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The longitudinal associations between substance use, crime, and social risk among emerging adults: A longitudinal within and between-person latent variables analysis

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ABSTRACT

Background: The reciprocal relationship between crime and substance use is well known. However, when examining this relationship, no study to date has disaggregated between- and within-person effects, which represents a more methodologically sound and developmentally-appropriate analytic approach. Further, few studies have considered the role of social risk (e.g., deviant peers, high-risk living situations) in the aforementioned relationship. We examined these associations in a group of individuals with heightened vulnerability to substance use, crime and social risk: emerging adults (aged 18–25 years) in substance use treatment.

Methods: Participants were 3479 emerging adults who had entered treatment. We used auto-regressive latent growth models with structured residuals (ALT-SR) to examine the within-person cross-lagged association between crime and substance use and whether social risk contributed to this association. A taxonomy of nested models was used to determine the structural form of the data, within-person cross-lagged associations, and between-person associations.

Results: In contrast to the extant literature on cross-lagged relations between crime and substance use, we found little evidence of such relations once between- and within-person relations were plausibly disaggregated. Yet, our results indicated that within-person increases in social risk were predictive of subsequent increases in crime and substance use. Post-hoc analyses revealed a mediation effect of social risk between crime and substance use.

Conclusions: Findings suggest the need to re-think the association between crime and substance use among emerging adults. Individuals that remain connected to high-risk social environments after finishing treatment may represent a group that could use more specialized, tailored treatments.

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1. Introduction

It is widely accepted that substance use and crime are strongly correlated (White, 1990; Farrell et al., 1992; White et al., 1999; D'Amico et al., 2008a). Indeed, a growing body of theoretical and empirical work suggests that substance use and crime may affect each other reciprocally, such that each perpetuates or exacerbates the other over time (Mason and Windle, 2002; D'Amico et al., 2008a). However, there are notable methodological shortcomings

of the current literature that may affect the conclusions and implications of these studies. In the present manuscript, we address these shortcomings in two ways. First, we address the methodological problems resulting from the way that these reciprocal processes are typically modeled. Second, we address the influence of context on the association between substance use and crime. Despite the well-recognized connection between social risk, such as deviant peer affiliation, with delinquency, crime, and substance use (Fergusson et al., 2002; Van Ryzin and Dishion, 2014), these social contexts have been largely absent from the extant literature when examining the reciprocal relations between substance use and crime. Indeed, social risk may be a critical mechanism through which substance use manifests in crime.

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1.1. Disaggregating within and between person effects

This paper extends work in this area by using recent advances in modeling longitudinal relationships. The most common method for testing reciprocal relationships—auto-regressive, cross-lagged (ARCL) structural equation models—will 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. For example, D'Amico et al. (2008a) utilized an ARCL model to understand the association between substance use and crime among a high risk adolescent sample. Results indicated a fully cross-lagged relationship between the two constructs, leading researchers and clinicians to draw conclusions for treatment practice and policy. Others have used similar methods to demonstrate comparable relationships between deviant peer association and substance use (see Mason and Windle, 2002 and Van Ryzin et al., 2012). However, these studies have neglected to include within-person effects, which can interfere with proper interpretation of true associations. For instance, typical ARCL specifications yield cross-lagged estimates that are an odd amalgam of between- and within-person estimates, weighted as a function of their respective reliabilities (Berry and Willoughby, 2016). These estimates are difficult to interpret and only plausible given the assumption that the between- and within-person effects are identical—an assumption that is incredibly rare in practice. For example, it is highly unlikely, that changes in substance use from one's 'typical' level (i.e., individual mean) would be identical to changes in substance use compared to other people (i.e., grand mean). The former measures state-like, time-variant deviations in substance use and the latter measures trait-like, time-invariant deviations in substance use, two substantively different levels of analysis with very different meanings and implications. As such, there is good reason to suspect that the extant findings regarding reciprocal relations between substance use and crime require some re-evaluation.

