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Examining the Pathways Between Bully Victimization, Depression, Academic Achievement, and Problematic Drinking in Adolescence

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In this article, we expand and test several theoretical models addressing the longitudinal relationships between bully victimization, depression, academic achievement, and problematic drinking from 3 approaches: Interpersonal risk model, symptom driven model, and a transactional model. Unfortunately, prior research has failed to consider these associations at the within-person level, which is arguably a more relevant level of analysis. Participants were 1,875 students sampled from four Midwestern middle schools and followed for 2 years. Baseline age ranged from 11–13 years with a racially diverse sample (44.3% African American, 29.2% White, 7% Hispanic, 3% Asian/Pacific Islander, and 16.5% Multi-Racial). The current study used an auto-regressive latent trajectory with structured residuals (ALT-SR) model to examine the within-person cross-lagged associations between bully victimization, depression, academic achievement, and problematic drinking. Results indicated support for an interpersonal risk model, where experiences of early bullying victimization resulted in a cascade of problems throughout middle school. Within this interpersonal risk model we also established that academic achievement was a key mechanism linking bully victimization to problematic drinking during adolescence We did not find evidence for a traditional symptom driven model (e.g., stemming from depression); however, we did find long-term problems stemming from early problematic drinking. Results are discussed in relation to prevention interventions for problematic drinking as well as screenings for early adolescent depression, bully victimization, and academic problems.

Keywords: peer victimization, substance abuse, depression, academic achievement, child abuse

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Adolescent problematic drinking is a major public health concern. Nearly 65% of teens report consuming alcohol before graduating high school and 23% report being drunk in the past year (Miech, Johnston, O'Malley, Bachman, & Schulenberg, 2015). Bully victimization is a significant contributor to the initiation (Valdebenito, Ttofi, & Eisner, 2015) and escalation (Gilreath, Astor, Estrada, Benbenishty, & Unger, 2014) of alcohol consumption, with 15% of alcohol consuming teens reporting some form of bully victimization (Modecki, Minchin, Harbaugh, Guerra, & Runions, 2014). Bully victimization is associated with higher rates of

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substance use among middle and high school students (Topper, Castellanos-Ryan, Mackie, & Conrod, 2011), with more frequent victimization experiences (i.e., weekly) being associated with heavier drinking compared to nonvictimized youth (Tharp-Taylor, Haviland, & D'Amico, 2009). Correlates of bully victimization include poorer academic achievement and mental health problems (Cole et al., 2014; Niemelä et al., 2011), both of which are associated with alcohol use and related consequences (Bryant, Schulenberg, O'Malley, Bachman, & Johnston, 2003).

Taken together, the psychological sequelae of experiencing ongoing peer victimization are wide ranging and present added risk toward the development of adverse behaviors such as substance misuse (Reijntjes, Kamphuis, Prinzie, & Telch, 2010). However, a better understanding of the mechanisms and transactional nature of how bully victimization, depression, academic achievement, and problematic alcohol use are related over time is needed. Hong et al. (2014) posited a theoretical model that proposed several mechanisms that explicate the association between bully victimization and increased substance misuse in adolescence (see online supplemental material Figure 1). The authors proposed that individual and contextual risk factors related to bully victimization and substance misuse are associated with individual characteristics and with the interpersonal and social environment contexts. The model proposed by Hong et al. (2014) is akin to an *interpersonal risk model*, which posits that increased exposure to bully victimization precipitates negative symptomology (e.g., academic achievement, depression) and increased risk for problematic alcohol use (Patterson & Capaldi, 1990). However, Hong et al. (2014) did not consider alternative models in which symptoms of depression antecede lower academic achievement, heightened levels of bully victimization, and increased problematic alcohol use (*symptom driven model*) or if these variables are reciprocally related to each other over time (*transactional model*). In the current study, we test and extend a theoretical model of the association between bully victimization and problematic drinking proposed by Hong et al. (2014) by evaluating three models: (a) interpersonal risk model (originally proposed); (b) a symptom driven model; and (c) a transactional model. Unfortunately, many of the current studies investigating these theoretical models focus on average between-person differences and do not disaggregate within- and between-person effects that carry different substantive meanings. Thus, our understanding of these relationships are limited and more nuanced methodologies that address multiple levels of analysis are needed.

Bully Victimization Definition

A standard definition of bullying in the literature is lacking (Olweus, 2004; Smorti, Menesini, & Smith, 2003). However, the World Health Organization (Srabstein & Leventhal, 2010) and the Centers for Disease Control and Prevention (CDC) define bullying as an intentional use of physical or psychological power threatened against another person, group or community that either result in or has a high likelihood of resulting in injury, death, psychological harm, mal-development, or deprivation (Gladden, Vivolo-Kantor, Hamburger, & Lumpkin, 2014). In line with these definitions, *bully victimization* in the present study is conceptualized as the experience of any intentional physical (e.g., hitting) or verbal (e.g., name-calling) aggressive act from peers that is repeated and intended to cause harm.

Interpersonal Risk Model

The model proposed by Hong et al. (2014) follows an interpersonal risk model. This theoretical model assumes that heightened distress with peers (e.g., bully victimization) constitutes a significant life stressor which, in turn, contributes to short and long-term problematic outcomes. Thus, youth who are victimized by their peers may develop a diluted sense of worthiness, leading to increased feelings of depression, decreased academic capabilities and ultimately, an increased risk of problematic alcohol use.

There are several studies that lend support to an interpersonal risk model where increased exposure to bullying victimization antecede the development of internalizing problems (e.g., depression; Cole et al., 2014; Niemelä et al., 2011; Schwartz, Lansford, Dodge, Pettit, & Bates, 2015; Stapinski, Araya, Heron, Montgomery, & Stallard, 2015), academic problems (Konishi, Hymel, Zumbo, & Zhen Li, 2010; Strøm, Thoresen, Wentzel-Larsen, & Dyb, 2013), and substance use (Espelage, Low, Rao, Hong, & Little, 2014; Tharp-Taylor et al., 2009). Prior studies indicate that bully victims experience a wide range of severe mental health and psychological problems including heightened levels of depression and anxiety (Hanish et al., 2004; Troop-Gordon & Ladd, 2005) and maladjustment during adolescence (Schwartz, Kurtines, & Montgomery, 2005). More recently, researchers have found that individuals who were bullied in childhood or adolescence have higher levels of psychological distress and nearly two times higher odds of having a depressive or anxiety disorder later in life (Takizawa, Maughan, & Arseneault, 2014).

Additionally, Tharp-Taylor et al. (2009) found that individuals who reported being bullied by their peers were nearly three times more likely to report current alcohol use. Others report that teens who identify as bully victims were 3 to 5 times more likely to use alcohol than nonvictims (Mishna, Khoury-Kassabri, Gadalla, & Daciuk, 2012). Further, being a victim of bullying in early childhood is associated with higher rates of binge drinking and being drunk in young adulthood, lending further evidence to the long-term effects of bullying on behavioral health outcomes (Niemelä et al., 2011). However, we cannot dismiss the close association that increased mental health (e.g., depression) and substance use have with bullying victimization. One study found the link between bullying victimization and substance use was fully mediated by depression (Luk, Wang, & Simons-Morton, 2009), lending further support for an interpersonal risk model. Lambe and Craig (2017) found similar results such that bullying and peer victimization were related to problematic alcohol use and cannabis use through increased negative affect and peer deviancy. Unfortunately, both studies utilized a cross-sectional design and as a result, the proposed mediators have no temporal order and thus are difficult to discern. Therefore, more research is needed on the longitudinal nature of these relationships and the mediating role of depression.

The link between bully victimization and academic functioning is less straightforward compared with that of victimization and behavioral and mental health outcomes. Some have found moderate to small associations between bullying victimization and worse academic achievement (Buhs, Ladd, & Herald, 2006; Konishi et

al., 2010; Strøm et al., 2013). In one meta-analytic study, teens who reported higher rates of bully victimization were more likely to have lower grades than those who did not experience peer victimization (Nakamoto & Schwartz, 2010). Theoretically, academic engagement and performance require a sense of emotional well-being and stability (Ryan & Deci, 2000) and some youth who experience bullying victimization experience negative psychological consequences, placing them at heightened risk for poor academic outcomes (Thijs & Verkuyten, 2008). Prior research has found that even temporary exposure to victimization can seriously impair academic achievement (Juvonen, Yueyan Wang, & Espinoza, 2011). Further, studies have found that individuals who, not only experienced higher rates of bullying performed worse academically, but those in *schools* with higher rates of bullying also had worse grades (Strøm et al., 2013). There have also been a handful of longitudinal studies that have found that victimized youth tend to have lower grades (Schwartz, Gorman, Nakamoto, & Toblin, 2005) or are more frequently absent from class than nonvictimized youth (Buhs et al., 2006; Gastic, 2008). Other studies have found that victimization and academic achievement are indirectly related (Beran, Hughes, & Lupart, 2008) or not related (Kochenderfer & Ladd, 1996). However, many of these studies are cross-sectional and have not explored longitudinal (or reciprocal) relationships between bully victimization, mental health, academic achievement, and substance use.

