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Bullying involvement and adolescent substance use: A multilevel investigation of individual and neighbourhood risk factors



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ABSTRACT

Background: Youth involved with school bullying are vulnerable to many negative outcomes, including substance use. Research has yet to examine how this vulnerability operates in the context of other individual and neighbourhood differences. The current study aimed to fill this gap by using multilevel modeling to investigate both the individual and neighbourhood risk factors associated with frequent drunkenness and frequent cannabis use among adolescents.

Methods: Data from the 2010 Canadian Health Behaviours in School-Aged Children (HBSC) survey were analyzed. Participants consisted of 8971 students from 173 neighbourhoods across Canada. Multilevel modeling was used to examine both individual (age, gender, bullying, victimization, peer deviancy, negative affect) and neighbourhood (socioeconomic status, crime, physical neighbourhood disorder, residential instability) risk factors. We tested whether the links between bullying involvement and frequent substance use were mediated by other risk factors.

Results: Both individual and neighbourhood risk factors were associated with an increased likelihood of frequent substance use. Specifically, bullying served as a unique risk factor for frequent substance use over and above more traditional risk factors. A cross-level interaction was observed between residential instability and peer deviancy, such that the link between peer deviancy and frequent drunkenness was stronger in more residentially-unstable neighbourhoods. Peer deviancy partially mediated the link between bullying and both types of frequent substance use, whereas both peer deviancy and negative affect mediated the link between victimization and both types of frequent substance use.

Conclusions: Youth who bully others are vulnerable to frequent substance use across peer and neighbourhood contexts.

1. Introduction

Adolescent substance use is a widespread public health issue. In Canada, 13% of 15-year-olds have used cannabis in the past 30 days, with 21–23% reporting getting drunk at least twice (Inchley et al., 2016). These prevalence rates are relatively high and concerning given the adverse outcomes associated with frequent substance use (e.g., Crews et al., 2007). While the risk factors associated with frequent adolescent substance use have been well documented (Durand et al., 2013; Hawkins et al., 1992), limited research has explored the link between bullying and frequent substance use. An ecological approach is needed to capture this relationship, as other risk factors and environments may change the nature of this association. Adolescent substance use is more than a product of individual differences – individual differences may be shaped by the larger social context in which youth live and grow. By examining the link between bullying and substance use in

context, we can examine the neighbourhood characteristics and individual differences that may increase or explain this vulnerability. Using multilevel modeling, the current study examined how individual and neighbourhood risk factors are associated with frequent drunkenness and frequent cannabis use among Canadian adolescents.

1.1. Individual risk factors

A variety of individual differences are risk factors for frequent substance use, including male gender, age, negative affect, peer deviancy, bullying, and victimization (Durand et al., 2013; Hawkins et al., 1992; Maniglio, 2016, 2015). Negative affect may account for the association between victimization and frequent substance use. The link between victimization and negative affect is well-established (Arseneault et al., 2010), with negative affect in turn predicting both heavy drinking and cannabis use among adolescents (Conrod and Nikolaou, 2016; Wu et al., 2008).

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Thus, victimization may indirectly increase vulnerability to frequent substance use through negative affect. This indirect effect has been noted in previous research investigating alcohol-related problems (Topper et al., 2011), and combined indices of substance use among girls only (Luk et al., 2010). These results highlight the importance of examining the link between victimization and substance use in context, and also highlight the need to consider gender.

Indirect effects between bullying and frequent substance use, however, have been neglected in the literature. Since bullying also is associated with negative affect (Klomek et al., 2007), it is possible that indirect effects exist both for victimization and bullying. It is also possible that peer deviancy mediates this link. Research demonstrates that aggressive children seek out affiliation with deviant peers, which leads to increased rule-breaking behaviour such as substance use (Ettetal and Ladd, 2015). Bullying is associated with future individual and peer deviancy (Low and Espelage, 2014), suggesting that having deviant friendships may increase vulnerability to frequent substance use among youth who bully others. Peer deviancy is a strong predictor of both alcohol and cannabis use among adolescents (Mayberry et al., 2009), but has yet to be investigated as an indirect path between bullying and substance use.

1.2. Neighbourhood risk factors

Individual risk factors, like bullying and peer deviancy, are not singular processes. As indicated by social ecological theory, adolescent development may be influenced by multiple, nested contexts. Adolescents spend increasing amounts of time outside the home, and the neighbourhood is considered one of the primary out-of-home contexts for development (Leventhal et al., 2009). According to social disorganization theory (Leventhal and Brooks-Gunn, 2000), such neighbourhood factors may be associated with well-being by maintaining or inhibiting social order.

