The Relation Between Impulsivity and Neighborhood Safety on Attitudes Toward Risky Sexual Behavior

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ABSTRACT
Existing work has suggested a link between early impulsivity and risky behavior in adolescence. Despite the negative ramifications of risky sexual behavior in adolescence, few studies have examined impulsivity and risky behavior that is sexual in nature. The current study examined impulsivity in middle childhood as a predictor of attitudes toward risky sexual behavior (RSB) in adolescence. Neighborhood safety was also examined as a protective factor for attitudes toward RSB. Participants included 249 children from a longitudinal study of development. Impulsivity (age 10) was measured using mother-report on the Behavior Assessment System for Children. Attitudes towards RSB (age 15) were assessed using adolescent-report on the Youth Risk Behavior Surveillance System. Neighborhood safety (age 15) was measured using mother-report on the Neighborhood Location and Structural Characteristics questionnaire. Regression analyses yielded a main effect of impulsivity on healthy attitudes towards RSB (β = -0.58 p < .05). Neighborhood safety moderated the association (β = 0.135 p < .05) such that neighborhood safety amplified the positive effects of low impulsivity on healthy attitudes toward RSB. Findings provide additional support for impulsivity as a risk factor for adolescent risk taking. Additionally, neighborhood safety and impulsivity interacted to predict unhealthy attitudes towards RSB. More work is needed to examine potential mechanisms explaining these relations and other risk and protective factors.

Adolescence has long been characterized as a transitional period of emotional instability, risk-taking, and acting without thinking (Romer, Reyna, & Pardo, 2016). Adolescents are often expected to display higher levels of sensation-seeking with little forethought. To this point, there appears to be a small subsection of youth who engage in a disproportionate amount of high-risk behaviors that are problematic for both themselves and society (Romer, 2010). For example, in the United States, fewer than 10% of all juvenile offenders are chronic offenders. However, 10% of these offenders are responsible for two-thirds of all violent offenses (United States Department of Justice, 1997; Biglan & Cody, 2003; Sickmund & Puzzanchera, 2014). Adolescent risky behavior has also been linked to a myriad of serious health complications involving preventable injuries, sexually transmitted diseases, heart disease, and cognitive deficits (Centers for Disease Control and Prevention, 2015). Aside from medical concerns, risky behavior is linked to 72% of all deaths between the ages of 10 and 24 (American Psychological Association, 2002). Understandably, adolescent risk-taking is a major concern for social scientists as they attempt to understand, explain, and prevent maladaptive risky behavior in America’s youth.
In order to achieve this goal, many researchers have attempted to identify antecedents of risky behavior patterns. Fulkerson and colleagues (2006) divided risky behavior into 8 high-risk behavior patterns: the Alcohol Risk Pattern, the Tobacco Risk Pattern, the Illicit Drug Risk Pattern, the Sexual Intercourse Risk Pattern, the Depression-Suicide Risk Pattern, the Antisocial Risk Pattern, the Violence Risk Pattern, and the School Problems Risk Pattern. These risk patterns represent life-course persistent development paths that can be traced back to temperament styles that are evident in early childhood (Moffitt, 1993; Romer, 2010). In fact, externalizing behaviors have been suggested to be linked to a set of core temperament traits (e.g., impulsivity) which can be observed as early as 3 years old (Caspi & Silva, 1995; Caspi, Henry, McGee, Moffitt, & Silva, 1995; Kreuger et al., 2002; Romer, 2010). Impulsivity, which is characterized by impatience, sensation-seeking, and the tendency to act without forethought, has been linked to future risk-taking behaviors (Romer, 2010; Braddock et al., 2011; Treloar et al., 2012). Examining impulsivity as a precursor of risky behavior may help us understand and potentially prevent the development of harmful risky behavior patterns.

When exploring the relation between impulsivity and risky behaviors, Romer (2016) divided risk-taking into two groups: 1) maladaptive risk behaviors such as substance use and risky sex and 2) adaptive risk behaviors such as participation in sports and competitions. Romer found that rash-impulsive traits were associated with maladaptive risk behaviors, but not adaptive ones. These findings suggest that early signs of impulsivity in childhood may be more predictive of the maladaptive high-risk behavior patterns Fulkerson et al. (2006) proposed. In contrast, they may be less predictive of the average (or adaptive) array of risky behaviors seen in adolescence.

