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Psychosocial Influences of the Escalation of Deviance: The Case of Prescription Drug Sniffing

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Abstract

The escalation of deviant behavior remains a central issue for criminologists, although mechanisms of intensification remain understudied. Using a sample of prescription drug misusers recruited via time-space sampling, we test five theoretically informed hypotheses on social and psychological factors – sensation seeking; coping; stigma; peer drug associations; use for pleasant times with peers – that may impact the escalation of deviance via non-normative consumption. Social factors – peer drug associations and use for pleasant time with peers – as well as stigma were associated with escalation. Sensation seeking was mediated by social factors. Social contexts are crucial for the intensification of deviant behavior.

Keywords

drugs; deviance; escalation; youth; prescription drug misuse

Within the field of criminology, there has been a tradition of research on the escalation of deviance and crime. Earlier studies of escalation focused heavily on progression through a hierarchy of increasingly serious criminal activity, with researchers identifying crime career trajectories of groups of individuals (Rojek and Erikson 1982; Blumstein et al. 1988; Nagin et al., 1995; Sampson and Laub 2003). An analogous line of research also considered the escalation of substance use to more harmful patterns of use (Kaplan et al. 1986; D'Amico and McCarthy 2006; Simons-Morton and Chen 2006). Studies of escalating deviance remain important as they assist with the identification of social and psychological processes that, in

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some instances, lead to increasingly harmful behaviors that may result in criminal justice sanctions or health problems. To contribute to this area of research, we assess several hypothesized psychosocial factors relevant for the escalation of deviance within the context of the prescription drug misuse problem. Notably, we evaluate this through the intensification of a behavior via considerations of non-normative routes of drug administration rather than simply increased frequency of use or transitions to “harder” drugs. Specifically, we consider whether sensation seeking, perceived coping, stigma, peer normative contexts, and the use of drugs to have pleasant times with peers are associated with the odds of sniffing prescription drugs among a sample of prescription drug misusers. Together, they provide a fuller sense of influences that shape the escalation of deviance among young people.

The Escalation of Deviance

The sustained and intensifying commission of deviant acts has been a target of concern for scholars and practitioners alike, particularly focused upon efforts to minimize those that are potentially harmful behaviors. Deviance may escalate in several ways. First, the individual may escalate a general pattern of deviance via taking on new, potentially more troubling, deviant behaviors; for example, an individual may progress through a criminal career that begins with acts such as vandalism but leads to acts of violence as a result of the status that is gained among one’s peers (Cohen 1955) or petty drug sellers take on the roles of stickup artists (Contreras, 2013). In such instances, the escalation is centered upon the growth of the repertoire of deviant behaviors. Second, the individual may escalate deviance via increasing the frequency of the deviant behavior; for example, drug dealing may begin casually and occasionally among friends, but then become more frequent as opportunities and networks are expanded for sales (Adler 1993). This represents an escalation in the regularity with which the individual engages in deviant behavior. Lastly, the individual may escalate a pattern of deviance through the intensification of the deviant act; for example, a trajectory of stealing may progress as the pickpocketing thief proceeds to shoplifting and eventually confidence games (Sutherland 1937). This escalation of deviance relates to intensification via an increasing gravity of a particular deviant behavior.

Each of these possibilities for escalation of crime and deviance have analogues in the substance use literature. In the first, an individual progresses through a hierarchy of “harder” substances, in what some have described as the “gateway hypothesis” (e.g. Yamaguchi and Kandel 1984). In the second, a substance user increases the frequency of their consumption; for example the crack smoker may increase the frequency of crack use from initial use on the weekends to daily use throughout the week (Bourgois, 1996). These two forms of escalation are undoubtedly the most studied within the substance abuse literature. We argue that the third form of escalation – the intensification of the use of a drug – remains relatively understudied for substance use, and in particular the psychological and social correlates of such escalation. In this form of escalation, the individual moves to non-normative, and potentially increasingly risky, forms of use of the *same* substance.

The use of both legal and illegal substances has become a large niche of focus in considerations of escalation, and possible theoretical explanations for such escalation of

deviance fit this area of research. Research on the escalation of crime and deviance has produced mixed results regarding the social and psychological factors responsible for the escalation. There remains a continued need to hypothesize how certain factors contribute to the escalation of deviance, and to evaluate such factors within the context of one another. We do so in the consideration of the intensification of drug use.

Research on the escalation of drug use has heavily focused on three major substances: alcohol, tobacco, and marijuana. Kaplan was at the forefront of the study of influences on escalating substance use, with results that lend themselves to the sociological and psychological aspects of escalation. Kaplan and colleagues' research studies (1975; 1982; 1984; 1986; 1996) have used the concepts of social control (or lack thereof) and individual internalization of circumstances to test use and escalation of different substances. Demographics such as gender and age of first use were found as important to the overall patterns of drug use in Kaplan's studies; however, psychological and personal characteristics of the individual were also significant predictors of escalating drug use. For example, Kaplan's series of studies on substance use escalation consistently found that increasing frequency of substance use was associated with psychological distress due to the individual's coping/defensive strategies (1975; 1986). These highlight the important role of psychological factors in the escalation of deviant behaviors.

While psychological factors such as internalization, sensation seeking, and impulsivity (Flory et al. 2004; Roberts et al. 2009; Quinn and Harden 2013) have been cited as significant predictors of drug use and abuse, the importance of social factors should not be underestimated. Themes of peer influences on substance use have been consistently echoed in previous research. Most consistently, use by the peer group has been associated with increased use of alcohol and marijuana (Stice et al., 1998; D'Amico and McCarthy 2006) and has a linear effect on increasing drug use (Simon-Morton and Chen 2006). Peer group rejection of marijuana has also been shown to have an inhibiting effect on escalation of use by decreasing the number of occasions for opportunities (Kaplan 1986); however, peer group norms were only associated with early onset of drug use, not increasing use over time (Kaplan 1986). This contrasts findings in earlier work that suggested peer influence was associated with increased drug use over time (Kaplan 1984). There also appears to be a reciprocal relationship between delinquent peers and substance use; while those who have delinquent peers tend to show increased substance use (Henry and Thornberry 2010), Simon-Morton and Chen's (2006) longitudinal study found that substance use at time one affected growth in the number of drug using peers within their social network at time two. This has important implications for the possible continued use and escalation of substances into adulthood and over the life course. Despite these contributions, a remaining limitation is that much of the literature on the escalation of drug use has limited focus on initiation into use of new substances or increased frequency of use rather than other forms of escalation related to intensity, such as transitions to non-normative routes of administration, which can be associated with dependence and other drug related problems (Kelly et al., 2015). There also has been little attention placed on the escalation of substance use with respect to the phenomenon of prescription drug misuse.

The case of prescription drugs

Escalation and the use of substances such as cannabis, tobacco, and alcohol have been well-documented in the literature due to their consistent popularity in Western societies. However, during the 21st century, prescription drug misuse increased significantly in many nations, especially the U.S. (Vosburg et al., 2012; Johnston et al., 2010). The misuse of these drugs is most prevalent among young adults (Herman-Stahl et al., 2007, Johnston et al., 2010, Kelly et al., 2013a; 2013b; McCabe et al., 2009, SAMHSA, 2009). Understandings of escalating prescription drug misuse remain limited relative to studies of alcohol, tobacco, and marijuana. For these reasons, examinations of escalating prescription drug misuse are important for both prevention efforts and academic criminological concerns about the escalation process.

