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Preventing and Reducing Non-Medical Prescription Stimulant Use: A Group Motivational Enhancement Intervention

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Abstract

College students are at increased risk for engaging in non-medical prescription stimulant use (NMPSU; Looby et al., 2014). Despite widespread NMPSU on college campuses, however, no research has examined the efficacy of group-based motivational enhancement intervention targeting NMPSU. Accordingly, we recruited 31 Trinity College students who reported a history of NMPSU, or who demonstrated two or more risk factors for NMPSU, with the intent to reduce use (or initiation of use), positive expectations of NMPSU, and to increase negative expectancies and study self-efficacy. Students were randomized into one of two conditions: (1) a group-based motivational enhancement intervention, which involved discussing NMPSU, study strategies, and pros/cons of NMPSU, or (2) a control group. We found limited support for our hypotheses; that is, NMPS users in the intervention group did not report a reduction in use compared to NMPS users in the control group, nor did they report a greater readiness to change behavior. As hypothesized, we found a trend for positive expectancies to decline in the treatment group, but no significant change in negative expectancies. Contrary to the last hypothesis, study self-efficacy didn't improve for the treatment group. Implications for future interventions targeting NMPSU are discussed.

Preventing and Reducing Non-Medical Prescription Stimulant Use: A Group Motivational Enhancement Intervention

Prescription stimulant medications (i.e. methylphenidate, amphetamine, dextroamphetamine), commonly referred to as Ritalin, Concerta, and Adderall, are prescribed to individuals to help combat attention-deficit/hyperactivity disorder. However, the illicit use of prescription stimulants for non- medical purposes and without proper supervision from a health care provider has emerged in the past decade as a substance use behavior (Bavarian, Flay, Ketcham & Smit, 2013). Data from the Substance Abuse and Mental Health Services Administration found that between 2005 and 2010, emergency room visits related to NMPSU increased from 5,212 to 15,585 (Substance Abuse and Mental Health Services Administration, 2013). Also, NMPS users are at an increased risk for engaging in problematic drug-related behaviors, such as polydrug use and engaging in illegal means of purchasing drugs (Looby, Young, & Earleywine, 2013). The increasingly high rates of use and adverse physical health and mental health effects suggests that users may be unaware of, or lack consideration for the potential negative consequences associated with NMPSU.

People are motivated to use prescription stimulants for non-medical purposes on account of perceived cognitive enhancement, such as an increase in concentration and alertness, in academic settings. College students are at the highest risk for non-medical prescription stimulant use; the literature suggests prevalence rates ranging from 19% to 35% (Looby et al., 2013; Wilens et al., 2008). A recent survey revealed that Trinity College has a prevalence rate of 37%, which is higher than rates reported in the literature (Minot, 2014). However, not all students are at equal risk for NMPSU; students with one or more of the following risk factors: male gender, Caucasian ethnicity, Greek Life participation, and a lower grade point average (<3.5) are at

elevated risk for initiating NMPSU (Looby, Beyer, & Zimmerman, 2014). Also, recent research has identified two additional risk factors associated with NMPSU; namely positive expectancies for cognitive enhancement and low academic self- efficacy (Looby et al., 2014).

Despite widespread NMPSU on college campuses and the potential for negative health consequences associated with NMPSU, no research has examined the efficacy of group-based intervention or prevention efforts targeting NMPSU. Because of this gap in research, the current study explored whether a brief group intervention could curb NMPSU initiation rates among nonusers and reduce frequency of use among users. Given the lack of empirically-supported preventive interventions for NMPSU, in the current study we adopted a group motivational interviewing approach, which has been effective in reducing heavy drinking in college students (LaBrie, Pedersen, Lamb, & Quilan, 2006).