The link between impulsivity and high-risk patterns has been suggested for many risky behaviors such as alcohol use, cigarette smoking, drug use, violence, and school problems (Caspi & Silva, 1995; Romer et al., 2009; Romer et al., 2011; Jaser, Yates, Dumser, & Whittemore, 2011; Treloar et al., 2012). For example, if a teen is suddenly asked by a peer to participate in cigarette smoking, this teen may be more likely to engage in the activity if they typically act without thinking. However, there is limited literature involving the relation between impulsivity and sexual behaviors that are risky in nature. When risky sexual behavior (RSB) is mentioned in the literature, it is often conceptualized as the act of sexual intercourse and/or the lack of protection against pregnancy and STDs (Fulkerson et al., 2006; Braddock et al., 2011; Khurana et al., 2015; 2012; Romer, Reyna, & Pardo, 2016). However, RSB involves more than these two concrete behaviors.

According to the Centers for Disease Control and Prevention (2015), RSB is any behavior that poses a threat to one’s sexual health. These behaviors include actions that increase the risk for HIV, STDs, and unintended pregnancy. RSB is noted among the leading causes of preventable deaths in the United States (Mokdad, Marks, Stroup, & Gerberding, 2004). However, healthy sexual behavior is not limited to the absence of disease or conception. Sexual health encompasses both healthy sexual behaviors and healthy sexual attitudes that allow for sexual experiences that are safe, appropriate, and free of coercion, discrimination, and violence (Centers for Disease Control and Prevention, 2015). While the literature on impulsivity and risky behavior has begun to examine the relation between childhood impulsivity and later sexual risk-taking, little research has investigated the impact of childhood impulsivity on adolescent attitudes toward RSB. Thus, this is one purpose of this study.

In terms of prevention, it is important to identify and understand variables that may act as risk or protective factors. Extensive research has identified how lower cognitive ability and lower working memory can confer risk on sexual risk-taking. For example,
we know adolescents with lower cognitive abilities are at a greater risk for premature sexual initiation, early childbearing, and having sexual relations with multiple partners (Halpern, Joyner, Udry, & Suchindran, 2000; Khurana et al., 2015). These results indicate that cognitive capacity has an impact on sexual risk-taking behavior. More importantly, the cognitive content also seems to be important in the decision to engage in risky behaviors. In particular, feedback processing (the cognitive ability to understand and assess the consequences of a decision) appears to be related to the ability to make healthy evaluations of objective risk conditions (Schiebener & Brand, 2015). Pertaining to this study, this suggests that the evaluation of, or attitudes towards, risky sexual behaviors may be an important factor to consider in conceptualizing risk for later RSB.

Empirically, adolescent perceptions and attitudes toward risk have been linked to risky behaviors. Feinberg, Ridenour, and Greenberg (2007) found that attitudes toward risky behavior correlate positively with risky behavioral tendencies. Adolescents with attitudes that tolerated, encouraged, or underestimated the consequences of risky behaviors were more likely to participate in those risky behaviors. In multiple studies, risk attitudes have been found to mediate the relation between measures of impulsivity and risky behaviors such as alcohol and drug use (Romer, 2010; Jaser, et al., 2011; Mishra & Lalumière, 2016). For example, Mishra & Lalumière found risk attitudes to be associated with impulsive and shortsighted behaviors such as engaging in unprotected sex. Considering the impact that attitudes have on behavior, it may be important to examine how other factors impact attitudes. Examining the relation between impulsivity and adolescents’ attitudes toward RSB may increase our understanding of an individual difference variable that relates to high-risk sexual behavior engagement. However, there may also be environmental factors that shape adolescents’ attitudes toward RSB.