Most prescription drug misuse is accomplished by oral ingestion, as this is a normative means of ingestion for both medical and non-medical use. However, users also tamper with these substances in order to achieve a quicker and more intense effect (Budman et al, 2009; Raffa and Pergolizzi, 2010; Vosburg et al., 2012). By crushing the substance to a powder (Raffa and Pergolizzi, 2010), sniffing prescription drugs has become a common alternative route of administration among those misusing these substances. Common enough, in fact, that pharmaceutical companies have created formulas that are crush-resistant to prevent users from altering the intended oral form of administration (Vosburg et al., 2012; Coleman et al, 2010). Having a quicker and more intense high from a substance, which can be produced via sniffing rather than oral consumption of prescription drugs, has been shown to have a higher reinforcement and addictive potential than a drug that has been orally administered and may be more likely to produce dependence (Compton and Volkow, 2006; Kelly et al. 2015).

The sniffing of prescription drugs by young adults has been shown to lead towards drug problems such as addiction and injection drug use. Epidemiological work by McCabe and colleagues identified that young adults who transition to sniffing prescription drugs are more likely to experience substance related problems (2007). A qualitative study of high risk youth and opioid abuse found that sniffing was marked as a transitional practice between oral prescription misuse and practices such as injection (Lankenau et al. 2012). Thus, the transition to sniffing prescription drugs is not insignificant, as such escalation has been shown to lead to drug problems and potential harm.

Psychosocial Influences on Escalation

As described above, the means by which deviance may escalate does not emerge from a single source. Rather, as identified in the literature, there are likely multiple influences of escalating patterns of deviance. Below, we specify five psychosocial factors described in the literature that have been shown to influence new drug use and increasing drug use frequency, and which may influence other pathways for the escalation of deviance among young people. These factors also permit us to simultaneously consider both psychological and social influences of escalating deviance, which are often not considered together. Below, we review relevant literature and specify a hypothesis for each of these important psychosocial factors.

Sensation Seeking

Sensation seeking has been conceptualized as a personality trait that leads individuals to seek out more intense experiences than those found in everyday life (Zuckerman, 1979). The trait may lead individuals to pursue novel or unusual stimuli. Aspects of sensation seeking have been proposed to lead individuals to engage in risky behaviors because of the excitement that occurs during the risk taking experience (Zuckerman, 1979). The diverse range of risky behaviors associated with sensation seeking includes dangerous driving, sexual risk taking, smoking, binge drinking, and illegal drug use (Donohew, et al., 1999; Hittner and Swickert, 2006; Kalichman et al., 1996; MacPherson et al., 2010; Romer and Hennessy, 2007; Zuckerman et al., 1990). Scholarship in this area also indicates that the trait of sensation seeking is most intense during adolescence and early adulthood (Zuckerman et al., 1978).

Individuals considered high in sensation seeking have been long identified as more susceptible to the use of a variety of substances (Arnett, 1990; Donohew et al., 1999; Palmgreen et al., 2001; Zuckerman et al., 1990). The physiological sensations associated with the drug effects create a novel experience for the individual (Donohew et al., 1999). In addition, the sensations associated with acts that are illegal may generate excitement that coheres with the desire to pursue novel experiences (Zuckerman, 1994), which ties into other research on the allure of crime and deviance when experienced as a “sneaky thrill” (Katz, 1988). Furthermore, individuals who are high in sensation seeking may estimate risk taking at lower levels than peers who score lower on measures of sensation seeking (Hovarth and Zuckerman, 1993). Thus, the use of drugs in a non-normative manner may elicit sensational experiences in multiple ways.

Numerous studies have shown that individuals who score high in sensation seeking are more likely to use illicit drugs than their low scoring peers (Donohew et al., 1999; Martins et al., 2008; Romer and Hennessy, 2007). Further, greater levels of sensation seeking may lead individuals to increase substance use over time (MacPherson et al., 2010). Despite the considerable evidence on sensation seeking and drug use, the role of escalation of drug use behaviors, particularly the intensification described above, has been less well studied than whether or not individuals choose to engage in substance use. We consider whether sensation seeking leads individuals to escalate deviance through the consideration of its impact on transitions to alternative routes of prescription drug administration.

H1: Individuals who score high in sensation seeking will report higher odds of sniffing prescription drugs.

Coping

We must also consider possible preventative processes of deviance escalation and drug use. In this regard, one’s perceived ability to manage life stress may directly influence whether or not patterns of deviance escalate, particularly for substance use, which has long been identified as a means of coping with stress for some people. Pearlin and Schooler defined coping as “any response to external life strains that serves to prevent, avoid, or control emotional distress” (1978:3). The Stress Process Model details coping’s role within this process of managing stress more thoroughly, and identifies several specific aspects relevant

for successful coping (Pearlin et al. 1981). While the Stress Process Model identifies the positive effects of coping, Agnew's General Strain Theory highlights the implications of unsuccessful coping with stress and strain. In brief, General Strain Theory posits that strain in an individual's life associated with the inability to achieve goals, inability to escape noxious stimuli, and a removal of positively valued incentives can drive them to commit delinquency and crime (Agnew and White, 1992). Collectively, these positive and negative aspects of coping may mediate the impact of stress, which can manifest itself in deviance and delinquency and in turn can cause harmful health and behavioral effects.

These theories identify "successful" and "unsuccessful" modes of coping, and are helpful in guiding current research on coping's effects on deviance escalation and drug use. It should be noted, however, that coping is generally divided into two forms: adaptive and maladaptive. Adaptive coping, sometimes referred to as problem-focused coping, involves active or behavioral approaches to manage stress (Cole, 1991). Maladaptive coping, on the other hand, refers to an unsuccessful form of coping that involves expressions of anger or helplessness as well as avoidance of the problem (Cooper et al., 1988; Rohde et al., 1990). Substance use has been characterized as a means of maladaptive coping due to the experience of escape some users report.

A number of studies have investigated the relationship between coping and drug use in order to understand why some people initiate use and continue to use, while others do not. Emotion-focused and avoidant coping has been largely seen as a risk factor for illicit drug use and alcohol consumption (e.g. Cooper et al., 1988; Hasking and Oei 2004; Johnson and Pandina, 2000; Simons and Robertson, 1989). On the other hand, adaptive coping, accounting for controls and other precursors of drug use, has been inversely related to drug use. Chiong and colleagues (2010) found that different coping styles had varying socially influenced effects on an individual's propensity to use or intention to use substances as mediated through perceptions of that substance. Those who coped by problem-solving or by referring to a caretaker were more likely to have negative views of alcohol and marijuana, and subsequently less likely to have intentions for substance use, while those who coped via substance use were more likely to have friends who use or tolerate substances, subsequently increasing the likelihood of substance use (Chiong et al., 2010). Evidence also suggests that regardless of race, positive coping strategies serve as a protective factor against substance use (Eitle and Eitle 2014). These theoretical and empirical findings collectively lead us to suggest that the escalation of deviance in the form of intensifying drug use may be mitigated by a perceived ability to properly cope with stress and strain.

H2: Individuals who perceive themselves to be less successful at coping will be more likely to sniff prescription drugs.

Stigma

The classic definition of stigma comes from Erving Goffman, who defined stigma as "an attribute that is deeply discrediting" (1963). The presence of a stigmatizing attribute can damage social relationships between those who have that undesirable attribute and those who do not. While there are different forms of stigma, the form that is applicable to this paper is "moral stigma," which is best described as a blemish of individual character. A

moral stigma is associated with the violation of social norms that regulate behavior or beliefs; drug use and deviance fall into this category of stigma (Levitin, 1975; Glassner and Freedman, 1979; Elliot et al. 1982). Those who do not have the stigmatizing attribute are theorized not only to avoid the discrediting behavior, but also interactions with the stigmatized due to guilt by association (Goffman 1963; Eliot et al. 1982). This finding is relevant to the relationship between individuals' attitudes about drug use/users and potential drug use and escalation.

