

## **Racial Differences in the Mediating Effects of Collective Efficacy between Neighborhood Economic Disadvantage and Male Adolescent Problem Behaviors**

### **Introduction**

Social disorganization theory (Shaw and McKay 1942/1969) frequently has been used to explain higher rates of adolescent delinquency in low-income urban neighborhoods (Elliott et al. 1996; Kingston, Huizinga, and Elliott 2009; Oberwittler 2004; Reyes et al. 2008). It has also been applied to substance use, although results have been more equivocal (Fendrich, Lippert, Johnson, and Brondino 2010; Gardner, Barajas, and Brooks-Gunn 2010; Hawkins, Catalano, and Miller 1992). Many of the studies informed by social disorganization theory have focused on the relationships among neighborhood economic disadvantage, physical and social disorder, and delinquency, although the mechanisms by which neighborhood context affects delinquency remain unclear.

Results from several studies suggest that collective efficacy (i.e., the level of informal social control in a neighborhood) may mediate the effects of neighborhood economic disadvantage on deviant and criminal behavior (Maimon and Browning 2010; Morenoff, Sampson, and Raudenbush 2001; Raudenbush and Sampson 1999; Sampson, Raudenbush, and Earls 1997). Moreover, while numerous studies have documented racial differences in neighborhood effects on delinquency, no studies have examined racial differences in the mediating role of collective efficacy. The purpose of the current study is to test whether perceptions of collective efficacy mediate the association between neighborhood economic disadvantage and deviant behavior (i.e., violence, hard drug use, and dealing) during late adolescence and to determine to what extent this relationship differs for African American and European American adolescent males.

### **Social Disorganization Theory**

Social disorganization theory posits that the presence or absence of crime and delinquency is dependent upon the strength of institutions within a community as well as the strength of the relationships among individuals within that community. When institutions and relationships within a community are weak, crime and delinquency are more likely to occur because social control is weakened. The theory originated with the Chicago School of Urban Sociology in the early 20th century. Scholars such as Louis Wirth (1938) contended that modernity, with the emergence of urban life characterized by increasingly immigrant and transient populations and high levels of poverty, could have negative effects on social ties. Shaw and McKay (1942/1969) expanded on Wirth's ideas and conducted an empirical study of the relationship between neighborhood structural disadvantage and crime. Using demographic data from the City of Chicago, they found that neighborhood crime rates varied significantly based on residential instability, population density, cultural heterogeneity, and poverty levels. Since then, multiple studies have replicated their findings demonstrating neighborhood effects on crime (see Sampson, Morenoff, and Gannon-Rowley 2002, for a review).

In a test of social disorganization theory, Sampson and Groves (1989) argued that densely populated neighborhoods characterized by high levels of poverty erode social ties and the development of shared values. Thus, social disorganization in a neighborhood can have negative effects on deviant behavior, including delinquency and substance use. Elliott et al. (1996) were careful to note that neighborhood disadvantage is not just poverty but a multi-faceted construct comprised of residential instability, cultural heterogeneity, unemployment, and lack of affordable and quality housing. Each of these factors represents a unique neighborhood effect thus indicating that poverty alone does not drive disadvantage. In fact, not all low-income

neighborhoods are characterized by unstable populations and broken down housing. Likewise, the populations in some upper-income neighborhoods may be culturally diverse and transient. Overall, theory and empirical evidence suggest that certain types of neighborhoods, specifically those which are lower-income and comprised of ethnic and racial minorities, may make it difficult for communities to build social ties and exert some form of informal social control over their members. These neighborhood characteristics create a disorganized environment in which crime and delinquency occur more readily.

### **Delinquency and Social Disorganization**

Juvenile crime in the United States tends to concentrate in socially disorganized neighborhoods with high levels of poverty, immigrant populations, or instability (Ng 2010; Stewart and Simons 2010), and findings have been similar for European cities (Eisner and Wikström 1999; Oberwittler 2004; Ouimet 2000). Moreover, studies have shown that cultural norms supportive of violence often develop in lower income communities (Stewart and Simons 2010), and individuals living in disadvantaged communities often have a greater exposure to crime (Halliday-Boykins and Graham 2001; Zimmerman and Messner 2010).

While delinquency seems to concentrate in distressed neighborhoods, the mechanisms that account for this association are not entirely clear. As Wikström and Sampson (2003) argued, geographic variations in crime rates differ from explanations of individual development of psychopathologies. While crime may be concentrated in specific communities, this does not necessarily mean that the specific communities are *causing* individuals to engage in criminal behavior. Multiple studies, however, have concluded that children growing up in lower SES neighborhoods are more likely to exhibit externalizing behavioral problems such as acting out

and aggression (Elliott et al. 1996; Leventhal and Brooks-Gunn 2000; 2004; 2008), which are behaviors associated with delinquency.