Symptom Driven Model

Symptom driven models tend to receive less attention as testable hypotheses as, here, the reverse relationship is posited—depression symptoms confer a risk for maladaptive interpersonal outcomes, such as higher peer victimization, worse academic functioning, and increased substance use (Agoston & Rudolph, 2013; Kochel, Ladd, & Rudolph, 2012). Symptom driven models are situated among long lasting theories of depression and psychopathology. In particular, the "scar" theory of depression posits that youth who have experienced depressive episodes or symptomology will have long-term behavioral problems (Lewinsohn, Steinmetz, Larson, & Franklin, 1981; Rohde, Lewinsohn, Tilson, & Seeley, 1990). This type of model conflicts with Hong and colleagues' (2014) model on associations between bully victimization and subsequent substance use, such that the imposed directionality of effects would be challenged.

Evidence of symptom driven models are abundant. Prior research has shown that being the victim of bullying is predicted by internalizing problems such as anxiety or depression (Arseneault, Bowes, & Shakoor, 2010), leading some to posit that less aggressive youth who display internalizing problems signal that they are easy targets for bullying (Arseneault et al., 2010). Others have found evidence of symptom-driven pathways when investigating associations between depressive symptoms and peer related experiences (e.g., rejection, victimization, and acceptance; Krygsman & Vaillancourt, 2017). Further, studies have found that more substance use predicts higher rates of bully victimization (Gámez-Guadix, Orue, Smith, & Calvete, 2013), indicating that substance use may be a part of a larger pattern of problem behaviors (e.g., association with deviant or antisocial peers) that increase risk of bullying victimization (Jessor, 1991).

Transactional Models

Transactional models posit that aspects of interpersonal functioning, such as substance use and qualities of the environment (e.g., peer relationships) share a bidirectional relationship over time. These models propose that individuals who are victimized by peers exhibit social behavioral maladaptation (e.g., use substances) and such maladaptive responses may perpetuate victimization experiences. For example, Begle and colleagues (2011) sought to understand the bidirectional relationship between substance use, victimization, and delinquency. Results indicated a full cross-lagged association between substance use and victimization. However, these associations were dependent on several factors such as the type of victimization and biological sex. Others have estimated similar models, examining bidirectional associations between various victimization constructs (e.g., bullying, posttraumatic stress disorder) and substance use (Espelage et al., 2014) with most studies supporting these pathways. In the current study there is potential for a multitude of "transactional" processes (e.g., substance use and bully victimization, depression and substance use, etc.), but given our focus, we only sought to test potential bidirectional associations between bully victimization and substance use. However, other transactional processes may emerge that are exploratory and are not hypothesized, a priori.

Disaggregating Between and Within-Person Effects

Despite the longitudinal work that has been done to investigate the association between bullying, substance use, and potential mechanisms, many of the studies attempting to understand long-term cascade effects are limited in their scope and ability to accurately interpret estimated paths. Further, as noted by Vaillancourt, Brittain, McDougall, and Duku (2013), many studies utilize unidirectional modeling approaches; thus, missing an opportunity to understand reciprocal processes that exist over time. Even among the few studies that have incorporated bidirectionality in their models, including Begle et al. (2011) who found a full cross-lag relationship between victimization and substance use among teens, many have not answered the critical question of "*How do individuals change?*" Instead, many rely on methods that yield estimates that are an amalgam of both between-person and within-person variance (e.g., Auto-Regressive Cross-Lag [ARCL] models). This is important because within- and between-person variation carries very different meanings (see Berry & Willoughby, 2016; Hoffman, 2015; Hoffman & Stawski, 2009). *Within-Person* effects refer to variation around an individual mean, allowing us to understand how increases in, say, exposure to bully victimization at higher levels than *typical* are associated with higher (or lower) levels than typical of, say, problematic alcohol use. *Between-Person* effects refer to variation from the overall average and allow us to understand how higher values of bully victimization compared with the whole sample, are associated with problematic alcohol use. Unfortunately, most studies that examine reciprocal association over time use methods that address between-person variations (e.g., how an individual's victimization score is related to the entire sample) to answer within-person questions about development (e.g., how an individual's victimization score is related to their own average).

The current study extends our understanding of how bully victimization, depression, academic achievement, and problematic

alcohol consumption are reciprocally related over time. Specifically, we use recent advances in modeling longitudinal relationships that allow for the disaggregation of both within- and between-person effects. The most common method for testing reciprocal relationships is the ARCL structural equation model (Selig & Little, 2012). ARCL models typically yield estimates that are difficult (if not impossible) to interpret because they do not allow for the disaggregation of between- and within-person effects. Instead, they yield cross-lagged estimates that are a combination of between- and within-person estimates, weighted as a function of their respective reliabilities (Berry & Willoughby, 2016). This can have profound effects on the interpretability of the bidirectional (or uni-directional) relationship between two or more variables. These estimates are only plausible given the assumption that between- and within-person effects are identical—an assumption that is incredibly rare in practice. For example, it is not likely that changes in problematic alcohol use from one's typical level (i.e., individual mean) would be identical to changes in alcohol use compared with their peers (i.e., grand mean). The former measures state-like, time-variant deviations and the latter measures trait-like, time-invariant deviations, two substantively different levels of analysis with very different meanings and implications. Thus, prior research that has investigated the reciprocal relationships between variables such as bully victimization, mental health, academic achievement, and problematic alcohol use (either together or modeling specific relationships; Knack, Tsar, Vaillancourt, Hymel, & McDougall, 2012; Vaillancourt et al., 2013) may need some re-evaluation.

Recent models for longitudinal data, such as the auto-regressive latent trajectory model with structured residuals (ALT-SR) introduced by Curran and Colleagues (2014), improve our ability to understand cross-lagged or reciprocal relationships over time (Berry & Willoughby, 2016; Davis et al., 2017; Merrin, Davis, Berry, D'Amico, & Dumas, 2016). Specifically, the ALT-SR model allows one to simultaneously consider between-person relations among more systematic—or trait-like—aspects of problematic alcohol use and, say, bully victimization (e.g., mean levels, growth rates), while simultaneously modeling reciprocal relations between these variables as they manifest *within* individuals over time (more state-like). This modeling approach provides two advantages. First, it anchors the reciprocal processes at an arguably more meaningful and relevant level of analysis—*within*-person. Second, the internal validity of the reciprocal effects is strengthened as each individual serves as his or her own control and therefore all time-invariant confounds are controlled.

Summary and Research Hypotheses

In Hong et al.'s (2014) conceptual framework, the author's proposed important mechanisms and paths that may contribute to the association between bully victimization and substance use among adolescents. Specifically, we extend this framework and prior research by examining longitudinal within-person bidirectional relationships between bully victimization, depression, academic achievement, and problematic alcohol use from three theoretical frameworks: interpersonal risk model, symptom driven model, and a transactional model. In our models, our objectives included examining the overall between-person associations among our variables of interest including both initial levels (i.e., intercepts) and change processes (i.e., slopes). Thus, for Hypothesis 1, we propose that, *among between-person associations*, we would find moderate to strong effects across all variables of interest.

Our hypotheses for within-person associations (Hypotheses 2–4) pit the three theoretical models against each other. Hypothesis 2 reflects an interpersonal risk model. Here, we hypothesize that experiences of peer victimization will precede experiences of psychological distress (depression), lower academic achievement, and increased problematic alcohol use. Given this theoretical model parallels Hong et al.'s (2014) conceptualization of the bully victimization—substance use pathway, we hypothesized that in this interpersonal risk model both academic achievement and/or depression would be the most salient mechanisms of change linking bully victimization to problematic alcohol use. Following suit, the symptom driven (Hypothesis 3) model hypothesizes psychological distress symptoms (e.g., depression) will precede any exposure to victimization and negative behavioral outcomes such as poor academic performance or problematic alcohol use. Finally, the transactional theory suggests that experiences of bullying victimization and prevalence of problematic alcohol use are bidirectionally related over time (Hypothesis 4). As stated above, any transactional associations that emerge other than bullying victimization and problematic alcohol use are exploratory.

Method

Participants

Participants for the current study consisted of 1,875 students sampled from four middle schools in a Midwestern state. At baseline, participants were in 5th, 6th, 7th, and 8th grade and between the ages of 11 and 13 years [($M_{\text{age baseline}}$ = 12.3 (SD = .71)]. All participants were followed longitudinally over a span of 2 years with four data collection points corresponding to fall and spring semesters over the 2 years. At final follow up, the participants were between the ages of 13 and 15 years [$M_{\text{age conclusion}}$ = 13.8 (SD = .72)]. Participants were 44.3% African American, 29.2% White, 7% Hispanic, 3% Asian/Pacific Islander, and 16.5% Multi-Racial. Participant demographics can be found in Table 1.