Recent models for longitudinal data, such as the auto-regressive latent growth model with structured residuals (ALT-SR) introduced by Curran et al. (2014), improve prediction because they allow one to simultaneously consider between-person relations among more systematic – or trait-like – aspects of substance use and social risk and crime (e.g., mean levels, growth rates), while modeling reciprocal relations between these variables as they manifest *within*-individuals over time. This provides two advantages. First, it anchors the reciprocal processes at an arguably more developmentally relevant level of analysis – *within*-person. Second, it strengthens the internal validity of the reciprocal effects as each individual serves as his/her own control group and therefore all time-invariant confounds are controlled.

1.2. Social risk and its association with substance use and crime

This paper also extends work in this area by addressing social context. Most studies do not consider social risk (i.e., association with deviant peers and high risk living situations) when investigating the reciprocal associations between substance use and crime. This is a notable limitation in the literature given that social risk is strongly associated with engagement in delinquent behavior (Prinstein et al., 2001; Paternoster et al., 2013; Helms et al., 2014) and substance use (Andrews et al., 2002; Butters, 2004; Henry et al., 2011; Lau-Barraco et al., 2012; Davis et al., 2015). It is possible that social risk may be an important mechanism underlying the relation between substance use and criminal behavior. Further, no studies have investigated these constructs together and in tandem with a clinical (in substance use treatment) emerging adult sample. This is an important endeavor as emerging adults have the highest prevalence of substance use compared to adolescents and adults, and they are also the least likely to complete substance use

treatment (Hedden and Gfroerer, 2011; SAMHSA, 2014). Emerging adults exhibit the highest rates of binge drinking (37.9%), cannabis (19%), alcohol (59.6%), and illicit drug use (21.5%) compared to adolescents and older adults (SAMHSA (NSDUH), 2014) and represent 34% of all substance use disorder treatment admissions in the United States (SAMHSA, 2013). Further, individuals involved in the criminal justice system (e.g., engaging in criminal behavior) have approximately a five times higher rate of substance use and three times higher rate of substance use disorders (Aarons et al., 2001; Grisso and Underwood, 2004). Prior research and theory suggests that emerging adulthood is a time of instability and change that includes identity development and autonomy (Arnett, 2005), and peers (especially deviant peers) may play a large role in whether youth become involved in substance use and crime. Therefore, it is important to understand the mechanisms that are most salient in predicting positive treatment outcomes or behaviors for emerging adults following treatment.

Including social risk may help explain the reciprocal relationship between substance use and crime because exposure to high social risk may create a social context that encourages and reinforces increased involvement in substance use and crime. Specifically, associations with deviant peer groups and higher risk living environments (e.g., people you live with) have been found to be significant predictors and mediators of substance use and dependence in adolescent samples (Van Ryzin et al., 2012; Van Ryzin and Dishion, 2014). However, no study to date has disaggregated within and between-person effects, thus allowing for an examination of a *within*-person mediation model. Investigating these relations at the within-person level can shed light on important within-person changes or shifts (e.g. social risk) that affect the relationship with subsequent substance use and crime, something current ARCL models cannot do.

1.3. Summary and hypotheses

The current study moves the field forward by testing three hypotheses regarding the associations between social risk, crime, and substance use over time. First, we hypothesized that the between-person relationship between substance use and crime would exist such that, on average, individuals who reported more substance use would also report more involvement in crime. Similarly, we hypothesized that between-person increases in social risk would be associated with increased crime and substance use. Second, we expected that the within-person cross-lagged relationship between substance use and crime would likely remain yet be attenuated in the context of the more rigorous within-person design. Third, we hypothesized that similar cross-lagged relations would be evident for social risk with substance use and crime, and conjectured an indirect relation, whereby the within-person link between substance use and crime would manifest partially via its lagged relation with social risk.

2. Methods

2.1. Participants

Human subjects approval was received by the Institutional Review Board prior to all analysis. We obtained data on emerging adults aged 18–25 years ($N=3479$) entering substance use treatment from Chestnut Health Systems through the Global Appraisal of Individual Needs (GAIN) Coordinating Center. Persons entering treatment were referred from a variety of sources such as the juvenile justice system, a probation officer, parents, partners, or self-referral. Treatment sites were spread across the United States and included agencies trained to administer the GAIN and

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