents, peers, and school) via risk assessments, and exosystem factors (such as socioeconomic status of the neighborhood and proximity to neighborhood risk/protective factors) via census and publicly available information. This is the first step in beginning to look at the issue of juvenile sex offending in a more holistic, multilevel format. All of these factors will still be looked at using a single level of analysis, meaning that each variable will be operationalized at the individual level (each youth will have the socioeconomic status

information from his neighborhood associated with him rather than using a hierarchical design where youth are nested within neighborhoods).

Research Questions

The study reported here aims to answer the following research questions:

1) Is there geographic variability in the distribution of the homes of juvenile sex offenders?

2) Does the inclusion of a sex specific risk assessment measure add incremental validity to the use of a general criminogenic risk assessment measure?

3) Does including multi-level variables increase the accuracy of risk prediction above individual level risk assessment variables alone? Specifically, is it possible to develop a multivariate risk prediction model including a general criminogenic risk assessment measure, a sex specific risk assessment measure, and community level variables that significantly increases the accuracy of prediction of future crime among juvenile offenders?

METHODS

Participants

This study is based on de-identified data provided to the author as secondary data. The sample size differs for each research question due to historical variability in when data collection measures were used. Female youth (N = 1) seen at the Court during this time interval were excluded, leaving a sample of only males. Spatial data was available on all juvenile sex offenders adjudicated from a Midwestern industrialized county court since 1999, totaling 232 youth. Only youth who were homeless or in confidential foster care homes did not have geographic data (N=5). Of these remaining 227 youth, 138 had a YLS/CMI assessment. The use of the JSOAP II, the sex specific risk assessment individual data measure began in 2007, and the YLS/CMI, the general risk assessment individual data measure, was used from 2004 through 2009. There were 58 youth that had all three: YLS/CMI, JSOAP II, and address data. In each of these time periods every youth who was adjudicated for a sex offense received the measure. The measure was not used from 2006 to 2008 due to a change in administration that no longer required court workers to complete the measure. The larger sample of 227 youth was used for research question one, while the smaller sample of 58 youth was used for questions two and three. Again, the unit of analysis for this study was individual offenders bundled with their individual neighborhood information. In each instance, the youth had been adjudicated for sex offenses from a Midwestern county court. This included all youth who received both a general and a sex specific risk assessment measure from 2006 through 2009 and who had provided
address information to the court at their time of adjudication. The average age of participants was 14.6 (ranging from 11 to 18 with a standard deviation of 1.8).

For neighborhood data, two different units of analysis were used. Socioeconomic status data, gathered from the census, was used at the block group level. Block groups are smaller than census tracts and are nested within census tracts. They are larger than face blocks, but face blocks are nested within block groups. Block groups are the smallest unit of analysis available that still provide socioeconomic status data. Larger census tracts were thought to be too large to make realistic conclusions. This data was not dealt with hierarchically due to the small sample size. Instead, the socioeconomic status data for the block group where the youth lives was associated with that youth and used as a predictor of recidivism. This is not to say that the socioeconomic status is thought to be that of the youth and his family, but that the socioeconomic status of the neighborhood surrounding the youth's home is thought to be related to recidivism, as suggested in the literature (Browning, Feinberg, & Dietz, 2004).

For the data regarding proximity to neighborhood resources, distance was calculated using geographic information software. These distances were "straight line" distances rather than street distance and were measured in meters to remain as accurate as possible. These were operationalized at the individual level since the distances were specific to the individual youth and their neighborhood.

Procedures

Measures.

Independent Variables – Individual level

YLS/CMI. The Youth Level of Service/Case Management Inventory (YLS/CMI) is a third generation risk assessment instrument, using 42 items to measure eight domains of criminogenic risk. These domains are: prior/current offenses, leisure/recreation, education/employment, peer relations, substance abuse, family circumstances/parenting, attitudes/orientations, and personality/behavior. Each of the 42 items are scored 0 for no/not present or 1 for yes/present.

