

Looking Beyond Neighborhood Risk: A Socioecological Examination of Neighborhood Risk and
Protective Characteristics on Rule-Breaking Behaviors among at-Risk Youth

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Abstract

Covert antisocial behavior (ASB), such as rule-breaking, is non-violent, disruptive behavior committed with the intention of not being observed. Covert ASB has been linked to child-level, familial, and contextual factors. Despite these multi-dimensional influences, little research has examined the relative impact of each of these predictors in a multi-level developmental model. The purpose of the present study is: (a) to examine the contributions of theoretically-relevant predictors (e.g., child impulsivity, parental monitoring, neighborhood danger and neighborhood cohesion) in a comprehensive socioecological model of rule-breaking, (b) to assess these predictors via child- and parent-reported outcome measures, and (c) to investigate the unique and interactive influences of neighborhood danger and neighborhood cohesion. Results showed that child- and parent-reported models of rule-breaking are differentially influenced by our theoretically-relevant predictors, highlighting important implications for examining covert ASB effectively. Further, neighborhood influences on rule-breaking show unexpected complexity. Specifically, neighborhood cohesion exhibited an entirely protective influence in the parent-model – increased cohesion was associated with lower levels of parent-reported rule-breaking. However, in the child-reported model, neighborhood cohesion interacted with neighborhood danger such that the positive relation between cohesion and child-reported rule-breaking was present only in neighborhoods with less danger. In high-danger neighborhoods, cohesion appeared to amplify rule-breaking.

Keywords: Neighborhood, Cohesion, Danger, Externalizing, Rule-Breaking, Delinquency

Antisocial behaviors committed by American children and adolescents carry a great social and economic cost (Anderson, 1999). More specifically, engaging in antisocial behavior before the age of 10 years is especially indicative of negative future outcomes. For example, “early starters” have been linked to more chronic and escalating trajectories of problem behavior and poorer adult outcomes, including higher rates of antisocial personality disorder, increased levels of depression, longer periods of unemployment and greater levels of criminal behavior later in life (Moffitt, Caspi, Harrington & Milne, 2002; Fergusson, Horwood, & Ridder, 2005). Previous research has classified youth antisocial behaviors into two subtypes (Frick, Lahey, Loeber, Tannenbaum, Van Horn, Christ, Hart & Hanson, 1993; Snyder, McEachern, Schrepferman, Zettle, Johnson, Swink, & McAlpine, 2006), including overt antisocial behavior that is violent and confrontational (e.g. aggression) and covert antisocial behavior that is non-violent, disruptive behavior committed with the intention of not being observed by authority figures (e.g., rule-breaking).

Although overt antisocial behavior often correlates significantly with covert antisocial behavior, longitudinal studies have shown that each subtype follows a different developmental pathway. Specifically, overt antisocial behavior is shown to be largely influenced by genetic factors, whereas covert antisocial behavior is influenced by both genetic and socioecological factors (Eley, Lichtenstein & Moffitt, 2003; Burt, Klump, Gorman-Smith & Neiderhiser, 2016). The identification of distinct developmental paths for different bands of antisocial behaviors should prompt researchers to examine the unique trajectories of each in order to inform the design of intervention strategies that can disrupt the development and lower the rate of problem behaviors. To this end, our study focuses on differentiating the effects of risk and protective socioecological factors on the manifestation of covert antisocial behaviors.

Investigations of the developmental trajectories of antisocial behavior have shown a strong relationship between antisocial behavior and child temperament (Rothbart, Ahadi & Hershey, 1994; Caspi, Henry, McGee, Moffitt & Silva, 1995), familial factors such as dysfunctional parenting and low parental monitoring (Patterson, DeBaryshe & Ramsey, 1989; Bacchini, Miranda & Affuso, 2011), social factors including adolescents' affiliation with deviant peers (Burnette, Oshri, Lax, Richards & Ragbeer, 2012; Dishion, Duncan, Eddy, Fagot & Fetrow, 1994; Dishion, McCord & Poulin, 1999; Granic & Dishion, 2003), and contextual factors such as exposure to violence within a youth's community (Barr, Hanson, Begle, Kilpatrick, Saunders, Resnick & Amstadter, 2012; Farrell & Bruce, 1997; Gorman-Smith, Henry & Tolan, 2004). However, despite the complex, multi-dimensional influences on antisocial behavior, only limited research has examined the relative impact of each of these factors in a comprehensive, multi-level developmental model. Our study contributes to the academic literature by testing a socioecological model of rule-breaking behavior that includes previously identified predictors of covert antisocial behavior. We aim to clarify main and interaction effects of each predictor while considering differences in the expression and patterns of rule-breaking based on parent and child report. Moreover, by accounting for various theoretically-relevant child-level and familial predictors, this study focuses on developing a deeper understanding of the relative influence of positive and negative neighborhood factors on rule-breaking behavior.