Stigma can act as a tool to marginalize and discourage the undesirable behavior, with the empirical literature finding an inverse relationship between attitudes of drug users and the likelihood of using drugs. A study of marijuana use (Plancherel et al. 2005) found that attitudes towards marijuana users were associated with personal use of the drug. Adlafa et al. (2009) built upon this study to determine that the more stigma an individual felt against those addicted to drugs, the less likely they were to use drugs and the less likely they were to have friends who used drugs. Further, the odds of lifetime illicit drug use has been shown to decrease as the individual experiences higher levels of drug-user stigmatization, net of other factors (Palamar et al., 2013). Yet, while considerable attention has been placed on the influence of stigma on any engagement in drug use, few studies have considered the role of stigma in the escalation of drug use.

Given that stigma tends to inhibit initiation into drug use, as well as interactions with drug using peers, we consider that stigma also inhibits the escalation of deviance in the form of transitions to non-normative routes of administration.

H3: Individuals who perceive more stigma towards prescription drug misuse will be less likely to sniff prescription drugs.

Peer Group Norms

The notion that individuals would be influenced by the ideas and behaviors of those around them has been well-established, and peer group norms have been identified as playing a key role in deviant behavior. In developing his classic Differential Association Theory, early work from Sutherland (1939) emphasized the importance of the group's influence on an individual's deviance through exposure to alternative norms and behaviors. Thornberry (1987) went further to identify that upon entering adolescence, associations with delinquent peers and deviant values can create a "mutually reinforcing loop" that increases the likelihood of escalating deviance. More specifically in reference to drug use, peer group norms can be seen as extremely important influences since drug use occurs primarily in groups and can be reinforced in these peer settings (Erickson and Jensen 1977, Warr 1996, Warr 2002).

Numerous studies have shown that the peer context is important for determining deviance and drug use. Peer risk factors such as friends' delinquency, drug use, and social rewards have been associated with individual drug behaviors (Oetting and Beauvais 1987; Swadi 1999; Cleveland et al., 2008). Hussong (2002) found that 3 different dimensions of peer group norms--peer group behavior, best friend behavior, and social cliques--were significantly related to the increases in drug use. While close-friends are extremely

important, peer influence can be extended beyond those in their close social networks. Peers in general who serve as role models and reference groups can have just as much influence on drug-using behaviors (Berten and Rossem 2011). More recently, a study completed by Maahs and colleagues (2016) indicated that having delinquent friends was a significant predictor of stimulant prescription misuse. Given the strong influence of peers identified in the literature, we consider that individuals situated in a normative peer context favorable towards drug use may be at increased risk for the escalation of deviant behaviors.

H4: Individuals who perceive prescription drug misuse to be more normative in their own peer groups will be more likely to sniff prescription drugs.

Pleasant Times with Others

A more covert form of peer influence that might have an effect on the escalation of deviance is the use of drugs to have pleasant times with others. Akers' Social Learning Theory builds upon Sutherland's Differential Association Theory to more concretely identify what may or may not contribute to promotion or prevention of deviant acts. Differential Reinforcement, an incorporated concept within Social Learning Theory, discusses the balance of punishment and rewards, and more specifically how indirect social interactions such as responses, presence, and behavior of others can reinforce the propensity to commit deviant acts (Akers and Jennings, 2009). If an individual associates the deviant act with favorable company and positive interactions they experience within that group, it may be internalized as a reward and reinforce the deviant behavior.

The enjoyment of company with peers may facilitate substance use in a variety of ways. Research has shown that drug-users are more likely to have close, intimate friendships than their non-using counterparts (Kandel and Davies 1991), and these intimate ties may trigger a pleasant response to those friends and their shared behaviors. The individual may consider the pleasant time a result of the actual drug-use in a group-setting, the enjoyment they get from having a shared secret or behavior with others (Katz 1988), or the affective solidarity that it generates (Kavanaugh and Anderson 2008). Thus, there are several mechanisms by which the desire to have pleasant times with peers may influence drug use and its escalation. The possible role that pleasant times with friends play in the escalation of deviance leads us to posit:

H5: Those who use drugs in order to have pleasant times with others will be more likely to sniff prescription drugs.

Methods

Sampling

We primarily utilized time-space sampling in nightlife venues in New York. Time-space sampling was first developed to capture hard-to-reach populations (Muhib et al., 2001; Stueve et al., 2001), but is useful to generate samples of venue-based populations (Parsons et al., 2008). Accordingly, we used venues as our basic sampling unit to systematically generate a sample of socially active youth.

We randomized “time” and “space” – the days/times for sampling individuals and the venues attended – using a sampling frame of venues and times of operation. To construct the sampling frame, ethnographic fieldwork during the previous year enabled the assessment of “socially viable” venues for each day of the week. A venue was viable if a threshold of youth patron traffic existed on that day of the week. We generated lists of venues for each day across several nightlife scenes. For each day of the week, socially viable venues were listed and assigned a number. Using a random digit generator, a random number was drawn corresponding to a particular venue on a particular day, yielding our schedule for recruitment.

At the venue, project staff conducted a screening survey, aiming to screen as many patrons as possible in that randomly sampled venue. Staff approached a patron, identified themselves, described the survey, and requested verbal consent for the anonymous survey conducted on an iPod Touch®. For those who provided consent, the surveys were initially administered by trained staff (consent, age, and residency) and respondents self-reported other information (race, sexual identity, gender, and substance use). Staff members were trained not to survey individuals who were impaired by intoxication to ensure the capacity to consent. If participants were eligible, they were given a brief description of the study and asked to provide contact information.

Time-space sampling recruitment was supplemented by online targeted recruitment of groups associated with nightlife scenes. Group members who were between the ages of 18–29 and resided in the NYC metropolitan area saw an advertisement for the study; if they clicked on it, they were directed to a Qualtrics® survey that screened for eligibility and, if eligible, collected their contact information. A small proportion of the total sample (<15%) was recruited via this supplemental method, and these individuals did not differ on the frequency of misuse of either pain killers, sedatives, or stimulants.

Project staff contacted all participants by phone and e-mail to provide more information about the study, confirm eligibility, and schedule an assessment. Eligibility criteria were: (1) ages 18–29; (2) misuse of prescription drugs at least three times in the past six months; and (3) misuse of prescription drugs during the past three months. During the assessment, participants provided informed consent and completed the survey. The data were collected between 2011 and 2013. All procedures were approved by university Institutional Review Boards.

Measures

The outcome variable, having sniffed a prescription drug during the past 90 days, is a dichotomous variable comprised of any instances of sniffing prescription sedatives, painkillers, or stimulants.

Various demographics of the participants such as self-reported age, gender, sexual identity, race/ethnicity (recoded as White vs. non-White), educational attainment, and parental socioeconomic status were included in the analyses to control for their possible effects on the outcome variable. Respondents’ drug use and mode of administration were additionally included in the models, which included their reported frequency of misuse of three

prescription drug types (pain killers, sedatives, and stimulants) during the previous three months (continuous), and also self-reported history of sniffing five illegal substances (binary): ketamine, cocaine, methamphetamine, heroin, and MDMA since past experiences sniffing illicit drugs may provide behavior to model for prescription drug misuse.

