



# The role of neighborhood disadvantage, physical disorder, and collective efficacy in adolescent alcohol use: a multilevel path analysis

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## ABSTRACT

Research into the salient exposures which explain neighborhood variation in adolescent alcohol use remains inconclusive. The Social Disorganization Theory suggests that neighborhood-level disadvantage may reduce collective efficacy to control adolescent risky behavior. Collective perceptions of physical disorder are also implicated in this neighborhood pathway. Drawing on data from a nationally-representative survey of urban high school students in New Zealand, multilevel path analysis was used to estimate the direct and mediating effects of neighborhood disadvantage, physical disorder, and collective efficacy on current drinking, frequency of binge drinking, and typical quantity of alcohol consumed. The findings supported an indirect pathway from disadvantage to binge drinking and high typical quantities in young adolescents (< 16 years), mediated by physical disorder and reduced collective efficacy. Collective efficacy was not associated with current drinking in young adolescents. An opposing indirect effect was evident among older adolescents (≥ 16 years), whereby collective efficacy was positively associated with drinking outcomes. Implications for future research are discussed.

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## 1. Introduction

An accumulating body of empirical evidence supports the role of the neighborhood in adolescent development, suggesting that many adolescent outcomes result from common underlying structural and social processes (Booth and Crouter, 2001). Extant research has focused on the Social Disorganization Theory (Shaw and McKay, 1942), which suggests that neighborhood structural disorganization (e.g. area-level disadvantage, residential mobility, and/or ethnic heterogeneity) weakens the bonds between neighbors, reducing their ability to build a normative consensus and control problematic behavior (Kubrin, 2009).

The potential for the presence of strong bonds among neighbors or unhealthy networks to act as a contagion to facilitate problem behavior in disadvantaged neighborhoods (Browning et al., 2004; Gau, 2014; Wilson, 1987) led many to consider the importance of “what was being connected” (Sampson, 2012, p.151).

It was further suggested that bonds were insufficient on their own to control behavior but rather, what was required was shared expectations for informal social control (Sampson et al., 1997). Moreover, within a transformed urban environment, neighbors were considered to be more satisfied with a level of working trust and infrequent social interaction, rather than sitting down for dinner together (Sampson, 2012). Consequently, the traditional definition of the Social Disorganization Theory was relaxed to include the mediating concept of ‘collective efficacy’, incorporating the components of social cohesion (established through weak rather than strong ties) and informal social control (Sampson et al., 1997).

A number of mechanisms may explain the role of neighborhood disadvantage hindering the development of social cohesion. Firstly, the creation and maintenance of neighborhood ties requires time and energy (Sampson and Groves, 1989), with low-income area residents being more likely to have less regular working hours, commute for longer, and consequently have less free time for neighborhood interaction (Valdimarsdóttir and Bernburg, 2015). Secondly, collective perceptions of physical disorder (e.g. broken footpaths, rubbish) in disadvantaged areas may have compelling effects on the development of neighborhood trust, attachment, and participation in community life (Burchfield,

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2009; Diez Roux, 2001; Skogan, 2012). Within a disordered environment, many neighbors may be reluctant to venture outside, reducing their ability to form ties and observe positive neighborhood interaction (Cohen et al., 2008). Additionally, the effects of disorder may go beyond the visible signs of decay (Sampson and Raudenbush, 2004; Skogan, 1992), whereby residents attribute the stigma or neighborhood reputation associated from disorder with a deeper social meaning of community malaise (Forrest and Kearns, 2001).

The ability for neighbors to establish common values and shared expectations for social control may also be impeded in disadvantaged communities. High levels of adult alcohol use, resulting from high densities of alcohol outlets coupled with low prices (Morrison et al., 2015), may give rise to a high prevalence of adult drinkers. This could affect the overall tolerance to alcohol use and willingness to intervene (Fagan et al., 2015a). The ability to build a normative consensus may also be compromised when there is a co-occurring presence of anti-social role models in the community, such as gangs (Pattillo, 1998; Valdimarsdóttir and Bernburg, 2015). Others refer to an increased prevalence of moral or legal cynicism or “Code of the Street” (Anderson, 1999; Solter et al., 2014), resulting from heterogeneity or ambiguity in value systems regarding deviance which weakens overall opposition to its occurrence (Kubrin and Weitzer, 2003; Sampson, 2012; Stewart and Simons, 2010). Notwithstanding, disadvantaged communities are not condemned to reduced collective efficacy as some studies have shown that high levels of monitoring and control can co-exist with area-level economic disadvantage (Chuang et al., 2005; Sampson, 2012). Sampson, (2012) suggests that such communities may have latent collective efficacy which is suppressed by cumulative disadvantage.