Neighborhood Danger & Neighborhood Cohesion

Individual development occurs in an ecological context, or a set of nested structures, that impacts the course of development (Bronfenbrenner, 1979). Thus, researchers advocate investigating child development through an ecological framework (McLoyd, 1998). For

example, neighborhood economic and social factors have been shown to impact developmental trajectories and outcomes for academic achievement, behavior problems, delinquency, and adolescent childbearing (Brooks-Gunn, Duncan, Klebanov, & Sealand, 1993; Crane, 1991; Esbensen & Huizinga, 1990; Kupersmidt, Griesler, de Rosier, Patterson & Davis, 1995; Peeples & Loeber, 1994; Sampson & Groves, 1989; Taylor, 1996). While contextual factors have been shown to influence a child's development of antisocial behavior, neighborhood-level factors have rarely been included in models of antisocial behavior as more than a one-dimensional risk factor (e.g. neighborhood danger or disadvantage) that link exposure to violence with externalizing problems. Protective contextual factors, such as neighborhood cohesion, have only received limited attention (Perez-Smith, Albus & Weist, 2001). Further, those studies that have aimed to account for both risk and protective aspects of neighborhood have typically done so by incorporating both elements into a composite score for neighborhood quality (Vanderbilt-Adriance, Shaw, Brennan, Dishion, Gardner & Wilson, 2015).

However, in line with pluralistic neighborhood theory (Aber & Nieto, 2000) we believe that community residents experience both negative and positive neighborhood and neighboring experiences that must be adequately accounted for. As such, we propose that the risk and protective elements of a neighborhood are best considered independently of each other. A further reason we offer this approach is because even factors that are typically considered to be either unequivocally positive or negative, show unexpected complexity depending on the context in which they are examined. For example, research on psychological sense of community, a concept closely tied to neighborhood cohesion, examines the individual's sense of belonging to a given community. Higher levels of psychological sense of community are typically assumed to describe an undeniably desirable social condition. In fact, this notion was long supported by the

academic literature until researchers re-examined psychological sense of community outside of primarily White, middle-class contexts. For example, Anne Brodsky assessed sense of community in racially-diverse and disadvantaged neighborhoods. She found that women raising children in communities that were perceived as unsafe or risky for children experienced what she termed a *negative* psychological sense of community and often opted to withdraw from the community. As such, unlike previous examinations that promoted psychological sense of community as entirely protective, Brodsky (1996) argued that resisting community relations in the way we typically conceive of as beneficial may in fact be adaptive in adverse contexts.

Considering Brodsky's surprising findings, along with the elevated risk status and racial and ethnic diversity of our participant families, we decided to examine neighborhood risk and protective effects separately in order to accommodate potentially unexpected interactive effects. Of particular interest in our study is the examination of potential interactive effects between our neighborhood-level and family-level variables.

The current study focuses on examining the effect of two neighborhood factors on the expression of rule-breaking behaviors: neighborhood danger and neighborhood cohesion. Existing research suggests that children growing up in violent communities may be at increased risk for both internalizing and externalizing symptomatology (Aneshensel & Succo, 1996; Robins, 1991). We have thus identified perceptions of neighborhood danger as an important risk factor for inclusion in our model of developmental trajectories of rule-breaking behaviors. We have chosen to include parent perceptions of neighborhood danger in our models, instead of objective measures of neighborhood risk, as there is sufficient evidence confirming that perceived risks in distressed communities are influenced by actual exposure to crime and visible

disorder (Bennett & Flavin, 1994; Warr, 1990). Furthermore, perceived risks are influential in driving parenting behaviors, such as parental monitoring.

To capture a potential protective influence of the neighborhood, this study will also examine neighborhood cohesion. Neighborhood cohesion encompasses neighborhood residents' feelings of connection to and willingness to better their communities and has generally been framed as a positive neighborhood characteristic. Our study assesses neighborhood cohesion through primary caregiver reports. A sense of cohesion as indicated by the primary caregiver provides an understanding into the social opportunities that are available to parents to get to know the children and adults in the neighborhood and to build supportive relationships, which leads to effective informal control and monitoring of children's activities (Sampson, Raudenbush, & Earls, 1997; Abada, Hou, & Ram, 2007). When assessed among adults, neighborhood cohesion has been associated with improved outcomes for youth (Perez-Smith, Albus & Weist, 2001).

Child Impulsivity and Parental Monitoring

Although not the primary focus of this study, important child-level and family-level variables that have been linked to the development of rule-breaking behavior are incorporated into our model, including child impulsivity and parental monitoring of child activities. On the child-level, prior research has convincingly demonstrated that antisocial behavior is linked with two broad dimensions of personality: including high negative emotionality and impulsivity (Cale, 2006; Miller & Lynam, 2001). Moreover, the broad personality dimensions influence overt and covert trajectories of antisocial behavior. While negative emotionality is particularly characteristic of aggressive behaviors, rule-breaking has been shown to be differentially

influenced by impulsivity or low behavioral control (Burt, 2012; Hopwood et al., 2009). High levels of impulsivity have been shown to play a significant role in the expression of rule-breaking, but not on aggressive behaviors. Moreover, this effect has been found in a range of studies examining child and adolescent, adjudicated, and clinical participant populations. This study includes impulsivity as the primary child-level factor influencing the development of covert anti-social behaviors.

