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## Can We Uncouple Neighborhood Disadvantage and Delinquent Behaviors? An Experimental Test of Family Resilience Guided by the Social Disorganization Theory of Delinquent Behaviors

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### Abstract

Although the influence of neighborhood disadvantage on youth development of delinquent behavior is well established, findings from this research have yet to inform the development of family-centered prevention programming to protect youth from these erosive effects. The current paper examines the role of family integration in buffering the impact of social disadvantage in a sample of  $N = 298$  families randomly assigned either to a control condition or to a family-based prevention program previously shown to enhance marriage and parenting. We first confirmed that neighborhood concentrated disadvantage predicted change in delinquent behaviors across the course of the study. Additionally, replicating prior work, parents participating in the Protecting Strong African American Families (ProSAAF) program, relative to those randomly assigned to the control group, significantly improved their use of effective communication strategies with each other and reduced ineffective conflict in front of youth. This resulted in a significant indirect effect of ProSAAF on change in youth delinquent behaviors. Furthermore, using mediated moderation analysis, the study tested the buffering effect of greater family integration, showing that experimentally produced change in interparental communication skills and the resulting reduction in youth exposure to parental conflict, buffered the effect of neighborhood disadvantage on change in youth delinquent behaviors, supporting a mediated moderation model in which family environments buffer neighborhood effects.

### Keywords

neighborhood disadvantage; effective interparental communication; exposure to parental conflict; youth delinquent behaviors; intervention

## Introduction

Many studies have documented that youth delinquent behaviors are predicted by living in disadvantaged neighborhoods. In particular, youth engage in more delinquent behavior if they are raised in neighborhoods with greater unemployment, and a higher percentage of households that are below the poverty line, female-headed, on public assistance, or have low household income (e.g., Sampson et al., 1997). The primary theoretical system guiding research on the way that neighborhood characteristics influence the development of delinquent behavior is social disorganization theory. This theory suggests that crime or deviance is often concentrated in disadvantaged neighborhoods because such neighborhoods have weak social ties and social controls. Not surprisingly, residing in these disadvantaged areas may place youth at high risk of engaging in various problem behaviors.

However, social disorganization theory also allows for the possibility that when other social control and ties are in place, such as when families are more tightly knit, there may be resilience to the erosive effects of neighborhood disadvantage. To the extent that family integration is greater, this can confer greater family-level control, counteracting the disorganizing effects of neighborhood disadvantage. Consistent with this expectation, most individuals residing in disadvantaged neighborhoods achieve positive outcomes and avoid becoming involved in delinquent activity, a phenomenon labeled *neighborhood resilience* (Lei, Beach, & Simons, 2018).

Reflecting the multi-level nature of contexts contributing to delinquent behaviors (e.g., family and neighborhood levels), the most popular explanation for resilience emphasizes the effect of a protective family context, i.e., the proximal social context for most youth (Forgatch et al., 2016). According to family integration perspectives, a protective family environment provides the child a feeling of being loved and cared for within the context of a caregiver relationship, and thereby enhances the perception of a secure family context, indirectly increasing family control and reducing the attractiveness of delinquent behaviors. Alternatively stated, it is the child's sense of being part of a strong, integrated family structure that ameliorates the deleterious impact of an unpredictable, threatening, and frightening neighborhood-level environment (Chen, Brody, & Miller, 2017), thereby conferring resilience. Recent evidence supports this perspective, suggesting that better interparental communication and less family conflict serve as protective mechanisms against the adoption of delinquent behaviors by youth (Fincham, 2003). For example the Supporting Healthy Marriage (SHM) project was described as "test(ing) the effectiveness of a skills-based relationship education program designed to help low-income married couples strengthen their relationships and, in turn, to support more stable and more nurturing home environments and more positive outcomes for parents and their children" (Hsueh et al., 2012, p. v).

A large majority of previous studies of neighborhood effects on delinquent behaviors have focused on metropolitan areas and relied on urban samples (e.g., Sampson et al., 1997). However, neighborhood effects in urban areas may differ from those in rural areas. Further, more than half of poor African Americans live in disadvantaged rural areas, mostly in the South (Lichter, Parisi, & Taquino, 2012). Rural areas not only have lower population

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densities, but also tend to have poorer health care system, lower educational attainment, higher poverty, crime, and unemployment rates than urban areas (Wells & Weisheit, 2004). Because African American adolescents from disadvantaged rural areas experience significant challenges that typically affect the development of delinquent behaviors, it is particularly important to see if the erosive effects of neighborhood disadvantage observed in urban settings can be generalized to rural areas. If so, it is also important to see if predictions from social disorganization theory regarding the resilience promoting effect of improved family functioning can also be observed in rural contexts.

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Most previous studies, whether in urban contexts or not, have relied on non-experimental designs to test for resilience effects. Non-experimental studies of resilience effects can provide useful initial evidence. Unfortunately, such designs are limited in their ability to draw strong inferences about whether any observed effects reflect causal interactions rather than the effect of correlated, third variables. Perhaps equally damaging, non-experimental studies are also typically limited in their statistical power to detect moderation (Howe, 2019). The limitations of non-experimental designs often foster doubt about the validity and replicability of moderating effects because direct replication is less likely (McClelland & Judd, 1993). Accordingly, when possible, it is useful to confirm moderation hypotheses derived from non-experimental results and theory using experimental methods. To our knowledge, no prior research has examined hypothesized family-based resilience to neighborhood disadvantage with a focus on youth delinquent behaviors using a randomized experimental design. One reason for the lack of prior experimental research in this area may be that we cannot ethically randomly assign individuals to levels of neighborhood disadvantage. However, we can ethically randomly assign individuals to programs designed to enhance family resilience, allowing us to experimentally test the causal significance of family-based resilience effects.