A child’s neighborhood is one environmental influence that may contribute to adolescent attitudes toward RSB. Studies generally show that neighborhood and community characteristics have significant effects on both the development and prevention of problem behaviors in youth. Neighborhood safety is typically assessed via parental report on the frequency of crime and violence in one’s neighborhood (Pinderhughes et al., 2001). Unsafe neighborhood characteristics have been linked to other risk-taking behaviors related to juvenile offending, antisocial peer groups, and school problems (Chung & Steinberg, 2006; Chung, Mulvey, & Steinberg, 2011).

Neighborhood safety also relates to externalizing behaviors (including risky behaviors) in children and adolescents through its impact on parental stress (Franco, Pottick, & Huang, 2010). Low levels of neighborhood safety, which are marked by aversive neighborhood events such as crime and vandalism, predict higher reports of stress and feelings of powerlessness (Guterman, Lee, Taylor, & Rathouz, 2009). Parental stress levels in turn can negatively affect a child’s development of prosocial attitudes and behaviors, as higher parental stress inhibits adaptive parent-child relations (Pinderhughes et al., 2001; Franco, Pottick, & Huang, 2010; Guterman et al., 2009) that allow for healthy child development. Thus, we propose that neighborhood safety will relate to adolescent attitudes toward RSB as well.

The link between neighborhood structure and RSB has also been established empirically. For example, Leventhal & Brooks-Gunn (2000) reported a number of studies supporting a link between neighborhood socioeconomic status (SES) and adolescent sexual activity. Specifically, low SES neighborhoods consistently predicted higher rates of adolescent childbearing, younger age of first intercourse, and lower rates of reported contraception use at first intercourse (Pleck, Sonenstein, & Ku, 1990; Crane, 1991; Leventhal & Brooks-Gunn, 2000). This relation may be explained through Bandura’s (1969) Social Learning Theory. According
to Bandura, the processes of observation, imitation, and modeling may shape a child’s attitudes in a way that mirrors one’s environment. Low SES neighborhoods, which tend to have fewer resources and opportunities, may provide more models of RSB than high SES neighborhoods (Bandura, 1969; Crane, 1991; Leventhal & Brooks-Gunn, 2000). Thus, children in low SES neighborhoods may be more likely to evaluate high-risk sexual behaviors as normative and develop unhealthy attitudes towards RSB.

Considering the strong correlation between SES and perceptions of neighborhood safety, particularly for urban neighborhoods (Bowen & Chapman, 1996; Feldman & Steptoe, 2004), we believe that perceptions of neighborhood safety will impact child development in ways similar to neighborhood SES. That is, we predict neighborhood safety to negatively correlate with unhealthy attitudes toward RSB. Consistent with research suggesting that neighborhood safety moderates the link between family variables and adolescent risk-taking, we predict that neighborhood safety will work to protect children from developing unhealthy attitudes toward RSB. This is the second goal of this study.

The Current Study
Healthy attitudes toward RSB acknowledge the risks, such as unintended pregnancy, inherent in premature and unprotected sexual activities. For example, a teen with healthy attitudes toward RSB may understand the importance of using protection during sexual intercourse in order to prevent pregnancy. Since healthy attitudes are at least in part a reflection of an adolescent’s knowledge of the risks involved in sexual activity, external factors that impact the education and acknowledgement of these risks may serve to moderate the relation between impulsivity in middle childhood and adolescent attitudes toward RSB. In the present study, we examine neighborhood safety as a moderator.

Our goals in the present study were twofold. First, we examined impulsivity in middle childhood as it relates to attitudes toward RSB in adolescence. We also examined the potential moderating effect of neighborhood safety on this association. Our goal is to contribute to a better understanding of the relation between impulsivity in middle childhood and healthy attitudes toward RSB in adolescence.

Consistent with previous literature, it was hypothesized that there would be a negative relation between these children’s impulsivity in middle childhood and later reported healthy attitudes towards RSB. This would indicate that children who displayed high levels of impulsivity would show less healthy attitudes toward RSB in adolescence. It was also hypothesized that higher levels of neighborhood safety in middle childhood would predict healthier attitudes toward RSB in adolescence. To address our second goal, we examined whether neighborhood safety buffered the relation between impulsivity on attitudes toward RSB. It was hypothesized that neighborhood safety would interact with impulsivity to predict attitudes toward RSB, such that children with higher levels of impulsivity and whose mothers reported safe neighborhood characteristics would have healthier attitudes toward RSB than would be predicted by impulsivity alone.