On the family-level, we have decided to focus on the relationship between parental monitoring and rule-breaking behavior. Parental monitoring describes parenting behaviors that pay attention to and keep track of a child's whereabouts, activities, and adaptations (Dishion & McMahon, 1998). As such, monitoring is explicitly related to a child's opportunities for rule-breaking. The behaviors encompassed by this construct focus on parental involvement and limit-setting and have consistently been linked with the reduction and prevention of children and adolescent externalizing behaviors (Leventhal & Brooks-Gunn, 2011). In our study, the focus is on parental monitoring in order to account for parenting practices that lower the risk of children's rule-breaking behaviors.

It should be noted that our focus is on pre-adolescence, a time when children have only limited independence. For this reason, the models presented in this study do not warrant the inclusion of peer influences. We strongly recommend, however, that work focusing on adolescent youth include peer-level factors.

Current Study

The purpose of the present study is threefold: (a) to examine the contributions of theoretically-relevant predictors in a comprehensive socioecological model of rule-breaking

behavior, (b) to assess these predictors as related to both child-reported and parent-reported outcome measures, and (c) to investigate the unique and interactive influences of neighborhood danger and neighborhood cohesion.

Specifically, our goal is to extend previous models of the developmental pathways of covert antisocial behavior by investigating trajectories of rule-breaking behavior in a model that accounts for known influences on rule-breaking at the child-, family- and neighborhood-level. The inclusion of theoretically-driven child and family level factors associated with rule-breaking allows for a more nuanced examination of neighborhood effects on rule-breaking. In our investigation of neighborhood factors, we focus on accounting for risk and protective characteristics of the neighborhood in which children grow up separately in order to allow for interactive and main effects to come to the forefront. Finally, since rule-breaking behaviors by definition aim to avoid detection, we undertake our efforts by assessing rule-breaking using both child-reported and parent-reported outcome measures.

In short, this study examines how neighborhood danger and neighborhood cohesion relate to rule-breaking behavior between the ages of 7 to 10 after accounting for child impulsivity and parental monitoring of child's activities, which have both been effectively linked to the manifestation of antisocial behaviors. In order to evaluate rule-breaking behavior we examine both parent-reported rule-breaking behavior and children's self-reported delinquency. Similar models are used to examine parent and child reported rule-breaking, while controlling for a host of demographic characteristics, such as parent education level and race, as well as family location (e.g., rural, suburban, urban). We will contrast a range of models using our theoretically-relevant predictors in order to identify the best-fitting models for both parent-reported rule-breaking behavior and child-reported rule-breaking behavior. In particular, we will focus on

detecting any interaction effects between the included variables based on parent-reported and self-reported delinquency. Consistent with previous literature, we hypothesize the following:

1. On the child and family level, we expect significant main effects for previously identified influences on rule-breaking behavior in our model, including child impulsivity and parental monitoring. We hypothesize that higher levels of child impulsivity will lead to higher levels of rule-breaking behavior, while higher levels of parental monitoring will result in less rule-breaking behavior. We expect to see these effects using both the child- and parent-reported outcome measures.
2. In terms of neighborhood-level variables, we expect to identify higher levels of rule-breaking among children who live in neighborhoods that are perceived to be more dangerous by caregivers, while neighborhood cohesion will offer a buffer against children's rule-breaking behavior. Again, we anticipate seeing these effects using both the child and parent reported outcome measures.

Method

Participants

This investigation uses data gathered through the *Early Steps Multisite Study*, funded by the National Institute on Drug Abuse. *Early Steps* is an ongoing, longitudinal study of 731 ethnically-diverse, high-risk families from urban (Pittsburgh, PA), suburban (Eugene, OR), and rural (Charlottesville, VA) sites. The present study uses data from assessments at ages 7, 8, 9, and 10.

Families were recruited from Women, Infants, and Children Nutritional Supplement (WIC) Centers when children were between 21 and 33 months of age (mean age 29.5 months,

SD=3.2). Of the 1,666 families that were approached, 879 met eligibility criteria, and 731 agreed to participate. At the time of recruitment, all families displayed risk in at least two of the following domains: a) low SES (i.e., low family income and low parental education), b) family risk (e.g., parental depression, history of drug use), and c) child risk (e.g., high levels of child disruptive behavior).

Of the final 731 families, 37% (n = 272) were recruited in Pittsburgh, PA, 37% (n = 271) were recruited in Eugene, OR, and 26% (n = 188) were recruited in Charlottesville, VA. Primary caregivers identified as African American (28%) Caucasian (50%), Biracial (13%), and Other (e.g. Native American; 9%). Thirteen percent of the sample identified as Hispanic. Forty-nine percent of the target children were female.