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The Protecting Strong African American Families (ProSAAF) is a family-centered preventive program designed to promote positive family relationships and interactions among African American couples and their early adolescent children living in disadvantaged neighborhoods in the rural South (Barton et al., 2018). Content for the parent sessions is provided using videotapes which structure couple activities, depict positive relationship processes, describe ways to deal with daily hassles and burdens, and promote communication skills, particularly active listening and the recognition that emotional states may affect listening (see Barton et al., 2017). Prior analyses of the ProSAAF randomized controlled trial found that it successfully enhanced effective couple communication and functioning (Barton et al., 2017), and that it had indirect effects on co-parenting (Lavner et al., 2019). A prior version of the ProSAAF program produced change in use of effective interparental communication strategies that, in turn, reduced youth exposure to parental conflict (Beach et al., 2014). Given the setting and the focus of the intervention, the ProSAAF program provides a unique opportunity to test the family-based resilience component of social disorganization theory.

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The current research contributes to the literature through its focus on two-parent, rural African American households with an early adolescent in the home. Prior research with African American families has overwhelmingly focused on youth living in single-mother-

headed households. For at least part of their adolescence, however, a substantial proportion of African American youth will live in a household with married parents (Jayakody & Kalil, 2002). A focus on single-mother-headed households has led to a dearth of programming that addresses the needs of two-parent African American families. In addition, interventions targeting both parents are particularly relevant for understanding protective effects for early adolescent youth. Summarizing, Figure 1 shows the theoretical model tested in the current study. Our hypotheses were as follows:

**H1:**

As predicted by the social disorganization model, levels of neighborhood disadvantage will be significantly related to increases in delinquent behaviors among rural African American adolescents across the study period (Pathway a).

**H2:**

As predicted by the family integration model, participants assigned to ProSAAF will increase their use of effective interparental communication strategies that, in turn, lead to reduced youth exposure to conflict (Beach et al., 2014). Reduced youth exposure to parental conflict will, in turn, be associated with less increase in youth delinquent behaviors (Pathways b, c, and d).

**H3A:**

Intervention-related increases in use of effective communication strategies by parents will buffer the effect of neighborhood disadvantage on delinquent behaviors (Pathways b and e).

**H3B:**

Youth exposure to conflict will moderate the association between neighborhood disadvantage and increases in delinquent behaviors across the study period (Pathway f)

**H3C:**

Combining the social disorganization model and the family integration model, we hypothesized “mediated moderation” in which the moderating effect of ProSAAF induced changes in effective communication between parents (Pathway b) would be mediated by the more proximal interaction between youth exposure to parental conflict and neighborhood disadvantage (through pathways c and f). The logic of this mediated moderation analysis is similar to traditional mediated models except that it focuses on testing the mediated effect of an interaction term on the outcome (Kwan & Chan, 2018). Thus, full mediation was expected to result in the significant interaction of interparental communication and neighborhood disadvantage becoming non-significant (Dashed line pathway e) when the interaction between youth exposure to parental conflict and neighborhood disadvantage was added to the model.

## Method

### Sample

Participants in the current study were African American couples with an adolescent child living in low-income neighborhoods in rural Georgia. Details of the participants' progress through the study are illustrated in the CONSORT flowchart in online supplement Figure S1. Through school lists and advertisements, we recruited 1,897 families from counties, defined as rural by the United States Census Bureau. Of these, 1,145 families were not eligible for participation because the child was in a single-parent household, the family was enrolled in another program, the child was not within the specified age range, the target child had a sibling/stepsibling in the same grade, or the child was not African American. In families for whom more than one child was in the targeted range (Grades four to six), the child who was closer to age 11 was identified as the target child. In addition, 347 declined to participate and 59 families were unable to schedule an assessment. In total, data at baseline were collected from 346 families, and they were randomly assigned to the intervention ( $n = 172$ ) or control ( $n = 174$ ) condition. Details regarding recruitment are described by Barton, Beach, and colleagues (2018).

Of the randomized sample, 63% were married, with an average marital duration of 9.7 years. Unmarried couples had been living together for 6.73 years. At baseline, the female caregiver's mean age was 36.51 years, the male caregiver's mean age was 39.89 years, and the child's mean age was 10.87 years. The long-term follow-up took place an average of 17 months after the baseline. Finally, the current study focuses on the 298 participants (165 boys and 133 girls) for whom data was available on all study measures between baseline and follow-up assessment. The mean age for youth was 12.72 years at the long-term follow up. Of the 298 families, 48.7% had two biological parents, 39.6% had a biological mother and stepfathers/adoptive father, and 7% had a biological mother and a stable romantic partner in the home for more than one year. The other families were eight grandparent families, five adoptive parents, and an aunt and uncle. The female caregivers included 284 biological mothers, 5 adoptive parents, 8 grandparents, and one aunt. The male caregivers included 145 biological fathers, 117 stepfathers, 6 adoptive parents, 7 grandparents, 21 female caregivers' romantic partners, and 2 uncles.

### ProSAAF program and control group

A trained African American facilitator visited the couple in their home for six consecutive weeks to conduct each two-hour intervention session. All facilitators were married, middle-aged African Americans from participants' local communities who had received 40 hours of training in program content, facilitation, and delivery methods, and adherence to the program manual. For eighty-one percent ( $n = 139$ ) of families both caregivers attended all six sessions. Sessions included video instruction and modeling, structured activities, and specific topics for discussion. Each session was designed to enhance the couple's relationship, their co-parenting, and their parenting. To reinforce material covered during the main course of instruction, two booster sessions were offered to all couples. For booster session 1, 73% ( $n = 126$ ) of intervention families participated. For booster session 2, 59% ( $n = 101$ ) participated. If a couple separated or divorced, an alternative booster session (4% of

intervention families,  $n = 7$ ) was offered that focused on the co-parenting relationship and protecting youth from the stress of separation and divorce. Booster session 1 was scheduled approximately 3 months after program completion (approximately two months before pre-test) and booster session 2 was scheduled approximately nine months after program completion (approximately 4 months before 17-month follow up).