Although the emergent, protective concept of collective efficacy was originally developed to explain neighborhood variation in crime (Sampson et al., 1997) it has since been shown to have wide reach in relation to a range of adult and adolescent health and social outcomes. Among children and adolescents, it has been found to be positively associated with the use of preventative services (Frankenberg, 2004), and general health (Browning and Cagney, 2002), and inversely associated with obesity (Cohen et al., 2006), anti-social behavior (Odgers et al., 2009), sexual initiation (Browning et al., 2005), and violence (Maimon and Browning, 2010). It may also act as a moderator, enhancing the protective effect of family attachment and support on suicide attempts (Maimon et al., 2010) and attenuating the relationship between victimization and substance use (Fagan et al., 2014).

The demonstration of protective health effects suggests that collective efficacy may be perceived as a general capacity, not just directed towards crime control (Uchida et al., 2015). Neighborhood-level supervision or regulation may therefore play a broad role in neighborhood well-being (Sampson, 2012). With regards to adolescents, a number of mechanisms may explain its protective effects. Parents within high collective efficacy neighborhoods may exert subtle or not-so-subtle pressures upon the parents of deviant youth to become more responsible caregivers (Simons et al., 2005). They may also work together to supervise local youth, disseminate information regarding their behavior, and reinforce to adolescents the appropriate social norms (Maimon and Browning, 2012). These processes may lead to adolescents feeling an added layer of surveillance and supervision, reducing their engagement in risky behavior for fear that such action may be noticed by others, sanctioned, and result in disappointment (Fagan et al., 2014; Sampson et al., 1997). Adolescents may also feel protected knowing that there are others looking out for their welfare that can be trusted to intervene on their behalf (Aisenberg et al., 2008).

To date, the intervention literature linking the concepts of the Social Disorganization Theory to adolescent alcohol use is scarce.

Moving to Opportunity, which tested the effects of moving from high- to low-poverty neighborhoods, showed positive reductions in young female drinking but not in their male counterparts (Sciandra et al., 2013). However, the findings have been questioned due to the highly selective sample representing the extreme tail of poverty, the inability to control for the disrupting effects of moving, and the level of inference permitted from the study design (DeLuca and Rosenbaum, 2003; Sampson, 2012).

Observational studies have found mixed results for the role of neighborhood disadvantage, disorder, and collective efficacy on adolescent alcohol use (Jackson et al., 2014; Bryden et al., 2013; Fagan et al., 2015b; Smith et al., 2014; Whaley et al., 2011) which may, in part, be due to methodological limitations. In particular, studies often control for potential mediators (e.g. parental and peer factors) on the causal pathway, masking the neighborhood effect (Jackson et al., 2014). Heterogeneity of effects is often neglected, whereby factors such as age (Matjasko et al., 2010; Rowland et al., 2014), genetics (Kendler et al., 2011), impulsivity (Neumann et al., 2010), or location of residence (Azar et al., 2016) may moderate the effect of the neighborhood on adolescent drinking. Adolescent development theory (Catalano and Hawkins, 1996) emphasizes the potential for moderation, indicating that risk and protective factors will have varying salience across the non-linear stages of adolescent development. To reduce same-source bias, some studies measure collective efficacy from the parents of adolescents or general residents. This may present problems if perceptions differ between adults and adolescents, as shown by others (Witherspoon and Ennett, 2011), and if the mechanisms of collective efficacy are via adolescent perceptions rather than that of adults. Many studies also seek to examine the effect of collective efficacy on less risky drinking patterns (e.g. past year use), negating the likelihood that community social processes are not set in motion until thresholds or perceived severity of behavior are met (Diez Roux, 2001; Galster, 2010). Furthermore, the use of city-based samples in studies may produce downward bias if the included neighborhoods have limited variation across exposures to identify important effects (Leventhal and Brooks-Gunn, 2000). Finally, the unit of geography used to demarcate neighborhoods is important to consider, given that the study of large units may dilute the effects of social mechanisms which may operate at smaller levels of geography (Gerell, 2015).

To further complicate matters, adolescents are also exposed to, and influenced by, the characteristics of their surrounding neighborhoods, including those contiguous to their school. This has considerable implications for neighborhood effect studies, highlighted by Byrnes et al. (2015) showing that older adolescent activity spaces intersected with 24 census tracts during a one-week period. The findings of independent or spill-over effects of the surrounding neighborhood's level of disadvantage, collective efficacy (Sampson, 2012), and ethnic diversity (Jackson et al., 2015) on health and social outcomes strongly indicate the need to incorporate spatial dependence models in neighborhood-level studies (Sampson, 2012).

Finally, the majority of studies have focused on direct effects, rarely exploring the mediating pathways which neighborhood conditions may influence (Jackson et al., 2014). This is particularly important in the study of neighborhoods effects, whereby distal exposures are often transmitted through a number of additional links in a causal chain, many of which may work in opposing directions to cancel out an overall direct effect (Shrout and Bolger, 2002). Recent advancements in statistical software, which permit mediation modeling within a multilevel framework, provide exciting opportunities for researchers to take the next steps towards understanding the salient pathways of neighborhood exposures. In the current study, it was hypothesized (Fig. 1) that a specific indirect effect would be found, whereby neighborhood disadvantage

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