Measures

Control Variables. A brief demographics questionnaire was developed for use in the Early Steps Project. Primary caregivers were asked to provide basic demographic data and information on various household characteristics during home visits. This study uses the questionnaire from the initial age-2 assessment in order to derive the target child's sex, the location of the family (urban, suburban, or rural), and the primary caregiver's race and ethnicity. The questionnaires from age 7, 8, 9, and 10 were used to measure primary caregiver's education level.

Child Impulsivity. The Moffitt Scale was used to assess impulsivity. Examiners used this 3-point observational scale to rate the extent to which a characteristic described a child's behavior during testing and interviews (e.g., "not at all," "somewhat," "definitely;" Caspi, Henry, McGee, Moffitt, & Silva, 1995). Dimensions of behavior assessed were

irritability/negative emotionality (e.g., frustration tolerance, hostility, resistance) and impulsivity/distractibility (e.g., restlessness, fleeting attention, lacking persistence). Only the impulsivity/distractibility subscale was used in this study. The impulsivity score was collected for years 7, 8, 9, and 10.

Parental Monitoring. Parental involvement and limit-setting was measured using the Parental Monitoring Interview, a 26-item questionnaire surveying parental involvement in children's activities, family rules and consistency of discipline, as well as the amount of time a child spends unsupervised in a typical week (Dishion et al., 1991). The parental monitoring score was collected for years 7, 8, 9, and 10.

Neighborhood Danger & Neighborhood Cohesion. Perceptions of neighborhood danger and neighborhood cohesion were assessed in years 7, 8, 9, and 10 using the Me and My Neighborhood Questionnaire (MMNQ), a 25-item measure that includes items evaluating the primary caregiver's perceptions of neighborhood affiliation and cohesion (e.g., "I feel loyal to the people in my neighborhood;" Perez-Smith et al., 2001) as well as items from the City Stress Inventory (Ewart & Suchday, 1999) assessing neighborhood disorder and violence (e.g., "Family member was robbed or mugged [in my neighborhood]"). Primary caregivers were prompted to complete the MMNQ in reference to the neighborhood in which they had lived the longest in the past year. Responses for items related to neighborhood cohesion were scored on a Likert-scale from 1 (*Not at all true*) to 7 (*Very true*). Neighborhood danger was assessed on a 4-point scale ranging from *never* to *often*. Internal consistency of these scales was found to be high ($\alpha = .89-.91$).

Rule-Breaking Behavior. Our outcome variable, rule-breaking, was assessed in two ways, through a) parental report and b) child self-report. The Child Behavior Checklist 6-18 (PCBC;

Achenbach & Rescorla, 2001), consisting of 112 items, was administered to primary caregivers at ages 7, 8, 9, and 10 to rate the extent to which various behaviors described that of the target child. Respondents rated each item on a 3-point scale: *not true (as far as you know)*, *somewhat or sometimes true*, and *very true or often true* to assess the extent to which various behaviors described that of the target child. The PCBC includes items related to Broadband Internalizing and Broadband Externalizing, each containing various subscales. The present study used the Rule-breaking Behavior subscale of the Broadband Externalizing factor. The Broadband Externalizing factor shows excellent reliability at age 7, age 8, age 9, and age 10 ($\alpha = .94$, $\alpha = .94$, $\alpha = .93$, and $\alpha = .95$).

The *Self-Report of Deviance* measure (Elliot et al. 1985) was administered to the target child in years 9 and 10 to assess the frequency with which youth engage in antisocial behaviors in the last year. This assessment incorporates 27-items from a longer measure developed by Elliot and colleagues (1985) to assess the frequency with which youth engage in delinquent behaviors. Using a 3-point rating scale (*never, once or twice, more often*), children rate the extent to which they have engaged in different types of antisocial activities (e.g., stealing, vandalism) in the last year. As the Self-Report of Deviance measure includes items that measure not only rule-breaking behaviors but also aggressive behaviors, we split the measure via confirmatory factor analysis using the lavaan package (Rosseel, 2012) in R (R Core Team, 2014). Based on our theoretical knowledge of antisocial behavior, items were first rated as either covert or overt antisocial behaviors. Second, a number of sub-categories were identified due to the highly correlated nature of the items. For example, behaviors describing theft were assessed for different locations where the behavior may have taken place. In order to account for these correlations, we created composite scores for highly-correlated items measuring behaviors

related to: a) theft, b) vandalism, and c) high-grade covert behaviors (i.e. carrying a hidden weapon; arson). The composite scores and additional items measuring cheating in school and trespassing were summed and averaged to create an overall self-reported rule-breaking score. In all, our latent variable for rule-breaking included 18 of the measure's 27 items. The confirmatory factor analysis demonstrated that our latent construct showed excellent fit (RMSEA = 0.014, CFI = 0.997, SRMR = 0.022).