Procedures

Human subject approval was obtained from the authors' University Institutional Review Board and the school district administration. A waiver of active consent was approved; parents received an informational letter that they signed and returned to school only if they *did not* want their child to participate. Student assent to participate in the study was obtained at each of the subsequent follow-up waves before the start of the survey. Nearly 98% of students participated in the study. Six trained research assistants and a faculty member collected data. All surveys were completed in class during school hours. Students were asked to sit separately to ensure confidentiality. At least two individuals were present in the classrooms ranging in size from 10–30 students and the survey was read aloud to the students by a trained research assistant. The survey took students approximately 40 min to complete.

Table 1
Baseline Characteristics

Variable	*M* (*SD*) or *n*%
	N = 1,875
Demographics	
Age	12.3 (1.03)
Female *n*(%)	953 (50.8)
African-American *n*(%)	830 (44.3)
White *n*(%)	546 (29.1)
Multi-race *n*(%)	311 (16.5)
Hispanic *n*(%)	135 (7.2)
Asian/Pacific Islander *n*(%)	53 (2.8)
Mother less than high school education	1,081 (54.3)
Behavioral and psychological health	
Current alcohol use *n*(%)	365 (19.5)
Current binge drinking *n*(%)	177 (9.5)
Bully victimization	1.42 (.58)
Depression	2.56 (.80)
Delinquency	1.29 (.42)
Family violence	2.24 (1.05)
Parental violence	1.10 (.20)
School characteristics	
Grades	3.76 (1.87)

Measures

Demographic control variables. All models controlled for participants' gender (female was the reference group), age, participants' race (non-White was the reference group), mothers' education as a proxy for socioeconomic status (SES; high school or less was the reference group), externalizing problems (e.g., delinquency), experience of childhood abuse or neglect, and parental and family violence exposure. Each of these covariates were regressed onto the latent growth factors to control for important baseline covariates. Doing this prevents any variance associated with covariates to be absorbed into the within-person cross-lag portion of the model.

Bully victimization. Bully victimization was assessed using the 4-item University of Illinois Victimization Scale (UIVS; Espelage & Holt, 2001). Students are asked how often the following things have happened to them in the past 30 days: "Other students called me names," "Other students made fun of me," "Other students picked on me," and "I got hit and pushed by other students." The six response options ranged from 0 = *never* to 5 = *7 or more times*. Construct validity of this measure was supported through exploratory and confirmatory factor analyses and convergence with peer nominations of victimization in various samples (Espelage & Holt, 2001). Higher scores indicate more self-reported victimization. Cronbach's α coefficient ranged from .79–.86 (M_{alpha} = .81) in this sample.

Depression. The 6-item Orpinas Modified Depression Scale (Orpinas, 1993) asks the participants to indicate how often they felt or acted in certain ways in the previous 30 days. Examples include: "Did you feel happy?" and "Did you feel hopeless about your future?" Response options ranged from 0 = *never* to 4 = *almost always*. Higher scores indicate more depressive symptoms. This scale has demonstrated strong construct validity through factor analyses and good internal consistency (α = .74) when administered to adolescents (Orpinas, 1993) and across various samples (Yabko, Hokoda, & Ulloa, 2008). In this study, good internal consistency reliability was found as the Cronbach's α coefficients range was .81–.82 (M_{alpha} = .815).

Academic achievement. Participants reported their average grades for the semester in which assessments were taking place. Options range from 1 = *mostly as* to 7 = *mostly Ds and Fs*. Higher scores indicate *worse* academic achievement.

Problematic drinking. For the purposes of this study, problem drinking was defined as a pattern of consumption that places youth at an increased risk for alcohol abuse, dependence, and alcohol-related consequences (e.g., injury). Problematic drinking was measured by asking each adolescent "how often have you drank five or more drinks in the past month" and "how often have you gotten drunk in the past month." Responses ranged from 0 = *never* to 5 = *10 or more times*. Generally consuming five or more drinks in one sitting is classified as harmful drinking behavior (Wechsler & Nelson, 2001) and youth who report drinking to intoxication at a younger age are more likely to continue to drink heavily and experience problems at a later age (Morean, Corbin, & Fromme, 2012).

Analytic Plan

We fit a taxonomy of ALT-SR models (Curran et al., 2014) to examine the simultaneous between and within-person effects of bully victimization, depression, academic achievement, and problematic drinking among adolescents during middle school. Using the ALT-SR specification, the between-person effects are captured by correlating our latent intercepts and growth parameters (represented by $\varphi_{standarized}$ below). We specified the respective between-person trajectories as linear functions. The latent intercept represents the estimated population mean level and (residual) between-person variance of the given variable (i.e., beginning of the study). The mean of the latent slope factor represents the between-person variance of the change or growth of the given variable. Thus, the remaining within-person variance is "pushed" into the residual auto-regressive and cross-lagged portion of the model.

One advantage of the ALT-SR over traditional auto-regressive cross-lag models is that we are able to capture variance that does not change (intercept), the variance that changes over the course of the study (slope), and latent growth within-person cross-lagged associations. To determine if the latent linear growth parameters should vary randomly, we tested each separately using likelihood ratio tests. Results revealed random slopes are needed for both problematic drinking and depression. Further, we also tested equality constraints in the auto-regressive and cross-lagged portion of the model. That is, we used likelihood ratio tests to examine decreases in model fit after constraining parameter estimates to be equal over time.

Our taxonomy of models first established basic autoregressive associations among our variables of interest (Model 1). Second, we established overall associations between bully victimization, depression, academic achievement, and problematic drinking (Model 2). Model constraint tests were used to determine if cross-lagged effects could be constrained to be equal over time. Results of our model building process revealed significantly improved model fit when all autoregressive, within-time correlations, and cross-lagged effects were constrained to be equal over time. Finally, we assessed potential

indirect effects that included depression or academic achievement as the mechanism of change between bully victimization and problematic alcohol use. To test for significant indirect effects, we used the "Model Constraint" command in *Mplus* to multiply *a* path and *b* path. Interpretation of a significant indirect effect would be a unit increase in *bullying victimization* (independent variable) is associated with a unit increase or decrease in *problematic alcohol use* (dependent variable) via *depression or academic achievement* (mechanism). Fit statistics were used to assess improvement in model specification. We used comparative fit index (CFI) of .95 or greater, root mean square error of approximation (RMSEA) of .05 or less, and standardized root mean square residual (SRMR) of less than .08 to indicate excellent model fit.

To address missing data (between 0 to 25% over the four waves), we used full information maximum likelihood (FIML) estimator in *Mplus* (Muthén & Muthén, 1999–2018). FIML treats all observed predictors as a single-item latent variable; therefore, each individual contributes to the data they have available at each time point to the likelihood function and no individuals are removed from the analysis through listwise deletion. Under the assumption that data are missing at random (MAR), or are conditionally random after adjusting for other variables in the model (MCAR), our estimates and *SE*s are unbiased by the missing data (Enders, 2011). We examined missing patterns by our covariates for all variables used in our models. Because females, those reporting delinquency and parental violence in middle school, individuals identifying as nonwhite, and individuals with higher family SES had more missing data, these variables were included in our covariance matrix to aid in accounting for the missing data patterns when using the maximum likelihood estimator. As such, because of the moderate amount of missing data, coupled with the large sample size, and adjusting for potential bias because of missingness on various demographic and individual variables, we believe the missing data likely had a small effect on model estimates.

Results

All model results with unstandardized parameter estimates and *SE*s are in Table 2 and Figure 1. Below we report unstandardized estimates (*b*) as well as standardized estimates (β; that are not found in the tables or figures). Between-person correlations are represented by $\varphi_{standardized}$ below.

