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Challenging expectancies to prevent nonmedical prescription stimulant use: A randomized, controlled trial

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ABSTRACT

Background: College students continue to report nonmedical prescription stimulant use to enhance alertness and concentration. Despite increasing prevalence of this behavior, techniques for preventing or treating it are lacking. An intervention that focuses on challenging positive consequence-oriented beliefs about prescription stimulants may be efficacious in preventing use.
Methods: The current study examined the efficacy of a randomized controlled expectancy challenge intervention to prevent nonmedical prescription stimulant use among 96 at-risk, stimulant-naïve college students (i.e., low grade point average, Greek involvement, binge drinking, cannabis use). Forty-seven participants completed a brief expectancy challenge intervention aimed at modifying positive expectancies for prescription stimulants, to consequently deter initiation of use. The remaining participants received no intervention.
Results: The expectancy challenge successfully modified expectancies related to prescription stimulant effects. Nevertheless, this intervention group and a control group showed comparable rates of nonmedical prescription use at 6-month follow-up. However, negative expectancies were significant predictors of reduced odds of future use.
Conclusions: A challenge session appears to modify stimulant-related expectancies, which are related to nonmedical prescription stimulant use. Nevertheless, a more potent challenge or booster sessions might be essential for longer-term changes.

1. Introduction

College students frequently engage in nonmedical prescription stimulant use (NPS; e.g., methylphenidate; MPH) to enhance cognitive performance, subjective mood, and arousal (Barrett et al., 2005; Low and Gendaszek, 2002; Teter et al., 2005). Lifetime prevalence rates suggest that 8.5% of Americans over the age of 12 and 12.3% of Americans between the ages of 21 and 25 have engaged in NPS (Substance Abuse and Mental Health Services Administration [SAMHSA], 2009). Additionally, past-year prevalence rates as high as 35% have been reported for college students (Wilens et al., 2008). Particularly problematic is that students expect benefits from using prescription stimulants while anticipating very few risks (Arria and DuPont, 2010); however, nonmedical users of prescription stimulant medications are substantially more likely to engage in or experience numerous problematic drug-related behaviors, including simultaneous polydrug use, engaging in illegal activities to obtain drugs, experiencing drug-related medical problems, and experiencing family conflict as a result of use (McCabe and Teter, 2007). Moreover, while little is known about the safety of mixing prescription stimulants with other drugs of abuse, high levels of prescription stimulant use alone may lead to dangerously high body temperature, cardiovascular failure, irregular heartbeat, seizures, or paranoia (National Institute on Drug Abuse, 2009). New reports indicate more than a four-fold increase in emergency room visits related to NPS among young adults aged 18–25 from 2005 to 2010 (SAMHSA, 2013). Recent publications highlight the need to recognize and address the high prevalence rates of NPS and urge healthcare providers, parents, university officials, and law enforcement to take action to discourage and reduce use among college students (Arria and DuPont, 2010; Rosenfield et al., 2011).

There is currently no published research examining prevention or treatment efforts to reduce NPS. Given that college students report engaging in NPS because they expect the medication to improve their concentration and alertness or make them feel high, interventions that focus on challenging these cognitions

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may be particularly effective. The current research on prescription stimulant-related cognitive enhancements among healthy adults (i.e., those without a diagnosis of Attention-Deficit Hyperactivity Disorder) is inconclusive. A recent review by Smith and Farah (2011) found that the only area of cognition with substantial evidence for an enhancement effect was long-term declarative memory, though effect sizes varied widely according to specific task and study. Other areas of cognition, including working memory and cognitive control, were not found to be reliably enhanced following ingestion of a prescription stimulant. Volkow et al. (2004) posit that prescription stimulants may function by enhancing interest and motivation among healthy individuals, rather than functionally enhancing cognitive abilities. It is also possible that some of the reported cognitive enhancement effects from prescription stimulants may truly be placebo effects resulting from positive cognitive enhancement-related expectancy effects.

Expectancy effects are motivationally relevant beliefs about drug-related consequences. Expectancies can reflect both positive and negative outcomes. Alcohol expectancy research reveals that each expectancy dimension is uniquely associated with various aspects of use. For example, the number of positive expectancies and their strength positively correlated with frequency and quantity of alcohol consumption (Brown et al., 1980; Fromme et al., 1993; Goldman et al., 1991). Negative expectancies appear to be more important in the prediction of abstinence and efforts to resist drinking (Jones and McMahon, 1996; Leigh and Stacy, 2004). Recent research has examined expectancy effects for prescription stimulants and obtained similar results; positive expectancies are strongest among users while negative expectancies are strongest among nonusers (Looby and Earleywine, 2010).