Analytic Strategy

Linear mixed effects models were chosen for our analyses as they are especially useful for repeated measures and deal effectively with correlation patterns observed in longitudinal data. A main benefit of this method is that unlike other analytic approaches, such as repeated-measures ANOVA, linear mixed effects models incorporate differences between participants into the model instead of accounting for them as error variance (Duncan & Duncan, 2004). We used R (R Core Team, 2014) and the lme4 package (Bates, Maechler & Bolker, 2014) to perform linear mixed effects analyses of the relationship between rule-breaking behavior, child impulsivity, parental monitoring, and perceived neighborhood danger and cohesion while controlling for various demographic factors. Multi-model selection based on the Akaike Information Criterion (AIC) allowed us to evaluate multiple models involving these theoretically relevant predictors from our dataset and identify the best-fitting models for the parent-reported and child-reported outcome measures. Significance values were obtained in R via likelihood ratio tests of the full model with the effect in question against the nested model without the effect in question (single term deletions). Residual plots for all models did not reveal any obvious deviations from homoscedasticity or normality.

Results

Descriptive Statistics

On average, both parents and children reported low levels of child rule-breaking behavior. Moreover, both parent-reported rule-breaking ($M = 2.96$ on a 0-20 point scale; $SD = 2.96$) and child-reported scores ($M = 0.14$ on a 0-2.83 point scale; $SD = 0.29$) were found to be variable indicating full use of the respective scales. Interestingly, the strength of the associations between parent-reported rule-breaking and child-reported rule-breaking was quite low ($r = 0.22$, $p < 0.001$), indicating substantial unique variance. However, rule-breaking behaviors by their very definition are covert behaviors designed to avoid detection by an authority figure. Therefore, it should not be surprising that the primary caregiver would not know the full extent of his/her child's delinquent behavior. Zero-order correlations showed relationships of the variables in the hypothesized direction for both parent-reported and child-reported rule-breaking, although one unexpected finding emerged. Specifically, child-reported delinquency was not significantly correlated with parental monitoring. Table 1 displays descriptive statistics for a selection of independent variable and the correlation of each variable with the two rule-breaking outcomes.

Table 1
Descriptive statistics and correlations of each predictor with rule-breaking outcomes.

Variables	M	SD	Min	Max	N	Correlation with	
						Parent-Reported Rule-Breaking	Child-Reported Rule-Breaking
Child Impulsivity	0.20	0.41	0	2	1988	0.18 ***	0.14***
Parent Monitoring	3.10	0.56	0.43	4.50	2100	-0.12 ***	-0.03
Neighborhood Danger	6.17	7.03	0	45	2014	0.25 ***	0.15***
Neighborhood Cohesion	11.61	4.06	0	20	2010	-0.19 ***	-0.13***
Child-reported Rule-breaking	0.14	0.29	0	2.83	993	0.22 ***	-
Parent-reported Rule-breaking	2.94	2.92	0	20	2126	-	0.22***

* $p < .05$, ** $p < .01$, *** $p < .001$.

Model Selection

We fitted a baseline model, a covariate model, a main effects model, and an interaction model in a hierarchical fashion. We followed these steps separately for parent-reported rule-breaking from age 7 to 10 and child-reported rule-breaking from age 9 to 10. The results for the parent-reported models are presented first, followed by results for the child-reported model.

Parent-Reported Rule-Breaking

A visual examination of parent-reported rule-breaking showed that the growth trajectories indicated a nonlinear growth pattern. For this reason, our unconditional baseline model (Model 1) included a quadratic growth parameter. Additionally, intercepts and slopes for the effect of years were allowed to vary for each family. Model 2 built on the baseline model through the inclusion of various demographic covariates, including child sex, the location of the family's residence (rural, suburban, urban), and the primary caregiver's race/ethnicity and education level. Model 3 expanded the covariate model through the inclusion of main effects for child impulsivity, parent monitoring, neighborhood danger and neighborhood cohesion. Finally, the full model added an interaction effect. Our discussion of the results focus on the full model.

Consistent with the study hypotheses, children with higher levels of impulsivity exhibited higher levels of parent-reported rule-breaking ($\beta = .08, p < .001$). Additionally, neighborhood cohesion provided a buffer to parent-reported rule-breaking ($\beta = -.06, p < .05$). Finally, the main effects were also qualified by a negative interaction between neighborhood danger and parent monitoring ($\beta = -.04, p < .05$), such that the association between neighborhood danger and rule-breaking behavior was attenuated in families with higher levels of parental monitoring (see Figure 1).