Two psychological variables were included in the analysis, respondents' propensity for sensation seeking and their perceived coping abilities. Sensation seeking is measured by using the 8-item Brief Sensation Seeking Scale (Hoyle et al. 2002). This scale asks the participant to identify their level of agreement with certain sensation-seeking tendencies and situations. The scale's internal reliability was good with a Cronbach's alpha of .798. To account for the individual's perceived ability to cope with stressful situations, we used the coping subscale of the Rhode Island Stress and Coping Inventory (Fava, Ruggiero, and Grimley, 1998). Higher scores on the coping subscale indicates a greater perceived ability to cope in the face of personal hardship. The Cronbach's alpha of this scale, .876, indicates good internal reliability.

We use the measure stigma as a bridge between the psychological and social variables as it combines both social perceptions and individuals' internalization of those perceptions. Six items make up a scale (Cronbach's alpha of .732) to reveal the participants' understanding of how others view drug users; higher scores indicate higher perceived stigma of drugs and users.

Peer drug associations emphasize the importance of the social benefits and costs to drug use that influence individuals (Oetting and Beauvais, 1987). Seventeen items from the Peer Drug Associations (PDA) scale were used to assess perceptions of the peer normative context of prescription drug misuse. Finally, we selected one sub-scale from the Inventory of Drug Taking Situations (IDTS) to assess an aspect of the social peer contexts, a peer-related motivation to misuse prescription drugs: the pleasant times with others sub-scale. The sub-scale had five items and the Cronbach's alpha was .872, revealing good internal reliability. The IDTS scale was designed to gauge the situational antecedents of drug use, and has been widely utilized in studies of drug use (Turner, Annis and Sklar, 1997).

Analysis

We assess recent history of sniffing a prescription drug. Given that our outcome is dichotomous, we used nested logistic regression models to examine the predictive power of a) demographic factors, misuse of prescription drugs in the past, history of sniffing five other drugs, b) psychological factors, c) stigma associated with drugs and users, and d) social factors. As such, the dichotomous outcome, sniffed any drugs in the past 90 days, was analyzed through a series of logistic regressions, sequentially adding controls, psychological variables, perceived stigma, and social variables in four blocks. The goal of this analysis is to understand the roles and importance of both psychological and social variables in the escalation of deviant behavior. Analyses were conducted using Stata 13.1.

Results

Model 1 includes demographic variables, prescription drug misuse in the past 90 days, and ever having sniffed select illicit substances. Of the demographic factors, age and education were significantly related to sniffing prescription drugs in the past 90 days. For every one unit increase in age, the likelihood of having sniffed a prescription drug in the past 90 days decreased by 14 percent ($p < .01$). Education was significant at all levels compared to those with a high school degree or less: individuals with an associate's degree or some college, currently in college, or with a bachelor's degree or higher were correspondingly 5.98 times ($p < .01$), 9.07 times ($p < .001$), and 8.91 times ($p < .001$) more likely to have sniffed prescription drugs during the past 90 days.

Some types of drug use, prescription and illicit, were significantly associated with the likelihood of sniffing prescription drugs in the past 90 days. Every instance of stimulant misuse in the past 90 days increases the likelihood of sniffing prescription drugs by 1 percent ($p < .01$). Those who have experience sniffing ketamine are 2.1 times ($p < .01$) more likely to have sniffed prescription drugs in the past 90 days, and those who have sniffed cocaine and heroin were respectively 4.83 times ($p < .001$) and 2.92 ($p < .05$) times more likely to have sniffed any drug in the past 90 days. MDMA and methamphetamine were non-significant.

Model 2 added two psychological variables, sensation seeking and coping, to the variables in model 1. The addition of these variables had very little effect on the size and significance of the previous variables, only slightly reducing the effect of ever having sniffed ketamine (now $p < .05$). Regarding the effects of the psychological variables, we find that perceived coping ability was not a significant predictor. Sensation seeking had a significant effect, showing that for every one unit increase in the sensation seeking scale, the likelihood of having sniffed a prescription drug during the past 90 days increased by 5 percent ($p < .05$).

Model 3 added a stigma variable to account for the individual's perception of how others view drugs and drug users. The addition of this variable had no effect on previous variables. With a negative association, stigma was marginally significant ($p < .10$), with every one-unit increase in the scale decreasing the odds of sniffing by 4.2 percent.

In the final model, we examine the effect of social variables on not only the outcome variable, having sniffed prescription drugs in the past 90 days, but also their mediating relationship to the psychological variables in the model. The most interesting findings with the addition of the social variables are the effects they had on both the psychological variables and stigma. Sensation Seeking, while significant in previous models, is reduced to non-significance; and stigma, originally marginally significant in the previous model, becomes significant, showing that for every one unit increase in the stigma scale, the odds of having sniffed prescription drugs during the past 90 days decreases by 8 percent ($p < .05$). Both social variables are associated with the odds of sniffing drugs: for every one unit increase in peer drug associations, the odds of having sniffed prescription drugs during the past 90 days increases by 7 percent ($p < .01$), and for every one unit increase in having

pleasant times with others, the odds of having sniffed prescription drugs increases by 11 percent ($p < .001$).

Discussion

This research identifies the role of psychosocial factors in the escalation of deviance, specifically with respect to intensification of deviant behavior via the transition to non-normative routes of consuming prescription drugs. Overall, the findings indicate support for certain factors in the escalation of deviance. Prior to considering social factors, the psychological trait of sensation seeking appeared to be an important indicator of delinquency escalation. However, once we included social factors in the model, this psychological factor is reduced to non-significance, perceived stigma becomes a significant factor, and it becomes clear that the social setting and peer factors are critical influences when considering the escalation of deviance, while psychological factors play less of a role. In brief, the overall model suggests that social factors are most important concerning the intensification of deviance.

As noted above, the psychological variable sensation seeking initially appeared to play a role in escalation in early models, but was reduced to non-significance with the addition of the social factors for peer drug associations and using drugs to have pleasant times with others. In other words, sensation seeking appears to matter only when social factors are not taken into consideration. While research suggests that sensation seeking is associated with the use of substances in general (Donohew et al., 1999; Palmgreen et al., 2001), we noted earlier that there has been little research on sensation seeking and the escalation of drug use. Quinn and Harden (2012) found that from adolescence to early adulthood, sensation seeking is associated with an increase in substance use; however, their models never included social or environmental factors besides maternal characteristics. Although we hypothesized that the sensation seeking trait would influence the odds of prescription drug sniffing, our findings suggest that social factors may override the influence of this personality factor in the escalation of drug use, potentially because individuals high in sensation seeking may pursue social experiences and friendships that meet those desires for unusual stimuli. Thus, our findings add to the body of research on the escalation of deviance by highlighting that social contexts in particular are salient factors for the escalation of drug use relative to the psychological variables considered in our study, although perhaps not entirely unrelated.

We also hypothesized that perceived coping ability would predict escalation, yet our results did not support this hypothesis. While the previous literature supports the notion that coping is an important factor for determining initiation and continuation of drug use, there have been few studies that demonstrate coping's role in the escalation of drug use. Among the few that have, Wills et al. (2001) investigated various coping strategies' effects on adolescent substance use over time, and found that while behavioral coping did not have a significant long-term effect on substance use, avoidant coping increased substance use over time. In light of other research identifying coping as influencing initiation into deviance and drug use (Chiong et al., 2010, Cooper et al., 1988, Johnson and Pandina, 2000), our results suggest that the effects of coping may cease once the individual is past the initial drug use period. As such, coping may not play a role in escalation to non-normative modes of administration.

While this provides some important information, our measure of perceived coping does not account for a need to cope with active stressors, which may, in future studies, give a more holistic view of the individual's life situation, and thus a more robust estimation of those effects.