Fortunately, expectancy effects appear modifiable, as direct attempts to change alcohol expectancies have decreased drinking (e.g., Goldman et al., 1991). Darkes and Goldman (1993) developed a multisession expectancy challenge procedure designed to undermine participants' existing associations between drinking and expected behavioral outcomes, suggesting that many of alcohol's desired consequences may be placebo effects. The expectancy challenge resulted in significantly weakened positive expectancies for social and sexual facilitation, along with reduced drinking at a 2-week follow-up. Similar results with longer follow-up periods (e.g., 1 month) appear in other alcohol expectancy challenge studies that were designed to target females (Musher-Eizenman and Kulick, 2003; Wiers and Kummeling, 2004) or that used a single-session brief expectancy challenge intervention (Lau-Barraco and Dunn, 2008). Thus, both expectancies and alcohol use can change from brief and practical expectancy challenge interventions, and these effects may persist for a clinically meaningful period.

Researchers have not applied an expectancy challenge for stimulant drug use. Since numerous studies have confirmed that stimulant expectancies function similarly to alcohol expectancies (e.g., Jaffe and Kilbey, 1994; Looby and Earleywine, 2009, 2010; Schafer and Brown, 1991), an expectancy challenge intervention might alter prescription stimulant expectancies to decrease or prevent nonmedical stimulant use. As the first step in addressing the substantial need to discourage and prevent NPS, the current study examines the efficacy of an expectancy challenge intervention for modifying expectancies and preventing NPS among college students. It was hypothesized that participants randomized to an expectancy challenge would be less likely to initiate NPS during a 6-month follow-up and report weaker positive expectancies compared to participants who did not take part in the challenge. Our research design also allows for prospective examination of expectancy effects as predictors of NPS to understand factors that may increase risk for use among an already high-risk group.

2. Methods

2.1. Participants

Participants were recruited to participate in a 3-session study (i.e., 2 laboratory visits and 1 online follow-up) via flyers posted on a university campus in the Northeastern United States. Interested participants completed a telephone screen to determine eligibility. In order to examine the expectancy challenge as a prevention effort, inclusion criteria required that participants report lifetime nonuse of any prescription stimulant medication, though they also were required to endorse at least two relevant risk factors for NPS. These risk factors included involvement in a fraternity or sorority (McCabe et al., 2005; Shillington et al., 2006), GPA below 3.5 (Teter et al., 2005; McCabe et al., 2006), at least one episode of binge drinking in the past 2 weeks (Herman-Stahl et al., 2007; McCabe et al., 2005; Shillington et al., 2006), and past-month cannabis use (McCabe et al., 2005). The remaining eligibility criteria included age between 18 and 25 years and current enrollment in college, which are additional risk factors for NPS (Johnston et al., 2005; Kroutil et al., 2006). Further details on recruitment information can be found elsewhere (i.e., Looby and Earleywine, 2011). All participants were provided monetary compensation for their involvement. This study was approved by a local Institutional Review Board and informed consent was obtained from all participants prior to beginning the study.

One hundred and six individuals consented to participate in the study. Ten participants withdrew prior to the intervention (9 participants were not retained for the second laboratory visit and 1 participant was withdrawn due to health reasons), resulting in 96 completers. Fifty-seven participants were male (60%) and participants ranged in age from 18 to 23 ($M = 19.57$, $SD = 1.26$). Average years of education was 13.49 ($SD = 1.07$) and participants were primarily Caucasian (71%). Other ethnicities reported were African American (8%), Hispanic (8%), Asian (4%), mixed race (4%), and Native American (1%). All participants were currently enrolled full-time in a 4-year college.

2.2. Procedure

Eligible participants were informed that their involvement would entail two laboratory visits and completion of an online survey 6 months following their second laboratory visit. The purpose of the laboratory visits was to obtain individualized data on prescription stimulant-related placebo effects to use for an expectancy challenge. All participants completed the Prescription Stimulant Expectancy Questionnaire-II (PSEQ-II; Looby and Earleywine, 2010) at the beginning of their first study visit. The PSEQ-II is a 45-item measure that assesses prescription stimulant expectancy effects along a 3-point Likert scale. It includes two positive expectancy factors (i.e., cognitive enhancement, social enhancement) and two negative expectancy factors (i.e., anxiety and arousal, guilt and dependence). Participants were then randomized to an expectancy challenge (EC) or a control condition. EC participants received what they were told was MPH on one visit and received no medication on the other visit; participants actually ingested a placebo substance rather than active MPH. Control participants did not receive any medication on either visit. During both visits, participants completed questionnaires assessing subjective mood and arousal and a battery of cognitive tasks assessing a wide range of cognitive abilities. Further details regarding these visits are available elsewhere (i.e., Looby and Earleywine, 2011).

At the conclusion of participants' second visit, an expectancy challenge intervention was conducted with the EC participants, who were debriefed and informed of placebo administration. They participated in a 30-min expectancy challenge to modify