### **Substance Use and Social Disorganization**

There is strong evidence to support the comorbidity of delinquency and substance use (White and Gorman 2000), and thus they may share some common causes. As a result, researchers have also drawn upon social disorganization to examine neighborhood effects on adolescent substance use. Studies reveal that patterns of adolescent substance use vary by neighborhood (Hawkins et al. 2004; Reboussin, Preisser, Song, and Wolfson 2010; Wright, Bobashev, and Folsom 2007). Unlike studies of general delinquency, however, results from studies exploring the effects of neighborhood disadvantage on substance use are less consistent (Gardner, Barajas, and Brooks-Gunn 2010), and the neighborhood context of drug use remains poorly understood (Galae, Rudenstine, and Vlahov 2005).

Compounding the problem, empirical evidence suggests that the relationship differs by type of substance and as well as by neighborhood characteristics and individual characteristics, such as gender and race/ethnicity. For instance, several studies have found no effects of neighborhood economic disadvantage on alcohol use (e.g. Buu et al. 2009; Chilenski and Greenberg 2009), while others have shown negative effects (e.g. Snedker et al. 2009). Kulis, Marsiglia, Sicotte, and Nieri (2007) found a negative effect of neighborhood economic disadvantage on tobacco use among acculturated Latinos but no effect among European Americans. Similarly, in a study of children of alcoholics (COA), neighborhood economic disadvantage was positively related to alcohol use for COAs and negatively for non COAs (Trim and Chassin 2008). In addition, studies have shown that residential instability, and not neighborhood economics, is positively related to tobacco (Kulis et al. 2007), alcohol, and

marijuana (Buu et al. 2009) use.

Most of the studies discussed above focused on alcohol and tobacco, and to a lesser extent, marijuana. Some studies have found a positive relationship between neighborhood disorganization and composite measures of substance use (Choi, Harachi, Catalano 2006; Winstanley et al. 2008) or specifically marijuana use (Lambert, Brown, Phillips, and Ialongo 2004; Tarter, Vanyukov, Kirisci, Reynolds, and Clark 2006), but others have shown no relationship (Kulis et al. 2007) or a negative relationship (Snedker et al. 2009) between neighborhood context and marijuana use. One study showed no association between social disorganization and marijuana use for Native American adolescents, but a positive association among non-Native Americans (Yabiku, Rayle, Okamoto, Marsiglia, and Kulis 2007). Similarly, Kling et al. (2007) found an association among boys but not girls (Kling et al. 2007). In a rare experimental study, Keels (2008) did not find that neighborhood economics affected male adolescent substance use.

Few studies have considered the effects of neighborhoods on adolescent hard drug use, but generally these few studies have found a positive association between neighborhood distress and hard drug use (Choi et al. 2006; Fuller et al. 2005). On one hand, it is logical to postulate that the neighborhood context would be strongly associated with hard drug use. For example drug dealing and gang activity, which frequently accompany hard drug use (Esbensen, Petersen, Freng, and Taylor 2002), are more common in low-income than high-income neighborhoods (Freisthler, Lascala, Gruenewald, and Treno 2005; Mason and Mennis 2010). Indeed, several studies have found that substance use is related to impressions of more neighborhood crime (Choi et al. 2006) and more economic disadvantage (Fuller et al. 2005; Grunwald, Lockwood, Harris, and Mennis 2010). On the other hand, hard drug use tends to be more prevalent among

European American than African American adolescents (Lee, Mun, White, and Simon, 2010), and the former are more likely to live in less disadvantaged neighborhoods than the latter. Thus, there may actually be negative relationship between neighborhood disadvantage and hard drug use. In sum, there is inconclusive evidence on the relationship between neighborhood disorganization and substance use. Neighborhood economic disadvantage has shown both negative and positive associations with substance use, but the relationship may be confounded by other factors including neighborhood residential instability and crime and individual characteristics such as race and gender.