Methods
Recruitment and Attrition
The current study utilized data from three cohorts of children who are part of an ongoing longitudinal study of social and emotional development (Smith, Calkins, & Keane, 2006). The goal for recruitment was to obtain a sample of children who were at risk for developing future externalizing behavior problems, and who were representative of the surrounding community in terms of race and socioeconomic status (SES). All cohorts were recruited through child day care centers, the County Health Department, and the local Women, Infants, and Children (WIC) program. Potential participants for cohorts 1 and 2 were recruited at 2-years of age (cohort 1: 1994-1996 and cohort 2: 2000-2001) and screened using the Child Behavior Checklist (CBCL 2-3; Achenbach, 1992), completed by the mother, in order
to over-sample for externalizing behavior problems. Children were identified as being at risk for future externalizing behaviors if they received an externalizing T-score of 60 or above. Efforts were made to obtain approximately equal numbers of males and females. This recruitment effort resulted in a total of 307 children. Cohort 3 was initially recruited when infants were 6 months of age (in 1998) for their level of frustration, based on laboratory observation and parent report, and were followed through the toddler period (see Calkins, Dedmon, Gill, Lomax, & Johnson, 2002, for more information). Children from Cohort 3 whose mothers completed the CBCL at two-years of age \((N = 140)\) were then included in the larger study. Of the entire sample \((N = 447)\), 37% of children were identified as being at risk for future externalizing problems. There were no significant demographic differences between cohorts with regard to gender, \(\chi^2 (2, N = 447) = .63, p = .73\), race, \(\chi^2 (2, N = 447) = 1.13, p = .57\), or two-year SES, \(F (2, 444) = .53, p = .59\).

Of the 447 originally selected participants, six were dropped because they did not participate in any data collection at 2 years old. An additional 12 families participated at recruitment, did not participate at two-year, but did participate at later years. At age 10, 357 families participated, including 31 families that did not participate in the 7-year assessment. No significant differences were noted between families who did and did not participate in the 10-year assessment in terms of child gender, \(\chi^2 (1, N = 447) = 3.31, p = .07\); race, \(\chi^2 (3, N = 447) = 3.12, p = .08\); 2-year SES, \(t (432) = .02, p = .98\); or 2-year externalizing T score, \(t (445) = -.11, p = .91\). At age 15, 327 families participated, including 27 families that did not participate in the 10-year assessment. There were no significant differences between families who did and did not participate in the 15-year assessment in terms of race, \(\chi^2 (3, N = 447) = 3.96, p = .27\); 2-year SES, \(t (432) = -.56, p = .58\); or 2-year externalizing T score, \(t (445) = .24, p = .81\). Boys were less likely to participate in the 15-year assessment, \(\chi^2 (1, N = 447) = 9.31, p = .002\).

**Participants**

The sample for the current study included 249 families (145 girls, 104 boys) who participated in the 10 and 15-year assessments. Four participants were dropped from the current study due to developmental delays. In addition, only participants with complete data for all variables of interest were included in the analyses. Sixty-six percent of the sample was European American, twenty-eight percent African American, and six percent other. Families were economically diverse based on Hollingshead (1975) scores at the 10-year assessment, with a range from 17 to 66 \((M = 44.93, SD = 11.90)\), and represented families from each level of social strata typically captured by this scale. Hollingshead scores that range from 40 to 54 reflect minor professional and technical occupations considered to be representative of middle class.

**Procedures**

Participants and their mothers participated in an ongoing longitudinal study when the children were 10 and 15 years of age. Families came to the university for two laboratory visits, during which children and their mothers engaged in various tasks designed to elicit emotional and behavioral responding and parent-child interactions. At each visit, children/adolescents and their mothers completed a packet of questionnaires in separate rooms with separate examiners. During the consent and assent process participants were informed that their information would be kept confidential unless abuse, neglect, or suicidal ideations were reported. Families no longer living in the area were asked to complete and return a packet of questionnaires mailed to their home. The current study utilized child self-report questionnaires from the 15-year time point and maternal questionnaires from the 10 and 15-year time point.