Between-Person

Overall mean trajectories (e.g., slopes) showed small to moderate, but significant, increases in problematic drinking ($\mu = .09$, $SE = .003$, $p < .001$) and academic achievement ($\mu = .20$, $SE = .02$, $p < .001$) and decreases in depression ($\mu = -.04$, $SE = .005$, $p < .001$) and bully victimization ($\mu = -.06$, $SE = .006$, $p < .001$). Our final model resulted in adequate model fit (CFI = .90, RMSEA = .08, SRMR = .08). Prior work has shown RMSEA values between .05 and .08 to be close to good fit criteria, as RMSEA is one index that is not affected by sample size. Our CFI value indicates poor to adequate model fit; however, in our final model many constraints are placed on variances, residual vari-

Table 2
Final ALT-SR Model: Associations Between Problematic Drinking, Bullying Victimization, Depression, and Academic Achievement (Parameter, SE)

ALT-SR effects	Model 1[a]	Model 2[b]
Within-person cross-lags		
Pblm Dnk_{t+1} *on* $BulV_t$	—	−.04 (.02)
$BulV_{t+1}$ *on* Pblm Dnk_t	—	.003 (.04)
Dep_{t+1} *on* $BulV_t$	—	−.06 (.03)
$BulV_{t+1}$ *on* Dep_t	—	−.05 (.04)
Grd_{t+1} *on* $BulV_t$	—	.22 (.10)*
$BulV_{t+1}$ *on* Grd_t	—	−.04 (.01)*
Pblm Dnk_{t+1} *on* Dep_t	—	.10 (.03)*
Dep_{t+1} *on* Pblm Dnk_t	—	.02 (.04)
Dep_{t+1} *on* Grd_t	—	.04 (.01)*
Grd_{t+1} *on* Dep_t	—	.10 (.10)
Pblm Dnk_{t+1} *on* Grd_t	—	.04 (.01)*
Grd_{t+1} *on* Pblm Dnk_t	—	.28 (.12)*
Auto-regressive		
Pblm Dnk_{t+1} *on* Pblm Dnk_t	.010 (.03)*	.11 (.04)*
$BulVict_{t+1}$ *on* $BulVict_t$	.19 (.03)*	.10 (.02)*
Dep_{t+1} *on* Dep_t	.37 (.04)*	.25 (.04)*
$Grades_{t+1}$ *on* $Grades_t$	.34 (.18)*	.14 (.04)*
(Co)variances (between-person)		
Pblm Dnk_{int} *with* $BulV_{int}$	.21 (.04)*	.05 (.06)
Pblm Dnk_{int} *with* Dep_{int}	.40 (.04)*	.14 (.06)*
Pblm Dnk_{int} *with* Grd_{int}	.32 (.04)*	.16 (.06)
$BulV_{int}$ *with* DeP_{int}	.60 (.03)*	.55 (.06)*
$BulV_{int}$ *with* Grd_{int}	−.22 (.05)*	.20 (.06)*
Dep_{int} *with* Grd_{int}	−.26 (.07)*	.14 (.07)*
Pblm Dnk_{int} *with* Dep_{slp}	.10 (.02)*	.02 (.01)*
Dep_{int} *with* Pblm Dnk_{slp}	−.01 (.03)	−.004 (.003)
Pblm Dnk_{slp} *with* Dep_{slp}	.05 (.01)*	.004 (.001)*
Residual (co)variances		
Pblm $Dnk_{\epsilon it1-\epsilon it7}$	.13 (.01)*	.52 (.03)*
$BulV_{\epsilon it1-\epsilon it7}$	.26 (.01)*	.98 (.01)*
$Dep_{\epsilon it1-\epsilon it7}$	.36 (.02)*	.90 (.02)*
$Grd_{\epsilon it1-\epsilon it7}$	.36 (.03)*	.87 (.02)*
Fit statistics		
−2LL	33721.39	26774.29
AIC	33849.39	26950.29
BIC	34180.86	27380.58
χ^2	1964.2	1611.46
df	88	112
RMSEA[c]	.12	.08
SRMR[d]	.07	.08
CFI[e]	.87	.90

Note. ARLT-SR = auto-regressive latent trajectory with structured residuals; AIC = Akaike's Information Criterion; BIC = Bayesian Information Criterion. Estimates for all control variables on all latent intercept, and linear growth parameters are not shown for readability. Variables on the left side of an "on" statement are the dependent variable at $t + 1$. Those on the right side represent the independent variables. Pblm Dnk = Problematic drinking; BulV = Bullying Victimization; Dep = Depression; Grd = Academic Achievement (higher scores associated with worse academic achievement). In the table above, subscripts identify time of measurement. For example, a single *t* indicates paths were constrained to be equal over time, $t + 1$ represents an outcome for a specific uni directional path at the next time point. Subscript *int* indicates latent intercept (mean level) to obtain between-person parameter estimates. Subscripts with an epsilon (ϵ*it*) indicate residual variance measured from Time 1 to Time *n*.
[a] Model 1 includes estimates for autoregressive paths only. [b] Model 2 includes binge drinking, impulse control, and victimization. [c] RMSEA = root mean square ereror of approximation. [d] SRMR = standardized root mean square residual. [e] CFI = comparative fit index.
* $p < .05$.

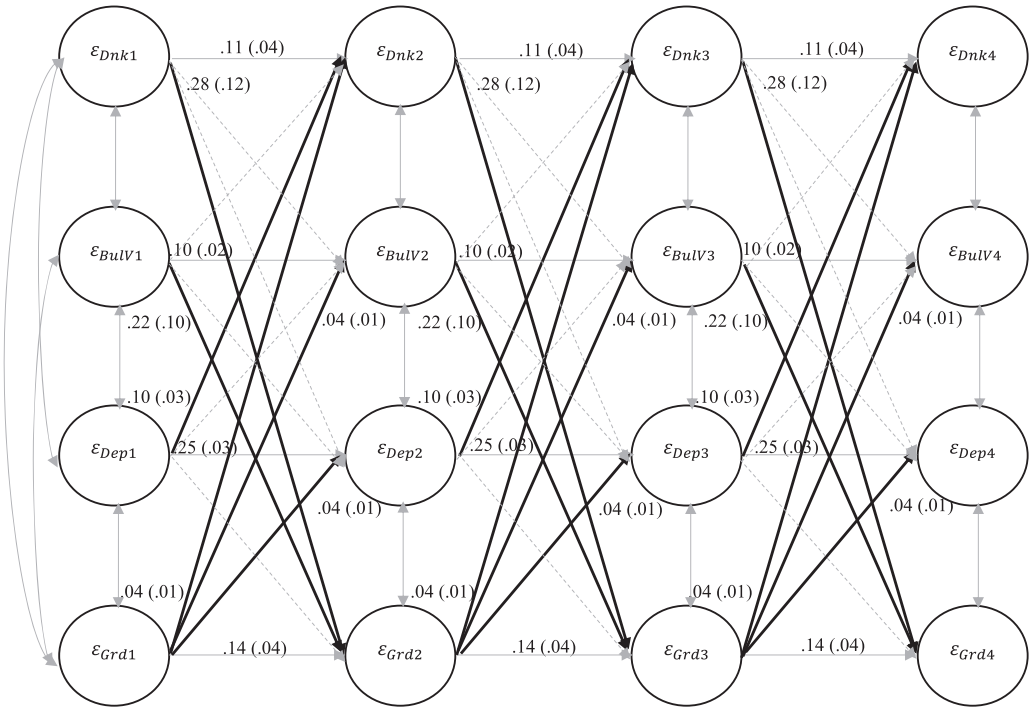

Figure 1. Auto-regressive latent trajectory with structured residuals (ALT-SR) final model. Bold lines indicate a significant path; *gray dash* lines indicate a nonsignificant path. All estimates can be found in Table 2. Dnk = problematic drinking; BulV = bullying victimization; Dep = depression; Grd = academic achievement.

ances, and covariances. For example, when residual variances are allowed to be freely estimated our model fit changes to CFI = .94, RMSEA = .04, SRMR = .05 indicating good model fit.

Hypothesis 1: Among between-person associations, we would find moderate to strong effects across all variables of interest. Intercept and slope factors represented by our latent growth models indicated moderate to strong associations for between-person bully victimization, problematic drinking, depression, and academic achievement (see Table 2). An interesting finding was that in Model 1 (that excluded all within-person associations) we found associations between *all* of our variables of interest at the between-person level of analysis. This would have fully supported our first hypothesis; however, in Model 2 several of these hypothesized associations did not hold. Specifically, we found higher initial levels of problematic drinking were associated with higher initial levels of depression ($\varphi_{standardized}$ = .14, p = .03), higher initial levels of bully victimization were associated with higher initial levels of depression ($\varphi_{standardized}$ = .55, p <.001), and lower academic achievement ($\varphi_{standardized}$ = .20, p = .02). Further, higher initial levels of depression were associated with lower initial academic achievement ($\varphi_{standardized}$ = .14, p = .02). We did not, however, find an association between problematic alcohol use and bullying victimization or academic achievement. We should note that these between-person effects are contemporaneous associations, thus not allowing us to conclude anything regarding temporal order. We do, however, report several intercept to slope and slope to slope associations in Table 2.

Within-Person Associations

The final within-person cross-lag portion of our model is presented in Figure 1 (for all estimates, see Table 2, Model 2). To interpret results from Table 2, the "within-person cross-lag" portion of the model represents all unidirectional pathways. Variable names to the left of "on" represent the dependent variable. Thus, *Pblm* Dnk_{t+1} *on* $BulV_t$ represents the effect of bullying victimization at time t on problematic drinking at time t + 1. All *significant* pathways are represented in Figure 1 with a bold line, which demonstrates the lagged effects of each variable over time.