Couples in the control group were assessed on the same schedule as those in the intervention group, thereby controlling for effects of repeated measurements, maturation, individual differences, and external social changes. After the baseline assessment, couples in the control group were provided the book “12 Hours to A Great Marriage” (Markman, Stanley, Blumberg, Jenkins, & Whiteley, 2004) and an accompanying workbook that presented reasons for enhancing the couple’s relationship, guidelines, examples of communication and problem-solving strategies, and exercises designed to enrich relationships.

### Treatment Fidelity

All sessions were audiotaped. A sample of sessions ( $n = 220$ ) was coded using an 87- to 143-point checklist (depending on the session) for adherence to intervention guidelines. All facilitators were assessed at least once. Of the audiotapes reviewed, 10% ( $n = 22$ ) were coded by more than one rater ( $ICC = .940$ ). The mean fidelity score across facilitators on a scale of 0–100% was 91% ( $SD = 9.0\%$ ).

### Measures

**Youth delinquent behaviors.**—At baseline and 17-month follow up, delinquent behavior was measured using youth self-reports on 13 items from the risky behavior questionnaire (RBQ; Rosenfield, Vertefuille, & McAlpine, 2000). The scale includes a series of questions regarding how many times (1 = none, 8 = 40 times or more) during the preceding year the respondent engaged in thirteen delinquent behaviors such as shoplifted something, attacked a person, vandalized a building, stole something from a person, and destroyed or damaged property on purpose. The stability of the measure across time was significant ( $r = .296$ ,  $p < .001$ ). Coefficient alpha for the scale was .912 at age 11 and .807 at age 13.

**Neighborhood disadvantage.**—Neighborhood disadvantage was assessed using the U.S. Census Bureau’s American Community Survey (ACS) 5-Year Estimates (2011–2015). These were mapped onto participants’ current residential addresses in 2015 using Federal Information Processing Standard (FIPS) census tract codes. Only 6% ( $n = 18$ ) of families moved between baseline and 17-month follow up. The neighborhood disadvantage scale included six items: median household income (reverse coded), percent unemployed, percent of residents below the poverty threshold, percentage of single-mother families, percent receiving public assistance, and percentage of residents less than age 18. The six items were standardized and averaged. Higher scores indicated a more disadvantaged neighborhood.

**Immigrant concentration.**—Two items from the ACS 5-Year Estimates (2011–2015) assessed the percentage of residents in the respondent’s census tract who are Hispanic and

foreign-born. These two items are highly correlated ( $r = .783, p < .001$ ). We standardized and then averaged these two items to form a measure of immigrant concentration.

**Residential stability.**—This construct was assessed using ACS data regarding the percentage of neighborhood residents living in the same house for at least one year and the percentage of owner-occupied homes. These two items were significantly correlated ( $r = .669, p < .001$ ). Scores for the two items were standardized and averaged to form a measure of residential stability.

**Effective interparental communication.**—Effective interparental communication was assessed using a 10-item Communication and Stress Scale developed for ProSAAF. An example item is “When I talk about my problems to my partner, [she/he] tries to help me feel better.” Responses ranged from 1 (strongly disagree) to 4 (strongly agree). The items were summed to create a measure of effective communication. The measure of effective interparental communication used in the current analyses is the average of both parents’ reports. Higher scores reflect more effective interparental communication. The relationship between baseline and 17-month follow-up was significant ( $r = .416, p < .001$ ). Cronbach’s alpha was .848 at baseline and .921 at follow up.

**Exposure to conflict.**—Target youth reported on their exposure to parental conflict using a ten-item a modification of the O’Leary Porter scale (Porter & O’Leary, 1980). An example is “how often do your parents physically fight (e.g., hit or push each other) in front of you.” Response format for these items ranged from 0 (never) to 4 (very often). Higher scores reflected greater exposure to conflict. Stability over time was significant ( $r = .412, p < .001$ ). Coefficient alpha for this instrument was .702 at baseline and .733 at follow up.

**Control variables.**—Several statistical covariates linked to youth delinquent behaviors were included to minimize risk of confounding of associations of interest. At 17-month follow up, we assessed *resistance to peer pressure* using a three-item scale (Ellickson & Hays, 1991). An example item is, “You’re with a friend you like. Your friend takes out a cigarette and asks if you want one.” Coefficient alpha for this scale was .723. To assess *parental monitoring* the target youths answered 5 questions regarding how often (1 = never, 5 = all of the time) during the past six months the parents engaged in various monitoring and supervision practices (e.g., When I was out with my friends, parents checked up on me to make sure I was where I was supposed to be). Coefficient alpha the measure of *parental monitoring* was .865. In addition, our analysis also included controls for demographic and socioeconomic characteristics including *child’s gender* (male = 1), *child’s age*, *family structure* (married = 1), and the *number of children* living at home. At baseline, four items measured *financial stress*, for example, “During the past 12 months, my family has not had enough money to afford the kind of home we need?” Cronbach’s alpha was .819.

### Equivalence of intervention and control groups

Descriptive statistics of study variables by time and condition are provided in supplemental Table S1. As shown in Table S2, no significant differences in study variables were observed at baseline between families assigned to ProSAAF vs. those in the control condition.

## Analytic strategy

For all analyses, we utilized *Mplus* 8 to test OLS regressions, the non-recursive path model, and mediated moderation models. To assess goodness-of-fit, chi-square statistics and Steiger's root mean square error of approximation ( $RMSEA < .05$ ) were used. Although families were clustered within neighborhoods, we did not use multilevel modeling because more than 60% of census tracts had less than two families. Instead, to avoid overestimating the significance of results due to non-independent samples, we used the complex sampling design command available in *Mplus* 8 ( $TYPE = COMPLEX$ ) to adjust standard errors and reflect the hierarchical data structure. We calculated change scores ( ) for study variables using the residuals from the regression of 17-month follow-up scores on baseline scores. To assess the significance of indirect or mediated moderation effects, the 95% confidence interval (CI) was estimated using bias-corrected and accelerated bootstrapping with 1,000 resamples.

