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### Proximal and time-varying effects of cigarette, alcohol, marijuana and other hard drug use on adolescent dating aggression

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#### ABSTRACT

Although numerous studies have established a link between substance use and adult partner violence, little research has examined the relationship during adolescence and most extant research has not examined multiple substance use types. The current study used hierarchical growth modeling to simultaneously examine proximal (between-person) and time-varying (within-person) relations between cigarette, alcohol, marijuana and hard drug use and physical dating aggression across grades 8 through 12 while controlling for demographic covariates and shared risk factors. Proximal effects of marijuana use on dating aggression were found for girls and proximal effects of hard drug use on dating aggression were found for boys. Time-varying effects were found for alcohol for both boys and girls and for hard drug use for boys only. Overall, findings suggest that alcohol, marijuana and hard drug use predict whether and when adolescents engage in dating aggression and should be targeted by prevention interventions.

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Adolescent dating aggression (DA) is a prevalent national problem (Centers for Disease Control and Prevention [CDC], 2012) that can result in devastating consequences including injury, depression, and suicidal ideation (Exner-Cortens, Exkenrode, & Rothman, 2013; O'Leary, Slep, Avery-Leaf, & Cascardi, 2008). Research generally suggests that substance use is an important risk factor associated with adolescent (e.g., Epstein-Ngo et al. 2013; Reyes, Foshee, Bauer, & Ennett, 2011; Rivera-Rivera, Allen-Leigh, Rodriguez-Ortega, Chavez-Ayala, & Lazcano-Ponce, 2007; Rothman, Johnson, Azrael, Hall & Wienberg, 2010; Temple, Shorey, Fite, Stuart, & Le, 2013) and adult partner violence (Moore et al., 2008; Shorey, Stuart, & Cornelius, 2011; Smith, Homish, Leonard, & Cornelius, 2012). However, key methodological limitations of previous research constrain interpretation and generalizability of these findings. In particular, most studies of associations between substance use and DA, have focused exclusively on a single type of substance use (e.g., alcohol use; Reyes et al. 2011), combined substance use indicators into a global construct (e.g., Schnurr & Lohman, 2008), or used analytic approaches that do not account for correlations among different substance use behaviors (e.g., Rothman et al., 2010). In all these cases,

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examination of the unique effects of multiple different substance use behaviors in relation to dating or partner aggression is precluded. More generally, little longitudinal research has examined relations between substance use and DA over the course of adolescence, a critical developmental period when patterns of substance use and relationship conflict may initiate and become established.

The few studies that have examined unique associations among multiple distinct substance use behaviors and adolescent DA suggest that associations may depend on substance use type and may differ for boys and girls, although findings are inconsistent. For example, using daily calendar-based analyses, Epstein-Ngo et al. (2013) found that alcohol, but not marijuana or sedative/opiate use, was associated with higher rates of severe DA in a sample of high risk urban girls. Using cross-sectional data, Rivera-Rivera et al. (2007) found an association between "illegal" drug use (marijuana and other types of illicit substance use combined) and DA among both boys and girls, whereas alcohol use was associated with DA only among girls. Using longitudinal data, Temple et al. (2013) found that hard drug and alcohol use each uniquely predicted DA among boys and girls, but marijuana use did not. In contrast, also using longitudinal data, Foshee, Reyes, and Ennett (2010) found that marijuana use predicted onset of DA among girls, but neither cigarette nor alcohol use was associated with DA onset among either boys or girls.

Taken together, these findings suggest that there may be heterogeneity in the relationship between different substance use types and DA that may not be detected in studies that group different substance use behaviors into a global construct and/ or fail to account for potential gender differences in relationships. Furthermore, some research suggests that associations between substance use and DA may vary over time and/or depend on whether one is examining whether substance use predicts *who* is at risk for DA (between-person effects) and/or whether substance use predicts *when* DA risk is elevated (within-person effects; Hussong, Huang, Curran, Chassin, & Zucker, 2010; Reyes et al. 2011). Very few studies of relations between substance use and DA have used analytic approaches designed to disentangle these different effects or examine variability in associations over time, possibly contributing to the inconsistent findings described above.

#### **Theoretical linkages**

Developmental models suggest several potential explanations for the linkage between substance use and DA. As one explanation, high levels of substance use across adolescence may interfere with the development of communication and interpersonal skills needed to form healthy relationships and may index a life-course persistent pattern of antisocial behavior that manifests as DA (Hussong, Curran, Moffitt, Caspi, & Carrig, 2004; Reyes et al., 2011). Moreover, through peer selection and socialization processes, adolescents who repeatedly engage in substance use tend to become embedded in peer contexts characterized by low levels of behavioral constraint and high levels of deviant behavior (Aikins, Simons, & Prinstein, 2010; Dishion, Véronneau, & Myers, 2010). In turn, deviant peer affiliation may increase risk of dating abuse by making it less likely that the peer network would constrain abusive behavior and/or by increasing the likelihood that romantic partnerships form between teens with behavior problems. In addition to such persistent effects over the course of adolescence, at any given time, elevated substance use may increase an individual's risk for DA directly, through psychopharmacological effects that disinhibit aggression, and/or indirectly, by contributing to relationship conflict that, in turn, leads to abuse (Klosterman & Fals-Stewart, 2006; Shorey et al., 2011).

The explanations outlined above suggest two types of over-time effects of substance use on levels of DA: proximal (between-person) effects and time-varying (within-person) effects. Proximal (between-person) effects index whether adolescents who report higher average levels of substance use during a given developmental period in turn report higher levels of DA during that same period. Proximal effects thus focus on *who* is at risk for DA during adolescence, with the hypothesis that those who report higher compared with lower average substance use across the developmental period will be at greater risk (Hussong et al., 2010). Proximal effects are implied by theories suggesting that repeated substance use during adolescence may interfere with teens' capacities to establish and maintain healthy relationships (Klosterman & Fals-Stewart, 2006), enmesh teens in a toxic peer environment (Dishion et al., 2010) that may be conducive to dating abuse, and/or serve as a marker that identifies teens following a life-course persistent trajectory of involvement in aggressive behavior (Hussong et al., 2004; Moffit 1993).

Time-varying (within-person) effects of substance use index whether teens report increased (or decreased) dating abuse, over their usual baseline, at those time-points when they report increased (or decreased) substance use. Time-varying effects focus on *when* a given adolescent might engage in DA, with the expectation that adolescents are at greater risk *at those times* when they are engaging in higher than average levels of substance use (Hussong et al., 2010). Time-varying effects are implied by theories that suggest a direct psychopharmacological effect of substance use on DA, as well as by theories that suggest that elevated substance use at a given time-point may put acute stress on the romantic relationship that contributes to conflict and abuse (Klosterman & Fals-Stewart, 2006; Shorey et al., 2011).

#### The current study

Proximal and time-varying effects are conceptually distinct and, as such, disaggregating and examining these effects simultaneously can provide unique insights into the etiology of the relationship between substance use and DA by providing a better understanding of whether, for whom, and when different types of substance use are related DA. To this end, the current longitudinal study simultaneously examined both the proximal and time-varying effects of cigarette, heavy alcohol,

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