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Peer Victimization, Mood Symptoms, and Alcohol Use: Examining Effects Among Diverse High School Youth

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Abstract

Peer victimization is associated with alcohol use among adolescents. However, few studies have examined the mediating role of depression and anxiety, or differences by race. The current study examined the prospective relationship of peer victimization, depressive and anxiety symptoms, and alcohol use across two timeframes: 9th to 11th grade and 10th to 12th grade among African American and White youth. 2,202 high school youth (57.6% female) who identified as either African American (n=342, 15.2%) or White (n=1860, 82.6%) provided data on study variables.

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The contribution of each author is as follows: AR and TZ conceived of the study, participated in its design, interpretation of data, and drafting of the manuscript. TZ also collaborated on the statistical analytic plan and coordinated writing components for co-authors; SF participated in the data collection and contributed to drafting of the manuscript and editing; DH participated in the study design, conducted primary statistical analyses, drafting of the manuscript, and editing; JB participated in the design and coordination of the parent study, worked with community partners to develop the measurement plan, conducted data collection and processing, and contributed to editing of the manuscript. All authors have given final approval of the version to be published.

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There are no conflicts of interests involved in the conduct of this research.

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Data collected for this study has been approved by the Institutional Review Board/ethnics committee at Michigan State University and the research has been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments.

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Path analysis among the overall sample indicated that anxiety symptoms was a significant mediator for both timeframes, with depressive symptoms mediating the pathway during the 10th to 12th grade timeframe. The findings were most consistent among White youth, with no significant indirect effects observed for African American youth. Thus, addressing depressive and anxiety symptoms may be effective targets to decrease alcohol use risk as a result of peer victimization among White youth. However, further research is needed to better understand risk models for peer victimization exposure on substance use outcomes among racial/ethnic minority youth.

Keywords

peer victimization; depression; anxiety; alcohol use; adolescence; race

Introduction

Peer victimization is broadly defined as any aggressive nonsexual behavior, whether physical, verbal, or relational, initiated by a youth towards a fellow peer (Hawker & Boulton, 2000). Peer victimization can occur in a number of contexts, though there is a large body of research that has examined peer victimization specifically within school settings (Alvarez-Garcia, Garcia, & Núñez, 2015; Hong & Espelage, 2012), which is important given that a majority of youths' social interactions occur at school (Rigby, 2000). Within this body of research, peer victimization has been documented to occur most often during early adolescence (Finkelhor, 2014; Ladd, Ettekal, & Kochenderfer-Ladd, 2017), with the severity of victimization increasing through late adolescent years (Arseneault, Bowes, & Shakoor, 2010; Hong & Espelage, 2012). The consequences of peer victimization during the adolescent developmental period, specifically, are dire. According to Erikson's stages of psychosocial development (1968), self-awareness and exploration of where one fits in society is critical in the formation of identity. Peer victimization during the identity versus role confusion stage can lead to a number of negative behavioral health consequences, including lowered self-confidence, increased depressed mood, self-harm, and violent behavior (see reviews by Arseneault et al., 2010; Smokowski & Kopasz, 2005). Victimization during high school also has a sustained impact on risky alcohol use (Maniglio, 2017; Radliff, Wheaton, Robinson, & Morris, 2012), which is the most commonly used substance during high school years (Johnston, O'Malley, Bachman, & Schulenberg, 2012). Thus, examining the impact of peer victimization on alcohol use outcomes among high school youth is critical.

With evidence of a direct effect of peer victimization on alcohol use vulnerability during adolescence, researchers have begun to examine mechanisms, such as negative affect, through which this risk process may operate (Hong et al., 2014). Negative affect has been shown to be directly impacted by peer victimization (Gladstone, Parker, & Malhi, 2006; Reijntjes, Kamphuis, Prinzie, & Telch, 2010) and also increases risk for alcohol use during adolescence (Espelage, Low, & De La Rue, 2012; Jiang, Yu, Zhang, Bao, & Zhu, 2016). Moreover, based on the stress-coping theory (Lazarus & Folkman, 1984), it is posited that the experience of threatening events, such as peer victimization, causes a stress response,

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which in turn results in psychological or behavioral responses, such as substance use, to ameliorate the distress.

Although limited, there is some evidence to support the presence of a mediation pathway between peer victimization, negative affect, and alcohol use. For example, Earnshaw et al. (2017) found among a sample of 4,297 youth, that frequent experiences of peer victimization experienced at school or other places (but not at home with siblings) by fifth grade was significantly predictive of greater likelihood of alcohol use in the tenth grade, and the risk pathway was mediated by depressive symptoms reported during seventh grade. Luk, Wang, and Simons-Morton (2010) also found a significant indirect effect of peer victimization on substance use through depressive symptoms among adolescents. However, this effect was only found for female youth, with a non-significant effect found for males. Lastly, although specific to victimization based on sexual orientation, Marshal, Burton, Chisolm, Sucato, & Friedman (2013) found that sexual orientation-related victimization was associated with greater alcohol and cigarette use among female adolescents indirectly through increases in depressive symptomatology. Thus, there is some evidence to suggest a mediating role of depressive symptoms on the relationship between peer victimization and alcohol and substance use. As for anxiety symptoms, although there is evidence on the effect of peer victimization on anxiety symptoms (Siegel, La Greca, & Harrison, 2009; Stapinski et al., 2014) and the negative impact of anxiety on substance use during adolescence (Buckner et al, 2008; Wu et al., 2010), it is unknown whether anxiety mediates the relationship between peer victimization and alcohol use during adolescence. The current study aims to fill this gap in the literature, by providing a better understanding on the potential influence of both depressive and anxiety symptoms within the risk pathway between exposure to peer victimization and alcohol use, which can inform intervention programming among this at-risk population of youth.

In addition to the need for more research examining the mediating role of depression and anxiety symptomology on the risk pathway between peer victimization and alcohol use, there is a need for research examining if the proposed risk pathways are cross-culturally valid. To date, although there is evidence of racial differences in prevalence of peer victimization (Vitoroulis & Vaillancourt, 2015) and substance use outcomes (Miech, Johnston, O'Malley, Bachman, & Schulenberg, 2016; Swendsen et al., 2012), there is a dearth of literature as to whether racial differences exist in the risk pathway between peer victimization and substance use. Most studies that have examined the relationship between peer victimization, depressive symptoms, and alcohol, or other substance use outcomes, have done so with diverse samples of racial and/or ethnic youth, but have failed to examine whether effects are comparable based on racial or ethnic background (Davis et al., 2018; Earnshaw et al., 2017; Luk et al., 2010).

The closest available evidence of cross-cultural validity of the proposed risk pathways can be gleaned from research conducted among more homogeneous samples of youth, such as work by Hong et al. (2017) who examined the risk pathway among African American participants and Zapolski et al. (2018) who examined a similar pathway among primarily White participants. Both studies found a significant indirect effect of negative affect within the risk pathway from peer victimization to substance use, suggesting that the process may

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operate similarly for African American and White youth. However, these studies are limited in that the age range of participants were not comparable across studies and the Hong et al. (2017) study was not based on prospective data. Thus, more work is needed examining whether the relationship between peer victimization, depression and anxiety symptomology, and alcohol use occurs similarly or differently among youth of different racial/ethnic backgrounds.