## Results

### Descriptive associations

Table 1 presents means, standard deviations, and zero-order correlations for the study variables. As expected, the ProSAAF intervention had a positive main effect on change in interparental communication from baseline to follow-up ( $r = .224, p < .001$ ). Change in parent-reported interparental communication, in turn, was correlated with change in youth-reported exposure to parental conflict from baseline to follow-up ( $r = -.127, p = .028$ ). Further, change in youth delinquent behaviors was positively associated with change in exposure to parental conflict from baseline to follow-up ( $r = .253, p < .001$ ), and correlated with neighborhood disadvantage ( $r = .133, p = .022$ ), suggesting that residing in a disadvantaged neighborhood was a significant risk factor for adolescents, and that all elements of the hypothesized indirect effect of ProSAAF on change in youth delinquent behavior were present. Also noteworthy are significant correlations of delinquent behaviors with financial stress ( $r = .179, p = .002$ ), and resistance to peer pressure ( $r = -.453, p < .001$ ). These variables were controlled in all analyses.

### H1: Testing the social disorganization model in rural neighborhood context

To test the social disorganization model for participants from rural areas, we begin by estimating the associations between neighborhood characteristics and youth delinquent behavior. As shown in Table S3, we conducted a preliminary analysis to test whether the effect of neighborhood disadvantage was robust to controls for immigrant concentration and residential stability. This model revealed that living in rural neighborhoods with greater neighborhood disadvantage was significantly associated with increased risk of delinquent behaviors at age 13 ( $b = .483, p = .013$ ), indicating that an increase of one standard deviation in neighborhood disadvantage was associated with an increase of .483 units in youth delinquent behaviors at age 13. As predicted, the observed relationship was robust to the addition of control variables, with the association of neighborhood disadvantage and delinquent behaviors at age 13 remaining significant even after controlling for demographic measures, resistance to peer pressure, parental monitoring, and baseline delinquent behaviors at age 11.



## H2: Testing family integration effects on interparental communication, exposure to conflict, and delinquent behaviors

Turning to the second hypothesis, a non-recursive (i.e., reciprocal) path model was used to test the potential direction of the relationship between interparental communication and youth exposure to parental conflict. This model used baseline information as instrumental variables to allow model identification. Reciprocal effects of equal size would have suggested examining the two-family measures as a single latent variable whereas unequal effects suggest that there are two distinct variables with an identifiable direction of effect between them. As shown in Figure 2, the fit indexes were good for this model, and showed that the ProSAAF intervention program had a significant positive effect on use of effective interparental communication ( $\beta = .210, p < .001$ ), which, in turn, led to significantly reduced exposure to parental conflict ( $\beta = -.421, p < .001$ ). The reverse order of causal effects (i.e. ProSAAF to exposure to parental conflict and then to interparental communication) was non-significant.

Using a bootstrapping technique with 1,000 replications we found that the indirect effect of ProSAAF on change in exposure to parental conflict through interparental communication was significant (indirect effect =  $-.088$ , 95% CI [ $-.193, -.033$ ]). Accordingly, consistent with Beach and colleagues' study (2014), the findings showed that there is an indirect effect from ProSAAF to youth exposure to parental conflict and that the effect goes through interparental communication. This is consistent with prior work showing that significant indirect effects can be present in the absence of a significant direct effect from the initial point in the sequence to the outcome (Preacher & Hayes, 2008). We also found support for our second hypothesis, showing that ProSAAF had a significant indirect effect on reductions in youth delinquent behaviors from baseline to follow-up by improving family process variables (indirect effect =  $-.025$ , 95% CI [ $-.062, -.009$ ]).

### H3A: Buffering effect of interparental communication for youth delinquent behavior

Although the interaction between ProSAAF and neighborhood disadvantage was not significant (not shown in Figure 3A), ProSAAF was related to a significant change in interparental communication. Accordingly, we examined the extent to which ProSAAF induced change in interparental communication buffered the effect of neighborhood disadvantage on change in youth delinquent behavior. Because controlling only for the main effects of covariates does not rule out potentially confounding moderating effects by covariates (Howe, 2019), we tested for significant interactions between neighborhood disadvantage and all covariates (see Table S4). The result showed that only the interaction of immigrant concentration  $\times$  neighborhood disadvantage exerted a significant effect on change in delinquent behavior and so it was controlled in all analyses. All other covariates were found to be non-significant moderators.

As shown in Figure 3A, the fit of the theoretical model was good. ProSAAF participants showed significantly improved effective interparental communication from baseline to follow-up compared to those who did not receive the program ( $\beta = .224, p < .001$ ). Further, the interaction of interparental communication and neighborhood disadvantage was a significant predictor of change in youth delinquent behavior ( $\beta = -.125, p = .023$ ).

To interpret the significant interaction effect, we plotted the simple slopes relating levels of neighborhood disadvantage to change in delinquent behavior for those at one standard deviation below and one standard deviation above the sample mean on interparental communication (see Figure 4A). Simple slope analyses revealed that the effect of neighborhood disadvantage on increase in youth delinquent behaviors from baseline to follow-up was positive and significant among those youth whose parents showed poorer interparental communication ( $b = .792, p = .024$ ) but was reduced to non-significance among those with more effective interparental communication. Supporting H3A, these results indicated that ProSAAF induced changes in effective communication between parents buffered the effect of neighborhood disadvantage on change in youth delinquent behaviors.

### **H3B: Buffering effect of youth exposure to parental conflict on youth delinquent behavior**

Given that change in interparental communication led to change in youth exposure to conflict in our indirect effects model, and buffered the effect of neighborhood disadvantage on change in youth delinquent behaviors, we tested whether change in youth exposure to parental conflict also moderated the link between neighborhood disadvantage and delinquent behaviors. As shown in Figure 3B, the interaction effect of exposure to parental conflict and neighborhood disadvantage ( $EC \times N$ ) was significant ( $\beta = .219, p = .002$ ). Fit indices suggested that the model provided a good fit to the data. Figure 4B graphically explicates the interaction. Based on a simple slope test, youth with less exposure to parental conflict showed no significant impact of neighborhood disadvantage, whereas those with greater exposure to parental conflict showed a significant positive impact of neighborhood disadvantage on change in delinquent behaviors from baseline to follow-up ( $b = 1.001, p = .002$ ). Therefore, hypothesis 3B was supported.

