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## Associations between alcohol-use and depression symptoms in adolescence: Examining gender differences and pathways over time

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#### ABSTRACT

Several studies examining alcohol use and depression in youth have focused on documenting prevalence of overlap, or temporal ordering in longitudinal samples. Fewer studies have examined pathways connecting alcohol use and depression over time. This study examined gender differences between depression and alcohol use across adolescence while examining peer and family pathways as possible mediators of effects. Data was collected longitudinally from 593 families from three urban public middle schools in the United States. Participants were recruited in 6th grade and followed through 9th grade. We examined gender differences using a nested model comparison approach. Results indicated the association between depression and alcohol use differs by gender. For males, depression and alcohol use were independent across adolescence, and no significant indirect pathways were observed. For females, bidirectional effects were found between alcohol use and depression, as well as an indirect effect from depression to alcohol use via peer deviance.

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Adolescence is a time of heightened risk for the development and escalation of both alcohol use and depression (Measelle, Stice, & Hogansen, 2006; Willoughby & Fortner, 2015). Indeed, developmental pathways for both depression and alcohol use are intertwined, and co-occurring depression and alcohol use problems represent one of the most prevalent and debilitating comorbidities in adolescence and adulthood. For instance, co-occurring depression and alcohol use problems are associated with greater severity of impairment, heightened risk for suicide, and prolonged symptom course (Archie, Kazemi, & Akhtar-Danesh, 2012; Brière, Rohde, Seeley, Klein, & Lewinsohn, 2014; Haynes et al., 2008). While much research has examined the interplay between alcohol use and depression, most studies have either focused on documenting prevalence of overlap, cross-sectionally (Birchwood, Mason, MacMillan, & Healy, 1993; Brown, Lewinsohn, Seeley, & Wagner, 1996), or examining temporal ordering in longitudinal samples (Brook, Brook, Zhang, Cohen, & Whiteman, 2002; King, Iacono, & McGue, 2004; Rohde, Lewinsohn, Kahler, Seeley, & Brown, 2001). Fewer studies have examined pathways connecting problems with alcohol use and depression over time, or potential gender differences within those pathways. Such work may have substantial prevention implications, highlighting targets and time-points for prevention efforts.

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#### 1. Models of co-occurrence

Several models describe the pathways through which depression may predict alcohol use, and vice versa. These models share an emphasis on the importance of risk processes common to both depression and alcohol use. Notable shared risk factors include peer relational difficulties, such as peer rejection and association with deviant peer groups (e.g. Connell & Dishion, 2006; Fergusson, Wanner, Vitaro, Horwood, & Swain-Campbell, 2003; Van Ryzin, Fosco, & Dishion, 2012), and conflictual parent-child interactions (e.g. Bond, Toumbourou, Thomas, Catalano, & Patton, 2005; Sigfusdottir, Farkas, & Silver, 2004). Directional models propose that family conflict and peer deviance are among the main pathways through which depression may predict later substance use (and vice versa). For example, these models suggest that as youth enter adolescence, they both spend more time with peers, and are at a heightened risk for susceptibility to peer influence (Fergusson, Swain-Campbell, & Horwood, 2002). The importance of family risk has also been well characterized, and parent-focused prevention and intervention efforts for alcohol use are well supported, with emerging evidence highlighting the importance of family-interventions for depression, as well (Bond, Toumbourou, Catalano, & Patton, 2005). Thus, examining the role of these risk factors represents an important step in delineating pathways connecting substance use and depression over adolescence.

In addition to these shared risk factors, there are also several, more specific, proposed directional models for cooccurrence. First, some evidence supports the influence of earlier substance use on subsequent depression (e.g. Brook et al., 2002; Fergusson, Boden, & Horwood, 2011; Rohde et al., 2001). For instance, the cumulative failure model (Patterson & Stoolmiller, 1991) suggests substance use may predict escalating difficulties in important life domains (e.g. social and academic problems), which may undermine self-confidence and lead to depression. Similarly, adolescent alcohol abuse may interfere with brain development (Hermens et al., 2013), producing neurocognitive impairments ultimately leading to depression (see Peeters, Vollebergh, Wiers, & Field, 2014).

Conversely, Hussong, Jones, Stein, Baucom, and Boeding (2011) reviewed evidence for an internalizing pathway to alcohol use disorders, in which early internalizing problems (including depression) predicted subsequent alcohol use through interpersonal (interpersonal difficulties and peer deviance) and cognitive (alcohol use as a coping mechanism) pathways. Several studies have supported the association between earlier depression and later alcohol use (see O'Neil, Conner, & Kendall, 2011). For instance, McCarty et al. (2012; 2013) found that depressive symptoms predicted later alcohol use across grades 6 through 12. Relatively few studies, however, have examined mediators of either directional model in detail.

#### 2. Gender differences

Evidence regarding directional effects has been mixed, with some studies supporting bidirectional associations (e.g. Needham, 2007; Pacek, Martins, & Crum, 2013). While several methodological factors might contribute to this variability (e.g. use of clinical vs. community samples, retrospective vs. prospective reports), there may also be gender differences in relations between substance use and depression over time. Gender differences in prevalence rates of depression have been well-documented (e.g. Hanna & Grant, 1997; Kumpulainen, 2000; Marmorstein, 2009). Similarly, studies have demonstrated differences in alcohol use patterns across males and females. For example, Hussong, Curran, and Chassin (1998) found greater variability in heavy alcohol use across time points for males and found that males' heavy alcohol use escalated at a faster rate than did females.

However, gender differences in the relation between alcohol use and depression across development have been less studied, and results have been inconsistent. Several studies have observed the association between alcohol use and depression in girls, but not boys (e.g. Edwards et al., 2014; Fleming, Mason, Mazza, Abbott, & Catalano, 2008; Miettunen et al., 2014; Nolen-Hoeksema, 2004). Others, have either found earlier depression predicted subsequent alcohol use in boys, but not girls (e.g. Kumpulainen, 2000; Tapert et al., 2003), or have failed to find gender differences (McCarty et al., 2012). For instance, Fergusson, Boden, and Horwood (2009) found no evidence for gender differences in their 25-year longitudinal study examining the association between alcohol use for girls in early adolescence, but was related to stronger growth in alcohol use through late adolescence for boys. Given the variability of findings, and the lack of studies testing whether intervening processes connecting depression and alcohol use may vary by gender, additional work examining the association between depression examples over adolescence is needed (Marmorstein et al., 2010).

The current study examines data from a large school-based intervention trial, but focuses on developmental processes (rather than treatment outcomes). In line with the randomized encouragement trial design of the current study, significant treatment effects have not been observed for depression or substance use in Intent to Treat analyses (Connell, Dishion, & Stormshak, 2013; Connell, Stormshak, & Dishion, 2009, 2014). As a result, significant developmental differences across intervention and control groups are unlikely. Thus, consistent with similar studies that have examined developmental questions using treatment samples (Dishion, Veronneau, & Myers, 2010; Murray-Close et al., 2010), the current study combined data from the control and intervention groups.

The broad goal of the current study was to examine pathways connecting alcohol use and depression symptoms longitudinally from 6th to 9th grade. We sought to characterize the direction of influences across early adolescence, and to examine possible family and peer pathways of effects. Given the substantial literature identifying peer deviance and family conflict as risk factors for both alcohol use (Baer, Garmezy, McLaughlin, Pokorny, & Wernick, 1987; Donovan, 2004; Fergusson et al., 2002; Newcomb, Maddahian, & Bentler, 1986) and depression (Brendgen, Vitaro, & Bukowski, 2000; Fergusson et al., Download English Version:

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