The YLS/CMI has been validated on the same juvenile court population as was used in the study reported here and a Receiver Operator Characteristic Area Under the Curve Statistic (ROC AUC) of .64 was found (Onifade, et al, 2008). The ROC AUC statistic is the true positive rate divided by the false positive rate. This allows it to be a robust measure of the predictive validity of the instrument without being susceptible to issues of low base rate (like in instances of recidivism). Court staff was trained in administering this measure until an acceptable inter rater reliability agreement of .80 was reached. Additionally, the YLS/CMI has been found to have an acceptable range of internal consistency across the eight domains as well as significant correlations between the overall scale and other risk prediction models such as the psychopathy scale, child behavior checklist, disruptive disorder scale, and the conduct disorder symptom scale (Rowe, 2002; Schmidt, Hoge, & Gomes, 2005; Schmidt, Hoge, & Robertson, 2002) . The YLS has been shown to successfully differentiate between offending youth and

nonoffenders (Jung, 1996). While this measure is useful for predicting general delinquency, its utility for predicting sexual crimes is less certain.

JSOAP II. The Juvenile Sex Offender Assessment Protocol II (JSOAP II) is a revised version of a previous instrument and appears to be fairly widely used (Burton, Smith-Darden, & Frankel, 2006). The JSOAP I and II combined have nine empirical studies available, more than other JSO risk assessment measures, who have eight combined. This can be seen in Table 1, which compares the data available for all measures. As shown in Table 1, the JSOAP I and II appear to be the most studied measures, but the studies still have several faults including most using unrealistic samples. All of the studies cited in Table 1 except for one (Petersen et al, 2010), are based on samples of youth in unrealistic, pre-sorted settings such as detention centers, foster care, or neglect referrals. Risk assessments are most useful at the "front door" of the court to assess the risks and treatment needs of all youth who commit sex crimes. The study proposed here uses a realistic sample of all youth adjudicated for a sex offense in a county court. Again, the studies in Table 1 focus only on the juvenile sex offender risk assessment measures and do not incorporate any other levels of ecological risk.

The original JSOAP was created using a sample of 96 youth, but found that the recidivism rate and sample size were too small to make any analyses meaningful. While the creators had several studies validating the original instrument which pointed to the changes necessary which formed the JSOAP II, validation studies on the JSOAP II came from outside researchers and are limited. As previously mentioned, there are only nine known studies that tie the JSOAP I or II to recidivism. Studies on the JSOAP I included a study of 253 "very high-risk juvenile sex offenders" which found correlations between some subscales and recidivism

(Waite, Pinkerton, Wieckowski, McGarvey & Brown, 2002). This study was not reflective of how the measure would typically be used since youth were already sorted prior to assessment, limiting interpretability. An additional study in a more reflective setting, but with a smaller sample size of 54 adjudicated male JSOs, found an AUC of .79 for total score predicting sexual recidivism (Hecker, Scoular, Righthand, & Nangle, 2002). A later study using the J-SOAP I demonstrated an intraclass correlation (ICC) of .70 and internal consistency (α) of .87 using archival file coding for 60 male youth adjudicated for a sexual offense (Martinez, Flores, & Rosenfeld, 2007). This same study found correlation coefficients of .34 for total score and any recidivism (p<.10), .31 for total score and sexual recidivism (p<.10), .33 for the dynamic scales score and any recidivism (p<.10), .42 for the dynamic scales score and sexual recidivism (p<.10) and .78 for sexual any recidivism (p<.10). Also ROC AUCs of .76 for any recidivism (p<.10) and .78 for sexual recidivism (p<.10) were found. This study was in a treatment program in a mostly minority urban setting.