### **Collective Efficacy**

Sampson (2006) argued that most studies of social disorganization tend toward a “risk-factor rather than an explanatory approach” (p. 149) by focusing on the neighborhood correlates of crime (e.g., poverty, segregation, instability) rather than the causes of crime. In an effort to explain how these structural factors affect social behaviors, Sampson et al. (1997) proposed that the relationship between neighborhood social disorganization and crime is mediated by collective efficacy. They defined collective efficacy as informal social control or “the capacity of a group to regulate its members according to desired principles – to realize collective, as opposed to forced, goals” (p. 918). The key components of collective efficacy are agency and control. Sampson et al. (1997) argued that collective efficacy differs from social ties in that it does not necessarily rely on the tightness or looseness of personal relationships, but rather on a shared belief in action, and engagement among individuals to exercise this action. Thus, individuals can be weakly related within a group but exercise a high amount of collective efficacy as a group. For example, neighbors, who rarely talk in person, may belong to an online neighborhood social

networking site through which they are able to successfully oppose the building a sewage plant near their community.

In their sample of Chicago neighborhoods, Sampson et al. (1997) found that neighborhood-level measures of collective efficacy were negatively related to violence, even when controlling for individual-level characteristics and prior neighborhood homicide rates. Subsequent reviews have confirmed these findings showing a strong negative relationship between collective efficacy and crime rates in a neighborhood (Kubrin and Weitzer 2003; Pratt and Cullen 2005; Sampson et al. 2002). A small number of studies have examined the relationship between collective efficacy and adolescent risk behaviors; generally, they have found that lower collective efficacy is associated with higher rates of antisocial behavior (Elliott et al. 1996; Maimon and Browning 2010; Yonas et al. 2010), but they have shown no effects for alcohol (Chilenski and Greenburg 2009), tobacco, and marijuana use (Brady 2006).

In two of the above studies that examined the relationship with substance use (i.e., Brady 2006; Chilenski and Greenburg 2009), collective efficacy was not treated as a mediating variable. Moreover, the existing studies had several limitations. For example, both studies only examined bivariate correlations between collective efficacy and substance use, along with other established structural corollaries of risk behaviors such as poverty, residential instability, and crime itself. Thus, it was not possible to parse out confounding factors between neighborhood variables and substance use. Moreover, Brady (2006) measured college students' perceptions of collective efficacy in their *home* environment as a predictor of substance use in their *college* environment; thus, the change in locations may explain the failure to find a significant relationship.

Elliott et al.'s (1996) research design most closely resembles the current study, although they used the term 'informal control' rather than collective efficacy. The definition included measures of social control such as "whether neighbors would respond if they saw others in trouble or someone breaking the law" (p. 399). Their study found strong support for the mediating role of informal control between neighborhood disadvantage and adolescent development. Neighborhoods with higher levels of informal social control were positively associated with prosocial competence (e.g., educational expectations and self efficacy) and conventional friends and negatively associated with problem behaviors, including substance use and delinquency. Elliott et al. (1996) included adolescents ranging in age from 10 to 18 years old, however, and they noted that failing to control for age may have obscured their findings somewhat since neighborhood effects may be more influential at older ages than younger ages. The current study expands on this research by examining a more narrow age range in late adolescence and by examining the moderating effects of race.

### **The Moderating Role of Race**

It is important to note that race was included in the original definition of socially disorganized neighborhoods (Shaw and McKay 1942/1969); consequently, race and neighborhood economic disadvantage were often collapsed into a single concept. Subsequently, segregation and racial inequality theories, which explicitly examine the intersection between race and disadvantage, have been applied to explain crime (see Peterson, Krivo, and Browning 2006, for a review). In general, these theories suggest that higher crime rates are observed among minority populations due to frustrations and hostilities developed in reaction to structural inequalities such as segregation and discrimination. Other research suggests, however, that specific characteristics of African American communities such as increased religiosity, strong



family ties, and lower alcohol consumption, may act as deterrents against criminal behavior (Entner Wright and Younts 2009). National data compiled by the Office of Juvenile Justice and Delinquency Prevention show that African American, compared to European American, male adolescents are more likely to engage in violence and criminal behavior (Snyder and Sickmund 2006). The former are also more likely to live in disadvantaged neighborhoods with high crime rates (Krivo, Peterson, Rizzo, and Reynolds 1998). Several studies have shown that when controlling for structural-level factors, such as income and segregation, the effects of race on criminal behavior are reduced (Bellair and McNulty 2003; Krivo et al. 1998; Velez, Krivo, and Peterson 2003). In general more research is needed to explore how different neighborhood contexts influence delinquency and substance use outcomes for African American and European American adolescents.