Current Study

The aim of the current study is to examine two specific risk pathways: the prospective effect of peer victimization at 9th grade on alcohol use at 11th grade through depressive and anxiety symptoms at 10th grade, and the prospective effect of peer victimization at 10th grade on alcohol use at 12th grade through depressive and anxiety symptoms at 11th grade. Based on the stress-coping theory (Lazarus & Folkman, 1984) and the available, though small, body of literature, it is hypothesized that peer victimization will prospectively predict alcohol use through depressive symptoms at each time point. Additionally, based on theory, it is hypothesized that a similar pathway will be found for anxiety symptoms. Moreover, the models will be stratified among two racial groups (i.e., non-Hispanic African American/Black and non-Hispanic White youth), to help determine if the risk pathways operate similarly by race. Given the dearth of research examining the influence of race or ethnicity within these risk pathways, no a priori hypotheses were made.

Methods

Participants and Procedures

The current study involves participants drawn from a five-wave parent study that began in 2004 examining indicators of health and wellbeing among students between 4th and 12th grade. Participants were sampled from 159 schools (21 school districts) in a large Midwestern county in the United States. Informed consent forms were sent home and parents of potential participants were asked to return signed forms back to the school if they wished to provide consent each year. Students for whom parents provided consent were administered either a paper/pencil or on-line survey during school hours by research staff. The survey consisted of 208-items designed to quantitatively assess eight broad domains of student functioning – social competence, emotional competence, school engagement, school environment, neighborhood environment, home environment, health behaviors, and substance use. The survey took approximately 30–60 minutes to complete.

In total, 32,210 youth provided data on the variables on interest (i.e., peer victimization, alcohol use, depressive symptoms, and anxiety symptoms). Retention rates for all grades were modest, with 45.2% of participants (N=14,565) providing two or more waves of data (27.7% provided two waves, 12.2% provided three waves, 4.4% provided four waves and 1.0% provide five waves). The analytic sample for the current study was constructed based on several steps. First, the sample was restricted to youth who reported data during 9–12 grade (n=9,981, 30.1% of larger sample). Second, the sample was further restricted to those youth from the high school sample who provided data from at least two waves across a three-year period (i.e., 9th-11th grade or 10th–12th grade), resulting in 2,455 participants.

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Finally, given the study aim to examine racial differences in the risk pathways, data was restricted to those youth who self-identified as either non-Hispanic African American/Black (n=342) or non-Hispanic White (n=1860, 84.5%). Thus, 2,202 (57.6% female) youth comprised the final sample for the current study.

Measures

Demographic and background measures.—Participants were asked to indicate their gender, grade, and racial and ethnic background (i.e., African American/Black, American Indian, Asian, Hispanic, Multiracial, White, and Other). Only participants who self-identified as either non-Hispanic African American/Black or non-Hispanic White were included for the current study due to small sample sizes in the other racial/ethnic group categories. Social mobility was also assessed by a 1-item question, "How many times have you moved into another home or apartment in the past year." Responses were rated on a 5-point Likert scale from 0 (*no times*) to 4 (*4 for more times*). Social mobility was used as it is a proxy for socioeconomic status (Buu et al., 2009; Jelleyman & Spencer, 2008).

Peer victimization.—Being a victim of peer aggression at school was assessed using a 12-item measure constructed for the parent study, which measured the frequency of victimization experiences in the past year. Items include statements such as "A kid at my school said he or she was going to hurt me," "A kid at my school hit or pushed me when they were not playing around," and "I have been left out or ignored by kids at school." Responses were rated on a 4-point Likert scale with 1 (*never*), 2 (*not much*), 3 (*sometimes*), and 4 (*a lot*), which were summed to generate a total peer victimization score. For the current study, the peer victimization scale showed good internal consistency at each grade level (α = .84–.89).

Depressive symptoms.—The Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977) is a 13-item self-report measure frequently used to assess depressive symptomatology with children, adolescents, and adults (Radloff, 1991; Roberts, Lewinsohn, & Seeley, 1991). CES-D assesses depressive behaviors and feelings experienced in the past week. For this study, the time frame was extended to the last year. For some of the items, the exact wording was used, and for others, the questions were changed to reflect more adolescent terms (e.g. when the original question was stated "My sleep was restless" the wording was changed to "I had a hard time sleeping", and "I had a crying spell" was changed to "I felt like crying"). Responses were rated on a 4-point scale with 1 (*not at all*), 2 (*a little*), *3* (*some*), and *4* (*a lot*), which were summed to generate a total depression score. The CES-D has been shown to have high internal consistency among youth within non-clinical settings (coefficient alpha of .86–.90, Dierker et al., 2001; Garber et al., 2009). For the current study, the scale also showed high internal consistency at each grade level (α =. 90-.91).

Anxiety Symptoms.—The State-Trait Anxiety Inventory for Children (STAIC; Speilberger, 1973) is a 10-item self-report measure to examine anxiety in elementary school children (ages 9–12) but has been administered to older children under 18 (e.g., Herzer, Vesco, Ingerski, Dolan, & Hood, 2011). Items were asked "during the last year, how often

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did the following things happen?" Sample items included "I worried a lot," "I got a funny feeling in my stomach," "I felt scared, my hands got all sweaty," "I felt nervous." Responses were rated on a 4-point scale with 1 *(not at all)*, 2 *(a little)*, 3 *(some)*, and 4 *(a lot)*, which were summed to generate a total anxiety score. The STAIC has been shown to have high internal consistency among youth (Negriff, Hillman, & Dorn, 2011; Totura, Green, Karver, & Gesten, 2009). For the current study, the scale also showed high internal consistency at each grade level (α = .92–.94).

Alcohol use.—The alcohol use measure was adapted from items included in various national studies conducted among youth (e.g., Monitoring the Future, YRBSS). Participants were asked to indicate how many days in the past 30 days had they engaged in the following behaviors: "had at least one drink of alcohol" or "have 5 or more drinks of alcohol in a row." Responses were rated on a 7-point Likert scale, with 1 (*0-days*), 2 (*1 or 2 days*), 3 (*3–5 days*), 4 (*6–9 days*), 5 (*10–19 days*), 6 (*20–29 days*) and 7 (*everyday*) which were summed to generate a total alcohol use score. The scales showed good internal consistency at each grade level (α = .91–.95).

Self-esteem.—Self-esteem was included as a covariate due to relationship with peer victimization (Carbone-Lopez, Esbensen, & Brick, 2010) and substance use outcomes (Luk et al., 2016). The self-esteem measure was adapted from items included in various national studies conducted among youth (e.g., Monitoring the Future, YRBSS). Participants were asked to respond to eight statements describing themselves, such as "I think I am good looking" and "I like who I am." Response were rated on a 4-point Likert scale (*1=strongly disagree* to 4 = *strongly agree*), which were summed to generate a total self-esteem score. The measure showed good internal consistency at each grade level (α = .82–.85).

Antisocial behavior.—Antisocial behavior was included as a covariate due to its relationship with peer victimization (Carbone-Lopez et al., 2010; Sullivan et al., 2006) and substance use (Cho et al., 2014). The antisocial behavior measure was adapted from items included in various national studies conducted among youth (e.g., Monitoring the Future, YRBSS). Items include questions such as "I took something on purpose that was not mine" and "I did something my parents told me not to do." Responses were rated on a 4-point Likert scale (1=never to 4 = *regularly (every week or two)*), which were summed to generate a total antisocial behavior score. The measure showed adequate internal consistency at each grade level (α = .73–.74).