The JSOAP II has a growing body of literature, with 6 published studies found via a ProQuest search using the measure to predict sexual recidivism. Additional studies have been done using the measure to predict treatment outcomes or building the validity using factor analyses and within-measure tests, but those are not be discussed here. The predictive validity studies on the JSOAP II are plagued with the same issues of non-representative and small samples. Parks and Bard (2004) used a sample of 156 male JSOs in a secure residential treatment facility found that the JSOAP II was able to differentiate between types of recidivist (sexual versus non-sexual) and that one scale (Impulsive/Antisocial behavior) was predictive of

sexual recidivism. While the Parks and Bard study is not extremely small, it is an unrepresentative sample of youth who had been selected to attend a secure residential treatment setting. Additionally, Mccoy (2008) used a sample of 128 youth in an outpatient treatment center, finding some correlated subscales but no significant prediction. Both of these samples use a pre-sorted group of youth that are not reflective of how the measure would be used in a prospective manner, the manner that is most useful to court and treatment workers. A published grant update by the creators of the measure used a larger sample size of nearly 800 youth with a longer follow-up period of between 6 months and 7 years (Prentky, 2006). This study found an AUC of .82 for pre-adolescents and .803 for adolescents for predicting sexual recidivism. This study was also done using an unrealistic sample of youth in custody of the social service system, not youth adjudicated for a sex offense receiving assessment at court intake. Though risk assessment measures have proven to be useful and valid in predicting risk for recidivism, they still only account for a small (<10%) proportion of the variance in offending (Schwalbe, 2007). These measures may be able to be combined with greater contextual factors in order to improve upon the existing risk prediction model.

Independent Variables – Macro Level.

Socioeconomic status – Neighborhood Type Index. Socioeconomic status indices were calculated from data collected from the 2000 census. Several variables (listed in table 2 along with the means and standard deviations for each of the variables across all of the block groups) were standardized, factored and then a cluster analysis of these factors was completed to form a "Neighborhood Type Index" (Onifade et al, 2011). There were three neighborhood types

found through this factor and cluster analysis process. This condenses 10 census factors into one neighborhood type index variable, which has three levels. The census factors included in this measure include data on labor participation, household income, and education level. These census variables were all operationalized at the block group level. These census variables loaded onto three factors, which we called Education Disadvantage, Labor Capital, and Household Instability. The three neighborhood types are labeled Benchmark, Distressed, and Resilient. The Benchmark group had moderate levels of education disadvantage, moderate labor participation, and low household instability. The Distressed group had high levels of education disadvantage, low labor participation, and moderate household instability. The Resilient group had low education disadvantage, low labor capital, and high household instability. These factor loadings are represented graphically in Figure 1.

Community risk and protective factors. Community level risk factors and protective factors were geographically mapped and the distance to these factors from each offender's home were used as an independent variable. These community factors are: schools, churches, parks, community centers, police/fire stations, liquor stores, libraries, and adult entertainment venues. These locations were found through publically available data sources including internet and phone book searches, liquor license locations, and community/city websites. The distance to the nearest location in each of these categories, measured in meters, was included as an independent variable. A regression was done on these variables alone to see if they are predictive of any of the three types of recidivism. Any of the proximity variables that were non-significant predictors were dropped before the final regression analyses in order to decrease the total number of predictors in the model and increase power. Given the lack of literature, it

was hypothesized that these community factors may be related to juvenile sex offending for several reasons. Since the offenders in question are juveniles, and most sex offenders offend against people who are known to them, schools are a likely location for offending behaviors. Thus it was hypothesized that living near a school may mean youth spend more time around the school (possibly unsupervised time after school hours) and schools may increase risk. The literature regarding churches has been mixed, with some suggesting that churches may be possible locations for crime (again possibly due to unsupervised time alone with potential victims, and others suggesting that the simple presence of churches in a neighborhood may be a protective factor, decreasing crime (e.g. Landor et al, 2011; Mochon et al, 2011). Similarly, parks, community centers and libraries are hypothesized to have possibilities as either risk or protective factors, providing opportunities for youth to engage in prosocial activities or providing potential victims. Police and fire stations were hypothesized simply to be reminders of social control, possibly making them protective factors from crime. Oppositely, although youth cannot be patrons of liquor stores or adult entertainment venues, it was hypothesized that they may be signs of social disorganization (as suggested by Sampson and Groves, 1989) and may be risk factors for crime.