African American and European American youth also vary in their substance use behaviors (Lee, et al. 2010; Wallace et al. 2009). In general, European American youth tend to use more alcohol, tobacco, and hard drugs, whereas African American youth use more or similar amounts of marijuana (Johnston, O'Malley, Bachman, and Schulenberg 2009; Wallace et al. 2003). Again, though, these differences may be the result of structural factors, rather than race. As noted before, Snedker et al. (2009) found that higher SES was related to higher levels of substance use. It may be that European American, compared to African American, adolescents are more likely to live in higher SES neighborhoods, which provide greater access to substances and more role models for use, and this exposure could explain their higher rates of substance use. Conversely, disadvantaged neighborhoods, in which African American adolescents are more likely to live, often have higher rates of drug dealing (Dunlap, Johnson, Kotarba, and Fackler 2010) as well as more bars and liquor stores per capita (Alaniz 1998). Therefore, adolescents

living in these neighborhoods may have greater opportunity to use substances than their peers living in higher-income communities. This increased opportunity may explain higher rates of marijuana use among the African American adolescents. To our knowledge, however, no studies have examined explicitly how race moderates the effects of neighborhood collective efficacy on adolescent substance use or violence.

### **Current Study**

The current study attempts to address these gaps in the literature by examining collective efficacy as a mediator of the effects of neighborhood disadvantage (an indicator of social disorganization) on adolescent problem behaviors, including both substance use and delinquency and by examining how this mediational relationship may differ for African American and European American youth. The study tests three hypotheses: 1) collective efficacy will mediate the relationship between neighborhood economic disadvantage and hard drug use, violence, and drug dealing; 2) greater neighborhood economic disadvantage and lower perceived collective efficacy will be related to a higher prevalence of hard drug use for African American boys, while lower neighborhood economic disadvantage and lower perceived collective efficacy will be related to a higher prevalence of hard drug use for European American boys; and 3) for both races greater neighborhood economic disadvantage and less perceived collective efficacy will be related to a higher prevalence of violence and drug dealing.

### **Methodology**

#### **Sample**

The study used data from the Pittsburgh Youth Study (PYS; Loeber, Farrington, Stouthamer, and Van Kammen 1998; Loeber, Farrington, Stouthamer-Loeber, and White 2008), a multi-cohort, longitudinal cohort study of antisocial behavior. The study has tracked 1,517

boys since 1987 to examine the development of offending, substance use, and mental health problems, as well as risk, protective, and promotive factors. The PYS sample consisted of boys enrolled in Pittsburgh public schools in 1987 in the first (youngest cohort), fourth (middle cohort), and seventh (oldest cohort) grades. Approximately 850 boys were selected from each grade and were screened for antisocial behavior risk. Initial participation rates were about 85% for all cohorts with no significant differences in terms of race and achievement test scores for those who participated and those who did not. In each cohort, the top 30% in terms of propensity for antisocial behavior were included (approximately 250 boys) along with approximately 250 boys randomly selected from the remaining boys, thus ensuring a high number of at-risk participants. Average retention rates over the course of the study have been over 90%. The sample is nearly evenly split between African American and European American boys with only 4% reporting to be of another race.

The current study included only African American (57.7%) and European American boys in the youngest cohort ( $N = 487$  at the first follow up).<sup>1</sup> For the current study, we used data from four consecutive waves during late adolescence; for ease of presentation, these waves are referred to as waves 1 – waves 4. The boys ranged in age from 14 to 18 years old ( $M = 16$ ,  $SD = 0.64$ ) at wave 1, 15 to 19 years old ( $M = 17$ ,  $SD = 0.64$ ) at wave 2, 16 to 20 years old ( $M = 18$ ,  $SD = 0.64$ ) at wave 3, and 17 to 21 years old ( $M = 19$ ,  $SD = 0.64$ ) at wave 4.

## Measures

**Neighborhood economic disadvantage** Five items from the 1990 Census were used to measure the latent construct, neighborhood economic disadvantage, and were matched to where the participants were living at wave 1. These items are consistent with measures of social disorganization used in other studies (Shaw and McKay 1942/1969; Sampson et al. 1997), and,

in an exploratory factor analysis, they have been shown to load onto a single factor (Wikström and Loeber 2000). They include: proportion unemployed, proportion of households receiving public assistance, median household annual income, proportion of divorced or single parent homes, and proportion of families below the federally-defined poverty level. An additional item, proportion of residents who are African American, was eliminated out of concern that the inclusion of this variable may affect the race moderation analysis. All measures showed a normal distribution. Median household income was reverse coded and standardized scores for the five items were used in the model to measure the latent construct, neighborhood disadvantage.