Data Analyses.—Preliminary analysis was conducted using SPSS. Structural equation modeling was conducted in Stata 13.0, using a maximum likelihood estimation for missing values, to examine the prospective relationships between peer victimization, depressive or anxiety symptoms, and alcohol use across two time periods: 9^{th} to 11^{th} grade and 10^{th} to 12^{th} grade (Figures 1–2). Two models were run, one with depressive symptoms as the mediator and the other with anxiety symptoms as the mediator. Within each model, 9^{th} grade scores on the opposite mood symptoms was included as a covariate (i.e., depressive symptoms included as a covariate within the anxiety model and anxiety symptoms included as a covariate within the depression model). Additional covariates included in the models

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were: gender, social mobility (as a proxy for socioeconomic status), and grade 9 scores of self-esteem and antisocial behavior. Lastly, to examine whether hypothesized pathways were similar across racial groups, models were run in which estimates were generated separately for African American and White youth. Global goodness of model fit was evaluated using chi-square and its *p*-value (Bollen & Long, 1992); local goodness of fit was assessed with the comparative fit index (CFI), for which ideal values range between 0.90 and 1.0, as well as the root mean square error of approximation (RMSEA; Brown & Cudeck, 1993), for which values of .08 or below indicate reasonable fit of the model to the data.

Results

Preliminary Analysis

Prevalence of past year peer victimization was 15.9% during 9th grade, 15.4% during 10th grade, 12.4% during 11th grade, and 14.4% during 12th grade. Past month alcohol use was reported to be 27.8% among 9th graders, 34.1% among 10th graders, and 36.8% among 11th graders, and 46.9% among 12th graders. Mean differences between racial groups were also examined for all study variables. Based on a one-way ANOVA, African American youth reported lower scores on each study variable compared to White youth, except for antisocial behavior in which scores were comparable. See to Table 1 for more details on descriptive statistics for study variables.

Path Model: Relationship between Peer Victimization, Depressive Symptoms, and Substance Use

The preliminary model (Figure 1) demonstrated poor fit ($\chi^2[89]= 2107.078$, $p < .001$; CFI=0.733; RMSEA[90% CI]= .091 [.093 – 0.111], $p <.001$). Modification indices suggested the addition of one error term covariance (9th grade bullying with 9th grade depression), which significantly improved the fit of the model ($\chi^2[88]= 900.904$, $p < .001$; CFI=0.899; RMSEA[90% CI]= 0.061 [.058–.068], $p <.001$; $\Delta\chi^2[1]= 1206.27(1)$, $p < .001$). In the overall sample, accounting for gender and 9th grade assessments for social mobility, self-esteem, antisocial behavior, and anxiety symptoms, a significant prospective effect was found for peer victimization at grade 9 on depressive symptoms at grade 10 (b[SE] = 0.12[0.03], $p<.001$). However, depressive symptoms at grade 10 did not significantly predict alcohol use at grade 11. The indirect pathway between 9th grade peer victimization, 10th grade depressive symptoms and 11th grade alcohol use was also non-significant. For the 10th to 12th grade pathway, accounting for the covariates, peer victimization at grade 10 was significantly predictive of depressive symptoms at grade 11 (b[SE] = 0.08[0.03], $p<.001$). Depressive symptoms at 11th grade also significantly predicted alcohol use at 12 grade (b[SE] = 0.17[0.06], $p<.001$). The mediation pathway between 10th grade peer victimization, 11th grade depressive symptoms, and 12th grade alcohol was also significant (b[SE] = 0.02[0.006], $p<.05$).

When examining pathways by race, a significant prospective effect of peer victimization on later depressive symptoms was found for White youth at both 9th grade (b[SE] = 0.08[0.03], $p<.05$) and 10th grade (b[SE] = 0.08[0.02], $p<.001$). However, the pathway from depressive symptoms to later alcohol use was non-significant for White youth at 10th to 11th grade, with

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a marginally significant effect at 11th to 12th grade (b[SE] = 0.12[0.06], p<.10). The indirect pathway of peer victimization to alcohol use through depressive symptoms was marginally significant for White youth during 10th to 12th grade (b[SE] = 0.01[0.006], p<.10). For African American youth, the effect of peer victimization at 9th grade on depressive symptoms at 10th grade was marginally significant (b[SE] = 0.13[0.08], p<.10), with a non-significant effect found for 10th to 11th grade. Depressive symptoms were not significantly predictive of alcohol use at either grade for African American youth. Both indirect pathways of peer victimization to later alcohol use through depressive symptoms were also non-significant for African American youth. Unstandardized path model estimates are presented in Figure 1.

Path Model: Relationship between Peer Victimization, Anxiety Symptoms, and Alcohol Use

The preliminary model (Figure 2) demonstrated poor fit (χ^2[89]= 4909.014, p < .001; CFI=0.644; RMSEA[90% CI]= .078 [.061–.085], p <.001). Modification indices suggested the addition of one error term covariance (9th grade bullying with 9th grade anxiety), which significantly improved the fit of the model (χ^2[16]= 33.829, p <.001; CFI=0.901; RMSEA[90% CI]= 0.41 [.040-.042], p <.001; $\Delta\chi^2$[1]= 12579.08(1), p < .001). In the overall sample, a significant prospective effect was found for peer victimization at grade 9 on anxiety symptoms at grade 10 (b[SE] = 0.09[0.03], p<.001) and for peer victimization at grade 10 on anxiety symptoms at grade 11 (b[SE] = 0.07[0.02], p<.001). The prospective effect of anxiety symptoms on later alcohol use was observed at both grade 10 (b[SE] = 0.12[0.05], p<.01) and grade 11 (b[SE] = 0.09[0.05], p<.05). A significant mediation pathway between peer victimization, anxiety symptoms, and alcohol was found for 9th to 11th grade (b[SE] = 0.002[0.001], p<.01) and 10th to 12th grade (b[SE] = 0.001[0.004], p<.01).

Examining the pathways by race, a direct effect of peer victimization on later anxiety symptoms was found for White youth at 9th grade (b[SE] = 0.08[0.04], p<.05), with a marginally significant effect at 10th grade (b[SE] = 0.05[0.03], p<.10). The pathway from anxiety symptoms to later alcohol use was significant for White youth for 10th to 11th grade (b[SE] = 0.13[0.05], p<.01) and 11th to 12th grade (b[SE] = 0.12[0.02], p<.001). The indirect pathway of peer victimization to alcohol use through anxiety symptoms was significant for White youth during 9th to 11th grade (b[SE] = 0.02[0.01], p<.05). For African American youth, the effect of peer victimization at 9th grade on anxiety symptoms at 10th grade was significant (b[SE] = 0.31[0.09], p<.01), with a non-significant effect found for 10th to 11th grade. Anxiety symptoms were not significantly predictive of alcohol use at any grade for African American youth. Both indirect pathways of peer victimization to later alcohol use through anxiety symptoms were non-significant among African American youth. Unstandardized path model estimates are presented in Figure 2.

Alternative Models and Sensitivity Analysis

Several alternative models were conducted prior to the models presented above. First, different approaches were considered to determine if depression and anxiety symptoms could be investigated within the same model, such as examining the direct and indirect effects for depression and anxiety simultaneously as well as including a latent variable

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representing depression and anxiety symptoms. These alternatives resulted in model fit challenges, as well as convergence problems. It was determined that models run with depression and anxiety as separate mediators, but with baseline assessments of the other mood symptom as a covariate was the best solution and produced the most parsimonious fit to the data. Second, alternative means of fitting the final model were explored with the inclusion and exclusion of cross-sectional paths within the final model. In the final model within wave effects between peer victimization, depression and anxiety symptoms, and alcohol use, as well as autoregressive effects between variables across time were retained as removing these paths resulted in substantial decreases in both global and local fit indices. Last, race analyses were conducted for the two most frequent groups within our sample – White and African American youth. Analyses with other racial/ethnic groups were removed as the sample sizes of the other groups were too small to adequately test the hypothesized pathways.