The significant social influences of peer drug associations and the desire to have pleasant times with others on the transition to sniffing prescription drugs leads us back to the importance of sociological insights into this topic. Our results support our hypotheses that peer drug associations supportive of prescription drug misuse and motivations to use drugs to have pleasant times with others would increase the likelihood of sniffing prescription pills, and also that these factors more generally help to spin the "mutually reinforcing loop" (Thornberry 1987) of deviance. The social contexts of drug use, thus, truly matter for the escalation of these behaviors. As has been shown more broadly in the literature on deviance, the social environment is crucial for shaping deviant behaviors of the individual although others have indicated that they do not influence transitions in crime careers (Rojek and Erikson, 1982). We suggest it is possible that the escalation hypothesis is more applicable to the escalation of drug use or self-reported crimes that have gone unpunished rather than the escalation of crimes that Rojek and Erikson (1982) measured purely in the form of arrest records. Social drivers of escalation, particularly the intensification of existing deviant behaviors, should be further tested with other datasets and research questions in order to uncover which areas of deviance might be more susceptible to escalation via the social context.

Stigma, a factor that straddles the social and the psychological, had varying effects based on the other variables included in the model. Though only marginally significant when the demographic and psychological variables alone were in the model, once the social variables were introduced into the model, stigma became significantly associated with escalation. This interesting pattern coincides with our previous conclusion that social factors, rather than psychological, have a greater effect on the escalation of deviance. This strong relationship reveals a suppression effect of stigma, showing that the social context strongly influences how the individual views drugs/drug users, and consequently predicts escalation of drug use.

Less central to the hypotheses, our research also revealed findings about personal characteristics that are important for shaping the escalation of deviance via a less normative route of drug administration. Overall, the demographic factors of age, education, and illicit drug use showed certain trends: as age increases, drug escalation decreases, and as education level increases, the odds of sniffing prescription drugs increases. Previous use of stimulants, and ever having sniffed drugs such as ketamine, heroin, or cocaine were also predictors of increased likelihood of sniffing prescription drugs. These previous sniffing of illicit substances may provide a model for sniffing prescription drugs to young people.

Although the results described above provide insights into the psychosocial influences of deviance escalation, some limitations should be considered. First, this project was designed to study a sample of young adults involved in nightlife scenes. This population is an important one given that psychoactive substances often are present and visible in nightlife venues, yet these findings may not generalize to the entire young adult population of drug

users. Second, as we used a time-space sampling method, we may have oversampled young adults who are more frequent nightlife participants. Third, we must express caution for our interpretations due to temporal ordering. It remains possible that there are selection effects; for example, young adults who escalate to sniffing prescription drugs may feel more highly motivated to use these drugs to have pleasant times with friends or join peer groups with favorable norms towards drug use. Finally, subjects were asked to self-report behaviors, and there may be social desirability or recall biases in the reporting of drug use behaviors, a concern common in social science research. However, studies have shown that the use of computer-assisted surveys improves self-report measures of sensitive topics (Williams et al., 2000), which improves our confidence in these responses.

This paper provides important additional evidence for the role of various psychosocial factors in the escalation of deviance, using the case of escalation to sniffing among prescription pill misusers. We add to the literature on the escalation of deviance through a) a consideration of the intensification of deviance which is a form of escalation less well studied than the addition of new or increasing frequency of deviant behaviors, b) the simultaneous consideration of both social and psychological factors, and c) an application to the 21st century trend of prescription drug misuse. Overall, we find that the social influences of the peer normative context, the desire to use drugs to have a pleasant time with friends, and stigma to be significant factors in shaping the escalation of deviance among young adults. We do not find the psychological factors of sensation seeking and perceived coping to be significant influences on such escalation net of the effects of social contexts. These results provide further evidence for the importance of social contexts on the escalation of deviance among young people.

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References

- Adlaf Edward M., Hamilton Hayley A., Wu Fei, and Noh Samuel. 2009 "Adolescent Stigma Towards Drug Addiction: Effects of Age and Drug Use Behaviour. *Addictive Behaviors*, 34(4): 360–64. [PubMed: 19097707]
- Adler Patricia A. 1993 *Wheeling & Dealing: An Ethnography of Upper-Level Drug Dealing and Smuggling*, Second Edition. New York: Columbia University Press.
- Agnew Robert and White Helene R.. 1992 "An Empirical Test of General Strain Theory." *Criminology*, 30(4): 475–500.
- Akers Ronald L. and Jennings Wesley G. 2009 "The Social Learning Theory of Crime and Deviance" In Krohn Marvin D., Lizotte Alan J. and Hall Gina P. (Ed.) *Handbook on crime and deviance* (pp. 103–20). New York, NY: Springer.
- Arnett Jeffrey. 1990 "Drunk Driving, Sensation Seeking, and Egocentrism among Adolescents." *Personality and Individual Differences*, 11(6): 541–46.
- Berten Hans and Ronan van Rossem. 2011 "Mechanisms of Peer Influence among Adolescents: Cohesion Versus Structural Equivalence." *Sociological Perspectives*, 54(2): 183–204.
- Blumstein Alfred, Cohen Jacqueline, Das Somnath, and Moitra Soumyo D.. 1988 "Specialization and Seriousness during Adult Criminal Careers." *Journal of Quantitative Criminology*, 4(4): 303–45.

- Bourgois Philippe. 1996 *In Search of Respect: Selling Crack in El Barrio*. New York, NY: Cambridge University Press.
- Budman Simon H., Grimes Serrano Jill M., and Butler Stephen F.. 2009 "Can Abuse Deterrent Formulations Make a Difference? Expectation and Speculation." *Harm Reduction Journal*, 6(8), b71.
- Chiong Angela S., Bry Brenna H., and Johnson Valerie L.. 2010 "Mediators between Coping Styles and Substance Use/Intentions in Urban High School Freshmen. *Addictive Behaviors*, 35, 57–59. [PubMed: 19735985]
- Cleveland Michael J., Feinberg Mark E., M. E. Daniel E. Bontempo DE. and Greenberg Mark T.. 2008 "The Role of Risk and Protective Factors in Substance Use Across Adolescence.: *Journal of Adolescent Health*, 43(2): 157–64. [PubMed: 18639789]
- Cohen Albert K. 1955 *Delinquent Boys: The Culture of the Gang*. Glencoe, IL: Free Press.
- Cole David A. 1991 "Preliminary Support for a Competency-Based Model of Depression in Children." *Journal of Abnormal Psychology*, 100, 181–90. [PubMed: 2040769]
- Coleman John J., Schuster Charles R., and DuPont Robert L.. 2010 "Reducing the Abuse Potential of Controlled Substances." *Pharmaceutical Medicine*, 24(1): 21–36.
- Compton Wilson M. and Volkow Nora D.. 2006 "Abuse of Prescription Drugs and the Risk of Addiction." *Drug and Alcohol Dependence*, 83(1): S4–S7. [PubMed: 16563663]
- Contreras Randol. 2013 *The Stickup Kids: Race, Drugs, Violence, and the American Dream*. Berkeley, CA: University of California Press.
- Cooper M Marsha Russell Lynne and George William H.. 1988 "Coping, Expectancies, and Alcohol Abuse: A Test of Social Learning Formulations." *Journal of Abnormal Psychology*, 97(2): 218–30. [PubMed: 3385075]
- D'Amico Elizabeth J. and McCarthy Denis M.. 2006 "Escalation and Initiation of Younger Adolescents' Substance Use: The Impact of Perceived Peer Use." *Journal of Adolescent Health*, 39(4): 481–87. [PubMed: 16982381]
- Donohew R Lewis, Hoyle Rick H., Clayton Richard R., Skinner William F., Colon Susan E., and Rice Ronald E.. 1999 "Sensation Seeking and Drug Use by Adolescents and Their Friends: Models for Marijuana and Alcohol. *Journal of Studies on Alcohol*, 60(5), 622–31. [PubMed: 10487731]
- Eitle Tamela M. and Eitle David. 2014 "Race, Coping Strategies, and Substance Use Behaviors: A Preliminary Analysis Examining White and American Indian Adolescents." *Substance Use & Misuse*, 49(3): 315–25. [PubMed: 24041130]
- Erickson Maynard L. and Jensen Gary F.. 1977 "Delinquency Is Still Group Behavior!": Toward Revitalizing the Group Premise in the Sociology of Deviance." *Journal of Criminal Law and Criminology*, 68(2): 262–73.
- Fava Joseph L. Ruggiero Laurie, and Grimley Diane M.. 1998 "The Development and Structural Confirmation of the Rhode Island Stress and Coping Inventory." *Journal of Behavioral Medicine*, 21(6), 601–611. [PubMed: 9891257]
- Flory Kate, Lynam Donald., Milich Richard, Leukefeld Carl, and Clayton Richard. 2004 "Early Adolescent through Young Adult Alcohol and Marijuana Use Trajectories: Early Predictors, Young Adult Outcomes, and Predictive Utility." *Development and Psychopathology*, 16(01): 193–213. [PubMed: 15115071]
- Glassner Barry and Freedman Johnathan A.. 1979 *Clinical Sociology*. New York, NY: Longman Publishing Group.
- Goffman Erving. 1963 *Behavior in Public Places*. New York: Glencoe: The Free Press.
- Hasking Penelope A. and Oei Tian. 2004 "The Complexity of Drinking: Interactions between the Cognitive and Behavioural Determinants of Alcohol Consumption. *Addiction Research & Theory*, 12(5): 469–88.
- Henry Kimberly L., and Thornberry Terence P.. 2010 "Truancy and Escalation of Substance Use during Adolescence. *Journal of Studies on Alcohol and Drugs*, 71(1): 115–24. [PubMed: 20105421]
- Herman-Stahl Mindy A., Krebs Christopher P., Kroutil Larry A., and Heller David C.. 2007 "Risk and Protective Factors for Methamphetamine Use and Nonmedical Use of Prescription Stimulants among Young Adults Aged 18 to 25." *Addictive Behaviors*, 32(5): 1003–15. [PubMed: 16920275]