**Perceived neighborhood collective efficacy.** Four questions from the *Community Cohesion Scale* (Elliott et al. 1996) were used to measure perceived neighborhood collective efficacy using a four-point Likert scale. The items were measured at wave 2 when the boys were 17 years old on average. Participants were asked about the degree to which they thought that their neighbors would exercise informal control over the neighborhood (i.e., “how likely is it that one of your neighbors would do something about it”: “if someone were breaking into your house in plain sight; “if someone were trying to sell drugs in plain sight; “if there were a fight in front of your house and someone was being beaten up; “if kids were fighting on the street that your neighbors would try to stop the fight?”). These items are consistent with definitions of collective efficacy found in the literature (Raudenbush and Sampson 1999; Sampson et al. 1997). Responses ranged from 1 (very unlikely) to 4 (very likely). The four items were used in the subsequent model to measure the latent construct of perceived collective efficacy. A composite score ranged from 4 (the least perceived collective efficacy) to 16 (the most) with a normal distribution ( $M = 11.62$ ,  $SD = 2.77$ ) and was used in the descriptive analysis ( $\alpha = 0.75$ ).

**Hard drug use.** The measure of hard drug use was taken from the 16-item *Substance Use Scale* based on the National Youth Survey (Elliott, Huizinga, and Ageton 1985) completed by the youth at each wave.<sup>2</sup> Prevalence of hard drug use was coded yes if participants reported using any illicit drug besides marijuana, including hallucinogens, cocaine, crack, heroin, and PCP, as well as tranquilizers, barbiturates, codeine, amphetamines, and other prescription medications for non-medical reasons. Prevalence was coded 1 for any hard drug use in wave 3, wave 4, or both (16.6%) and 0 for no hard drug use at waves 3 or 4 (83.4%).

**Violence.** Combined data from official records and self and parent reports of offending were used to measure the prevalence of violence (gang fighting, assault, robbery, sexual coercion, rape, attacking, and homicide) in the past year at waves 3 and 4. Sources of data included: 1) official court records from the Allegheny Juvenile Court, Commonwealth of Pennsylvania, and FBI; 2) the Self-Reported Delinquency Scale (SRD; Loeber et al. 1998); 3) the Youth Self-Report (YSR; Achenbach 1991); and 4) the Extended Child Behavioral Checklist (CBCL; Achenbach 1991). Prevalence was coded 1 for any violence in wave 3, wave 4, or both (9.2%) and 0 for no violence at waves 3 or 4 (90.8%).

**Drug dealing.** Drug dealing was measured as the prevalence of dealing marijuana or other drugs in the past year at waves 3 and 4, using combined data from official records and self and parent reports from the same instruments used to measure violence. It was coded 1 for any report of dealing in wave 3, wave 4, or both, (30.2%) and 0 for no dealing in waves 3 or 4 (69.8%).

**Covariates.** Age and family socioeconomic status (SES) at wave 1 were included as covariates. Family SES was based on the Hollingshead (1975) index of social status and was calculated from data on the caretakers' education and occupation. The higher score was used in

the case of two caretakers. Family SES ranged from 9 to 66 and showed a normal distribution ( $M = 40.32$ ,  $SD = 11.45$ ). Higher scores indicated higher SES.

### **Data Analysis**

Analyses were conducted with SPSS (version 18 2009) and Mplus (version 6, Muthén and Muthén 1998-2010). Missing data ranged from 0% for race, effective age, and violence, to 16.3% for prevalence of hard drug use. We imputed missing data using a predictive mean matching (PMM) algorithm available in SPSS Missing Value Analysis. under the assumption of missing at random, which provides less bias than listwise deletion (Enders and Bandalos, 2001; Jelicic, Phelps, and Lerner, 2009; Little & Rubin, 2002). PMM is useful in that it preserves the properties of the variables such as minimum and maximum values and increments (Rubin 1996; Siddique and Belin 2008). The imputation procedure as well as preliminary chi square and t-test analyses were conducted using SPSS 18 to assess race differences in the prevalence of problem behaviors, means for the neighborhood variables, and strength and direction of the relationships among the variables. The composite collective efficacy score was used in these analyses, but the items representing neighborhood economic disadvantage were examined individually because of their varying intrinsic meanings. The imputed data set was imported from SPSS into Mplus to test the hypothesized relationships in structural equation models (SEM). In the current study, the hypothesized model proposed relationships among neighborhood variables and three outcome variables: hard drug use, violence, and drug dealing. The three outcomes were tested one by one. The moderating role of race was tested using multi-group SEM analyses.