Predictors of Non-Medical Prescription Stimulant Use

People often engage in NMPSU in academic settings motivated by perceived cognitive benefits, such as improved concentration and increased energy levels. Although perceived cognitive advantages are what drive students to engage in NMPSU, there are numerous other risk factors associated with stimulant use among college students (Looby et al., 2014). In McCabe, Knight, Teter, and Wechsler's (2005) study of NMPSU among college students, researchers sampled 119 colleges nation-wide (10,904 randomly selected students) and inquired about demographics and substance use behaviors. In particular, NMPSU, alcohol use, cigarette use, and illicit drug use all were reported on. Regression analyses indicated that NMPSU was higher among college students who were Caucasian, male, members of Greek life, earned low GPA averages (B or lower), attended schools located in the northeastern United States, and who engaged in other risky behaviors (i.e. alcohol and marijuana use). For example, students who

earned a B or lower were two times more likely to report NMPSU in comparison to those who earned a B+ or higher. McCabe et al.'s (2005) study illustrated numerous academic and demographic factors that appear to put students at higher risk.

Aside from the risk factors identified in McCabe et al.'s (2005) study, Looby and Earleywine (2010) were interested in examining risk factors that could have the potential to be altered through targeted intervention. Current research has highlighted the importance of positive cognitive expectancy effects as a predictor of substance use. Expectancies are beliefs, both positive and negative, that reflect potential outcomes and consequences associated with the use of a substance. A large body of research has examined alcohol expectancies and has shown that positive expectancies are highest among users, while negative expectancies are greater in non-users (Looby et al., 2013). Accordingly, Looby and Earleywine (2010) developed an expectancies measure specific to non-medical prescription stimulant use to explore whether expectancies for prescription stimulants operated in same way as expectancies for alcohol in predicting substance use. Five hundred and forty seven participated in an online survey pertaining to the use of prescription stimulants. Participants completed measures on use and misuse of prescription stimulants and also completed their newly developed Prescription Stimulant Expectancy Questionaire-II (PSEQ-II). The PSEQ-II is a 51-item questionnaire assessing positive and negative expectancies of use. Questions on expectancies are divided into 4 domains: expected cognitive enhancement, social enhancement, anxiety and arousal, and guilt and dependence. Looby and Earleywine (2010) found that nonusers held the strongest expectancies for guilt and dependence, while users (medical and recreational) held the most positive expectancies. To date, the PSEQ-II is the only questionnaire designed to examine prescription stimulant expectancy effects; additional research using this measure could further

illuminate cognitions of NMPS users and non-users, which could prove informative for intervention and prevention efforts.

The notion that cognitive expectancies serve as a modifiable risk factor for NMPSU led Looby et al. (2013) to design the first expectancy challenge intervention specifically for prescription stimulant misuse. The intervention aimed to examine whether the challenge would alter participants' expectancies and lead to a decrease in, or the prevention of the onset of NMPSU. Researchers hypothesized that participants who were randomized into the expectancy challenge group would show a decrease in positive expectancies and a reduced likelihood of engaging in NMPSU within a 6-month follow up period in comparison to participants who did not receive the expectancy challenge. Ninety-six college students participated in the study; 47 of the 96 participants completed the expectancy challenge intervention while the other 49 simply completed the study measures. All participants came into the laboratory twice and completed a 6-month follow up survey. On their first visit, participants completed the Prescription Stimulant Expectancy Questionnaire II (PSEQ-II) and then were divided into the control and experimental groups. The experimental group received what they were told was a Methylphenidate pill (i.e. Concerta, Ritalin) but instead was actually a placebo, while the control group did not receive anything. Participants completed questionnaires that assessed mood and cognitive abilities. In the second laboratory session, the experimental group received a 30-minute expectancy challenge, which lectured participants on NMPSU and had participants examine their own personal expectancies within a group setting. The discussion examined cognitive enhancement expectancies, negative consequences associated with NMPSU, and facilitators presented participants with current research suggesting that stimulant drugs do not significantly enhance cognitive abilities in healthy individuals. The discussion on present research gave way to the