Discussion

Peer victimization during high school is associated with increased risk for alcohol use during this developmental period (e.g., Maniglio, 2017). However, less is known as to the mechanisms, such as depressive and anxiety symptoms, that may underlay this risk pathway (e.g., Earnshaw et al., 2017). Moreover, to date, limited work has been conducted examining if the potential risk pathways operate similarly across racial/ethnic groups. The primary aim of the current study was to determine whether depression and anxiety symptomatology mediated the relationship between peer victimization and alcohol use among high school youth, and whether this risk process was found for both African American and White youth.

Support was found for the first hypothesis, with a significant mediating role found for depression and anxiety symptomatology within the relationship between peer victimization and alcohol use. However, this effect was found to differ based on grade level. Specifically, when examining the indirect pathway between peer victimization and alcohol use via depressive symptoms, a significant effect was only found for the 10^{th} to 12^{th} grade pathway. This suggests that for high school youth, the role of depressive symptoms on the relationship between peer victimization and alcohol use may be delayed until late adolescence. However, for anxiety symptoms, a significant pathways was found for both 9^{th} to 11^{th} grade and 10^{th} to 12^{th} grade, suggesting a more robust and consistent influence of anxiety symptoms on the risk pathway between peer victimization and alcohol use across high school years. It is also plausible that there may be interactive effects of anxiety and depressive symptoms (Hamilton, Potter, Olino, Abramson, Heimberg, & Alloy, 2016; Jacobson & Newman, 2017), such that after prolonged exposure to peer victimization, the worry captured by anxiety might manifest into depression as the victimized adolescent internalizes more of their experience. Further research is needed to empirically test the potential interactive effect of anxiety and depressive symptoms on substance use outcomes a function of exposure to peer victimization across adolescence.

The findings on the prospective relationship between peer victimization, depression and anxiety symptomatology, and alcohol use also have important clinical implications, as the present findings highlight that addressing anxiety and depressive symptomatology may be an

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effective target to reduce risk for alcohol use among youth who have experienced peer victimization. Moreover, the present study indicates a transitional period between 10th and 11th grade where the indirect effect of alcohol use as a consequence of peer victimization though negative affect changes from primarily anxiety as the mediating factor to both anxiety and depressive symptoms. Thus, programs that are implemented to address the needs of youth who have experienced peer victimization and deter alcohol use may be more effective by addressing anxiety symptoms among younger adolescents, whereas addressing both anxiety and depressive symptoms may be more appropriate and effective for older adolescents. Additionally, given that the perception of school-based peer victimization is not often identified by adolescents or adults (Bradshaw, Sawyer, & O'Brennan, 2007) and adolescents do not always feel comfortable disclosing their victim status (Eliot, Cornell, Gregory, & Fan, 2010), providing selective interventions for youth expressing symptoms of depression and anxiety, based on developmental stage, may reach victimized youth who may otherwise not be identified.

The second aim of the study was to examine whether the indirect effect of peer victimization on alcohol use through depression and anxiety symptoms would be observed when stratifying the sample based on self-identified race: African American and White. Interestingly, contrary to the overall model of significant indirect effects of peer victimization on alcohol use through both depressive and anxiety symptoms, when stratified by race these relationships were primarily observed for White youth. Specifically, White youth who reported peer victimization in 9th grade were more likely to drink alcohol during 11th grade indirectly through 10th grade anxiety symptomatology. Moreover, a marginally significant indirect effect of depressive symptoms was found for the prospective relationship between 10th grade peer victimization and 12th grade alcohol use. Within the stratified model, there were no significant indirect effects through either depressive or anxiety symptoms for African American youth. These findings indicate that effects found in the full model may not be representative of African American, as the effects appear to be largely driven by the relationships observed for White youth.

For African American youth, the non-significant effect may potentially be explained by protective factors that have been shown to reduce risk for health outcomes among this group (e.g., Cook, 2000; Utsey, Giesbrecht, Hook, & Stanard, 2008). For example, African American youth are more likely to report being religious or attending religious services that their White peers (Wallace, Forman, Caldwell, & Willis, 2003), and these differences in religiosity have been posited to be an explanatory factor in group differences in substance use (Brown, Parks, Zimmerman, & Phillips, 2001; Wallace, Brown, Bachman, & Laveist, 2003). Thus, it is plausible that African Americans may rely more heavily on positive religious coping strategies that may protect them from the development of anxiety or depressive symptoms and subsequent alcohol use (Chapman & Steger, 2010). Additionally, cultural factors, such as racial identity have also been shown to be protective against substance use outcomes for African American youth (Caldwell, Sellers, Bernat, & Zimmerman, 2004; Zapolski, Fisher, Banks, Hensel, & Barnes-Najor, 2017). It may be the case that racial identity was high among our sample, which resulted in a non-significant effect of peer victimization on alcohol use through depressive and anxiety symptoms. Future research is needed to test the potential moderating role of these variables within risk models

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of peer victimization and substance use outcomes among African American youth. Lastly, although depressive and anxiety symptoms does not appear to mediate the pathway between peer victimization and alcohol use for African American youth, given that a significant direct effect between peer victimization and alcohol use was observed, other factors may operate as significant mediators within this risk pathway. For example, within the racial discrimination literature, it has been suggested that anger mediates the relationship between discrimination and substance use (Gibbons et al., 2010; Terrell, Miller, Foster, & Watkins, 2006). Thus, additional research is warranted examining how peer victimization may influence alcohol use through mechanisms other than depressive and anxiety symptoms among African American youth.

The current study is novel in that it utilized a prospective design to investigate the effect of peer victimization on alcohol use through depression and anxiety symptoms among high school youth, and whether pathways were similar based on racial background; however findings should be interpreted in light of the study's limitations. First, the impact of peer victimization was examined in isolation. However, it is also true that youth may be a victim of peer aggression in one context and become the perpetrator in another (e.g., Krug, Mercy, Dahlberg, & Zwi, 2002; Ryoo, Wang, & Swearer, 2015). Furthermore, youth who are bully-victims have been shown to have more internalizing problems (e.g., depression, anxiety), externalizing problems (e.g., aggression, substance use), fewer prosocial behaviors, and greater academic difficulties than youth who are only victims or have never been victimized (Arseneault et al., 2006). Therefore, future studies might look at specific peer victimization behavior or victim experiences to determine if this differentially impacts future alcohol or other substance use. Second, anxiety was measured by a scale that did not differentiate the varying types of anxiety that youth experience (Kaplow, Curran, Angold, & Costello, 2001). Moreover, given the social climate during high school, in which peer interactions are critical (Wang & Eccles, 2012), anxiety about group conformity might also differentially impact patterns of use and motivation for alcohol use. Thus, further research is needed to examine whether varying types of anxiety differentially explain the relationship between peer victimization and alcohol use among adolescents, as understanding this difference can have important implications on intervention programming. Third, in regards to race, alcohol is most widely consumed by White adolescents (Chen & Jacobson, 2012; Miech et al., 2016) which could have potentially inflated the data for White youth compared to African American youth. Future studies are needed to examine the impact of peer victimization on other substances such as cannabis and tobacco, which have been shown to vary by race (Chen & Jacobson, 2012) and for cannabis in particular, as it is a more salient outcome among racial/ethnic minorities compared to their White counterparts (Johnson et al., 2015). Finally, small sample size of other race groups in the present sample limited power to detect an effect among these groups and resulted in exclusion of other racial/ethnic groups within the study analyses. Future studies are warranted examining whether the proposed pathways are valid for other racial/ethnic groups.