In the model, five items (described above) were used to measure the neighborhood disadvantage, and the factor loading was set to one for unemployment; four items captured collective efficacy and the factor loading was set to one for broken families (for details, see

Figures 1-3). The outcomes were regressed on family SES and age at wave 1. The weighted least square parameter estimator (WLSMV) was used to accommodate ordinal variables. Model fit was assessed using the  $\chi^2$ /df ratio, Root Mean Square Error of Approximation (RMSEA; Browne and Cudeck 1993), and the Comparative Fit Index (CFI; Browne and Cudeck 1993). The  $\chi^2$ /df ratios less than 3, RMSEA values less than 0.08, and CFI values greater than 0.95 indicate an adequate fit (Maruyama 1998). A partially mediated model was compared to the fully mediated model to test for indirect effects. These two models tested the first hypothesis that collective efficacy acted as a mediating variable between neighborhood disadvantage and adolescent problem behavior outcomes. Subsequently, multi-group analyses were used to test the moderated mediation effect. The paths were freed one at a time to test for racial group differences, and model fit was compared using a  $\chi^2$  difference test procedure available in Mplus.

## Results

### Race Differences

Differences between African American and European American adolescents on the neighborhood characteristics and outcomes were tested using *t*-tests and  $\chi^2$  (see Table 1). *T*-tests showed significant mean differences for collective efficacy and the five neighborhood economic disadvantage variables. African American adolescents, compared to their European American peers, reported lower neighborhood collective efficacy and higher rates of neighborhood economic disadvantage across all five variables. Results also showed significant differences for the three outcome variables. African American adolescents reported a lower prevalence of hard drug use but a higher prevalence of drug dealing and nearly three times as high a prevalence of violence.

We also examined bivariate correlations for both African American and European American adolescents (see Table 2). Among African American adolescents (above the diagonal), results showed that hard drug use was not related to collective efficacy. There were, however, significant, negative correlations with unemployment and welfare and a significant, positive correlation with income suggesting that prevalence of hard drug use might be higher among African American adolescents living in less economically disadvantaged neighborhoods. None of the neighborhood economic disadvantage variables were significantly related to violence. There was a significant, negative correlation between violence and collective efficacy indicating that lower levels of collective efficacy were associated with a higher prevalence of violence. Drug dealing was not associated with any of the neighborhood variables.

Among the European American adolescents, hard drug and drug dealing were negatively associated with collective efficacy (see Table 2, below the diagonal). Prevalence of violence was not related to any of the neighborhood variables. None of the neighborhood economic variables was related to hard drug use. Unemployment and welfare were both positively related to drug dealing.

### **Measurement Model**

Before testing the structural model, a measurement model was tested to ensure that the items used to measure collective efficacy and neighborhood economic disadvantage were valid indicators of the constructs. Results from the confirmatory factor analysis showed that the measurement model had acceptable fit ( $\chi^2 = 203.807$ ,  $df = 72$ ,  $p < 0.00$ ; CFI = 0.931; RMSEA = 0.087) and measurement invariance was observed across the two races.<sup>3</sup>



## Structural Model

The current study hypothesized that the relationship between neighborhood economic disadvantage and prevalence of hard drug use, violence, and drug dealing would be mediated by perceived collective efficacy. To test these hypotheses, we first compared a fully mediated model (Model 1) to a partially mediated model (Model 2) for all three outcomes and with all paths constrained to be equal between African American and European American adolescents. In the fully mediated model, there were direct paths from economic disadvantage to perceived collective efficacy and from perceived collective efficacy to the prevalence outcomes. In the partially mediated model, a direct path from economic disadvantage to prevalence was added. We controlled for the effects of age and family SES at wave 1 on the outcomes (see Table 3). For all three outcomes, Model 1 fit the data better than Model 2. Thus, the fully mediated model (Model 1) was used as the base model for all three outcomes when testing racial group differences. As explained in Data Analysis section, we tested two other models to test a moderated mediation effect. Model 3 freed the path from neighborhood economic disadvantage to collective efficacy to vary across two race groups, and Model 4 freed the path from collective efficacy to the outcome between the two groups.

**Prevalence of hard drug use.** Results from the  $\chi^2$  tests of difference indicated that the best fitting model for hard drug use was Model 4 in which the path from collective efficacy to hard drug use was allowed to vary between races (see Table 3 and Figure 1). The path from neighborhood economic disadvantage to collective efficacy was significant for both races, showing that higher levels of economic disadvantage predicted lower levels of collective efficacy. The effect of collective efficacy on hard drug use was only significant for European Americans, with lower levels of collective efficacy linked to a higher prevalence of hard drug

use. Overall, the indirect effect was not significant for the African Americans (indirect path estimate = 0.000, critical ratio = -0.054,  $p = 0.96$ ), but it was for the European Americans (indirect effect path estimate = 0.172, critical ratio = 2.097,  $p < 0.05$ ).