- Hittner James B. and Swickert Rhonda. 2006 "Sensation Seeking and Alcohol Use: A Meta-Analytic Review." *Addictive Behaviors*, 31(8): 1383–1401. [PubMed: 16343793]
- Hoyle Rick H., Stephenson Michael T., Palmgreen Philip, Lorch Elizabeth P., and Lewis Donohew R. 2002 "Reliability and Validity of a Brief Measure of Sensation Seeking." *Personality and individual differences*, 32(3): 401–14.
- Hussong Andrea M. 2002 "Differentiating Peer Contexts and Risk for Adolescent Substance Use." *Journal of Youth and Adolescence*, 31(3): 207–20.
- Johnson Valerie and Pandina Robert J.. 2000 "Alcohol Problems among a Community Sample: Longitudinal Influences of Stress, Coping, and Gender." *Substance Use & Misuse*, 35(5): 669–86. [PubMed: 10807151]
- Johnston Lloyd D., O'Malley Patrick M., Bachman Jerald G., and Schulenberg John E.. 2010 *Monitoring the future: National results on adolescent drug use: Overview of key findings 2009* (NIH Publication No. 10–7583) National Institute on Drug Abuse, Bethesda, MD.
- Kalichman Seth C., Heckman Timothy, and Kelly Jeffrey A.. 1996 "Sensation Seeking as an Explanation for the Association between Substance Use and HIV-Related Risky Sexual Behavior." *Archives of Sexual Behavior*, 25(2): 141–54. [PubMed: 8740520]
- Kandel Denise and Davies Mark. 1991 "Friendship Networks, Intimacy, and Illicit Drug Use in Young Adulthood: A Comparison of Two Competing Theories." *Criminology*, 29(3): 441–69.
- Kaplan Howard B. 1975 *Self-attitudes and deviant behavior*. Oxford, England: Goodyear.
- Kaplan Howard B. 1982 "Self-Attitudes and Deviant Behavior: New Directions for Theory and Research." *Youth and Society*, 14(2): 185–211.
- Kaplan Howard B. 1984 *Patterns of Juvenile Delinquency: Social Origins, Continuities, and Consequences*. Beverly Hills, CA: Sage.
- Kaplan Howard B. 1996 "Empirical Validation of the Applicability of an Integrative Theory of Deviant Behavior to the Study of Drug Use." *Journal of Drug Issues*, 26(2): 345–78.
- Kaplan Howard B., Martin Steven S., Johnson Robert J., and Robbins Cynthia A.. 1986 "Escalation of Marijuana Use: Application of a General Theory of Deviant Behavior." *Journal of Health and Social Behavior* 27(1): 44–61. [PubMed: 3486897]
- Katz Jack. 1988 *Seductions of Crime: Moral and Sensual Attractions in Doing Evil*. New York: Basic Books.
- Kavanaugh Philip R. and Anderson Tammy L.. 2008 "Solidarity and Drug Use in the Electronic Dance Music Scene." *The Sociological Quarterly*, 49(1): 181–208.
- Kelly Brian C., Wells Brooke E., LeClair Amy, Tracy Daniel, Parsons Jeffrey T., Golub Sarit A.. 2013 "Prevalence and Correlates of Prescription Drug Misuse among Socially Active Young Adults." *International Journal of Drug Policy*, 24(4): 297–303. [PubMed: 23036649]
- Kelly Brian C., Wells Brooke E. LeClair Amy, Tracy Daniel, Parsons Jeffrey T, and Golub Sarit. 2013 "Prescription Drug Misuse among Young Adults: Looking across Youth Cultures" *Drug & Alcohol Review*, 32: 288–294. [PubMed: 23190213]
- Kelly Brian C., Vuolo Mike, Pawson Mark, Wells Brooke E., and Parsons Jeffrey T.. 2015 "Chasing the Bean: Prescription Drug Smoking Among Socially Active Youth" *Journal of Adolescent Health*, 56(6): 632–38. [PubMed: 26003578]
- Lankenau Stephen E., Teti Michele, Silva Karol, Bloom Jennifer J., Harocopos Alex, and Treese Meghan. 2012 "Initiation into Prescription Opioid Misuse amongst Young Injection Drug Users." *International Journal of Drug Policy*, 23(1): 37–44. [PubMed: 21689917]
- Levitin Teresa E. 1975 "Deviants as Active Participants in the Labeling Process: The Visibly Handicapped." *Social Problems*, 22(4): 548–57.
- Maahs Jeffrey R., Weidner Robert R., and Smith Ryan. 2016 "Prescribing Some Criminological Theory: An Examination of the Illicit Use of Prescription Stimulants among College Students." *International journal of offender therapy and comparative criminology*, vol. 60 (2): 146–64 [PubMed: 25156423]
- MacPherson Laura, Magidson Jessica F., Reynolds Elizabeth K., Kahler Christopher W., and Lejuez CW. 2010 "Changes in Sensation Seeking and Risk-Taking Propensity Predict Increases in Alcohol Use among Early Adolescents." *Alcoholism: Clinical and Experimental Research*, 34(8): 1400–08.