Dependent Variable.

Recidivism. Recidivism, or repeat offending, was measured by new petitions to the juvenile court, or new criminal charges to adult court for those youth who had passed their 17th birthday during the follow-up period. In the State in which these data were collected, alleged crimes are handled by the Juvenile Court until the perpetrator reaches his 17th birthday. After

that, they are handled by the adult court. Both types of records were searched during the follow-up period. Recidivism data was collected for one year following their sex offense charges. Recidivism was separated into three categories: Any recidivism (any type of offense), nonsexual recidivism, and sexual recidivism. These three variables served as dependent variables. Each of the analyses was run separately for each dependent variable. Sexual recidivism was defined by State law and included criminal sexual conduct, indecent exposure, and gross indecency. The three categories of recidivism (e.g., any crime, sex crime only, nonsexual crime only) were tested separately to assess how the measures and the multivariate model predict each type of recidivism. In a follow up time of one year post initial sex offense, there was a 9% sexual recidivism rate, 7% nonsexual recidivism rate, and 13% total recidivism rate (N=227).

Results

For the purposes of organization, the results are discussed in order of the research questions. An a priori power analysis suggested that, with the existing sample size of 58, power may be a concern if too many predictor variables were included. The following questions attempted to determine the geographic dispersion of offenders, assess their risk for recidivism using community data, and do so in the most parsimonious way possible. A total of 3 predictors were included for the final model presented in research question three (JSOAP II, YLS/CMI, and one proximity measure). As a result, the study described here had power of .78 for an R² effect size of .17 (as was found using the JSOAP for total recidivism).

1) Is there geographic variability in the distribution of the homes of juvenile sex offenders?

Geographic Information Systems (GIS) software called ArcGIS was used to geographically map the home locations of each of the 227 offenders (see Figure 2). Then kernel intensity maps were created to show the geographic distribution of offenders (Figure 3). Kernel intensity maps take a point pattern map (where there's a dot for each person's home) and "smoothes" them out into a map that looks more like an elevation map. This is done by passing a window, called a kernel, over the point pattern map and counting the number of points within that window. The underling population at risk (youth ages 5 to 18) was also be mapped out using census data (Figure 4). These two kernel intensity maps were then used to calculate a kernel intensity ratio. This analysis basically stacks the two kernel intensity maps on top of one another and measures the distance between the values at each point. This shows where there are more offenders (or fewer offenders) than expected given the underlying population at risk. This is represented in

Figure 5 and shows that there are more juvenile sex offenders in the Northwest corner of the county (the large city area) than would be expected given the underlying population at risk. A L-hat statistic was also calculated, which measures the distance from one point to its nearest neighbor to assess whether or not the points are significantly clustered. This is shown in Figure 6. A clustered distribution such as this suggested that the points are not geographically distributed randomly, but instead there is something associated with geographic distribution that is affecting where offenders live.

2) Does the inclusion of a sex specific risk assessment measure add significant incremental validity to the use of a general criminogenic risk assessment measure?

The receiver operator characteristic area under the curve (ROC AUC) statistic is a nonparametric procedure used to describe the predictive validity of diagnostic tests (Schwalbe, 2007). The ROC AUC ranges from .50 to 1.00 and is the probability that a randomly chosen reoffender has a higher assessment score than a randomly chosen non-reoffender. This statistic is robust to variations in base rates, which is especially important for juvenile sex offenders since base rates are quite low (Rice & Harris, 1998). Adjusted R²s assess the amount of variance in the dependent variable that is accounted for in the independent variable.

For this question, the ROC AUC of the YLS/CMI was assessed for this male juvenile sex offender sample of 58 (who had a JSOAP and a YLS/CMI completed). Due to the exploratory nature of this study, a significance level of p<.10 was used for all of the analyses reported. For the YLS/CMI an AUC of .63 (*ns*) was found for nonsexual recidivism, .52 for sexual recidivism (*ns*), and .63 for any recidivism (*ns*). The YLS/CMI score was also regressed onto recidivism to

find an adjusted R^2 . An adjusted R^2 of .03 was found for nonsexual recidivism (*ns*), -.01 for sexual recidivism (*ns*), and .03 for any recidivism (*ns*).