**Prevalence of violence.** Although Model 1 was the best fitting model (see Table 3 and Figure 2) for violence, there was no evidence of an effect of neighborhood disadvantage on violence via collective efficacy. There were no indirect effects for both African American and European American adolescents (indirect effect path estimate = 0.021, critical ratio = 0.857,  $p = 0.39$ ).

**Prevalence of drug dealing.** Model 4, the fully mediated model in which the path from collective efficacy to the outcome was freed, showed the best model fit statistics for drug dealing (see Table 3 and Figure 3). For both racial groups, when controlling for family SES and age, there was a significant negative relationship between neighborhood economic disadvantage and collective efficacy. However, the proposed mediation effect was only evident among the European American adolescents (indirect effect path estimate = 0.248, critical ratio = 3.067,  $p < 0.01$ ; for the African Americans, indirect effect path estimate = 0.017, critical ratio = 0.802,  $p = 0.42$ ).

## Discussion

The current study sought to empirically examine how neighborhood economic disadvantage may influence adolescent problem behaviors and whether this process differs by race and across different types of problem behaviors. Our hypotheses were based on the theories of social disorganization (Shaw and McKay 1942/1969) and collective efficacy (Sampson et al. 1996), as well as strong empirical evidence of racial differences in adolescent drug use (Johnston et al. 2009) and violence (Snyder and Sickmund 2006). Our findings suggest that the process by

which neighborhood economic disadvantage affects problem behaviors does indeed differ according to the type of behavior examined as well as by race.

We hypothesized that collective efficacy would mediate the relationship between neighborhood economic disadvantage and problem behaviors and that this relationship would be moderated by race. For all three outcomes, for both African American and European Americans, we found a strong and consistent relationship between neighborhood economic disadvantage and collective efficacy in the fully constrained model suggesting that higher economic disadvantage is related to lower collective efficacy. This finding supports the theoretical argument that the strains placed on a community by economic disadvantage make it difficult for the members to develop shared norms and values and to exercise some sort of informal social control over behavior (Sampson 2006). Results only partially supported our hypotheses of the mediating effect of collective efficacy on problem behaviors, however. There was no evidence of mediation for African Americans adolescents for all three outcomes. Among their European American peers, though, results showed significant indirect effects of collective efficacy between neighborhood economic disadvantage and hard drug use and drug dealing. There was no mediating effect for violence. Thus, these findings suggest that the mediating effects of collective efficacy are conditional on the type of problem behavior and that race moderates these effects.

Comparing the fully mediated to the partially mediated model, we found that neighborhood economic disadvantage did not have a direct effect on drug use, violence, or drug dealing. This finding is surprising for the latter two behaviors given previous evidence supporting this relationship (Halliday-Boykins and Graham 2001; Ng 2010). Unlike prior studies, however, which are more commonly cross-sectional, this study examined longitudinal

effects of neighborhood economic disadvantage. It may be that proximal neighborhood effects are not sustained and that as adolescents age other environmental factors, such as peer groups, assume greater influence over their behaviors. In addition, during waves 1 and 2, when we measured neighborhood effects, these adolescents would have been in high school. During this developmental time period, adolescents often spend more time with their peers and at school than they do at home. These schools and peer groups during high school may be located outside their immediate neighborhoods.

As mentioned, when we examined race differences, we found differences in the effect of collective efficacy. The construct was not related to any of the outcomes for the African American adolescents. It was related to prevalence of hard drug use and drug dealing for the European American adolescents, but it had no effect on violence. It may be that for European American adolescents, who are more likely to live in middle to upper-income neighborhoods, there is greater opportunity for community members to exercise some level of social control, which affects behaviors. According to Sampson et al.'s (1997) theory, individuals living in communities with highly transient populations and high levels of poverty and economic instability may find it challenging to build relationships with neighbors and thus develop shared values and norms around community behavior. In these types of neighborhoods, collective efficacy will be low and the ability to exercise some form of informal social control could be more difficult. In communities with higher levels of collective efficacy, however, there may be greater social approbation against hard drug use and drug dealing. Overall, though, the results indicate that strategies to enhance collective efficacy and social norms that discourage drug use and dealing may be one way to implement community-level prevention efforts among European American adolescents.