### **H3C: Mediated moderation effects**

For the mediated moderation hypothesis, Figure 3B also shows that the interaction effect of interparental communication  $\times$  neighborhood disadvantage ( $IC \times N$ ) was no longer significant ( $\beta = -.058, NS$ ) when the interaction effect of ( $EC \times N$ ) was added to the equation. Using the approach outlined by Kwan & Chan (2018), the mediated moderation effect from ( $IC \times N$ ) to youth delinquent behaviors via ( $EC \times N$ ) was significant (mediated moderation effect =  $-.053$  (95% CI  $[-.145, -.002]$ ), supporting the hypothesis of mediated moderation. The buffering effect attributable to improved interparental communication was fully mediated by the buffering effect attributable to youth exposure to parental conflict.

### **Sensitivity analysis**

Given that causal mediation analysis relies on the sequential ignorability assumption (Howe, 2019), i.e., that the mediator is effectively randomly assigned given baseline covariates and the randomized treatment design, and given that this assumption may be questioned because the experimental design does not directly randomize change in the hypothesized mediator, we conducted two sensitivity analyses to investigate the robustness of our mediated moderation model to the potential presence of unobserved confounders (Muthén & Asparouhov, 2015). Following this approach, we computed a  $p$ -value to gauge the minimum strength of association that unmeasured confounders would need to have with both the mediator and the outcome, after controlling other covariates, to provide an alternative

explanation for the observed mediated effect. Larger values indicate results that are robust to potential conceptual challenges. We obtained a medium effect = .225 (95% CI [.005, .380]), suggesting that our model is relatively robust. As a further test of robustness, we repeated the analyses presented in Figure 3 including the interaction between baseline levels of family process variables and neighborhood disadvantage in the model, rather than using residual change scores ( ). The results showed no change in the pattern of effects (See Figure S2).

## Discussion

Living in disadvantaged neighborhoods is widely thought to be a cause of youth delinquent behaviors. Nevertheless, most of the research on neighborhood processes related to delinquent behaviors has focused on urban or metropolitan areas and used non-experimental designs. This was a natural response to salient difficulties in urban settings but has overlooked the substantial problem of rural poverty and its potential erosive effects on youth development of delinquent behavior. To address this gap in the application of social disorganization theory, we examined a sample of participants living in disadvantaged rural areas, using multiple sources of data (e.g., the parent, the child, and census bureau data) to avoid inflation due to shared method variance, and utilizing an experimental design to better examine the causal significance of improvement in family functioning in promoting resilience to neighborhood disadvantage. Supporting social disorganization theory and its extension to rural contexts, our results replicated and extended the existing neighborhood literature and suggested that, even in rural areas, exposure to disadvantaged neighborhoods during adolescence results in increased risk of delinquent behaviors.

The family is perhaps the most important context protecting youth from the erosive effects of neighborhood disadvantage because it can influence the child's perception of safety and social integration and is also the primary setting for socialization. Engaging in effective family communication and appropriate co-parenting activities is thought to increase family integration and social control (Galvin, Braithwaite, & Bylund, 2015). In contrast, non-productive arguing between parents that occurs in front of youth is expected to undermine felt safety and sense of family integration (Fincham, 2003). Being a proximal outcome, it was hypothesized that reduced arguing in front of youth would account for much, if not all, of the impact of improved interparental communication on youth vulnerability to neighborhood disadvantage.

In the current study, we used a random controlled trial design to test hypotheses derived from family integration model and employed a non-recursive model to examine causal priority for two family process variables measured concurrently. As predicted, among rural African Americans, participating in the ProSAAF program increased use of effective communication strategies relative to changes observed in the control group, which in turn, led to reductions in youth exposure to parental conflict. Further, we also found that indicators of better family integration were associated with less delinquent behavior among rural African American adolescents. Thus, the results replicated prior observations of the impact of ProSAAF on couples and families in more urban contexts (Beach et al., 2014), and extended them to families in disadvantaged areas.

The results also suggest some practical limitations on ProSAAF's benefits in protecting youth and enhancing resilience to neighborhood disadvantage. Despite a significant indirect effect on change in delinquent behavior through its impact on interparental communication and youth exposure to parental conflict, there was not a significant direct effect of ProSAAF on change in youth delinquent behavior. This non-significant finding suggests that although there is evidence for the underlying systemic theory, the spillover from one level of the model to the next is not sufficiently great, nor the intervention effects sufficiently strong, to produce reliable direct or moderating effects of ProSAAF on youth outcomes. Accordingly, additional work is needed to enhance effects before ProSAAF can be used to provide population level change in youth resilience.

From a family integration perspective, a key element of family functioning contributing to youth resilience is that the family be seen as an integrated unit able to counter the destabilizing impact of neighborhood disadvantage. Non-productive parental arguing, witnessed by youth, is hypothesized to be a particularly problematic form of co-parenting behavior with the potential to negatively affect youth well-being in multiple ways (Hsueh et al., 2012). We extended the family integration model by combining it with the social disorganization model to hypothesize that protective family environments would moderate the impact of neighborhood disadvantage on the development of youth delinquent behaviors. We tested these hypotheses by examining intervention induced change in family processes as moderators of the erosive effect of neighborhood disadvantage, thereby more stringently testing their causal role in creating resilience. Intervention induced improvement in effective communication moderated neighborhood disadvantage effects on change in delinquent behavior. Further, the moderating effect of improved parental communication was further explained by the moderating effect of youth exposure to parental conflict. Thus, experimentally produced change in caregivers' communication skills and the resulting reduction in youth exposure to parental conflict, buffered the effects of neighborhood disadvantage on youth delinquent behaviors, supporting a mediated moderation model in which family environments buffer neighborhood effects on change in delinquent behavior. This buffering mechanism suggests that although residing in disadvantaged neighborhoods may have adverse effects on youth well-being, the family, as a meso-level context, provides an important source of control and support, protecting youth against the development of delinquent behavior.