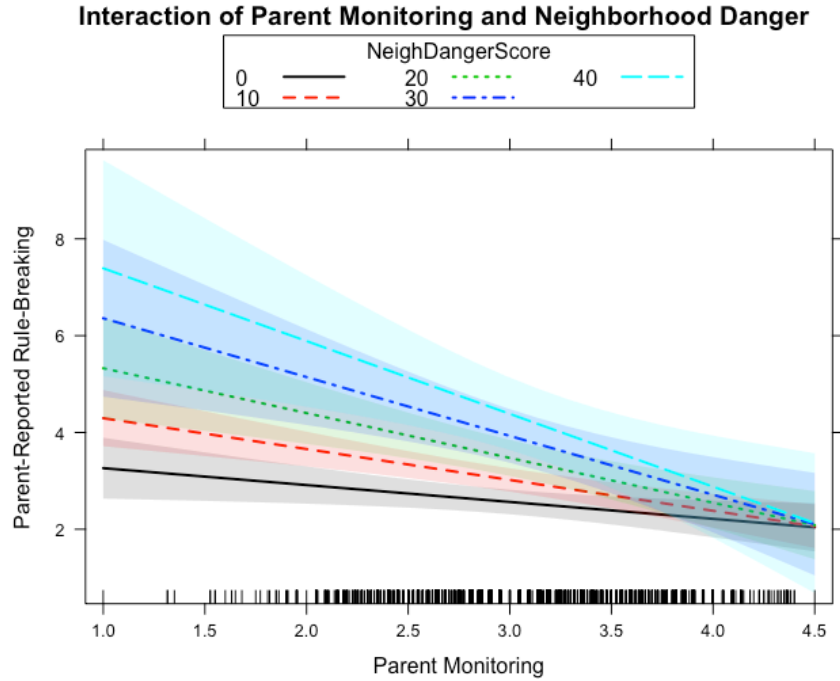


Figure 1. Plot of simple slopes to visualize the interaction between neighborhood danger with parent monitoring and parent-reported rule-breaking.

Table 2 provides the detailed results for the parent-reported model. Due to the diversity of our participant sample, and because this study is not focused on making comparisons across racial or ethnic lines, we have included race / ethnicity as a control variable in our model but do not report those results below.

Table 2
Model results for the four multi-level models with parent-reported rule-breaking as the outcome.

Variables	Model 1 (Null)	Model 2 (Covariate)	Model 3 (Main Effects)	Model 4 (Full)
Intercept	0.16	-0.38 (0.61)	-0.78 (0.82)	-0.78 (0.82)
Year	-2.65***	-3.13 (0.72)***	-2.01 (0.80)*	-1.90 (0.81)*
Year (quadratic)	2.11***	1.98 (0.58)***	2.89 (0.65)***	2.87 (0.65)***
Child Sex: Male	-	0.21 (0.08)**	0.18 (0.07)*	0.18 (0.07)*
Location: Suburban	-	0.18 (0.10)	0.18 (0.10)	0.18 (0.10) [†]
Location: Urban	-	0.33 (0.10)***	0.32 (0.10)**	0.32 (0.10)**
Education Level	-	-0.05 (0.02)*	-0.04 (0.02)*	-0.04 (0.02)*
Child Impulsivity	-	-	0.08 (0.02)***	0.08 (0.02)***
Parent Monitoring	-	-	-0.10 (0.02)***	-0.10 (0.02)***
Neighborhood Danger	-	-	0.09 (0.03)***	0.10 (0.03)***
Neighborhood Cohesion	-	-	-0.06 (0.02)*	-0.06 (0.02)*

Parental Monitoring X Neighborhood Danger	-	-	-	-0.04 (0.02)*
ΔR^2	-	0.058	0.093	0.095

Note. All estimates are standardized and reported with their standard errors in the parentheses. P-values were obtained by likelihood ratio tests of the full model with the effect in question against the model without the effect in question.

ΔR^2 was calculated as the reduction in deviance compared to the null model.

† p < 0.1, * p < .05, ** p < .01, *** p < .001.

Child-Reported Rule-Breaking.

Unlike the parent-reported outcome for which four years of data were available, the child-reported data were limited to only ages 9 and 10. For this reason, a linear growth pattern with a random intercept for each family was the appropriate choice for our baseline model. Model 2 built on the baseline model by including the same covariates as the parent-reported model (child sex, family location, as well as primary caregiver race / ethnicity and education level). Model 3 includes main effects for child impulsivity, parent monitoring, neighborhood danger and neighborhood cohesion. Finally, the full model incorporated an interaction effect for neighborhood cohesion and neighborhood danger.

Surprisingly, trajectories of child-reported rule-breaking showed divergent patterns compared to those of parent-reported rule-breaking. Focusing on the full model for the child-reported outcomes, we examined the same hypotheses as for the parent-reported model. For child-reported rule-breaking, the main effects of impulsivity and parental monitoring showed only marginal significance, although the direction of those effects was similar to those of the parent-reported outcome. An examination of the neighborhood variables, however, showed an unexpected positive interaction between the risk and protective neighborhood effects ($\beta = .07$, $p < .05$). In neighborhoods marked by high neighborhood danger, child-reported rule-breaking was amplified by higher levels of neighborhood cohesion. On the other hand, in low danger

neighborhoods, high levels of neighborhood cohesion decreased rates of child-reported rule-breaking (see Figure 2).