Hypothesis 2: Interpersonal risk model. To understand if evidence exists for an interpersonal risk model, long-term problems must stem from early exposure to bullying victimization (see Figure 1). Interestingly, we did *not* find that bully victimization predicted subsequent problematic alcohol use (b = −.04, 95% CI [−.08, .01]) or depression (b = −.06, 95% CI [−.01, .01]). We did, however, find that individuals reporting higher levels of victimization than their average (or individual mean) had lower academic achievement (higher scores reflect *worse* academic achievement) at the next time point (b = .22, 95% CI [−.20, −.03]; β = .07). Looking closer at Figure 1, and following the pathway from bully victimization at Time 1 to lower academic achievement at Time 2, we see a continued pathway to maladaptive functioning. Specifically, we see that this attenuated academic achievement at Time 2 is associated with higher levels of problematic drinking (b = .04, 95% CI [.80, .25]; β = .16), higher

levels of depression (b = .04, 95% CI [.04, −.17]; β = .12), and lower levels of bully victimization (b = −.04, 95% CI [−.23, −.04]; β = −.14) than their typical levels at the next time point. These pathways allowed us to test one of our hypothesized pathways from peer victimization to problematic drinking via academic achievement (e.g., mechanisms model for interpersonal risk model). Results indicated a modest, yet statistically significant, indirect effect (*indirect effect*: .01, 95% confidence interval, CI [.001, .016]). This indicates that youth who reported higher peer victimization than their typical level also reported lower academic achievement at the next time point, which is associated with increased problematic drinking 1 year later. We did not find support for a pathway from peer victimization to problematic drinking via depression.

Finally, we found even more support for an interpersonal risk model linking bullying victimization to problematic alcohol use involving both academic achievement and depression, irrespective of our hypothesized pathways. Specifically, we found that when youth report higher bullying victimization than typical, they report worse academic functioning at Time 2 (b = 0.22), which predicted higher depression scores at Time 3 (b = 0.04), and subsequently, predicted higher problematic alcohol use (b = .10) at Time 4. These results point to a much more nuanced and intricate interpersonal risk pathway from experiences of bully victimization to problematic alcohol use.

Hypothesis 3: Symptom-driven model. To assess a symptom driven model, one simply begins by tracing pathways from depression to long-term behavioral problems. We did not, however, find support for a symptom-driven model, in the traditional sense. Interestingly, we found that youth who reported higher depression than their typical average during early adolescence reported higher problematic alcohol use than their typical levels at the next time point (b = .10, 95% CI [.05, .15]; β = −.14); however, depression was not predictive of any other behavioral problem.

If we expand our understanding of symptom driven models to include other mental health problems such as early alcohol use, we do find evidence of a symptom driven model. Following pathways in Figure 1 we see youth who reported higher problematic alcohol use than their typical average at Time 1 reported worse academic functioning (b = .28, 95% CI [.05, .51]; β = .08) at Time 2. This attenuated academic performance at Time 2 was associated with higher levels of depression at Time 3 (b = .04, 95% CI [−.004, −.13]; β = .10) and this heightened depression was associated with higher problematic alcohol use at Time 4 (b = 0.10, 95% CI [.05, .15]; β = .14).

Hypothesis 4: Transactional model. Transactional (or bidirectional) models indicate that two or more processes are reciprocally related over time. In our model, we did not find a reciprocal association between bully victimization and problematic alcohol use. Interestingly, we did not find a unidirectional association between bully victimization or alcohol use, in either direction. We did, however, have two transactional associations emerge from the final model. Specifically, we found that problematic alcohol use and academic performance were reciprocally related to each other over time as were bully victimization and academic achievement.

Discussion

In the present study, we advanced a conceptual model proposed by Hong and colleagues (2014). Specifically, we estimated an ALT-SR model that examined how bully victimization, depression, academic achievement, and problematic drinking were reciprocally related over time. This allowed us to assess three theoretical models: *interpersonal risk model* (originally proposed), *symptom-driven model*, and a *transactional model*. We found support for an interpersonal risk model, such that experiencing bully victimization predicted a long-term series of problems including worse academic achievement, higher depression, and more problematic alcohol use over the course of middle school. Further, mediational analyses suggested that academic achievement was a significant mechanism linking bully victimization and problematic alcohol use. Conceivably, adolescents who are frequently bullied may have diminished academic performance, as they are attempting to cope with stress, leading to risk-taking behaviors, such as alcohol use. While we did not find support for a symptom driven model in the classical sense, stemming from depressive symptoms, we did find support for a cyclical pattern of problem behaviors stemming from early engagement in problematic alcohol use. Our evidence is consistent with several studies, which reported a significant association between alcohol use and problematic behaviors in adolescents (Brown et al., 2015).

Between-Person Findings

Our between-person results revealed that youth who started middle school with higher rates of problematic drinking also reported higher rates of depression, which is consistent with empirical findings (see Sullivan, Fiellin, & O'Connor, 2005, for a review). One possible explanation is that alcohol use can lead to social difficulties, or it could stem from genetic factors, which can exacerbate depressive symptoms (Boden & Fergusson, 2011). Further, we found that higher levels of bully victimization were associated with higher levels of depression and worse academic achievement, supporting prior study findings (Buhs et al., 2006; Cole et al., 2014; Konishi et al., 2010; Niemelä et al., 2011). However, we did not find associations between problematic alcohol use and bullying victimization or academic achievement.

These results are akin to prior literature on the basic associations between peer related victimization and negative behavioral health and academic outcomes. For example, early research has found youth who reported *both* heavy drinking and depression have lower levels of temperament (e.g., emotional regulatory abilities), higher levels of externalizing problems, increased levels of stressful life events, and higher delinquency and substance use compared with youth who were only depressed or only reported heavy drinking (e.g., Windle & Davies, 1999). Our results are also consistent with recent meta-analyses on alcohol use and depressive disorders. Specifically, Boden and Fergusson (2011) found that the presence of one disorder (e.g., alcohol use disorder or depressive disorder) was associated with two times higher odds of having the second disorder and that the most plausible causal association was when alcohol use disorder increased the risk of depressive disorders. We also found associations between bully victimization and academic achievement. This, again, is in line with prior meta-analyses that have found small correlations between bully victimization and lower academic achievement. It is interesting

that when accurately separating variance at the within- and between-person levels of analysis (Model 2) the associations between problematic drinking and bullying victimization or academic achievement were no longer significant. One explanation for this finding is the modeling approach we used. That is, when adding the within-person cross lags into our model, variance that was once indicating strong between-person associations between drinking and victimization or academic achievement moved to the within-person portion of the model. This speaks to the importance of understanding differences between within- and between-person effects and how some estimates can be biased when the variance is not properly disaggregated (Berry & Willoughby, 2016; Davis et al., 2017; Hoffman & Stawski, 2009; Merrin et al., 2016).

Interpersonal Risk and Symptom Driven Model Perspectives

One of the main objectives of this study was to understand how bully victimization, depression, academic achievement, and problematic drinking were related at the within-person level of analysis. With prior longitudinal studies primarily supporting an interpersonal risk model, where youth who are chronically victimized (e.g., over the course of months or years) have worse academic trajectories, mental health, and higher risk or increased substance use (McDougall & Vaillancourt, 2015; Vaillancourt et al., 2013), understanding how these variables are linked together can aid in prevention and intervention strategies to mitigate long-term problems.

Our final model revealed that the association between bully victimization and problematic alcohol use is not a simple, unidirectional pathway. That is, we found an intricate cascade of problems after experiences of bully victimization that involve both academic achievement and depression. Specifically, we found no *direct* within-person association between bully victimization and problematic drinking. While this is surprising, it may be that these associations are most prominently expressed as between-person effects. This is not to say that a link does not exist between bully victimization and increased prevalence of problematic alcohol use but, rather, this link may only exist as a general individual difference trajectory (i.e., between-person effect) and may be more nuanced and include various mechanisms at the within-person level. Looking closer at our results, when assessing the wave-to-wave fluctuations, the relationship between bullying victimization and problematic alcohol use is more nuanced than a simple direct association. This is in line with Hong and colleagues' (2014) conceptual model, which identified academic achievement and internalizing problems (e.g., depression) as putative mechanisms linking bully victimization and problematic drinking.