These same procedures were repeated using the JSOAP II total score as the independent variable. For the JSOAP an AUC of .71 (*ns*) was found for nonsexual recidivism, .74 for sexual recidivism (p<.10), and .81 for any recidivism (p<.10). The JSOAP score was also regressed onto recidivism to find an adjusted R². An adjusted R² of .05 was found for nonsexual recidivism (p<.10), .17 for sexual recidivism (p<.10), and .08 for any recidivism (p<.10).

The two measures were then analyzed using a hierarchical regression to see if adding in the JSOAP II increased the adjusted R^2 , or the amount of variance in recidivism explained above and beyond the YLS/CMI. For nonsexual recidivism, the adjusted R^2 increased from .007 to .031 (*ns* for both blocks). For sexual recidivism, the adjusted? R^2 increased from -.013 to .09 (*p*<.10). For total recidivism, the R^2 increased from .025 to .167 (*p*<.10). This suggests that while the YLS/CMI is not a good predictor of recidivism on its own for juvenile sex offenders, it can be useful when used in combination with the JSOAP II. This also shows that using a sex specific measure significantly increases the amount of variance in recidivism explained beyond what is explained by the YLS/CMI.

3) Does including multi-level variables increase the accuracy of risk prediction above individual level variables alone? Specifically, is it possible to develop a multivariate risk prediction model including a general criminogenic risk assessment measure, a sex specific risk assessment

measure, and macro community level variables that significantly increases the accuracy of prediction of future crime among juvenile offenders?

Distances were calculated between each of the 58 offender's home address and the nearest location for each of the nine types of community factors (police/fire departments, homeless shelters, liquor stores, schools, churches, parks, community centers, hospitals and adult entertainment establishments). When the distances to these locations was regressed onto the types of recidivism, no factors were significant predictors of nonsexual or sexual recidivism and the only factor that was a significant predictor of total recidivism was churches (R^2 =.0003, *p*<.10).

A regression was also used to see if the neighborhood type index predicted any of the three types of recidivism. It failed to reach statistical significance for all three types of recidivism, sexual, nonsexual, and total.

To combine these analyses, a regression was calculated to see the incremental validity added by first using the JSOAP score, followed by the YLS/CMI and lastly, the proximity to the nearest church. For sexual recidivism the adjusted R² increased from .075 to .091 and finally to .097 and they were significant predictors at each step (p<.10). For nonsexual recidivism the adjusted R² decreased from .049 to .031 to .021 and only the first step (JSOAP only) was significant (p<.10). For total recidivism the adjusted R² decreased slightly from .169 to .167 and finally to .166, but they were statistically significant predictors of total recidivism at each block (p<.10).

Given that the YLS/CMI and the JSOAP are highly correlated for this sample (r=.68, p<.10), and given the previous literature using integrative theories of offending etiology, an interaction between the JSOAP and the Neighborhood Typologies was also hypothesized. A hierarchical regression was used to test this hypothesis on the sample of 58 offenders with geographic data, YLS/CMI, and JSOAP data. The Neighborhood Type/JSOAP interaction was entered first, followed by the YLS/CMI and the proximity to the nearest church. The regression equations were significant (p<.10) for sexual, nonsexual, and total recidivism. Thus, it seems that the JSOAP is differentially predictive in each of the three neighborhood types. The JSOAP is only an accurate predictor of nonsexual recidivism for neighborhood type 2 (Distressed). The JSOAP is not a significant predictor of sexual recidivism in any of the three neighborhood types. The JSOAP is, however, an accurate predictor of total recidivism also in neighborhood type 2 (Distressed). This would suggest that the JSOAP is not a good predictor of recidivism in the Benchmark or Resilient neighborhoods. These two neighborhoods (Benchmark and Resilient) account for 2/3 of the youth in this sample of 58 youth. This is especially curious given that the three neighborhood types are not significantly different from one another on JSOAP score or any measure of recidivism. These results will be further discussed in the next section.