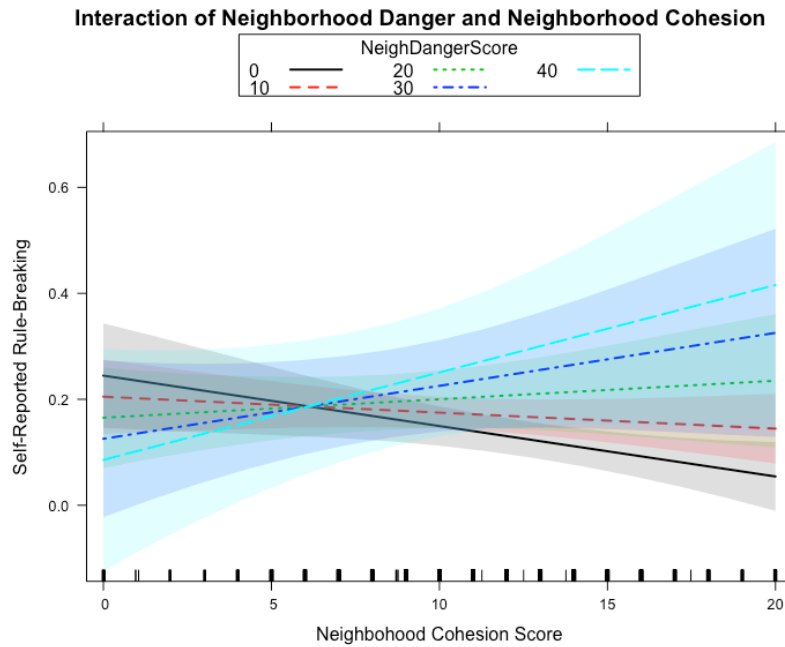


Figure 2. Plot of simple slopes to visualize the interaction between neighborhood danger with neighborhood cohesion and child self-reported rule-breaking.

Table 3 provides the detailed results for the child-reported model. As above, due to the diversity of our participant sample, and because this study is not focused on making comparisons across racial or ethnic lines, we have included race / ethnicity as a control variable in our model but do not report those results below.

Table 3
Model results for the four multi-level models with child-reported rule-breaking as the outcome.

Variables	Model 1 (Null)	Model 2 (Covariate)	Model 3 (Main Effects)	Model 4 (Full)
Intercept	1.16 (0.51)	1.02 (1.18)	0.71 (1.20)	0.77 (1.20)
Year	-0.12 (0.05)*	-0.13 (0.05)*	-0.11 (0.06)'	-0.11 (0.06)'
Child Sex: Male	-	0.22 (0.09)**	0.21 (0.09)*	0.21 (0.09)*
Location: Suburban	-	0.06 (0.12)	0.04 (0.12)	0.03 (0.12)
Location: Urban	-	0.27 (0.12)*	0.20 (0.12)'	0.19 (0.12)
Education Level	-	-0.05 (0.03)*	-0.05 (0.03)'	-0.04 (0.03)'

Child Impulsivity	-	-	0.07 (0.04) [†]	0.07 (0.04) [†]
Parent Monitoring	-	-	-0.03 (0.04)	-0.03 (0.04)
Neighborhood Danger	-	-	0.05 (0.04)	0.09 (0.05) [†]
Neighborhood Cohesion	-	-	-0.07 (0.04)	-0.08 (0.04) [†]
Neighborhood Cohesion X Neighborhood Danger	-	-		0.07 (0.03)*
ΔR^2		0.046	0.060	0.065

Note. All estimates are standardized and reported with their standard errors in the parentheses. P-values were obtained by likelihood ratio tests of the full model with the effect in question against the model without the effect in question. ΔR^2 was calculated as the reduction in deviance compared to the null model.

[†] $p < 0.1$, * $p < .05$, ** $p < .01$, *** $p < .001$.

Discussion

The parent-reported model confirmed our a priori hypotheses. Consistent with the previous literature on covert antisocial behaviors, child impulsivity, parental monitoring, neighborhood danger, and neighborhood cohesion were all significantly associated with rule-breaking in the expected directions: child impulsivity and neighborhood danger increased rates of rule-breaking; parental monitoring and neighborhood cohesion decreased rule-breaking behaviors. However, the findings of our parent-reported model were not replicated using the child-reported outcome measures. Child impulsivity emerged as only marginally significant, while parental monitoring was unrelated to levels of rule-breaking. Moreover, neighborhood factors also behaved differently in the child-reported model. Contrary to previous findings, the effects of neighborhood danger and neighborhood cohesion were not explicitly negative and positive influences on rates of rule-breaking behaviors. The implications of these overarching findings are now discussed in greater detail.