In the current study, only academic achievement emerged as an important mechanism of change linking bully victimization to increased problematic drinking. As youth experience higher bully victimization than their typical average, their academic performance decreases, which is related to increased problematic drinking as youth near the end of middle school. Our results also point to an interesting pathway from bully victimization to problematic drinking that involves depression. While depression was not a specific mechanism, we did find that bully victimization at Time 1 was associated with worse academic achievement at Time 2, which predicted higher depression scores at Time 3, leading to increased problematic drinking at Time 4. This may be a result of lower academic achievement being associated with mitigation of long-term academic goals (e.g., higher education) that could be compromised by feelings of inadequacy or depression and lead youth to experiment with alcohol use. It also may be the variation that exists in coping behaviors as some youth who are both victimized and have high academic achievement may use school (e.g., focusing on grades) rather than substances as an outlet for coping (Crosnoe, 2011). These results are also consistent with theories of early life stress (Shonkoff et al., 2012) and interpersonal theories of depression (Rudolph, 2009; Rudolph, Hammen, & Daley, 2006), which posit that early life stress (e.g., victimization, abuse, and violence exposure) are associated with a myriad of psychological (e.g., anxiety, substance use) and physiological (e.g., dysregulated stress response system; Raposa, Hammen, Brennan, O'Callaghan, & Najman, 2014; Shonkoff et al., 2012) problems. Schools and practitioners may wish to focus on engaging youth in preventing long term distress who have experienced early bullying victimization as this may impede academic achievement and exacerbate depressive symptomology. For example, some youth may have impaired academic achievement from experiencing various posttraumatic stress disorder symptoms such as avoidance and concentration issues. Others may experience anxiety, shame or loneliness which may also lead to increased problematic drinking. Thus, our results identify academic functioning and depression as crucial mechanisms of which future bullying and alcohol prevention and intervention programs should focus.

In fact, while we did not find support for a classic symptom driven model (e.g., stemming from depression) we did find that a cyclical symptom driven model was evident for youth who reported high problematic alcohol use in early adolescence. Specifically, increased problematic drinking at Time 1 lead to worse academic functioning at Time 2, which predicted higher levels of depression at Time 3 and, finally, increased problematic drinking at Time 4. Not only do these results point to a variant of symptom driven models, but they also point to a long cascade of problems throughout middle school for youth who report high levels of problematic alcohol use. This is important as adolescence is a time during which youth are likely to initiate alcohol use (Brown & Tapert, 2004) and experience problems associated with heavy drinking. For example, early work has shown that youth who begin drinking early in adolescence (e.g., before the age of 14) have a 40% increase in the likelihood of developing an alcohol use disorder (DeWit, Adlaf, Offord, & Ogborne, 2000). Other studies have found that adolescents who engage in high risk drinking (e.g., binge drinking, heavy episodic drinking) were more likely to report poorer school performances, ride in cars with someone who had been drinking, be a victim of dating violence, engage in illicit drug use, and seriously consider suicide (Miller, Naimi, Brewer, & Jones, 2007). Results from the current study follow suit with this literature and implicate symptom driven models stemming from early alcohol use which, eventually, lead to higher reports of problematic alcohol use at the end of middle school (through poor academic performance and increase depressive symptomology). This cascade of events may lead some youth to enter mid to late adolescence (high school) with increased problems (e.g., heightened alcohol use, more depressive symptoms) which may affect other systems associated with negative behavioral health such as emotion dysregulation (Squeglia, Jacobus, & Tapert, 2009), atten-

uated impulse control, and experiences of victimization (Davis et al., 2017). It will be important for future research to understand how this symptom driven model influences behavioral and psychological outcomes later in life, especially for those youth who have early onset alcohol use or experience early life victimization.

Limitations and Conclusion

Despite the numerous strengths of the present study, limitations also need to be noted. One limitation of the study is that the measures were based on self-reports, which can be subject to biased reporting. For example, our measure of academic achievement and problematic alcohol use were self-reported and, thus, may be subject to reporting biases. However, several studies have advocated that self-report data are a reliable source (Chan, 2009). Additionally, our measure of problematic drinking is just that—potentially problematic. A threshold of five or more drinks may have unintentionally disregarded young girls who are drinking the standard binge drinking amount for females, which is four or more drinks (U.S. Department of Health and Human Services and U.S. Department of Agriculture, 2015). Nonetheless, the secondary assessment of whether these youths had drunk to intoxication may be sufficient to identify problematic youth drinkers. Another limitation is the possibility that because our sample is from middle schools in a Midwestern state, our results may not be generalizable to different geographical regions. Further, while we considered the nested nature of the data at the within- and between-person level, our study was not able to consider broader school climate issues (e.g., teacher–student relationships), which could impact students' academic grades and psychosocial experience in school. Additionally, based on prior literature that highlights gender differentiated responses to victimization (Green & Diaz, 2008), this study did not explore gender differences. Future research could examine differences in the processes between male and female students.

Overall, this study provides a more nuanced perspective to understand mediating mechanisms and processes in the link between bully victimization and problematic drinking that can serve to be sources for targeted prevention and intervention efforts. For youth who experience peer victimization, our study suggests that targeting programming efforts at alleviating depressive symptoms and academic achievement is important in reducing alcohol use. Concurrently, efforts must be made to raise peer awareness of the impact of depression among victimized youth. These individuals could also benefit from approaches to enhance their academic grades. All in all, this study highlights critical areas of prevention and interventions that can reduce bully victimization and problematic alcohol use.

References

Agoston, A. M., & Rudolph, K. D. (2013). Pathways from depressive symptoms to low social status. *Journal of Abnormal Child Psychology, 41,* 295–308. http://dx.doi.org/10.1007/s10802-012-9675-y

Arseneault, L., Bowes, L., & Shakoor, S. (2010). Bullying victimization in youths and mental health problems: 'much ado about nothing'? *Psychological Medicine, 40,* 717–729. http://dx.doi.org/10.1017/S0033291709991383

Begle, A. M., Hanson, R. F., Danielson, C. K., McCart, M. R., Ruggiero, K. J., Amstadter, A. B., . . . Kilpatrick, D. G. (2011). Longitudinal pathways of victimization, substance use, and delinquency: Findings from the National Survey of Adolescents. *Addictive Behaviors, 36,* 682–689. http://dx.doi.org/10.1016/j.addbeh.2010.12.026

Beran, T. N., Hughes, G., & Lupart, J. (2008). A model of achievement and bullying: Analyses of the Canadian National Longitudinal Survey of Children and Youth data. *Educational Research, 50,* 25–39. http://dx.doi.org/10.1080/00131880801920379

Berry, D., & Willoughby, M. (2016). On the practical interpretabilty of cross-lagged panel models: Rethinking a developmental workhorse. *Child Development, 88,* 1186–1206.

Boden, J. M., & Fergusson, D. M. (2011). Alcohol and depression. *Addiction, 106,* 906–914. http://dx.doi.org/10.1111/j.1360-0443.2010.03351.x

Brown, S. A., Brumback, T., Tomlinson, K., Cummins, K., Thompson, W. K., Nagel, B. J., . . . Tapert, S. F. (2015). The National Consortium on Alcohol and NeuroDevelopment in Adolescence (NCANDA): A multisite study of adolescent development and substance use. *Journal of Studies on Alcohol and Drugs, 76,* 895–908. http://dx.doi.org/10.15288/jsad.2015.76.895

Brown, S. A., & Tapert, S. F. (2004). Adolescence and the trajectory of alcohol use: Basic to clinical studies. *Annals of the New York Academy of Sciences, 1021,* 234–244. http://dx.doi.org/10.1196/annals.1308.028

Bryant, A. L., Schulenberg, J. E., O'Malley, P. M., Bachman, J. G., & Johnston, L. D. (2003). How academic achievement, attitudes, and behaviors relate to the course of substance use during adolescence: A 6-year, multiwave national longitudinal study. *Journal of Research on Adolescence, 13,* 361–397. http://dx.doi.org/10.1111/1532-7795.1303005

Buhs, E. S., Ladd, G. W., & Herald, S. L. (2006). Peer exclusion and victimization: Processes that mediate the relation between peer group rejection and children's classroom engagement and achievement? *Journal of Educational Psychology, 98,* 1–13. http://dx.doi.org/10.1037/0022-0663.98.1.1

Chan, D. (2009). So why ask me? Are self-report data really that bad. In C. Lance & R. Vandenberg (Eds.), *Statistical and methodological myths and urban legends: Doctrine, verity and fable in the organizational and social sciences* (pp. 309–336). New York, NY: Routledge.