conversation about the role of expectancies in perceived cognitive enhancements. After the discussion, both experimental and control groups completed the PSEQ-II. The 6-month follow up survey assessed reported frequency of use and stimulant expectancies via the PSEQ-II. Results showed that positive cognitive expectancies were weakened immediately after the brief intervention but were not maintained at the 6-month follow-up period. In addition, baseline expectancies for cognitive, social, and guilt and dependence expectancies were not significant factors of predicted future use, however, anxiety and arousal expectancies at baseline were significant predictors of future NMPSU. Expectancy beliefs may help accurately predict students who are at risk for using as well as current users, and may also be examined as a means of changing student behaviors (Looby et al., 2014).

In Looby et al.'s (2014) study on modifiable risk factors, researchers examined another factor that they believed could help accurately predict NMPSU. McCabe et al. (2005) highlighted the risk factor of low GPA, which could increase the risk of NMPSU due to low academic self-efficacy. An explanation for this specific risk factor could be that students with a low GPA do not embody high academic self- efficacy, which in turn leads them to engage in stimulant use to compensate for their poor academic self-efficacy (Looby et al., 2014). Prior to Looby et al.'s (2014) study, the relationship between high cognitive expectancies and perceived low academic-self efficacy had not been examined. In order to quantify academic self-efficacy, participants completed the Self-Efficacy for Learning Form, a 57-item scale that measures students' beliefs about how they cope with challenging academic situations in the following domains: reading, studying, note-taking, writing, and test preparation (Zimmerman & Kitsantas, 2005). Researchers were particularly interested in self-efficacy for studying subscale, as they were interested in testing whether there was a relation between limited study skills and low

academic self-confidence and the likelihood of engaging in NMPSU to increase perceived academic performance. In addition to academic self-efficacy, Looby et al. (2014) also examined the effects of cognitive enhancement expectancies for NMPSU. In order to measure perceived cognitive enhancement, participants completed the PSEQ-II. Results showed that strong cognitive enhancement expectancies and decreased levels of academic self-efficacy were two predictors of NMPSU. Individuals with high GPAs were at lower risk for NMPSU engagement, while individuals with a GPA of 3.5 or below were at greater risk. These findings suggest that expectancy effects and low academic self-efficacy are two factors in particular that may be modified through a targeted intervention, including educating participants on the actual effects of NMPSU on people without an ADHD diagnosis and teaching effective alternative study skills.

Negative Consequences of NMPSU

Despite widespread NMPSU evident on college campuses nationwide, users are often unaware of the detrimental consequences of stimulant use. Frequent NMPSU has to potential to induce risk for increased bodily temperatures, cardiovascular problems, irregular heart rate, seizures, and the ability to intensify psychiatric disorders (Looby et al., 2013). McCabe and Teter (2007) were interested in examining the relationship between NMPS users and other drug users pertaining to drug related issues (other drug users refer to the non-medical use of marijuana, cocaine, LSD, crystal methamphetamine, heroin, inhalants, ecstasy, sleeping medication, and off-label anxiety medication and/or pain medication). A large sample of undergraduate students at a large midwestern university participated in a web-based survey, which consisted of measures pertaining to drug use and misuse and a modified version of the Drug Abuse Screening Test (DAST-10). Results showed that 90% of students who reported past-year NMPSU also reported other drug use and 90% of NMPS users reported past-year marijuana use. Also, 54% of past year

NMPS users were more likely than other users to report polydrug use. The higher rates of polydrug use among NMPS users may contribute to an increase likelihood of drug-related problems (i.e. medical problems including headaches, memory loss, withdrawal symptoms). While little is known about the safety of a healthy individual engaging in NMPSU, taking more than one potentially toxic drug at once is a cause for great concern. College campuses are environments where students dangerously experiment with drugs with, perhaps, more limited fear of consequences. This study suggests that NMPS users are at high risk for polydrug use, indicating a need for education on the dangers of substance use.