Although our study presents several important findings, it has limitations that need to be noted as well. First, because our sample was limited to African American families it does not allow us to test for differences in social disorganization or family integration effects across ethnic or racial groups. However, this shortcoming might also be seen as a strength. Myriad studies have indicated that African Americans are more likely than other ethnic groups to reside in disadvantaged neighborhoods, and so also more likely to engage in delinquent behaviors. Testing a model within an ethnically homogeneous group overcomes potential confounding issues that may arise in multi-ethnic samples and provides a more stringent test of theory. Accordingly, this may be an ideal initial sample in which to examine family-related resilience to neighborhood adversity. Nonetheless, it will be important to examine and replicate the observed relationships in other disadvantaged groups as well. Second, although our design is able to test indirect causal effects from intervention through

measured family processes, and to examine causal interaction effects due to change in family processes, we do not have a similar level of control regarding the effect of neighborhood disadvantage on the development of delinquent behavior in the current study, and so must rely on a long history of research that indicates its likely role in the development of delinquent behavior. Third, given the cost of implementing the intervention, the current study was limited by relatively small numbers of families within each neighborhood tract. As a result, the sample did not allow us to examine factors contributing to within-neighborhood variation. Fourth, all measures of interparental communication and youth exposure to parental conflict were assessed through self-report. Although multiple data sources were used to reduce inflation of associations due to potential mono-agent bias, social desirability and approval bias may still exert an influence on some of the observed results. Future studies using direct observational measurements of change in family processes may help to further stringently test the proposed model while minimizing self-report artifacts. Finally, the current study does not rule out possible additional influences on the development of delinquent behavior, and it should be noted that many factors may contribute to the development of delinquent behavior as well as to family resilience in disadvantaged neighborhood contexts. Unmeasured in the current study were potential sources of resilience due to various neighborhood characteristics (e.g., available supports and resources for families with adolescents), other family relationships (e.g., sibling relationships), and peer relationships (e.g., affiliation with deviant peers). Forgatch et al. (2016) examined six-year follow-up data from an intervention study of separated single mothers who lived in a mid-sized community. Consistent with the current investigation, they found a significant intervention effect on change in effective parenting, which moderated the association between family socioeconomic status and youth deviant peer association. Thus, although the current research supports the potentially important role of the family in protecting against neighborhood disadvantage, it should not be taken as ruling out other sources of risk or the utility of other types of family intervention to reduce delinquent behaviors among youth who live in disadvantaged environments. Future studies should replicate and extend the current study by examining different neighborhood, family, and peer factors that reduce the risk of adolescents developing delinquent behaviors.

In conclusion, the current results extend prior observations to a rural context and show that erosive effects of neighborhood disadvantage and protective effects of family appear to operate as hypothesized in the rural context as well. To compliment prior non-experimental research, we used a randomized experimental design to construct a more stringent test of causal hypotheses regarding the role of interparental communication and youth exposure to parental conflict in promoting resilience to neighborhood disadvantage. Thus, our results not only revealed that the erosive effects of neighborhood disadvantage can be observed in rural contexts, but also that family processes, specifically parental communication and arguing in front of youth exert a protective effect. Combining the social disorganization model and the family integration model, our findings provides further evidence that a supportive family environment, i.e., one characterized by effective communication and less negative interaction, is an important protective factor for African American adolescents, protecting against the development of delinquent behavior in rural disadvantaged neighborhoods.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