Discussion

The geographic variability in the home locations of juvenile offenders indicates that the geographic distribution is neither random nor reflective of the underlying population at risk. This suggests that there is something that is related to sexual offending that is also related to spatial distribution. This study aimed to test out several spatially related factors, namely indicators of socioeconomic status and the proximity to possible protective or risk factors in the community. The only one of these macro level factors that was predictive of any type of recidivism was the distance to the nearest church. The possible relationship between church proximity and recidivism is unclear and needs further investigation. The nonrandom geographic distribution of juvenile sex offenders does not appear to be explained by the macro level variables analyzed within this study including the socioeconomic status variables derived from the census and the proximity to various neighborhood structures. The factors driving this spatial relationship require further research. It is possible that other factors that are also spatially nonrandom, such as population density, community collective efficacy, or police surveillance may be driving this spatial distribution. The level of participation in the community factors included in this study was not assessed. It is possible that the mere presence of these factors is not what is of importance, but it is instead the utility of these factors. This too is a suggested area of future research.

Overall, the JSOAP II appears to be the best predictor of risk for recidivism for juvenile sex offenders (both sexual and nonsexual recidivism). Although it only accounts for 17% of the variance in sexual recidivism, it appears to be the greatest predictor studied thus far. The

YLS/CMI appears to add some predictive validity when used alongside the JSOAP II. The YLS/CMI is not a significant predictor of sexual, nonsexual, or total recidivism in this sex offender sample when considered on its own. Given that the YLS/CMI assesses several areas that are not assessed by the JSOAP II, the YLS/CMI may still be useful for case management or treatment planning by court personnel.

It does not appear that the indicators of socioeconomic status included in the neighborhood types index are predictive of recidivism by juvenile sex offenders. This is *not* to say that these factors are not predictive of initial offenses or offenses that go unreported. Future research is needed to further assess these relationships. It is also possible that other indicators of socioeconomic status may be related to recidivism and these possibilities also require further research. Some prior research has suggested that the effects of being in a lowincome household are exacerbated for youth who also live in a low income neighborhood (Hay, Fortson, Hollist, Altheimer, & Schaible, 2007). This was not assessed in this study, as only the block group socioeconomic status is represented in the census. This is another area of recommended future research, considering the possible hetero or homogeneity of the socioeconomic status of sex offenders' households in comparison to the socioeconomic status of their surrounding neighborhoods.

The JSOAP/Recidivism relationship appears to function differently in each of the three Neighborhood Types. The Neighborhood Types are not significantly different on JSOAP score or recidivism, but the interaction between the Neighborhood Types and the JSOAP is a significant predictor of recidivism, suggesting a moderating effect of Neighborhood Type (which is a proxy

for socioeconomic status). This is concerning, as 67% of juvenile offenders in this sample are not in the Distressed Neighborhood group where the JSOAP is significantly predictive. Thus, the JSOAP may be inaccurately predicting risk for youth living Benchmark or Resilient Neighborhood groups. This is an issue that requires further investigation in future research. A larger sample size would be extremely beneficial in increasing the ability to further understand this relationship. If this finding should hold, risk factors other than what is captured on the JSOAP should be explored, and systematic processing should be assessed across the neighborhood types. Additional research could further explore these neighborhood differences by not only looking at individual risk factors, but also family, school, and neighborhood factors. Larger systemic factors may also play a role, such as norms of what situations require contacting the police, police surveillance or police responding behaviors. Court processing and court workers may unintentionally be sorting youth and handling juvenile sex offenders differently based on their perceptions of the additional risk added by the type of neighborhood they live in. Again, further research is needed to see if this finding hold true on a larger sample, and if so, to investigate the causes of this neighborhood difference.