Stimulant drugs alone can be highly addictive for both prescribed users and users who engage without a prescription, yet users do not seem overly concerned or ignore the potential side effects for their future health. A given individual may be at risk for substance abuse without being consciously aware of their condition. Individual differences in cognitive and physical bodily responses make it difficult to know who is at risk (McCabe & Teter, 2007). Users tend to anticipate a high reward of cognitive enhancement while downplaying or ignoring the dangerous consequences, both physical and psychiatric, that can result when mixing stimulants with other drugs or taking them for what seems like a one night's worth of academic work (Looby et al., 2014). Similar to all medications, prescription stimulants come with unpleasant side effects. The most common side effects include headache, dizziness, increased heart rate, abdominal pain, anxiety, and loss of appetite. In addition, more rare side effects have been reported, including the risk of cardiovascular problems (high blood pressure and irregular heart rhythm), an exasperation of psychiatric conditions and visual problems (Arria & Dupont, 2010). Side effects, coupled with data from the Substance Abuse and Mental Health Services Administration showing an increase in emergency room visits related to NMPSU from 2005 to 2010, highlights the need for college

campus officials to become proactive in educating the student body on the dangers of NMPSU (SAMHSA, 2013). Students tend not to adhere to warning signs on labels if there has not been a known dangerous incident to their knowledge. This lack of knowledge and concern needs to be addressed so that students are aware of what they are taking and the potential negative effects.

Cognitive Enhancement Effects on Healthy Individuals

Interestingly, despite the fact that many NMPS users perceive significant cognitive enhancement after taking the drugs, the literature has yielded inconclusive results as to the effects of stimulant use on healthy individuals. Ilieva, Boland, and Farah (2013) conducted a study examining mixed amphetamine salts (MAS), brand name Adderall, on 46 healthy adults ranging from 21-30 years of age. The study randomized healthy participants into one of two groups; administration of 20mg of MAS and a placebo group. Both groups participated in 13 cognitive tasks evaluating areas of working and episodic memory, inhibitory control, creativity, and components of standardized tests. Ilieva et al (2013) also examined participants' subjective experience of taking prescription stimulants non-medically by asking them the extent to which they perceived the stimulant was enhancing their cognitive participants' abilities**.** Following administration of the drug, the results did not reveal significant cognitive enhancement among tasks completed by participants who took MAS. That is, participants who took Adderall did not perform significantly better on these tasks than people who received a placebo. This study showed, however, that participants who received Adderall *believed* that the drug improved their performance. That is, even though they didn't evidence better performance, they believed that the Adderall led them to perform better on the study's tests of memory, creativity, etc. Thus, prescription stimulant use may not, in fact, have cognitive benefits for healthy individuals, though perceived enhancement may induce a placebo effect, which in turn promotes continued

stimulant use.

Advokat (2010) reviewed the neuropsychological literature pertaining to stimulant use among adults diagnosed with ADHD and also among healthy individuals. Studies in healthy individuals suggest that prescription stimulants may perform dual action. On the one hand, stimulants do not promote heightened learning of new knowledge and may actually impair tasks of adaptation, flexibility, and planning. Despite these findings, studies suggest that stimulants might improve an individual's ability to retain already learned information and help with memory consolidation and attention. Research suggests that stimulant use does *not* enhance cognitive plasticity in the learning of new material. Also, although the performance on simple tasks that involve direct attention may be enhanced, literature suggests that selective attention for more complex tasks is actually impaired because of the facilitation of impulsive responding that accompanies the use of stimulants. Advokat's (2010) article suggests that stimulants have an arousing effect on users, which is turn might worsen impulsivity and interfere with cognitive flexibility.