Cole, D. A., Dukewich, T. L., Roeder, K., Sinclair, K. R., McMillan, J., Will, E., . . . Felton, J. W. (2014). Linking peer victimization to the development of depressive self-schemas in children and adolescents. *Journal of Abnormal Child Psychology, 42,* 149–160. http://dx.doi.org/10.1007/s10802-013-9769-1

Crosnoe, R. (2011). *Fitting in standing out: Navigating the social challenges of high school to get an education*. New York, NY: Cambridge University Press. http://dx.doi.org/10.1017/CBO9780511793264

Curran, P. J., Howard, A. L., Bainter, S. A., Lane, S. T., & McGinley, J. S. (2014). The separation of between-person and within-person components of individual change over time: A latent curve model with structured residuals. *Journal of Consulting and Clinical Psychology, 82,* 879–894. http://dx.doi.org/10.1037/a0035297

Davis, J. P., Dumas, T. M., Berey, B. L., Merrin, G. J., Cimpian, J. R., & Roberts, B. W. (2017). Effect of victimization on impulse control and binge drinking among serious juvenile offenders from adolescence to young adulthood. *Journal of Youth and Adolescence, 46,* 1515–1532. http://dx.doi.org/10.1007/s10964-017-0676-6

DeWit, D. J., Adlaf, E. M., Offord, D. R., & Ogborne, A. C. (2000). Age at first alcohol use: A risk factor for the development of alcohol disorders. *The American Journal of Psychiatry, 157,* 745–750. http://dx.doi.org/10.1176/appi.ajp.157.5.745

Enders, C. K. (2011). Analyzing longitudinal data with missing values. *Rehabilitation Psychology, 56,* 267–288. http://dx.doi.org/10.1037/a0025579

Espelage, D. L., & Holt, M. K. (2001). Bullying and victimization during early adolescence. *Journal of Emotional Abuse, 2,* 123–142. http://dx.doi.org/10.1300/J135v02n02_08

Espelage, D. L., Low, S., Rao, M. A., Hong, J. S., & Little, T. D. (2014). Family violence, bullying, fighting, and substance use among adolescents: A longitudinal mediational model. *Journal of Research on Adolescence, 24,* 337–349. http://dx.doi.org/10.1111/jora.12060

Gámez-Guadix, M., Orue, I., Smith, P. K., & Calvete, E. (2013). Longitudinal and reciprocal relations of cyberbullying with depression, substance use, and problematic internet use among adolescents. *The Journal of Adolescent Health, 53,* 446–452. http://dx.doi.org/10.1016/j.jadohealth.2013.03.030

Gastic, B. (2008). School truancy and the disciplinary problems of bullying victims. *Educational Review, 60,* 391–404. http://dx.doi.org/10.1080/00131910802393423

Gilreath, T. D., Astor, R. A., Estrada, J. N., Jr., Benbenishty, R., & Unger, J. B. (2014). School victimization and substance use among adolescents in California. *Prevention Science, 15,* 897–906. http://dx.doi.org/10.1007/s11121-013-0449-8

Gladden, R. M., Vivolo-Kantor, A. M., Hamburger, M. E., & Lumpkin, C. D. (2014). *Bullying surveillance among youths: uniform definitions for public health and recommended data elements* (Version 1.0). Atlanta, GA: National Center for Injury Prevention and Control, Centers for Disease Control and Prevention and U.S. Department of Education.

Green, D. L., & Diaz, N. (2008). Gender differences in coping with victimization. *Brief Treatment and Crisis Intervention, 8,* 195–203. http://dx.doi.org/10.1093/brief-treatment/mhn004

Hanish, L. D., Eisenberg, N., Fabes, R. A., Spinrad, T. L., Ryan, P., & Schmidt, S. (2004). The expression and regulation of negative emotions: Risk factors for young children's peer victimization. *Development and Psychopathology, 16,* 335–353. http://dx.doi.org/10.1017/S0954579404044542

Hoffman, L. (2015). *Longitudinal analysis: Modeling within-person fluctuation and change*. New York, NY: Routledge.

Hoffman, L., & Stawski, R. S. (2009). Persons as contexts: Evaluating between-person and within-person effects in longitudinal analysis. *Research in Human Development, 6,* 97–120. http://dx.doi.org/10.1080/15427600902911189

Hong, J. S., Davis, J. P., Sterzing, P. R., Yoon, J., Choi, S., & Smith, D. C. (2014). A conceptual framework for understanding the association between school bullying victimization and substance misuse. *American journal of orthopsychiatry, 84,* 696.

Jessor, R. (1991). Risk behavior in adolescence: A psychosocial framework for understanding and action. *Journal of Adolescent Health, 12,* 597–605. http://dx.doi.org/10.1016/1054-139X(91)90007-K

Juvonen, J., Yueyan Wang, Y., & Espinoza, G. (2011). Bullying experiences and compromised academic performance across middle school grades. *The Journal of Early Adolescence, 31,* 152–173. http://dx.doi.org/10.1177/0272431610379415

Knack, J. M., Tsar, V., Vaillancourt, T., Hymel, S., & McDougall, P. (2012). What protects rejected adolescents from also being bullied by their peers? The moderating role of peer-valued characteristics. *Journal of Research on Adolescence, 22,* 467–479. http://dx.doi.org/10.1111/j.1532-7795.2012.00792.x

Kochel, K. P., Ladd, G. W., & Rudolph, K. D. (2012). Longitudinal associations among youth depressive symptoms, peer victimization, and low peer acceptance: An interpersonal process perspective. *Child Development, 83,* 637–650.

Kochenderfer, B. J., & Ladd, G. W. (1996). Peer victimization: Manifestations and relations to school adjustment in kindergarten. *Journal of School Psychology, 34,* 267–283. http://dx.doi.org/10.1016/0022-4405(96)00015-5

Konishi, C., Hymel, S., Zumbo, B. D., & Zhen Li, Z. (2010). Do school bullying and student–teacher relationships matter for academic achievement? A multilevel analysis. *Canadian Journal of School Psychology, 25,* 19–39. http://dx.doi.org/10.1177/0829573509357550

Krygsman, A., & Vaillancourt, T. (2017). Longitudinal associations between depression symptoms and peer experiences: Evidence of symptoms-driven pathways. *Journal of Applied Developmental Psychology, 51,* 20–34. http://dx.doi.org/10.1016/j.appdev.2017.05.003

Lambe, L. J., & Craig, W. M. (2017). Bullying involvement and adolescent substance use: A multilevel investigation of individual and neighbourhood risk factors. *Drug and Alcohol Dependence, 178,* 461–468.

Lewinsohn, P. M., Steinmetz, J. L., Larson, D. W., & Franklin, J. (1981). Depression-related cognitions: Antecedent or consequence? *Journal of Abnormal Psychology, 90,* 213–219. http://dx.doi.org/10.1037/0021-843X.90.3.213

Luk, J. W., Wang, J., & Simons-Morton, B. G. (2009). Bullying victimization and substance use among U.S. adolescents: Mediation by depression. *Prevention Science, 11,* 355–359.

McDougall, P., & Vaillancourt, T. (2015). Long-term adult outcomes of peer victimization in childhood and adolescence: Pathways to adjustment and maladjustment. *American Psychologist, 70,* 300–310. http://dx.doi.org/10.1037/a0039174

Merrin, G. J., Davis, J. P., Berry, D., D'Amico, E. J., & Dumas, T. M. (2016). The longitudinal associations between substance use, crime, and social risk among emerging adults: A longitudinal within and between-person latent variables analysis. *Drug and Alcohol Dependence, 165,* 71–78. http://dx.doi.org/10.1016/j.drugalcdep.2016.05.009

Miech, R. A., Johnston, L. D., O'Malley, P. M., Bachman, J. G., & Schulenberg, J. E. (2015). *Monitoring the future national survey results on drug use, 1975–2014: Volume I, Secondary school students*. Ann Arbor, MI: Institute for Social Research, The University of Michigan.

Miller, J. W., Naimi, T. S., Brewer, R. D., & Jones, S. E. (2007). Binge drinking and associated health risk behaviors among high school students. *Pediatrics, 119,* 76–85. http://dx.doi.org/10.1542/peds.2006-1517

Mishna, F., Khoury-Kassabri, M., Gadalla, T., & Daciuk, J. (2012). Risk factors for involvement in cyber bullying: Victims, bullies and bully-victims. *Children and Youth Services Review, 34,* 63–70.

Modecki, K. L., Minchin, J., Harbaugh, A. G., Guerra, N. G., & Runions, K. C. (2014). Bullying prevalence across contexts: A meta-analysis measuring cyber and traditional bullying. *Journal of Adolescent Health, 55,* 602–611. http://dx.doi.org/10.1016/j.jadohealth.2014.06.007

Morean, M. E., Corbin, W. R., & Fromme, K. (2012). Age of first use and delay to first intoxication in relation to trajectories of heavy drinking and alcohol-related problems during emerging adulthood. *Alcoholism: Clinical and Experimental Research, 36,* 1991–1999. http://dx.doi.org/10.1111/j.1530-0277.2012.01812.x

Muthén, B. O., & Muthén, L. K. (1998–2018). *Mplus user's guide, Eighth edition*. Los Angeles, CA: Author.