Conclusion

Previous research has examined the effect of peer victimization on substance use outcomes, however few have investigated mechanisms underlying this risk process. The current study

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aim to fill this gap in the literature by providing a better understanding on the influence of depressive and anxiety symptoms within the risk pathway between exposure to peer victimization and adolescent alcohol use among high school youth. Moreover, pathways were examined by race to determine if the proposed pathways operated similarly for African American and White youth. The findings indicated a mediation pathway through anxiety for both the 9^{th} –11^{th} grade pathway and the 10^{th}-12^{th} grade pathways, with an effect observed for depressive symptoms only at the 10^{th}-12^{th} grade pathway. Moreover, these effects were primarily found for White youth, with no evidence of an indirect relationship through depression or anxiety symptoms for African American youth. These findings suggest that intervention efforts to address school-based peer victimization on alcohol use may be most effective by addressing anxiety symptoms, with depressive symptoms also being an important target during later adolescence. However, these targets may be more effective for White youth, given no evidence of a risk pathway through anxiety and depressive symptoms for African American youth. For African American youth, more research is needed to determine whether there are other mechanisms that mediate the relationship between peer victimization and substance use outcomes, as well as specific circumstances in which peer victimization might impact substance use outcomes for this group of youth. A better understanding of these relationships is critical in the aim to prevent substance use among adolescent populations.

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Tamika C. B. Zapolski, is a clinical psychologist and an Assistant Professor of Psychology at Indiana University-Purdue University Indianapolis. Dr. Zapolski’s research program examines the influence of cultural and psychosocial factors on behavioral health outcomes among youth, with a particular focus on outcomes among racial/ethnic minority youth.

Devon J. Hensel, is a sociologist and an Assistant Research Professor of Pediatrics at the Indiana University School of Medicine and an Assistant Professor of Sociology at Indiana University Purdue University Indianapolis. Dr. Hensel’s research expertise includes adolescent sexual health, romantic/sexual relationships development and methods for longitudinal data analysis.

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Sycarah Fisher, is a school psychologist and an Assistant Professor in the Department of Educational, School, and Counseling Psychology at the University of Kentucky. Dr. Fisher's research focuses on the implementation of school-based substance use interventions and the identification of risk and protective factors related to African American adolescent substance use.

Jessica Barnes-Najor is the Associate Director of the Community Evaluation and Research Collaborative at Michigan State University. She received her doctorate in Developmental Psychology from Michigan State University. Her major research interests include understanding the contextual supports that promote positive development for children and adolescents from diverse racial, ethnic and socio-economic backgrounds.

References

Álvarez-García D, García T, & Núñez JC (2015). Predictors of school bullying perpetration in adolescence: A systematic review. Aggression and Violent Behavior, 23, 126–136.

Arseneault L, Bowes L, & Shakoor S (2010). Bullying victimization in youths and mental health problems: 'Much ado about nothing'?. Psychological Medicine, 40(5), 717–729. [PubMed: 19785920]

Arseneault L, Walsh E, Trzesniewski K, Newcombe R, Caspi A, & Moffitt TE (2006). Bullying victimization uniquely contributes to adjustment problems in young children: a nationally representative cohort study. Pediatrics, 118(1), 130–138. [PubMed: 16818558]

Barnes J, Almerigi J, & Hsu WW (2009). Coordinated community assessment: Data from the Coordinated Community Student Survey.

Bollen KA, & Long JS (1992). Tests for structural equation models: introduction. Sociological Methods & Research, 21(2), 123–131.

Bradshaw CP, Sawyer AL, & O'Brennan LM (2007). Bullying and peer victimization at school: Perceptual differences between students and school staff. School Psychology Review, 36(3), 361.

Brown M, & Cudeck R (1993). EQS structural equations program manual. Multivariate Software Inc., Los Angeles.

Buckner JD, Schmidt NB, Lang AR, Small JW, Schlauch RC, & Lewinsohn PM (2008). Specificity of social anxiety disorder as a risk factor for alcohol and cannabis dependence. Journal of Psychiatric Research, 42(3), 230–239. http://doi.org/10.10167j.jpsychires.2007.01.002 [PubMed: 17320907]

Buu A, Dipiazza C, Wang J, Puttler LI, Fitzgerald HE, & Zucker RA (2009). Parent, family, and neighborhood effects on the development of child substance use and other psychopathology from preschool to the start of adulthood. Journal of Studies on Alcohol and Drugs, 70(4), 489–498. [PubMed: 19515288]

Caldwell CH, Sellers RM, Bernat DH, & Zimmerman MA (2004). Racial identity, parental support, and alcohol use in a sample of academically at-risk African American high school students. American Journal of Community Psychology, 34(1–2), 71–82. https://doi-org.proxy.ulib.uits.iu.edu/10.1023/B:AJCP.0000040147.69287.f7 [PubMed: 15495795]

Carbone-Lopez K, Esbensen FA, & Brick BT (2010). Correlates and consequences of peer victimization: Gender differences in direct and indirect forms of bullying. Youth Violence and Juvenile Justice, 8(4), 332–350.

Chapman LK, & Steger MF (2010). Race and religion: Differential prediction of anxiety symptoms by religious coping in African American and European American young adults. Depression and Anxiety, 27(3), 316–322 [PubMed: 20225240]

Chen P, & Jacobson KC (2012). Developmental trajectories of substance use from early adolescence to young adulthood: Gender and racial/ethnic differences. Journal of Adolescent Health, 50(2), 154–163. [PubMed: 22265111]

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

Cho SB, Heron J, Aliev F, Salvatore JE, Lewis G, Macleod J, Hickman M, Maughan B, Kendler KS, … Dick DM (2014). Directional relationships between alcohol use and antisocial behavior across adolescence. Alcoholism, Clinical and Experimental Research, 38(7), 2024–33.

Cook KV (2000). "You have to have somebody watching your back, and if that's God, then that's mighty big": The church's role in the resilience of inner-city youth. Adolescence, 35(140), 717–730. [PubMed: 11214210]

Dierker LC, Albano AM, Clarke GN, Heimberg RG, Kendall PC, Merikangas KR, … & Kupfer DJ (2001). Screening for anxiety and depression in early adolescence. Journal of the American Academy of Child & Adolescent Psychiatry, 40(8), 929–936. [PubMed: 11501693]

Earnshaw VA, Elliott MN, Reisner SL, Mrug S, Windle M, Emery ST, … & Schuster MA (2017). Peer victimization, depressive symptoms, and substance use: a longitudinal analysis. Pediatrics, e20163426.

Eliot M, Cornell D, Gregory A, & Fan X (2010). Supportive school climate and student willingness to seek help for bullying and threats of violence. Journal of School Psychology, 48(6), 533–553. [PubMed: 21094397]

Erikson EH (1968). Identity: Youth and crisis (No. 7). WW Norton & Company.

Espelage DL, & Holt MK (2001). Bullying and victimization during early adolescence: Peer influences and psychosocial correlates. Journal of Emotional Abuse, 2(2–3), 123–142.

Espelage DL, Low S, & De La Rue L (2012). Relations between peer victimization subtypes, family violence, and psychological outcomes during early adolescence. Psychology of Violence, 2(4), 313.

Finkelhor D (2014). Trends in bullying and peer victimization.