Although an acceptable level of power was achieved in this study, one limitation is the sample size. These analyses could be made more robust if a larger sample and longer follow-up time is possible. As previously mentioned, there are several directions of future research that is called for by this study. The results reported take the first step at increasing our understanding of "what matters" in the ecological contexts of juvenile sex offenders. Much of the variance in recidivism is still unexplained and further research is needed to see what factors (individual, micro, or macro level) are predictive of both sexual and nonsexual recidivism.

In summary, it seems that there is geographic variation in the homes of juvenile sex offenders, with some geographic locations having more sex offenders than would be expected given the underlying population. The Juvenile Sex Offender Assessment Protocol II individual level risk assessment appears to be the best predictor of recidivism currently available, although the Youth Level of Service/Case Management Inventory also appears to be useful. Neighborhood socioeconomic factors appear to mediate the relationship between the JSOAP II and recidivism, with the JSOAP II only being a significant predictor of risk in one of the three neighborhood types. Additionally, the distance to the nearest church is also a predictor of recidivism. Including these multi-leveled predictors in addition to the individual level risk assessments appears to increase the amount of variance in recidivism explained, but more work is needed. Future research is needed to further investigate the role of neighborhood socioeconomic status. Additional research on risk factors such as participation in neighborhood activities, collective efficacy, neighborhood crime reporting, police responding and surveillance could account for further variance in recidivism. APPENDIX

Appendix

Figure 1. Block-Group Types and Mean Factor Scores for Each Dimension of Neighborhood Ecology.

For interpretation of the references to color in this and all other figures, the reader is referred to the electronic version of this dissertation.



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referred to the electronic version of this dissertation.

Figure 2. Point Pattern Map of Juvenile Sex Offenders' Home Locations



Red circles = offenders' home location at the time of the sexual offense

Figure 3. Kernal Intensity Map of Juvenile Sex Offenders' Home Locations



This figure shows the density of offenders' home addresses, with yellow and green colors signifying greater density of offenders. The kernal (window) size used for this figure is 1000 meters.

Figure 4. Kernal Intensity Map of the Underlying Population at Risk



This figure shows the density of the underlying population at risk (youth ages 5-18), with yellow and green colors signifying greater density of youth. The kernal (window) size used for this figure is 2500 meters.





This figure shows the kernal intensity ratio of juvenile sex offenders and the underlying population at risk. The yellow area indicates a higher number of offenders than would be hypothesized given the underlying population at risk. This figure uses a kernal size of 1000 meters for offenders' homes and 2500 for the underlying population at risk.





This figure shows the Lhat-h calculation for the home locations of juvenile sex offenders. This figure indicates that the homes are clustered together, rather than being randomly distributed across the space.

Figure 7. Block Groups



This figure shows the block groups in the county. These are developed by the census bureau and are nested within census tracts.

Measure	Authors & Year	Sample Size (N)	Age Range	Average Age	Males Only	Location	Length of follow-up	Sexual Recidivism Rate	Total Recidivism Rate	Results
Juvenile Sex Offender Risk Assessm- ent Protocol (JSOAP I)	Prentky, Harris, Frizzell, & Righthand (2000)	96	9- 20	14.2	NR	Inner City Philadelphia, Low socioeconomic status, youth referred a treatment center, 2/3 adjudicated, 1/3 from welfare system	12 months	4% (3 of 75 for whom recidivism data was available)	10.7% (8 of 75 for whom recidivism data was available)	.35 point-biserial correlation between overall score and any reoffense ; Descriptives of score differences between recidivists and non recidivists only
	Waite, Pinkerton, Wieckow-ski, McGarvey, & Brown (2002)	253	NR	NR	NR	"Very high-risk juvenile sex offenders"	9 years	4.3% (11 of 253)	Approx. 60%	High scale 2 youth were 3 times more likely to recidivate sexually than low scale 2 youth

Table 1: Juvenile Sex Offender Risk Assessments Review Table

Table 1 (Cont'd.)