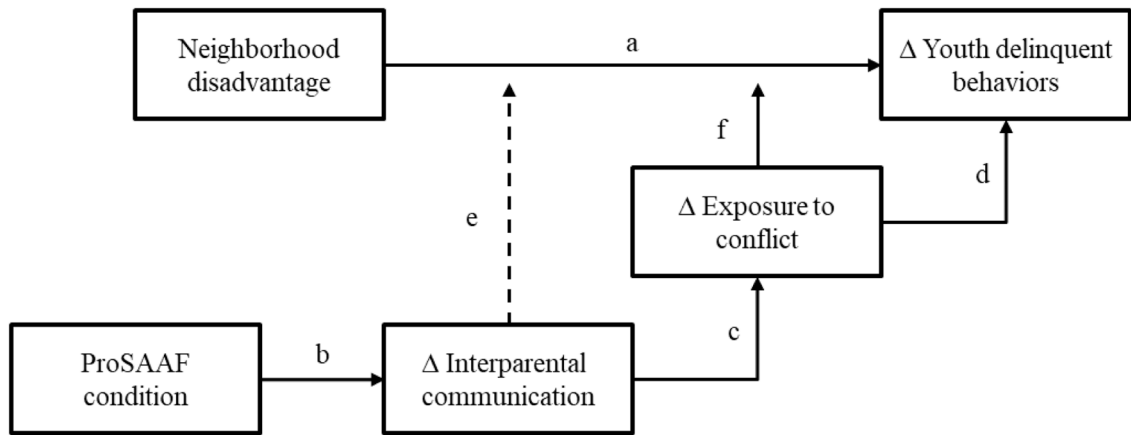
## Acknowledgments

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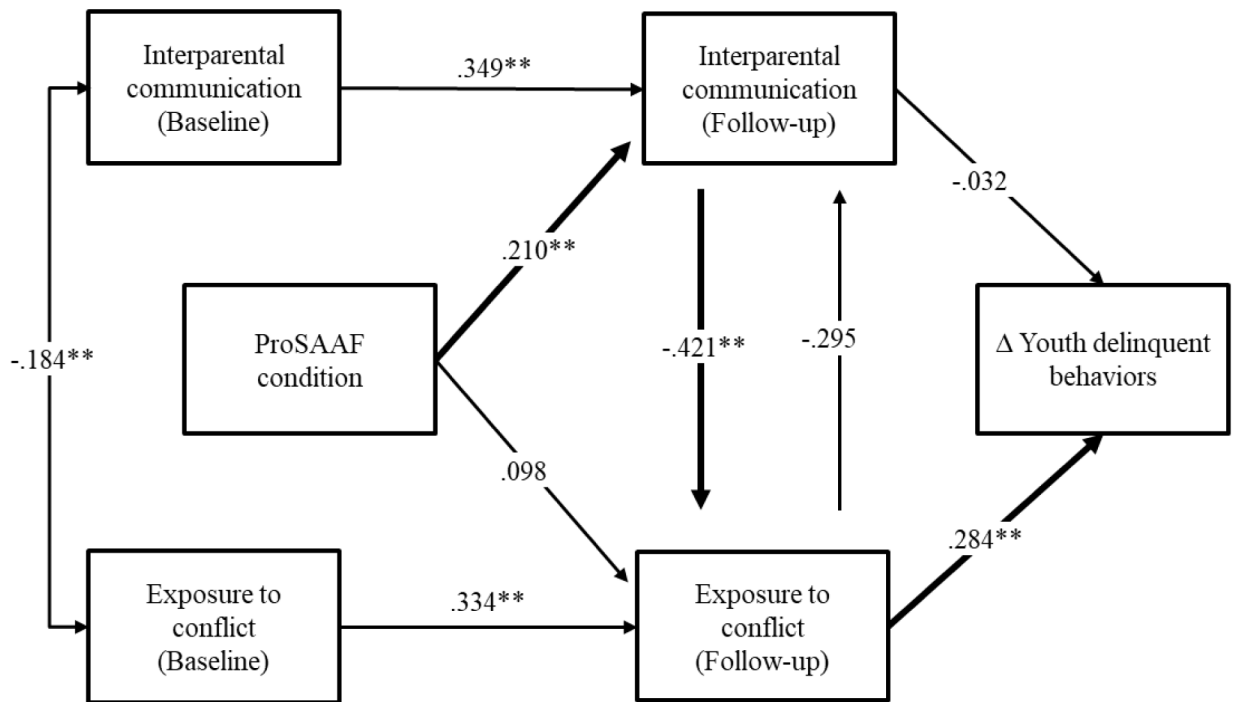
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**Figure 1.** Theoretical model showing hypothesized indirect pathways from ProSAAF and interparental communication to youth delinquent behaviors through effects on youth exposure to parental conflict. Also shown are hypothesized moderating and mediated moderation effects of interparental communication and youth exposure to parental conflict on the relationship between neighborhood disadvantage and youth delinquent behaviors  
*Note.* Δ = change from baseline to follow up.



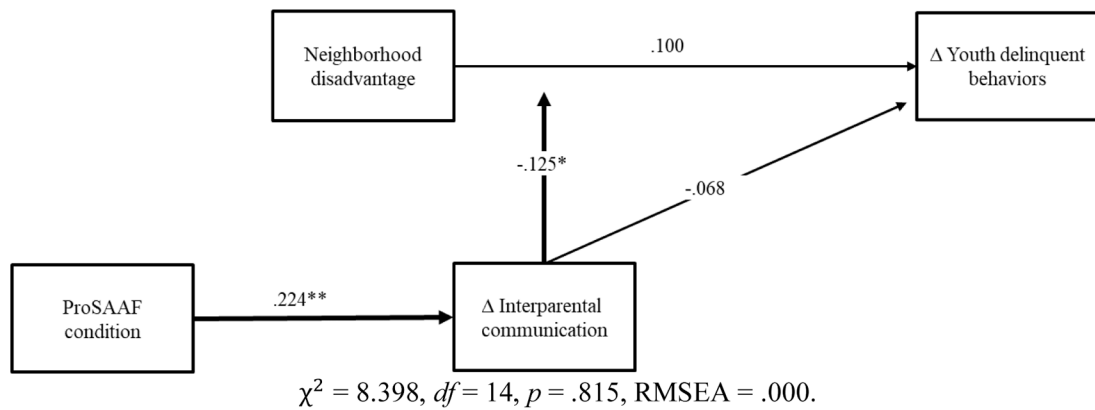


**Figure 2.**

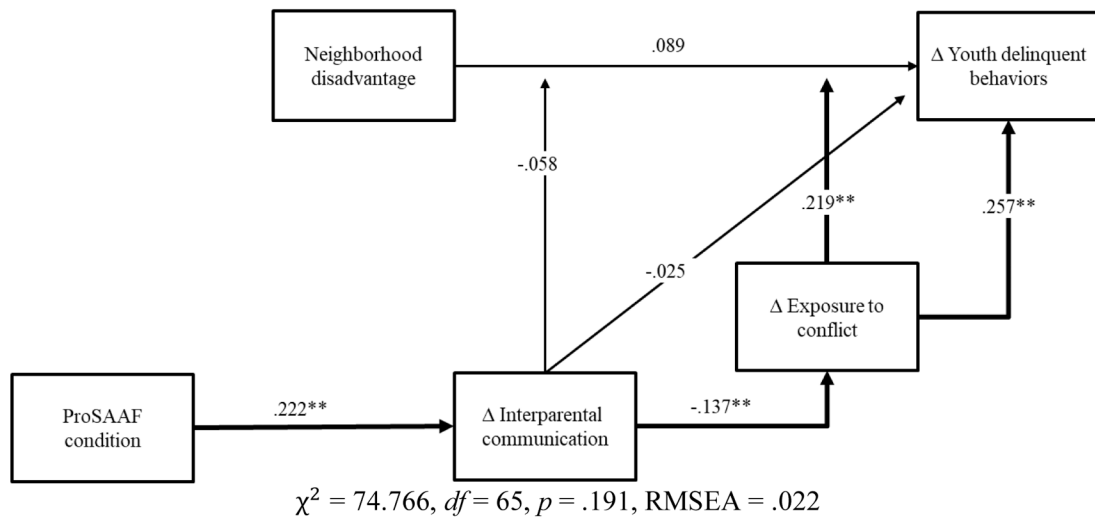
Non-recursive path model showing the reciprocal relationship between interparental communication and exposure to parental conflict. The bold lines indicate that the test of indirect effect from ProSAAF to youth delinquent behavior is significant.