Informant Discrepancies

A primary finding is that rule-breaking seems to be differentially influenced by our theoretically-relevant predictors depending on whether the outcomes were measured via child-

report or parent-report. However, discrepancies often exist among different informants' ratings of child outcomes (De Los Reyes & Kazdin, 2005; Grills & Ollendick, 2002). Moreover, discrepancies among informants' ratings are even less surprising considering that rule-breaking is by its very definition designed to avoid detection by an authority figure. It is important to consider, however, these large discrepancies between child- and parent-reported rule-breaking strongly suggest that researchers studying covert antisocial behaviors need to consider carefully how to most accurately assess the behaviors under investigation. It may be possible, for example, to account for informant discrepancies in theory-driven ways by examining the relations between informant characteristics and informant discrepancies.

In regards to covert antisocial behaviors, researchers may wish to weigh the ways in which younger and older children differ in their expression of covert externalizing behaviors in order to consider how such behaviors may be more or less observable to different informants. At the same time, informant characteristics should be considered in light of the specific problem type under investigation. For example, older children may have higher self-awareness about their problems than younger children and may, as a result, be better informants. Yet, younger children may be more likely to openly exhibit externalizing problems, making rule-breaking behaviors more observable and lowering informant discrepancies (De Los Reyes & Kazdin, 2005). Clearly, there are a number of issues to consider in determining the best methods for assessing covert antisocial behaviors. Our findings should encourage researchers to systematically evaluate methodological questions around reliable and valid measurement of a construct under investigation in light of the specific problems being examined and the unique characteristics of the participant sample.

Neighborhood Danger and Neighborhood Cohesion

Neighborhood influences on rule-breaking show unexpected complexity in our models. Specifically, neighborhood cohesion exhibited an entirely protective influence in the parent-model – higher levels of neighborhood cohesion were associated with lower levels of parent-reported rule-breaking. In the child-reported model, on the other hand, neighborhood cohesion interacted with neighborhood danger such that the protective relation between neighborhood cohesion and child-reported rule-breaking was present only in neighborhoods with lower levels of danger. In high-danger neighborhoods, neighborhood cohesion appeared to amplify rule-breaking. Our findings support Aber and Nieto’s (2000) pluralistic neighborhood theory, which suggests that neighborhood residents have both negative and positive neighborhood and neighboring experiences that do not necessarily coincide with structural characteristics (Nicotera, 2008). As such, researchers investigating neighborhood influences may wish to account for both unique and interactive effects of neighborhood risk and protective factors. The neighborhood finding also has important implications for intervention efforts. Neighborhood cohesion has long been considered a patently protective influence. However, in light of our results, researchers and practitioners should consider that neighborhoods marked by significant dysfunction may not benefit from intervention efforts aiming to increase levels of cohesion.

Strengths and Limitations

Our study has several strengths. First, the large sample of racially and ethnically diverse parents and children residing in rural, suburban and urban environments likely improves the generalizability of our results to other low-income, high-risk populations. Further, our work takes a distinct and comprehensive perspective by considering the unique contribution of child-level, family-level, and neighborhood-level factors on the developmental trajectories of rule-

breaking behavior. Moreover, in order to account for the inherent limitations of assessing rule-breaking behaviors through parent report, we also examined rule-breaking through child self-report.

However, this study has several limitations. First, child-reported delinquency was not available for the same time span as parent-reported rule-breaking behavior so we could not test the same effect of time on child-reported rule-breaking as we were able to for the parent-reported outcome. Regardless, comparison plots of parent- and child-reported rule-breaking did seem to indicate that the developmental patterns in rule-breaking were comparable. Second, the neighborhood level variables were measured through parent report. Measuring neighborhood danger and neighborhood cohesion as perceived by the youth, especially at later ages, could provide more detail regarding the relationships that were tested. In particular, children likely perceive their embeddedness in the neighborhood quite differently than their parents do, which could have vast implications for the emergent contextual influences on rule-breaking.

Future Directions

We offer several avenues for future research. First, while our model focuses on the developmental period prior to adolescence, research is needed to examine the relationship between neighborhood protective and risk factors with rule-breaking behaviors extending into adolescence and beyond. Further, though our model is quite comprehensive in that it includes child-, family- and neighborhood-level variables, any work that extends the developmental timeframe under investigation may also consider including peer influences. More specifically, previous literature has postulated two types of peer influences that may increase the risk of rule-breaking behaviors - peer rejection and having deviant peers (Patterson, DeBaryshe & Ramsey,

1989; Vitaro, Pedersen & Brendgen, 2007). Second, developmental trajectories for other types of overt and covert antisocial behaviors should be examined in order to determine whether contextual risk and protective influences function similarly across externalizing domains. An understanding of divergent patterns in the development of antisocial behaviors could help inform intervention efforts targeted toward improving ecological factors by ensuring that intervention strategies reflect the distinct undercurrents of each type of antisocial behavior.

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