Garber J, Clarke GN, Weersing VR, Beardslee WR, Brent DA, Gladstone TR, … & Shamseddeen W (2009). Prevention of depression in at-risk adolescents: a randomized controlled trial. JAMA: Journal of The American Medical Association, 301(21), 2215–2224. [PubMed: 19491183]

Gibbons FX, Etcheverry PE, Stock ML, Gerrard M, Weng CY, Kiviniemi M, & O'hara RE (2010). Exploring the link between racial discrimination and substance use: What mediates? What buffers?. Journal of Personality and Social Psychology, 99(5), 785–801. doi: 10.1037/a0019880. [PubMed: 20677890]

Gladstone GL, Parker GB, & Malhi GS (2006). Do bullied children become anxious and depressed adults?: A cross-sectional investigation of the correlates of bullying and anxious depression. The Journal of Nervous and Mental Disease, 194(3), 201–208. [PubMed: 16534438]

Hamilton JL, Potter CM, Olino TM, Abramson LY, Heimberg RG, & Alloy LB (2016). The temporal sequence of social anxiety and depressive symptoms following interpersonal stressors during adolescence. Journal of Abnormal Child Psychology, 44(3), 495–509. [PubMed: 26142495]

Hanish LD, & Guerra NG (2000). The roles of ethnicity and school context in predicting children's victimization by peers. American Journal of Community Psychology, 28, 201–223. [PubMed: 10836091]

Hawker DS, & Boulton MJ (2000). Twenty years' research on peer victimization and psychosocial maladjustment: A meta-analytic review of cross-sectional studies. The Journal of Child Psychology and Psychiatry and Allied Disciplines, 41(4), 441–455.

Herzer M, Vesco A, Ingerski LM, Dolan LM, & Hood KK (2011). Explaining the family conflict-glycemic control link through psychological variables in adolescents with type 1 diabetes. Journal of Behavioral Medicine, 34(4), 268–274. [PubMed: 21222028]

Hong JS, Davis JP, Sterzing PR, Yoon J, Choi S, & Smith DC (2014). A conceptual framework for understanding the association between school bullying victimization and substance misuse. American Journal of Orthopsychiatry, 84(6), 696–710. doi: 10.1037/ort0000036 [PubMed: 25545436]

Hong JS, & Espelage DL (2012). A review of research on bullying and peer victimization in school: An ecological system analysis. Aggression and Violent Behavior, 17(4), 311–322.

Hong JS, Voisin DR, Cho S, Smith DC, & Resko SM (2017). Peer victimization and substance use among African American adolescents and emerging adults on Chicago's Southside. American Journal of Orthopsychiatry. Advance online publication. 10.1037/ort0000247

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

Hughes D, Del Toro J, Harding JF, Way N, & Rarick JR (2016). Trajectories of discrimination across adolescence: Associations with academic, psychological, and behavioral outcomes. Child Development, 87(5), 1337–1351. [PubMed: 27684390]

Jacobson NC, & Newman MG (2017). Anxiety and depression as bidirectional risk factors for one another: A meta-analysis of longitudinal studies. Psychological Bulletin, 143(11), 1155. [PubMed: 28805400]

Jelleyman T, & Spencer N (2008). Residential mobility in childhood and health outcomes: a systematic review. Journal of Epidemiology & Community Health, 62(7), 584–592. [PubMed: 18559440]

Jiang Y, Yu C, Zhang W, Bao Z, & Zhu J (2016). Peer victimization and substance use in early adolescence: Influences of deviant peer affiliation and parental knowledge. Journal of Child and Family Studies, 25(7), 2130–2140. doi:10.1007/s10826-016-0403-z

Johnson RM, Fairman B, Gilreath T, Xuan Z, Rothman EF, Parnham T, & Furr-Holden CDM (2015). Past 15-year trends in adolescent marijuana use: differences by race/ethnicity and sex. Drug and Alcohol Dependence, 155, 8–15. [PubMed: 26361714]

Johnston LD, O'Malley PM, Bachman JG, Schulenberg JE. (2012). Monitoring the Future National Survey Results on Drug Use, 1975–2011 Volume I: Secondary School Students. Ann Arbor, MI: Institute for Social Research, University of Michigan.

Kaplow JB, Curran PJ, Angold A, & Costello EJ (2001). The prospective relation between dimensions of anxiety and the initiation of adolescent alcohol use. Journal of Clinical Child Psychology, 30(3), 316–326. [PubMed: 11501249]

Kochenderfer BJ, & Ladd GW (1996). Peer victimization: Cause or consequence of school maladjustment?. Child Development, 67(4), 1305–1317. [PubMed: 8890485]

Krug EG, Mercy JA, Dahlberg LL, & Zwi AB (2002). The world report on violence and health. The Lancet, 360(9339), 1083–1088.

Ladd GW, Ettekal I, & Kochenderfer-Ladd B (2017). Peer victimization trajectories from kindergarten through high school: Differential pathways for children's school engagement and achievement?. Journal of Educational Psychology, 109(6), 826.

Lazarus RS, & Folkman S (1984). Stress, appraisal, and coping. New York: Springer.

Luk JW, Patock-Peckham JA, Medina M, Terrell N, Belton D, & King KM (2016). Bullying perpetration and victimization as externalizing and internalizing pathways: A retrospective study linking parenting styles and self-esteem to depression, alcohol use, and alcohol-related problems. Substance Use & Misuse, 51(1), 113–25. [PubMed: 26757486]

Luk JW, Wang J, & Simons-Morton BG (2010). Bullying victimization and substance use among U.S. adolescents: mediation by depression. Prevention Science: The Official Journal of the Society for Prevention Research, 11(4), 355–9. [PubMed: 20422288]

Maniglio R (2017). Bullying and other forms of peer victimization in adolescence and alcohol use. Trauma, Violence, & Abuse, 18(4), 457–473.

Marshal MP, Burton CM, Chisolm DJ, Sucato GS, & Friedman MS (2013). Cross-sectional evidence for a stress-negative affect pathway to substance use among sexual minority girls. Clinical and Translational Science, 6, 321–322. doi:10.1111/cts.12052 [PubMed: 23919370]

Miech RA, Johnston LD, O'Malley PM, Bachman JG, & Schulenberg JE (2016). Monitoring the Future national survey results on drug use, 1975–2015: Volume I, Secondary school students. Retrieved from Ann Arbor: http://www.monitoringthefuture.org//pubs/monographs/mtf-vol1_2015.pdf

Negriff S, Hillman JB, & Dorn LD (2011). Does competence mediate the associations between puberty and internalizing or externalizing problems in adolescent girls?. Journal of Adolescent Health, 49(4), 350–356. [PubMed: 21939864]

Radliff KM, Wheaton JE, Robinson K, & Morris J (2012). Illuminating the relationship between bullying and substance use among middle and high school youth. Addictive Behaviors, 37(4), 569–572. [PubMed: 22277772]

Radloff LS (1977). The CES-D scale: A self-report depression scale for research in the general population. Applied Psychological Measurement, 1(3), 385–401.

Radloff LS (1991). The use of the Center for Epidemiologic Studies Depression Scale in adolescents and young adults. Journal of Youth and Adolescence, 20(2), 149–166. [PubMed: 24265004]

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

Reijntjes A, Kamphuis JH, Prinzie P, & Telch MJ (2010). Peer victimization and internalizing problems in children: A meta-analysis of longitudinal studies. Child Abuse & Neglect, 34(4), 244–252. [PubMed: 20304490]

Rigby KEN (2000). Effects of peer victimization in schools and perceived social support on adolescent well-being. Journal of Adolescence, 23(1), 57–68. [PubMed: 10700372]

Roberts RE, Lewinsohn PM, & Seeley JR (1991). Screening for adolescent depression: A comparison of depression scales. Journal of the American Academy of Child & Adolescent Psychiatry, 30(1), 58–66. [PubMed: 2005065]

Romero AJ, Martinez D, & Carvajal SC (2007). Bicultural stress and adolescent risk behaviors in a community sample of Latinos and non-Latino European Americans. Ethnicity and Health, 12(5), 443–463. [PubMed: 17978943]

Ryoo JH, Wang C, & Swearer SM (2015). Examination of the change in latent statuses in bullying behaviors across time. School Psychology Quarterly, 30(1), 105. [PubMed: 25111466]

Sangalang CC, Tran AG, Ayers SL, & Marsiglia FF (2016). Bullying among urban Mexican-heritage youth: Exploring risk for substance use by status as a bully, victim, and bully-victim. Children and Youth Services Review, 61, 216–221. [PubMed: 28190910]

Siegel RS, La Greca AM, & Harrison HM (2009). Peer victimization and social anxiety in adolescents: Prospective and reciprocal relationships. Journal of Youth and Adolescence, 38(8), 1096–1109. [PubMed: 19636774]

Smokowski PR, & Kopasz KH (2005). Bullying in school: An overview of types, effects, family characteristics, and intervention strategies. Children and Schools, 27(2), 101–110.