Mommaerts et al. (2013) conducted a study that examined the influence of methylphenidate treatment assumptions on cognitive enhancement with individuals without an ADHD diagnosis. The study consisted of a double blind and placebo-controlled trial. Twenty-one students participated and were partly sleep deprived, receiving 4 or less hours of sleep the night before the session. At the session, they were given either a placebo or a 20mg pill of methylphenidate. The participants performed recall verbal tests and Go/No-Go tasks. In addition, their mood and tiredness were assessed as well. Results indicated that there was no significant difference between the participants who received the stimulant and those who received a placebo. Significant differences were observed between subjects who had assumed they had received the

MPH and those who assumed they received a placebo, whereas assumed MPH users recalled a greater percentage of words from the recall test, in comparison to assumed placebo. Therefore, the enhanced confidence on the recall was due to the participant's treatment assumption and not the actual pill, suggesting that cognitive expectancies alone can be quite potent in affecting performance. Taken together, students expect cognitive short-term benefits from stimulant use, but evidence is inconclusive as to whether stimulants have the same cognitive effects on healthy individuals as they do on individuals with an ADHD diagnosis (Ilieva et al., 2013).

Previous Interventions

Psychoeducational interventions. Despite the prevalence of NMPSU on college campuses, there have been few intervention and prevention efforts to reduce this behavior or delay its onset. In addition to the aforementioned expectancy challenge intervention (Looby et al., 2013), The Ohio State University College of Pharmacy created The Generation Rx Initiative in 2007 for the purpose of decreasing prescription drug misuse and abuse through educational prevention programs. The Generation Rx toolkits are freely available online and are tailored to the needs of different developmental groups (i.e., elementary school age, high school age, college age, parents, etc.). The toolkits contain a range of educational approaches and strategies including online video resources and age appropriate interactive activities. In order to enhance medication safety and prescription drug abuse prevention, all of the toolkit resources are available for free online. In the college toolkit specifically is the *Adderall Dilemma* toolkit, which consists of several skits, associated with discussion questions and handouts on the prevalence and risks of NMPSU.

In a 2015 review from The Ohio State University College of Pharmacy on The Generation Rx Initiative statistics, the 2012-2013 Grantee Report to the Cardinal Health

Foundation found that after toolkits were administered: 92% of youth agreed that, "I will not use prescription drugs that are not prescribed for me" (*n*=5,406), 99% of adults agreed that, "I will only use prescription drugs as directed by a health professional in the future" (*n*=2,156), and 99% of seniors agreed that, "I will store prescription medications in a secure location" (*n*=156) (The Ohio State College of Pharmacy, 2015). According to Wade-Mdivanian, Anderson-Butcher, Hale, Kwiek, Smock, Radigan, and Lineberger (2012), 318 adults and 1,187 youth across 21 programs in the United States have completed the evaluation tools. All participants across the programs completed a survey after their workshop, which assessed self-report intention to use in order to support Generation Rx and the Cardinal Health Foundation investments in the programs. Results from adult self-reports include: 95% reported greater knowledge about the dangers of abusing stimulants, 93% reported to be more likely to store stimulants in a secure location, and 92% reported that they are more likely to refer a friend who is abusing stimulants to a professional (Wade-Mdivanian et al., 2012). The positive findings for this population led us to explore the efficacy of this intervention with college students. To our knowledge, no one has empirically assessed the effects of implementing the Generation Rx toolkit on Adderall with a college sample. Accordingly, in the current study we presented one of the two skits on Adderall and the associated discussion questions as one component of our intervention.

Motivational enhancement interventions. Although few interventions targeting NMPSU have been reported on in the literature, there are numerous evidenced-based approaches to preventing and reducing the use and misuse of other substances in college students. One type of intervention that has proven effective for reducing problematic drinking behaviors in college students is the use of motivational interviewing (MI). The perspective with which one practices MI involves an underlying spirit involving collaboration, compassion, acceptance, and evocation

(Miller & Rollnick, 2012). An interviewer should strive to create a positive relationship and an environment that fosters change through the client's own exploration of ambivalence. With that in mind, it is important that the interviewer does not convey his or her personal opinions about a particular topic that would persuade a client without any inner reflection. Motivational interviewing was developed, in part, with Carl Roger's "unconditional positive regard" concept in mind. The interviewer is accepting, non-judgmental, and takes an active interest in a client's perspective about a particular behavior (Miller & Rollnick, 2012).