**Measures**

**Demographics.** Mothers completed questionnaires to provide demographic information, such as child’s sex and ethnicity, parent marital status, and income and education for each parent.
**Impulsivity.** Mothers reported on their perceptions of the child’s behavior using the 160-item Behavior Assessment System for Children 2nd Edition (BASC-2; Reynolds & Kamphaus, 2004) when children were age 10. Mothers responded to statements indicating how well a range of adaptive and maladaptive behaviors describes the child recently within the last several months. Each question uses a scale of 0 to 3 indicating how frequently the behaviors occur (0 = never, 1 = sometimes, 2 = often, 3 = almost always). A sum of 5 items assessing the child’s impulsivity was used in the current study; higher scores indicated higher impulsivity. Sample items include statements such as, “acts without thinking” and “has poor self-control.” Internal reliability for these items was adequate (Cronbach’s alpha = .76).

**Neighborhood safety.** Mothers completed the Neighborhood Location and Structural Characteristics questionnaire which assesses the quality and social aspects of the neighborhood, using participant perceptions of the neighborhood (Chung & Steinberg, 2006). Mothers reported on 16 items about their family’s current neighborhood when children were age 15. Of note, the Neighborhood Location and Structural Characteristics questionnaire was not administered to parents when children were age 10, thus, data collected at 15 year were employed in the current study. The current study used the neighborhood safety subscale which includes 5 items such as “how often are there problems with muggings, burglaries, assaults, or anything else like that around here” and “how much of a problem is the selling and using of drugs around your neighborhood.” An average score was calculated such that higher values indicating higher neighborhood safety. Internal reliability for this scale was adequate (Cronbach’s alpha = .78).

**Attitudes toward risky sexual behavior.** Adolescents reported on 60 items assessing their perceptions of how “okay” various risky behaviors are when they were 15 years old. Items are from the Youth Risk Behavior Surveillance System (YRBSS), developed by the CDC to monitor health risk behaviors (Centers for Disease Control and Prevention, 2005). Questions from the YRBSS were reworded to ask participants to rate how much they agreed or disagreed with statements about risky behaviors being “okay,” rather than reporting on frequency of their own behaviors. Response options ranged from 0 to 4 and included (0 = strongly agree, 1 = agree, 2 = neither agree nor disagree, 3 = disagree, 4 = strongly disagree). Seven items were phrased differently from other items, using the phrasing “it is important” or “teens should” rather than “it is okay.” For instance, “It is important to be concerned about getting HIV/AIDS,” and “Birth control should be used when s/he has sexual intercourse.” Due to these changes in phrasing, these items were reverse coded such that higher scores indicated higher approval of these safety behaviors (higher scores on other items indicated greater disapproval of risky behavior). The current study used the sexual behaviors subscale which included 14 items such as, “it is okay to have had several sexual partners” and “it is important to be concerned about getting an STD” with higher scores indicating healthier attitudes toward RSB. Internal reliability for this scale was adequate (Cronbach’s alpha = .76).

**Data Analytic Strategy**

The present study included participants with complete data for all measures at ages 10 and 15 (N=249). SPSS (IBM Corp., 2012) was used to compute descriptive statistics and measure the correlation between all measures. Also using SPSS, a multiple linear regression analysis was calculated to predict attitudes toward RSB at age 15 based on impulsivity and neighborhood safety.

**Results**

**Preliminary Analyses**

Data from the Neighborhood Location and Structural Characteristics questionnaire and the Attitudes Toward Risky Behavior questionnaire were imputed at the single item level to account for missing items (e.g., a mother chose not to answer certain items, accidentally skipped items, or skipped a
page of items). Imputation was completed by removing all cases with completely missing data and using the expectation maximization (EM) method to impute at the item level for the remaining participants. The BASC-2 was not imputed due to the standardized nature of the measure.