Spielberger CD (1973). State-Trait Anxiety Inventory for Children (STAIC): Preliminary Manual. Consulting Psychologists.

Stapinski LA, Bowes L, Wolke D, Pearson RM, Mahedy L, Button KS, & … Araya R (2014). Peer victimization during adolescence and risk for anxiety disorders in adulthood: A prospective cohort study. Depression And Anxiety, 31(7), 574–582. doi:10.1002/da.22270 [PubMed: 24788688]

Sullivan TN, Farrell AD, & Kliewer W (2006). Peer victimization in early adolescence: Association between physical and relational victimization and drug use, aggression, and delinquent behaviors among urban middle school students. Development and Psychopathology, 18(1), 119–137. [PubMed: 16478555]

Swendsen J, Burstein M, Case B, Conway KP, Dierker L, He J, & Merikangas KR (2012). Use and abuse of alcohol and illicit drugs in us adolescents: Results of the national comorbidity survey-adolescent supplement. Archives of General Psychiatry, 69(4), 390–398. doi:10.1001/archgenpsychiatry.2011.1503 [PubMed: 22474107]

Terrell F, Miller AR, Foster K, & Watkins CE Jr (2006). Racial discrimination-induced anger and alcohol use among black adolescents. Adolescence, 41(163), 485–492. [PubMed: 17225663]

Totura CMW, Green AE, Karver MS, & Gesten EL (2009). Multiple informants in the assessment of psychological, behavioral, and academic correlates of bullying and victimization in middle school. Journal of Adolescence, 32(2), 193–211. [PubMed: 18801565]

Utsey SO, Giesbrecht N, Hook J, & Stanard PM (2008). Cultural, sociofamilial, and psychological resources that inhibit psychological distress in African Americans exposed to stressful life events and race-related stress. Journal of Counseling Psychology, 55(1), 49.

Vitoroulis I, & Vaillancourt T (2015). Meta-analytic results of ethnic group differences in peer victimization. Aggressive Behavior, 41(2), 149–170. [PubMed: 27539935]

Wallace JM, Brown TN, Bachman JG, & Laveist TA (2003). The Influence of Race and Religion on Abstinence from Alcohol, Cigarettes and Marijuana among Adolescents. Journal of Studies on Alcohol, 64(6), 843–848. https://doi-org.proxy.ulib.uits.iu.edu/10.15288/jsa.2003.64.843 [PubMed: 14743948]

Wallace JM Jr., Forman TA, Caldwell CH, & Willis DS (2003). Religion and US Secondary School Students: Current Patterns, Recent Trends, and Sociodemographic Correlates. Youth & Society, 35(1), 98–125. https://doi-org.proxy.ulib.uits.iu.edu/10.1177/0044118X03254564

Wang MT, & Eccles JS (2012). Social support matters: Longitudinal effects of social support on three dimensions of school engagement from middle to high school. Child Development, 83(3), 877–895. [PubMed: 22506836]

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

Wu P, Goodwin RD, Fuller C, Liu X, Comer JS, Cohen P, & Hoven CW (2010). The Relationship Between Anxiety Disorders and Substance Use Among Adolescents in the Community: Specificity and Gender Differences. Journal of Youth and Adolescence, 39(2), 177–188. 10.1007/s10964-008-9385-5 [PubMed: 20084563]

Zapolski TCB, Fisher S, Banks D, Hensel D, & Barnes-Najor J (2017). Examining the protective effect of ethnic identity on drug attitudes and use among a diverse youth population. Journal of Youth and Adolescence, 46(8), 1702–1715. doi: 10.1007/s10964-016-0605-0 [PubMed: 27830403]

Zapolski TCB, Rowe AT, Fisher S, Hensel DJ, & Barnes-Najor J (2018). Peer victimization and substance use: Understanding the indirect effect of depressive symptomatology across gender. Addictive Behaviors, 84, 160–166. https://doi-org.proxy.ulib.uits.iu.edu/10.1016/j.addbeh.2018.04.010 [PubMed: 29698871]

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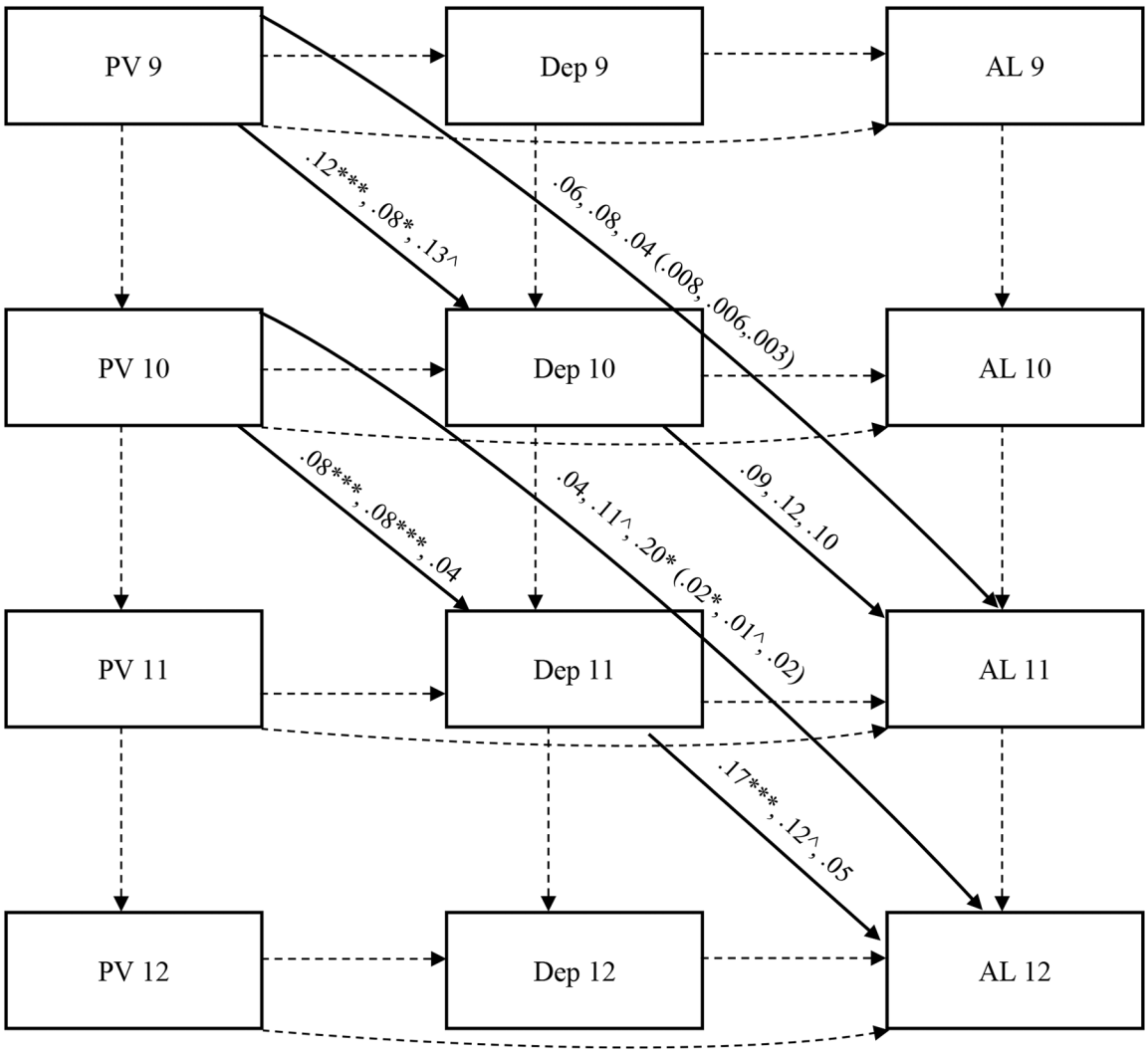