Nakamoto, J., & Schwartz, D. (2010). Is peer victimization associated with academic achievement? A meta-analytic review. *Social Development, 19,* 221–242. http://dx.doi.org/10.1111/j.1467-9507.2009.00539.x

Niemelä, S., Brunstein-Klomek, A., Sillanmäki, L., Helenius, H., Piha, J., Kumpulainen, K., . . . Sourander, A. (2011). Childhood bullying behaviors at age eight and substance use at age 18 among males. A nationwide prospective study. *Addictive Behaviors, 36,* 256–260. http://dx.doi.org/10.1016/j.addbeh.2010.10.012

Olweus, D. (Ed.). (2004). *Bullying at school: What we know and what we can do - Dan Olweus*. Maiden, MA: Blackwell Publishing.

Orpinas, P. (1993). *Modified Depression Scale*. Houston, TX: University of Texas Health Science Center at Houston.

Patterson, G., & Capaldi, D. M. (1990). A Mediational model for boys' depressed mood. In J. Rolf, A. S. Masten, D. Cicchetti, K. H. Nuechterlein, & S. Weintraub (Eds.), *Risk and protective factors in the development of psychopathology* (pp. 141–163). New York, NY: Cambridge. University Press. http://dx.doi.org/10.1017/CBO9780511752872.010

Raposa, E. B., Hammen, C. L., Brennan, P. A., O'Callaghan, F., & Najman, J. M. (2014). Early adversity and health outcomes in young

adulthood: The role of ongoing stress. *Health Psychology, 33,* 410–418. http://dx.doi.org/10.1037/a0032752

Reijntjes, A., Kamphuis, J. H., Prinzie, P., & Telch, M. J. (2010). Peer victimization and internalizing problems in children: A meta-analysis of longitudinal studies. *Child Abuse & Neglect, 34,* 244–252. http://dx.doi.org/10.1016/j.chiabu.2009.07.009

Rohde, P., Lewinsohn, P. M., Tilson, M., & Seeley, J. R. (1990). Dimensionality of coping and its relation to depression. *Journal of Personality and Social Psychology, 58,* 499–511. http://dx.doi.org/10.1037/0022-3514.58.3.499

Rudolph, K. D. (2009). The interpersonal context of adolescent depression. In S. Nolen-Hoeksema & L. M. Hilt (Eds.), *Handbook of depression in adolescents* (pp. 377–418). New York, NY: Routledge/Taylor & Francis Group.

Rudolph, K. D., Hammen, C., & Daley, S. E. (2006). Mood Disorders. In D. A. Wolfe & E. J. Mash (Eds.), *Behavioral and emotional disorders in adolescents: Nature, assessment, and treatment* (pp. 300–342). New York, NY: Guilford Press.

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55,* 68–78. http://dx.doi.org/10.1037/0003-066X.55.1.68

Schwartz, D., Gorman, A., Nakamoto, J., & Toblin, R. (2005). Victimization in the peer group and children's academic functioning. *Journal of Educational Psychology, 97,* 425–435. http://dx.doi.org/10.1037/0022-0663.97.3.425

Schwartz, D., Lansford, J. E., Dodge, K. A., Pettit, G. S., & Bates, J. E. (2015). Peer victimization during middle childhood as a lead indicator of internalizing problems and diagnostic outcomes in late adolescence. *Journal of Clinical Child & Adolescent Psychology, 44,* 393–404.

Schwartz, S. J., Kurtines, W. M., & Montgomery, M. J. (2005). A comparison of two approaches for facilitating identity exploration processes in emerging adults an exploratory study. *Journal of Adolescent Research, 20,* 309–345. http://dx.doi.org/10.1177/0743558404273119

Selig, J. P., & Little, T. D. (2012). Autoregressive and cross-lagged panel analysis for longitudinal data. In B. Laursen, T. D. Little, & N. A. Card (Eds.), *Handbook of developmental research methods* (pp. 265–278). New York, NY: Guilford Press.

Shonkoff, J. P., Garner, A. S., Siegel, B. S., Dobbins, M. I., Earls, M. F., Garner, A. S., . . . the Committee on Psychosocial Aspects of Child and Family Health, & the Committee on Early Childhood, Adoption, and Dependent Care, & the Section on Developmental and Behavioral Pediatrics. (2012). The lifelong effects of early childhood adversity and toxic stress. *Pediatrics, 129,* e232–e246. http://dx.doi.org/10.1542/peds.2011-2663

Smorti, A., Menesini, E., & Smith, P. (2003). Parents' definitions of children's bullying in a five-country comparison. *Journal of Cross-Cultural Psychology, 34,* 417–432.

Squeglia, L. M., Jacobus, J., & Tapert, S. F. (2009). The influence of substance use on adolescent brain development. *Clinical EEG and Neuroscience, 40,* 31–38. http://dx.doi.org/10.1177/155005940904000110

Srabstein, J. C., & Leventhal, B. L. (2010). Prevention of bullying related morbidity and mortality: A call for public health policies. *Bulletin of the World Health Organization, 88,* 401–480.

Stapinski, L. A., Araya, R., Heron, J., Montgomery, A. A., & Stallard, P. (2015). Peer victimization during adolescence: Concurrent and prospective impact on symptoms of depression and anxiety. *Anxiety, Stress, & Coping, 28,* 105–120.

Strøm, I. F., Thoresen, S., Wentzel-Larsen, T., & Dyb, G. (2013). Violence, bullying and academic achievement: A study of 15-year-old adolescents and their school environment. *Child Abuse & Neglect, 37,* 243–251. http://dx.doi.org/10.1016/j.chiabu.2012.10.010

Sullivan, L. E., Fiellin, D. A., & O'Connor, P. G. (2005). The prevalence and impact of alcohol problems in major depression: A systematic review. *The American Journal of Medicine, 118,* 330–341. http://dx.doi.org/10.1016/j.amjmed.2005.01.007

Takizawa, R., Maughan, B., & Arseneault, L. (2014). Adult health outcomes of childhood bullying victimization: Evidence from a five-decade longitudinal British birth cohort. *The American Journal of Psychiatry, 171,* 777–784. http://dx.doi.org/10.1176/appi.ajp.2014.13101401

Tharp-Taylor, S., Haviland, A., & D'Amico, E. J. (2009). Victimization from mental and physical bullying and substance use in early adolescence. *Addictive Behaviors, 34*(6–7), 561–567. http://dx.doi.org/10.1016/j.addbeh.2009.03.012

Thijs, J., & Verkuyten, M. (2008). Peer victimization and academic achievement in a multiethnic sample: The role of perceived academic self-efficacy. *Journal of Educational Psychology, 100,* 754–764. http://dx.doi.org/10.1037/a0013155

Topper, L. R., Castellanos-Ryan, N., Mackie, C., & Conrod, P. J. (2011). Adolescent bullying victimisation and alcohol-related problem behaviour mediated by coping drinking motives over a 12 month period. *Addictive Behaviors, 36,* 6–13. http://dx.doi.org/10.1016/j.addbeh.2010.08.016

Troop-Gordon, W., & Ladd, G. W. (2005). Trajectories of peer victimization and perceptions of the self and schoolmates: Precursors to internalizing and externalizing problems. *Child Development, 76,* 1072–1091.

U.S. Department of Health and Human Services and U.S. Department of Agriculture. (2015). *2015–2020 Dietary guidelines for Americans*. 8th edition. December 2015. Available at http://health.gov/dietaryguidelines/2015/guidelines/

Vaillancourt, T., Brittain, H. L., McDougall, P., & Duku, E. (2013). Longitudinal links between childhood peer victimization, internalizing and externalizing problems, and academic functioning: Developmental cascades. *Journal of Abnormal Child Psychology, 41,* 1203–1215. http://dx.doi.org/10.1007/s10802-013-9781-5

Valdebenito, S., Ttofi, M., & Eisner, M. (2015). Prevalence rates of drug use among school bullies and victims: A systematic review and meta-analysis of cross-sectional studies. *Aggression and Violent Behavior, 23,* 137–146. http://dx.doi.org/10.1016/j.avb.2015.05.004

Wechsler, H., & Nelson, T. F. (2001). Binge drinking and the American college student: What's five drinks? *Psychology of Addictive Behaviors, 15,* 287–291. http://dx.doi.org/10.1037/0893-164X.15.4.287

Windle, M., & Davies, P. T. (1999). Depression and heavy alcohol use among adolescents: Concurrent and prospective relations. *Development and Psychopathology, 11,* 823–844. http://dx.doi.org/10.1017/S0954579499002345

Yabko, B. A., Hokoda, A., & Ulloa, E. C. (2008). Depression as a mediator between family factors and peer-bullying victimization in Latino adolescents. *Violence and Victims, 23,* 727–742. http://dx.doi.org/10.1891/0886-6708.23.6.727

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