Descriptive statistics were examined to assess for normality. Data for all variables fell within normal limits. The Neighborhood Location and Structural Characteristics questionnaire had a minimum score of 3.3 and maximum score of 50. The mean of the Neighborhood Location and Structural Characteristics questionnaire was 41.3 and the standard deviation was 7.8. The BASC-2 was not imputed due to the standardized nature of the measure.

Correlations among demographic variables indicate several significant differences for race and socioeconomic status (SES). More specifically, race was significantly associated with SES. In addition, families reporting higher SES had children with healthier attitudes toward RSB in adolescence ($r = .15, p < .05$). In terms of neighborhood safety, Caucasian participants reported living in safer neighborhoods compared to African American or “other race” participants ($t(245) = 3.42, p = .018$; Caucasian: $M=42.32$, $SD=6.76$; African American: $M=39.66$, $SD=8.42$; Mixed: $M=36.33$, $SD=14.88$).

Correlations among study variables were also examined (see Table 1). Significant correlations were in the expected direction. Children’s impulsivity at age 10 was significantly negatively correlated with healthy attitudes toward RSB in adolescence ($r = -.16, p < .05$) and with positively associated with neighborhood safety at age 15 ($r = .19, p < .01$).

Regression Analyses

Hierarchical linear regression analyses were conducted to test the main and moderation effects of impulsivity and neighborhood safety on adolescent attitudes toward RSB. Continuous variables were centered by subtracting the grand mean score of each variable from the data. The interaction term of impulsivity X neighborhood safety was calculated by multiplying centered impulsivity with centered neighborhood safety and was entered in the second step of the regression. Table 2 describes the beta weights and significance levels for all steps of the regression. Consistent with previous literature, children’s impulsivity significantly predicted adolescent’s attitudes towards RBS. More specifically, as rates of impulsivity increased when children were 10, adolescents were more likely to endorse less healthy attitudes toward RSB ($\beta = -.16, p < .01$). There was no significant main effect for neighborhood safety ($\beta = .007, p = .91$). However, there was a significant moderation of the link between children’s impulsivity and later attitudes toward RSB ($\beta = -.14, p < .05$). A simple slope analysis was conducted using the guidelines developed by Aiken and West (1991). Results indicated that children with moderate ($t(245) = -2.76, p < .01$) and high ($t(245) = -3.18, p < .01$) levels of neighborhood safety and lower rates of impulsivity were more likely to report healthier attitudes towards RSB at age 15 (see Figure 1). In fact, children with the lowest rates of impulsivity at age 10 and the highest levels of neighborhood safety reported the healthiest attitudes towards RSB at age 15.

Discussion

The first goal of the current study was to test whether impulsivity in middle childhood predicted healthy attitudes toward RSB in adolescence. Consistent with previous literature
and our hypothesis, children with higher levels of impulsivity at age 10 were more likely to have unhealthy attitudes toward RSB at age 15. Although the link between impulsivity and risky behaviors has been documented in numerous studies (Braddock et al., 2011; Treloar et al., 2012), the link between impulsivity and attitudes toward risky behaviors has been less clear. These results indicate that children’s impulsivity may be important to consider in the development of adolescent cognitions about risky behavior, not just the behavior itself. However, it is also important to note that the correlation between impulsivity and attitudes toward RSB, although significant, is relatively small ($r = -0.16$), suggesting a weak relation. This indicates that there are other factors influencing the formation of adolescent attitudes toward RSB.

In fact, another potential predictor of attitudes toward RSB is neighborhood safety. We hypothesized that higher neighborhood safety would predict healthier attitudes toward RSB in adolescence. However, neighborhood safety was not correlated with attitudes toward RSB. This finding is inconsistent with previous literature examining the effects of community characteristics on risk-taking behaviors in general (Chung & Steinberg, 2006; Fulkerson et al., 2006); however, these studies did not look specifically at RSB. There may be something different about attitudes toward behaviors that are sexual in nature that sets them apart from other forms of risky behaviors, such as drug use and violence. In addition, it is possible that some adolescents were reluctant to provide accurate information regarding their attitudes to RSB, despite assurances of confidentiality.