Figure 1. Mediation pathway of peer victimization, depressive symptoms, and alcohol use across 9th to 12th grade

Depiction of structural model representing the pathways from peer victimization to alcohol use through depressive symptoms. For ease of presentation, hypothesized pathways are presented with bolded arrows. Pathways included in the tested model, but not included in the study hypotheses are presented with dashed arrows. The first coefficient is for the overall sample, the second for White youth, and the third for African American youth. Indirect coefficients are included in parenthesis. PV=peer victimization, Dep=depressive symptoms, AL=alcohol use, 9=9th grade, 10=10th grade, 11=11th grade, 12= 12th grade. Not included in the figure, for ease of presentation, are correlations among the variables, disturbance terms, error terms, and covariates. ^p<.01, * p <.05, ** p <.01, ***p <.001

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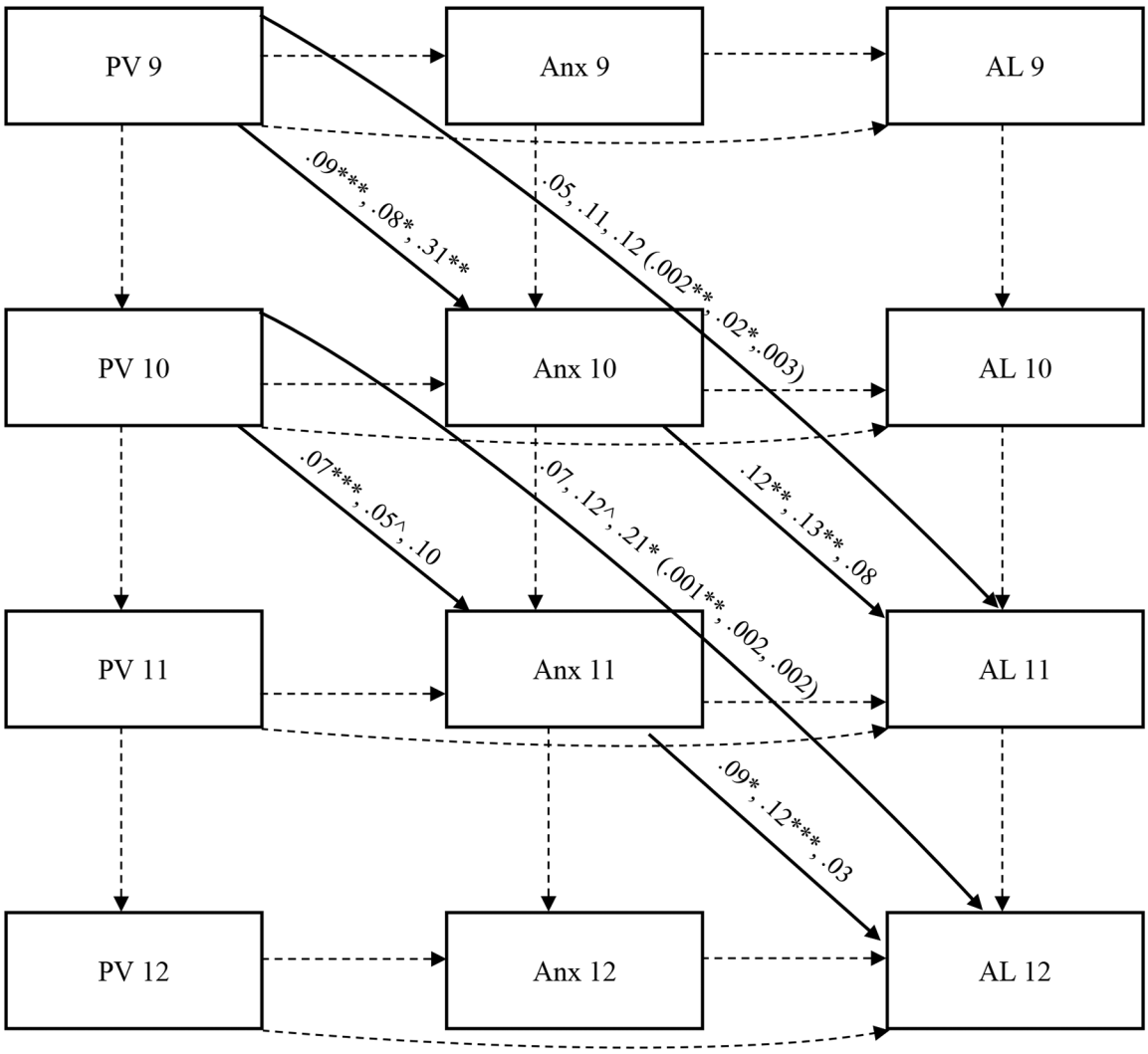

Figure 2. Mediation pathway of peer victimization, anxiety symptoms, and alcohol across 9th to 12th grade

Depiction of structural model representing the pathways from peer victimization to alcohol use through anxiety symptoms. For ease of presentation, hypothesized pathways are presented with bolded arrows. Pathways included in the tested model, but not included in the study hypotheses are presented with dashed arrows. The first coefficient is for the overall sample, the second for White youth, and the third for African American youth. Indirect coefficients are included in parenthesis. PV=peer victimization, Anx=anxiety symptoms, AL=alcohol use, 9=9th grade, 10=10th grade, 11=11th grade, 12= 12th grade. Not included in the figure, for ease of presentation, are correlations among the variables, disturbance terms, error terms, and covariates. ^p<.01, * p <.05, ** p <.01, ***p <.001

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Table 1.

Descriptive statistics for peer victimization, depressive and anxiety symptoms, and alcohol use for the full sample and by race

	Score Range	Total Sample *M* (SD)	African American *M* (SD)	White *M* (SD)
Social Mobility	0–4	.39 (.64)	.61 (.76)	.35 (.60) *
Self-Esteem	1–4	3.29 (.55)	3.52 (.45)	3.24 (.55) *
Antisocial Behavior	1–4	1.62 (.56)	1.59 (.53)	1.62 (.57)
Peer Victimization	1–4	1.55 (.51)	1.49 (.43)	1.56 (.52) *
Depressive Symptoms	1–4	2.14 (.65)	2.02 (.61)	2.15 (.65) *
Anxiety Symptoms	1–4	2.56 (.81)	2.33 (.79)	2.60 (.80) *
Alcohol Use	1–7	3.11 (2.24)	2.42 (1.23)	3.22 (2.34) *

Note: Covariate means based on grade 9 data. All other mean values based on scores across all waves of data.

* mean difference at $p < .05$ between African American and White youth