Note:  $\chi^2 = 39.064$ ,  $df = 30$ ,  $p = .124$ , RMSEA = .032. Note: = change from baseline to follow up. Values are standardized parameter estimates. \* $p < .05$ ; \*\* $p < .01$  (two-tailed tests),  $N = 298$ .

A. Interparental communication as a moderator



B. Exposure to parental conflict as a mediated moderation effect



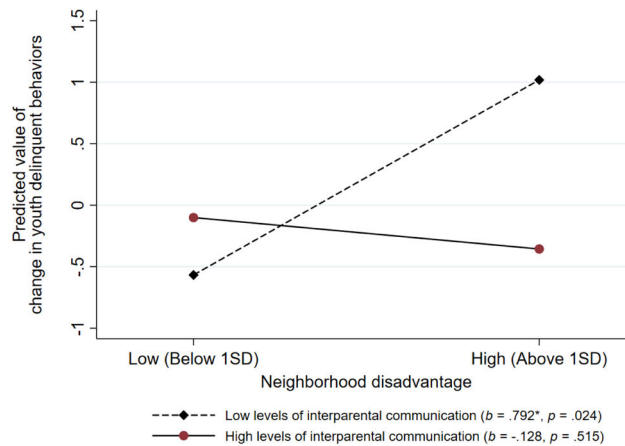
**Figure 3.**

The role of interparental communication and exposure to parental conflict as moderators of the association between neighborhood disadvantage and youth delinquent behaviors, as well as the role of moderation by exposure to parental conflict in mediating the observed buffering effect of interparental communication.

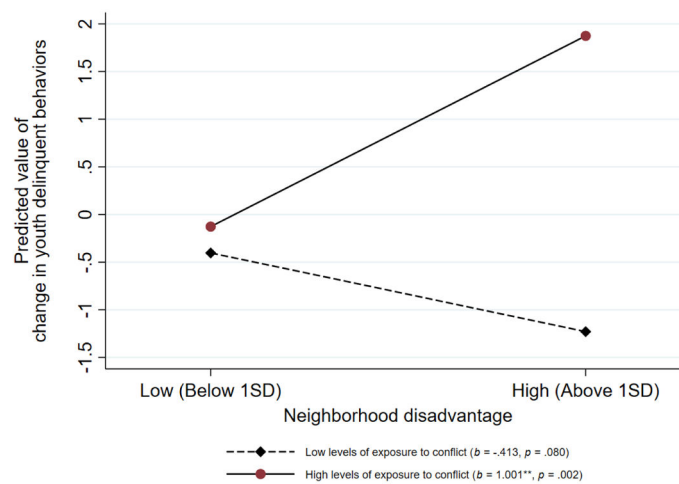
*Note:* = change from baseline to follow up. Values are standardized parameter estimates. Child’s gender, child’s age, financial stress, family structure, number of children, resistance to peer pressure, parental monitoring, neighborhood immigrant concentration, residential stability, and immigrant concentration × neighborhood disadvantage are controlled. The bold lines indicate that the test of indirect effect from ProSAAF to youth delinquent behavior is significant.

\*  $p < .05$ ; \*\*  $p < .01$  (two-tailed tests),  $N = 298$ .

A. Interparental communication as a moderator



B. Exposure to parental conflict as a moderator



**Figure 4.** Effects of neighborhood disadvantage on youth delinquent behaviors by levels of interparental communication or exposure to parental conflict  
*Note:* The lines represent the regression lines for different levels of a moderator (low: 1 *SD* below the mean; high: 1 *SD* above the mean). Numbers in parentheses refer to simple slopes.  
 \*  $p < .05$ ; \*\*  $p < .01$  (two-tailed tests),  $N = 298$ .

**Table 1.** Correlations, Means, and Standard Deviations among the Study Variables (N = 298)

Variable or statistic	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Delinquent behaviors	1													
2. Concentrated disadvantage	.133*	1												
3. Immigrant concentration	.004	-.081	1											
4. Residential stability	-.049	-.436**	.041	1										
5. Interparental communication	-.104	-.056	-.022	.013	1									
6. Exposure to conflict	.253**	-.017	-.044	.062	-.127*	1								
7. ProSAAF intervention	-.028	-.086	.038	.068	.224**	.014	1							
8. Child's gender (1 = males)	.106	-.033	.012	-.071	.018	-.084	-.100	1						
9. Child's age	.067	.029	-.018	.048	-.021	-.034	-.008	-.006	1					
10. Financial stress	.179**	.156**	.046	-.154**	-.122*	.054	.068	-.007	.094	1				
11. Family structure	-.092	-.137*	.006	.159**	.106	.072	.040	-.028	.044	-.215**	1			
12. Number of children	-.025	.102	.054	.006	.030	-.034	.078	.065	.055	.080	-.056	1		
13. Resistance to peer pressure	-.453**	.007	.027	-.018	.064	-.002	.003	-.105	-.233**	-.126*	.073	-.000	1	
14. Parental monitoring	-.104	-.132*	-.049	.061	-.001	-.012	.066	.002	-.102	-.008	.012	.009	-.003	1
Mean	.000	.000	.000	.000	.000	.000	.463	.554	12.718	11.287	.624	2.956	8.758	16.648
SD	3.321	1.000	1.000	1.000	3.937	4.796	.499	.498	.880	2.485	.485	1.478	.846	4.476

Note. = change from baseline to follow up.

\* p .05

\*\* p .01 (two-tailed tests).