The second goal of this study was to examine whether neighborhood safety buffered the relation between children’s impulsivity on attitudes toward RSB. As hypothesized, neighborhood safety moderated the effect of impulsivity on adolescent attitudes toward RSB. However, the moderation effect was different than predicted. Neighborhood safety did not buffer against the negative impact of impulsivity on unhealthy attitudes toward RSB; instead, neighborhood safety amplified the positive effects of low impulsivity on healthy attitudes toward RSB. Children with low impulsivity who lived in neighborhoods categorized as moderately and highly safe at age 10, had the healthiest attitudes toward RSB at age 15 (see Figure 1). That is, for adolescents with low impulsivity, neighborhood safety has additional benefits, specifically when involving adolescent attitudes toward RSB. However, the negative impact of high impulsivity on adolescent attitudes toward RSB was not ameliorated by neighborhood safety. With this in mind, it is important to look at other factors, aside from an adolescent’s neighborhood environment, that may play a part in adolescent attitude formation and involvement with RSB. For example, adolescents may need more proximal positive influences, such as positive family factors and peer relationships, to cope with high levels of impulsivity.

RSB in adolescence is influenced by family factors. Markham and colleagues (2010) conducted a systematic review of the literature of adolescent family connectedness on adolescent RSB. Family connectedness, measured by adolescent attachment, bonding, affiliation, trust, and belonging to a family group, may reduce risk for adolescent RSB. Markham and colleagues (2010) highlight two specific protective factors for adolescent RSB: parent-adolescent communication about sex and parental monitoring. Their results indicate that increased communication about sex was protective against adolescent’s early sexual initiation, in particular. Likewise, parental monitoring decreased rates of adolescent participation in early sexual initiation and contraction of sexually transmitted infections as well as increased adolescent contraceptive use. Results such as these confirm that family factors, including communication and parental monitoring, are strongly associated with adolescent sexual behaviors. Therefore, it is possible that more proximal family variables are more important in determining adolescent RSB behaviors than the neighborhood environment. Further
examination of adolescent attitudes toward RSB may enhance our understanding of the variables that predict positive and negative behavioral outcomes.

Data also suggest that peers have a strong influence on adolescent attitudes and risky behaviors. Gifford-Smith, Dodge, Dishion, and McCord (2005) explain that if one adolescent in a peer group is partaking in risky behaviors it is more likely for other adolescents in the peer group to participate in risky behaviors. For example, if one adolescent participates in early sexual initiation, other adolescents from his/her peer group are then more likely to engage in the same risky behavior. Peer group influence is a powerful influence and if an adolescent is afforded opportunity to interact with risk-taking peers, positive family factors may no longer be a protective factor against risk-taking behaviors (Gifford-Smith et al. 2005). However, if parents are aware that their adolescent’s peer group participates in risky behaviors and restrict their adolescent’s involvement in the peer group, this parental monitoring may buffer the negative impact of the peer group. On the other hand, continued exposure to a group of risk-taking peers will in turn influence the adolescent’s own risk taking attitudes and behaviors (Galan, Shaw, Dishion, & Wilson, 2016). Overall, family and peer factors may be important to consider in the context of impulsivity and attitudes toward RSB, aside from neighborhood safety. It is possible that adolescents living in unsafe neighborhoods with close family and less risky peers will be protected against risk taking attitudes and behaviors that are sexual in nature.

Given the documented importance of family and peers in predicting adolescent risky behavior, future studies may wish to examine the interplay of parent, peer and environment on the relation between impulsivity and adolescent attitudes toward RSB. This additional exploration of family factors (e.g. connectedness, communication, parental monitoring) and peer factors may lead to a better understanding of how and why adolescents form healthy versus unhealthy attitudes toward RSB. By examining and understanding other risk and protective factors related to RSB, we can facilitate parenting techniques and develop beneficial programs to address risky and unhealthy sexual behaviors. In addition to considering other moderating factors, future work could look at a later stage in adolescence (e.g., age 17). It is possible more RSB is taking place during late adolescence, marking this time as an important period to examine attitudes toward RSB.