- Martins Silvia S., Storr Carla L., Alexandre Pierre K., and Chilcoat Howard D.. 2008 “Adolescent Ecstasy and Other Drug Use in the National Survey of Parents and Youth: The Role of Sensation-Seeking, Parental Monitoring and Peer’s Drug Use.” *Addictive Behaviors*, 33(7): 919–33. [PubMed: 18355973]
- McCabe Sean E., Cranford James A., Carol J Boyd CJ and Christian J Teter CJ 2007 “Motives, Diversion and Routes of Administration Associated with Nonmedical Use of Prescription Opioids.” *Addictive Behaviors*, 32(3): 562–75. [PubMed: 16843611]
- McCabe Sean E., Boyd Carol J., and Teter Christian J.. 2009 “Subtypes of Nonmedical Prescription Drug Misuse.” *Drug and Alcohol Dependence*, 102(1): 63–70. [PubMed: 19278795]
- Muhib Farzana B., Lin Lillian S., Stueve Ann N., Miller Robin L., Ford Wesley L., Johnson Wayne D., and Community Intervention Trial for Youth Study Team. 2001 “A Venue-Based Method for Sampling Hard-to-Reach Populations.” *Public Health Reports*, 116 (Suppl 1): 216–22. [PubMed: 11889287]
- Nagin Daniel S., Farrington David P., and Moffitt Terrie E.. 1995 “Life-Course Trajectories of Different Types of Offenders.” *Criminology*, 33(1): 111–39.
- Oetting Eugene R. and Beauvais Fred. 1987 “Peer Cluster Theory, Socialization Characteristics, and Adolescent Drug Use: A Path Analysis. *Journal of Counseling Psychology*, 34(2): 205–13.
- Palamar Joseph J., Halkitis Perry N., and Kiang Mathew V.. 2013 “Perceived Public Stigma and Stigmatization in Explaining Lifetime Illicit Drug Use among Emerging Adults.” *Addiction Research & Theory*, 21(6): 516–25.
- Palmgreen Philip, Donohew Lewis, Lorch Elizabeth P., Hoyle Rick H., and Stephenson Michael T.. 2001 “Television Campaigns and Adolescent Marijuana Use: Tests of Sensation Seeking Targeting.” *American Journal of Public Health*, 91(2): 292–96. [PubMed: 11211642]
- Parsons Jeffrey T., Grov Chirstian, and Kelly Brian C. 2008 Comparing the effectiveness of two forms of time-space sampling to identify club drug-using young adults. *Journal of Drug Issues*, 38(4): 1061–81. [PubMed: 20686625]
- Pearlin Leonard I., and Schooler Carmi. 1978 “The Structure of Coping.” *Journal of Health and Social Behavior*, 19(1): 2–21. [PubMed: 649936]
- Pearlin Leonard I., Menaghan Elizabeth G., Lieberman Morton A., and Mullan Joseph T.. 1981 “The Stress Process.” *Journal of Health and Social Behavior*, 22(4): 337–56. [PubMed: 7320473]
- Plancherel Bernard, Bolognini Monique, Stephan Philippe, Laget Jacques, Chinnet Leonie, Bernard Mathieu, and Halton Olivier. 2005 “Adolescents’ Beliefs about Marijuana Use: A Comparison of Regular Users, Part Users, and Never/Occasional Users.” *Journal of Drug Education*, 35(2): 131–46. [PubMed: 16312110]
- Quinn Patrick D. and Paige Harden K. 2013 “Differential Changes in Impulsivity and Sensation Seeking and the Escalation of Substance Use from Adolescence to Early Adulthood.” *Development and Psychopathology*, 25(1): 223–39. [PubMed: 22824055]
- Raffa Robert B. and Pergolizzi Joseph V., Jr. 2010 “Opioid Formulations Designed to Resist/Deter Abuse.” *Drugs*, 70(13): 1657–75 [PubMed: 20731474]
- Roberts Brent W., Jackson Joshua J., Burger Jessica, and Trautwein Ulrich. 2009 “Conscientiousness and Externalizing Psychopathology: Overlap, Developmental Patterns, and Etiology of Two Related Constructs.” *Development and Psychopathology*, 21(3): 871–88. [PubMed: 19583888]
- Rohde Paul, Lewinsohn Peter M., Tilson Mark, and Seeley John R.. 1990 “Dimensionality of Coping and Its Relation to Depression.” *Journal of Personality and Social Psychology*, 58(3), 499–511. [PubMed: 2324939]
- Rojek Dean G. and Erickson Maynard L.. 1982 “Delinquent Careers a Test of the Career Escalation Model.” *Criminology*, 20(1), 5–28.
- Romer Daniel and Hennessy Michael. 2007 “A Biosocial-Affect Model of Adolescent Sensation Seeking: The Role of Affect Evaluation and Peer-Group Influence in Adolescent Drug Use.” *Prevention Science*, 8(2): 89–101. [PubMed: 17286212]
- Sampson Robert J. and Laub John H.. 2003 “Life-Course Desisters? Trajectories Of Crime Among Delinquent Boys Followed To Age 70.” *Criminology*, 41(3): 555–92.
- Simons Ronald L. and Robertson Joan F.. 1989 “The Impact of Parenting Factors, Deviant Peers, and Coping Style Upon Adolescent Drug Use.” *Family Relations*, 38(3): 273–81.

- Simons-Morton Bruce and Chen Rusan S.. 2006 "Over Time Relationships between Early Adolescent and Peer Substance Use." *Addictive Behaviors*, 31(7): 1211–23. [PubMed: 16229958]
- Stice Eric, Myers Mark G., and Brown Sandra A.. 1998 "A Longitudinal Grouping Analysis of Adolescent Substance Use Escalation and De-Escalation. *Psychology of Addictive Behaviors*, 12(1): 14–27.
- Stueve Ann, O'Donnell Lydia N., Duran Richard, San Doval Alexi, and Blome Juliana. 2001 "Time-Space Sampling in Minority Communities: Results with Young Latino Men who have Sex with Men. *American Journal of Public Health*, 91(6): 922–26. [PubMed: 11392935]
- Substance Abuse and Mental Health Services Administration (SAMHSA). 2009 Results from the 2008 National Survey on Drug Use and Health: National Findings Office of Applied Studies. NSDUH Series H-36, HHS Publication No. SMA 09–4434. Rockville, MD.
- Sutherland Edwin H. 1937 *The Professional Thief*. Chicago: University of Chicago Press.
- Sutherland Edwin H. 1939 *Principles of Criminology*. Philadelphia, PA: Lippincott
- Swadi Harith. 1999 "Individual Risk Factors for Adolescent Substance Use." *Drug and Alcohol Dependence*, 55(3): 209–24. [PubMed: 10428362]
- Thornberry Terence. P. 1987 "Toward an Interactional Theory of Delinquency." *Criminology*, 25(4): 863–91.
- Turner Nigel E., Annis Helen M., and Sklar Sherrilyn M.. 1997 "Measurement of Antecedents to Drug and Alcohol Use: Psychometric Properties of the Inventory of Drug-Taking Situations (IDTS)." *Behaviour Research and Therapy*, 35(5): 465–83. [PubMed: 9149457]
- Vosburg Suzanne K., Jones Jermaine D., Manubay Jeanne M., Ashworth Judy B., Benedek Irma H., and Comer Sandra D., S. D. 2012 "Assessment of a Formulation Designed to be Crush-Resistant in Prescription Opioid Abusers." *Drug and Alcohol Dependence*, 126(1), 206–15. [PubMed: 22721679]
- Warr Mark. 1996 "Organization and Instigation in Delinquent Groups." *Criminology*, 34(1): 11–38.
- Warr Mark. 2002 *Companions in Crime: The Social Aspects of Criminal Conduct*. New York, NY: Cambridge University Press.
- Williams Mark L., Freeman Robert C., Bowen Anne M., Zhao Zixian, Elwood William N., Gordon Chris, and Young Paul, Rusek Ryan and Signes Carmen-Anita. 2000 "A Comparison of the Reliability of Self-Reported Drug Use and Sexual Behaviors Using Computer-Assisted versus Face-to-Face Interviewing." *AIDS Education and Prevention*, 12(3), 199–213. [PubMed: 10926124]
- Yamaguchi Kazuo, and Kandel Denise B.. 1984 "Patterns of Drug Use from Adolescence to Young Adulthood: III. Predictors of Progression." *American Journal of Public Health* 74:673–81. [PubMed: 6742253]
- Zuckerman Marvin. 1979 *Sensation Seeking: Beyond the Optimal Level of Arousal*. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Zuckerman Marvin. 1994 *Behavioral Expressions and Biosocial Bases of Sensation Seeking*. New York, NY: Cambridge University Press.
- Zuckerman Marvin, Ball Samuel, and Black James. 1990 "Influences of Sensation Seeking, Gender, Risk Appraisal, and Situational Motivation on Smoking." *Addictive Behaviors*, 15(3), 209–20. [PubMed: 2378281]
- Zuckerman Marvin, Eysenck Sybil B., and Eysenck Hans J.. 1978 "Sensation Seeking in England and America: Cross-Cultural, Age, and Sex Comparisons." *Journal of Consulting and Clinical Psychology*, 46(1): 139–49. [PubMed: 627648]