	Hecker, Scoular, Righthand, & Nangle (2002)	54	NR	NR	X	Adjudicated male sex offenders	10-12 years	11% (6 of the 54)	37% (20 of the 54)	Scale 1 AUC .79, total score not correlated with sexual recidivism,
	Martinez, Flores, & Rosenfeld (2007)	60	12- 18	14.9	X	Adolescent sex offender treatment program, over 50% Latino, 28% African American, 16% Caucasian	NR	13.3% (8 of 60)	20% (12 of 60)	.31 correlation between total score and sexual recidivism, .78 AUC for total score and sexual recidivism, .86 AUC for dynamic score and sexual recidivism
Juvenile Sex Offender Risk Assessm- ent Protocol II (JSOAP II)	Parks & Bard (2004)	156	12- 17	14.86	x	Secure correctional facility run by the Oklahoma Office of Juvenile Affairs	NR	6.4%	30.1%	The JSOAP was able to differentiate between types of offenders and the Impulsive/Antisocial behavior subscale was predictive of sexual recidivism (Cox regression – Beta of .30, <i>p</i> <.05).
	Мссоу (2008)	128	NR	NR	NR	Outpatient treatment center	1.5-13 years	5.6%	56%	Some correlated subscales but not significantly predictive

Table 1 (Cont'd.)

	Prentky	797	3-	12.4		Youth in the	6	18% (145	46.5% (371 of	AUC of .824 for
	(2006)—		20			custody of the	months	of 797)	797)	preadolescents and
	Manuscript					depart. of social	- 7			.803 for adolescents
	presented as					services in MA	years			
	a grant					who were				
	update, not					recommended				
	published in					to be evaluated				
	а					for sexually				
	professional					abusive				
	journal					behaviors				
	Young (2007)	NR	NR	NR	NR	NR	NR	NR	NR	Significant
										relationship
										between dynamic
										score and sexual
										recidivism
	Viljoen, Scal-	169	15.	NR	х	Non-secure	6.58	8.3%	42.8%	.59 AUC for sexual
	ora, Cuadra,		4			residential	years			recidivism
	Bader, Cha-					setting in				
	vez, Ullman,					Midwestern				
	& Lawrence					medium sized				
	(2008)					city				
	Мссоу	128	NR	NR	NR	Outpatient	1.5-13	5.6%	56%	Some correlated
	(2008)					treatment	years			subscales but not
						center				sig. predictive
ERASOR	Hersant	91	NR	NR	NR	Residential	NR	NR	NR	Differentiated
	(2007)					treatment				between sexual
						center				recidivists and non-
										recidivists

Table 1 (Cont'd.)

	Worling (2004)	136	NR	NR	x	45 Community- based agencies and 91 residential treatment centers	NR	NR	NR	AUC of .72 for sexual recidivism using total score, .66 AUC for clinical risk estimate
J-SORRAT	Epperson et al. (2005)	636	NR	NR	x	adjudicated males	NR	NR	NR	AUC of .89 for sexual recidivism as a juvenile and .79 for sexual recidivism as an adult
	Viljoen, Scal- ora, Cuadra, Bader, Chav- ez, Ullman, & Lawrence (2008)	169	15. 37	NR	x	Non-secure residential setting in Midwestern med. sized city	6.58 years	8.3%	42.8%	.55 AUC for sexual recidivism

Table 2: Census variables

Descriptive Statistics - Census Variables for County Block Groups (n=157)

Variable	Mean	SD
% single parent household	22.1	13.5
% non-White	23.9	18.5
% no high school diploma	15.5	1
% male - no high school diploma	16.5	1.1
% female - no high school diploma	14.6	1
% residents not participating in labor force - over 16	32.3	6.5
% male - residents not participating in labor force - over 16	26	7.3
% female - residents not participating in labor force - over 16	36	8.4
% households receiving public assistance	4.8	5
% households with ratio of income to poverty less than one	14.3	10.9
Vacancy rate	6	4.2
% households with more than 1 person per room	24.4	10.1
Rental rate	35.5	23.8
% households spending more than 30% of income on		
rent/mortgage	37.8	17.1

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