We view this work as a first step in understanding the relation between impulsivity and contextual risk variables on attitudes toward RSB. However, the study is not without limitations. For instance, one limitation was its sole reliance on questionnaire data. Future studies should consider using observational measures of impulsivity (e.g., Continuous Performance Test; behavioral coding), or using census data to assess neighborhood risk. It is also possible that teens may not be reporting honestly about their attitudes toward RSB. Thus, peer report on their friend’s attitudes toward RSB may be informational for understanding teen’s attitudes toward RSB. In addition, only a small amount of variance in attitudes toward RSB was explained by this model (4%), indicating that other factors are important to include in future work. There are multiple environmental and individual difference variables that, when taken together, may better explain adolescent attitudes toward RSB.

Despite some limitations, the current study has multiple strengths. For instance, multiple reporters were employed in the assessment of study variables, limiting the impact of same-reporter bias. More specifically, impulsivity and neighborhood safety were assessed by maternal report, but teens reported on their attitudes toward RSB. Given the internal nature of attitudes and the private nature of sex, self-report may be a more accurate indicator of this construct. Additionally, the longitudinal design permitted a prospective analysis of the research questions. To our knowledge this is the first study that
examined factors in per-adolescence that relate to later attitudes toward RSB in early adolescent, which is a particularly salient time. The transition from pre-adolescence to adolescence is an important period when peer influences may outweigh parental influences in attitude formation (Galan et al., 2016). Our study indicates that for those with high impulsivity in childhood, neighborhood safety alone does not protect against forming unhealthy attitudes during adolescence. However, literature shows that both family factors and peer factors can buffer the negative impact of unhealthy attitudes toward RSB. Therefore, future research should examine these factors in concert.

In conclusion, the present study provides additional support for impulsivity as a risk factor for adolescent risk-taking. Children with higher levels of impulsivity were more likely to have unhealthy attitudes toward RSB at age 15. It was expected that neighborhood safety would be related to attitudes toward RSB as well; however, results indicated no correlation between the two. This finding is inconsistent with previous literature, but these studies examined other forms of risky behavior (e.g. drug use, violence) and not RSB. It is also possible the influence of family and peer factors on RSB may overpower the influence of the neighborhood environment. In addition, there may be something structurally different about attitudes toward RSB that sets them apart from other forms of risky behavior. Finally, neighborhood safety and impulsivity did interact to predict unhealthy attitudes towards RSB. Neighborhood safety amplified the positive effects of low impulsivity on healthy attitudes toward RSB. For adolescents who were reported to have low impulsivity at age 10, those currently living in a neighborhood with higher safety have attitudes toward RSB that amplify above the main effect of impulsivity. More work is needed to examine potential mechanisms explaining these relations and other risk and protective factors.

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Table 1: Correlation Coefficients for Study Variables

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<th>Measure</th>
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<tr>
<td>2. Attitudes Toward RSB</td>
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<td>-</td>
<td></td>
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<tr>
<td>3. Neighborhood Safety</td>
<td>-.187**</td>
<td>.036</td>
<td>-</td>
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*. Correlation is significant at the 0.05 level.
**. Correlation is significant at the 0.01 level.

Table 2: Attitudes Toward RSB Regressed onto Impulsivity, Neighborhood Safety, and Their Interaction

<table>
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<td>Neighborhood Safety</td>
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<td>.007</td>
<td></td>
</tr>
<tr>
<td>Step 2</td>
<td></td>
<td>.041</td>
<td>.016*</td>
</tr>
<tr>
<td>Impulsivity X NS</td>
<td></td>
<td>-.135*</td>
<td></td>
</tr>
</tbody>
</table>

*p < .05
Figure 1: *Children’s impulsivity and neighborhood safety interact to predict adolescent attitudes towards sex.* * Indicates a significant slope.
REFERENCES


Hollingshead, A. B. (1975). Four factor index of social status. Yale University, Department of Sociology.