Table 1.

Descriptive statistics of the sample

<u>Demographic characteristics</u>		Total (N = 404)
Age (mean, sd)		24.57 (2.69)
Gender		
Male		220 (54.73%)
Female		182 (45.27%)
Race		
White		270 (66.83%)
Nonwhite		134 (33.17%)
Educational achievement		
High school or less		28 (6.93%)
Some college or Associates degree		65 (16.09%)
Currently enrolled in college		83 (20.54%)
Bachelor's degree or higher		228 (56.44%)
Sexual identity		
Heterosexual		210 (51.98%)
LGBTQ		194 (48.02%)
Parental class		
Rich		20 (4.99%)
Upper middle class		132 (32.92%)
Middle class		157 (39.15%)
Working class/poor		92 (22.94%)
<u>Substance use characteristics</u>		
Past 90 days prescription drug misuse		
Sedatives (mean, sd)		11.94 (19.99)
Pain killers (mean, sd)		10.03 (18.24)
Stimulants (mean, sd)		12.93 (21.28)
Ever sniffed Ketamine		119 (29.31%)
Ever sniffed Cocaine		321 (79.06%)
Ever sniffed Methamphetamine		35 (8.62%)
Ever sniffed Heroin		55 (13.55%)
Ever sniffed MDMA		172 (42.36%)
Psychosocial Factors		
Sensation Seeking score (mean, sd)		30.41 (5.84)
Coping score (mean, sd)		18.99 (3.51)
Stigma score (mean, sd)		21.13 (3.78)
Peer Drug Associations score (mean, sd)		34.34 (6.32)
Pleasant Times w/ Others score (mean, sd)		11.60 (4.89)

Table 2.
Nested Logistic regression predicting probability of ever having sniffed drugs in the past 90 days.

	Model 1		Model 2		Model 3		Model 4	
	Coef. (Std. err.)	O.R.	Coef. (Std. err.)	O.R.	Coef. (Std. err.)	O.R.	Coef. (Std. err.)	O.R.
Age	-0.157** (0.059)	0.855	-0.154** (0.059)	0.858	-0.157** (0.060)	0.855	-0.176** (0.064)	0.838
Parents' class								
Upper middle class	0.095 (0.574)	1.100	0.119 (0.585)	1.126	0.094 (0.580)	1.099	-0.207 (0.615)	0.813
Middle class	0.024 (0.564)	1.024	-0.039 (0.577)	0.962	0.000 (0.573)	1.000	-0.264 (0.609)	0.768
Working class/poor	0.706 (0.595)	2.025	0.690 (0.604)	1.994	0.718 (0.601)	2.051	0.500 (0.637)	1.649
Educational achievement								
Some college or Associates degree	1.789** (0.654)	5.981	1.778** (0.656)	5.915	1.827** (0.666)	6.218	1.847** (0.714)	6.338
Currently in college	2.205*** (0.642)	9.075	2.200*** (0.644)	9.027	2.253*** (0.655)	9.513	2.314*** (0.698)	10.111
Bachelor's degree or higher	2.187*** (0.655)	8.906	2.249*** (0.657)	9.479	2.309*** (0.667)	10.062	2.349*** (0.716)	10.476
Nonwhite	0.098 (0.270)	1.103	0.105 (0.272)	1.111	0.153 (0.276)	1.166	-0.023 (0.290)	0.977
Male	0.432 (0.249)	1.540	0.333 (0.256)	1.394	0.314 (0.257)	1.369	0.191 (0.271)	1.211
Heterosexual	-0.348 (0.249)	0.706	-0.387 (0.253)	0.679	-0.441 (0.255)	0.643	-0.518 (0.268)	0.595
Pain killers instances of use (past 90 days)	0.012 (0.008)	1.013	0.013 (0.008)	1.013	0.014 (0.008)	1.014	0.003 (0.009)	1.003
Sedatives instances of use (past 90 days)	0.012	1.012	0.012	1.012	0.013	1.013	0.008	1.008

	Model 1		Model 2		Model 3		Model 4	
	Coef. (Std. err.)	O.R.	Coef. (Std. err.)	O.R.	Coef. (Std. err.)	O.R.	Coef. (Std. err.)	O.R.
Stimulants instances of use (past 90 days)	(0.007) 0.014 **	1.014	(0.007) 0.015 **	1.015	(0.007) 0.016 **	1.016	(0.007) 0.013 *	1.013
Ever sniffed Ketamine	(0.006) 0.740 **	2.095	(0.006) 0.689 *	1.991	(0.006) 0.676 *	1.966	(0.006) 0.620 *	1.859
Ever sniffed Cocaine	(0.284) 1.576 ***	4.834	(0.287) 1.590 ***	4.903	(0.288) 1.507 ***	4.513	(0.299) 1.310 **	3.707
Ever sniffed Methamphetamine	(0.414) -0.260	0.771	(0.418) -0.280	0.756	(0.419) -0.296	0.744	(0.436) -0.149	0.862
Ever sniffed Heroin	(0.436) 1.071 **	2.919	(0.437) 1.025 **	2.787	(0.433) 1.124 **	3.077	(0.459) 1.045 **	2.844
Ever sniffed MDMA	(0.374) 0.269	1.309	(0.376) 0.246	1.279	(0.380) 0.229	1.257	(0.397) 0.276	1.318
Sensation Seeking	(0.259) -		(0.263) 0.047 *	1.048	(0.264) 0.047 *	1.048	(0.276) 0.018	1.019
Coping	-		(0.023) -		(0.024) -		(0.026) -	
	-		-0.005	0.995	-0.003	0.997	0.012	1.012
	-		(0.037) -		(0.037) -		(0.039) -	
Stigma	-		-		-0.064	0.938	-0.084 *	0.919
	-		-		(0.034) -		(0.035) -	
Peer Drug Associations	-		-		-		0.069 **	1.072
	-		-		-		(0.024) -	
Pleasant times with Others	-		-		-		0.106 ***	1.112
	-		-		-		(0.032) -	
Constant	-1.278 (1.599)	0.279	-2.629 (1.841)	0.072	-1.322 (1.971)	0.267	-2.598 (2.162)	0.074
Log likelihood	-211.696		-209.655		-207.839		-194.005	
LR chi2	110.620 ***		114.700 ***		118.330 ***		146.000 ***	

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