Youth in disorganized neighbourhoods are more vulnerable to frequent substance use. Youth in low SES neighbourhoods may be exposed to more delinquency and have fewer resources to promote positive youth development. There are mixed findings, however, on how neighbourhood SES is associated with adolescent alcohol use (Jackson et al., 2014), highlighting the need for more research. Additionally, youth in high-crime neighbourhoods may use substances as a means to cope with stress (Cooley-Strickland et al., 2009), or substances may be more available in these areas. Indeed, neighbourhood crime is positively associated with frequent adolescent cannabis use, even when more proximal predictors are considered (de Looze et al., 2015). Third, the presence of physical neighbourhood disorder (e.g., graffiti, abandoned buildings) may signal that deviant behaviour is acceptable. For example, Furr-Holden et al. (2011, 2015) found that physical neighbourhood disorder was positively associated with adolescent cannabis use. Lastly, a high rate of change within neighbourhood residents (i.e., residential instability), weakens social ties and inhibits the shared supervision and socialization of youth towards conventional norms. The associations between residential instability and adolescent substance use are mixed (Fagan et al., 2015), highlighting the need to clarify these associations.

Few studies have examined how elements of neighbourhood disorganization may be associated more proximal risk factors for adolescent substance use. Peer deviancy is more common among residentially unstable youth (Haynie and South, 2005), and within physically disordered neighbourhoods (Brody et al., 2001; Chung and Steinberg, 2006), suggesting that there may be a stronger link between peer deviancy and frequent substance use within disorganized neighbourhoods. Similarly, exposure to neighbourhood violence predicts both deviant behavior and bullying involvement (Low and Espelage, 2014), suggesting youth may be more vulnerable in these neighbourhoods.

1.3. Rationale and hypotheses

From a social ecological perspective, the risk factors associated with frequent substance use exist within multiple, interacting contexts.

Research has yet to examine how bullying and victimization are related to frequent substance use within the context of individual and neighbourhood factors. We hypothesized that individual factors (bullying, victimization, male gender, age, negative affect, peer deviancy) and neighbourhood factors (low SES, crime, physical neighbourhood disorder, residential instability) would be positively associated with frequent drunkenness and frequent cannabis use. We also explored whether the magnitude of the individual-level effects would vary with the neighbourhood-level factors. Secondly, we hypothesized that negative affect would mediate the link between victimization and frequent substance use, whereas deviant peer relationships would mediate the link between bullying and frequent substance use (while exploring the moderating role of gender). This comprehensive approach may inform our understanding of the individual differences and neighbourhoods in which vulnerable youth are at a heightened risk for frequent substance use.

2. Methods

2.1. Study design

This study utilized data from the 2010 Canadian Health Behaviour in School-Aged Children (HBSC) survey. The HBSC is a cross-national study conducted every four years in collaboration with the Public Health Agency of Canada to examine the health and well-being of youth. A systematic sampling approach was used to selected whole classes of students (from eligible and consenting schools) to participate in the survey. Surveys were administered in a classroom setting during one 45–70 min session.¹ Information about the neighbourhoods surrounding each of the schools (using a 1-km circular buffer) was collected using CanMaps Streetfiles, Google Earth Streetview Imaging, and the 2006 Canadian Census. A 1-km buffer around each school was selected as a proxy for neighbourhood as this represents the area in which youth are likely to travel (i.e., a 10–15 min walking time). Previous HBSC research indicates there are no significant differences in neighbourhood variables between a 1-km and 5-km buffer area (Simpson et al., 2005). Thus, we analyzed students nested within schools. The area around each school was used as a proxy for students' day-to-day experiences within their neighbourhood. Ethics approval was obtained from Queen's University.

2.2. Participants

The Grade 9/10 version of the 2010 Canadian HBSC survey collected data from 10,429 students. 1458 participants were excluded from the current study as neighbourhood data were not available.² The final sample of participants consisted of 8971 students from 173 schools across Canada. The majority of students were in grades 9 (50.8%) and 10 (47.4%), with a smaller proportion in grade 8 (0.2%) and grade 11 (1.6%). The sample was 50.6% female and had an average age of 15.3 years. Most participants (89.5%) identified with one ethnicity: 76.9% White, 3.4% First Nations, 2.7% Métis, 2.6% Chinese, 2.6% South Asian, and 2.5% Black.

2.3. Measures

2.3.1. Demographics

Age and gender were assessed

¹ A detailed description of the HBSC study design is available in the 2010 report by Freeman et al.: <http://www.phac-aspc.gc.ca/hp-ps/dca-dea/publications/hbsc-mentale-mentale/index-eng.php>

² Participants excluded from the data analysis had significantly higher levels of bullying others, victimization, negative affect, and cannabis use. For all variables, however, the magnitude of this difference was very small (Cohen's $d = .08$ for bullying others, $.12$ for victimization, and $.06$ for negative affect; Cramer's $V = .05$ for cannabis use).

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