In addition, our hypothesis regarding the strength of the relationships was only partially supported by the data. We had expected the models to be stronger for violence and drug dealing than for hard drug use. The model did predict the greatest amount of variance for dealing, but only for European Americans. Nevertheless, rates of drug dealing were significantly higher among African Americans than European Americans. Other factors in addition to neighborhood context must be important for the decision to deal drugs among African Americans. Our data show that African Americans report significantly lower family SES than European Americans. Thus, for these adolescents, drug dealing may be more influenced by personal economic situation than by neighborhood level social control factors. In addition, the bivariate results indicated that hard drug use was less prevalent among African Americans than European Americans, a finding which is consistent with national studies (Johnston et al. 2009). Thus, it may be viewed as less problematic for African Americans and thus fewer social norms may be developed around discouraging the behavior.

The lack of neighborhood effects on violence among the African American and European American adolescents at both the bivariate and multivariate level was unexpected. However, prevalence rates were relatively low so there was little variance to explain. Perhaps if we had included more minor forms of violence or examined delinquency in general, we may have found stronger relationships in our models.

There are several limitations to this study that should be noted. First, the present study examined an all male, African American and European American adolescent sample from Pittsburgh, PA. Therefore, results can only be generalized to male adolescents of these two races living in similar urban environments. Neighborhood effects for adolescents of other racial and ethnic backgrounds are increasingly important to understand, particularly among the growing

Hispanic population. Moreover, rates of delinquency, specifically violent delinquency, are rising among females (Snyder and Sickmund 2006); thus examining contextual influences on their behaviors is critical. In addition, the study relied on self-reports of hard drug use while violence and dealing were drawn from self-reports as well as official records. Nonetheless, previous studies have demonstrated high reliability and validity for self-reports of drug use (Graham, Roberts, Tatterson, and Johnston 2002).

While we controlled for age and SES in the current study, we did not control for other factors known to influence adolescent problem behaviors. The goal of this study was to isolate the neighborhood effects on drug use, violence, and drug dealing. Future studies, however, should incorporate other variables such as family dynamics, school environment, peer behaviors, and individual characteristics and examine the interactions among these various systems. While a few studies have examined these interactions (Beyers, Loeber, Wikström, and Stouthamer-Loeber 2001; Tobler, Komro, and Maldonado-Molina, 2009; Wikström and Loeber 2000), to our knowledge, only one has examined racial differences in these interactions (Choi et al., 2006) and none have considered collective efficacy, specifically, as it interacts with family, peer, and individual factors.

A final limitation to this study was our temporal ordering of the variables in the structural equation model. We measured neighborhood economic disadvantage before collective efficacy. Sampson (2006) has argued that the presumption that economic disadvantage leads to lower collective efficacy may not always be accurate. Instead, it may be lack of collective efficacy that leads to economic disadvantage in a neighborhood through a breakdown of community-level social mechanisms. The lack of informal social control may lead to dilapidated housing and crime, thereby increasing perceptions of communities as unattractive and dangerous, which in

turn could lower property values and discourage people with higher incomes from moving to these areas. It would be interesting in the future to test this reversed ordering of neighborhood economic disadvantage and collective efficacy and thus determine more precisely which one causes the other. In addition, we did not take into account mobility in this analysis. Some youth may have moved between waves, which could have affected the ability to accurately predict from one wave to the next. Considering the substantial volume of research documenting the negative effects of mobility on adolescent substance use (Buu et al. 2009; DeWitt 1998; Freisthler et al. 2005; Kulis et al. 2007; Snedker et al. 2009) and delinquency (Gasper, DeLuca, and Estacion 2010), more research is needed to examine the effects of mobility on these associations.

Overall, this study found that the mechanisms by which neighborhood context influence adolescent problem behaviors differ by outcome and by race. Thus, it is important to distinguish between drug use and delinquency when discussing neighborhood effects as well as between African American and European American adolescents. In addition, collective efficacy appears to be much more influential for European American, compared to African American, male adolescents' drug use and dealing. Thus, prevention efforts targeting social norms may be effective at preventing these behaviors within this population. For African American adolescents, however, other interventions at other levels than the neighborhood (e.g., the individual or family level) may prove to be more effective for preventing problem behaviors.

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## Notes

1. A total of 503 adolescents were included in the original PYS youngest cohort. Twelve adolescents were excluded from this study because they were not African American or European American. An additional individual was excluded, because the neighborhood tract in which he lived showed outlier characteristics on the Census tract items. Finally, three individuals were excluded because they were deceased at this point in the study.

2. We had planned on measuring frequency for the three problem behaviors; however, given the relatively high number of zeros and the skew of the distributions, we decided that prevalence would be a better measure.

3. Residual variances for the two indicator variables, proportion of single-parent families and median household income, were set to 0.05.