The MI technique is especially effective in motivating individuals to explore both positive and negative consequences of their behavior. Specifically, it is useful for individuals who do not necessarily know that they have a problem, or if they are ambivalent to change their behavior (LaBrie et al., 2005). One component of MI that is instrumental to exploring these positive and negative consequences is the decisional balance exercise. Derived from Janis and Mann's (1977) decision-making model, the decisional balance exercise assumes that it is beneficial for individuals to carefully examine both pros and cons to their behavior that they may not think about ordinarily. This exercise in turn helps individuals explore ambivalence that they may have around changing their behavior. By examining the advantages and disadvantages of a certain behavior and encouraging elaboration and reflection, this process allows people to explore each element relevant to personal behavioral change (Miller & Rollnick, 2012).

Several studies have examined the efficacy of implementing both individual and group motivational interviewing techniques for the purpose of reducing heavy drinking among college students. LaBrie et al. (2005) conducted a study that examined the effectiveness of the decisional balance exercise through a brief intervention targeting male college students at risk for engaging in excessive drinking, defined as engaging in drinking more than twice a week. In addition,

unsafe sexual practices were also examined and defined as having intercourse with two or more heterosexual partners in the past two months. If participants met both factors listed above, they qualified as at-risk individuals and were eligible to participate in the study. This study utilized the decisional balance exercise along with non-confrontational style questions to induce readiness to change drinking behaviors. The first part of the intervention consisted of a questionnaire that assessed intentions of alcohol use. Next, participants reported on their alcohol use and risky sexual behavior over the past three months. The third task consisted of the decisional balance exercise, where students created a pros and cons list of "drinking less than now". In addition, each participant was asked to rate how important each of their listed pros/cons were on a scale from 0=*not important at all* to 10=*extremely important*. Facilitated in a non-judgmental manor by the interviewer, lastly, participants engaged in conversation about their pros/cons and subsequent ratings. Participants engaged in a 5-10 minute MI-styled conversation where the interviewer asked questions such as, "*can you tell me why X is important to you?*" and follow-up questions encouraged participants to share personal benefits for altering their behavior. The facilitator participated in the conversation by contributing reflections on participant responses and added additional points to highlight discrepancies in responses. Consistent with the spirit of MI, facilitators were non-judgmental in their approach to reflecting on responses and participants were never confronted about their opinions for change. After the intervention, participants logged their drinking and sexual behaviors for a 30-day period and Change Rulers were completed in order to measure motivation and intention to change these risky behaviors. Results of the 30-day follow up showed that there was a statistically significant increase in motivation to change heavy drinking habits and a decrease in drinks intended to consume per month, week, and occasion. Researchers specifically did not use the decisional balance exercise

for risky sexual behavior, as they were interested in targeting alcohol behaviors. Furthermore, sexual behavior was not affected by the intervention and participants did not show change in motivation to alter their risky sexual encounters. In this study, participants served as their in control because while participants believed the intervention was focused around alcohol consumption and sexual behavior, in fact, researchers were only interested in changing alcohol related behaviors through the implementation of the decisional balance exercise. This exemplifies the strengths of the motivational interviewing technique in altering behaviors relating to excessive substance use.

In addition, LaBrie et al. (2006) conducted a group motivational interview intervention that targeted freshman male college students and problematic heavy drinking behaviors. LaBrie et al. (2006) was interested in testing whether motivational interviewing designed in a group format could be affective in changing behaviors. First, participants completed a Timeline Followback assessment of drinking behavior within the past 3 months of the intervention. After the assessment, facilitators presented participants with normative student drinking data derived from the CORE Alcohol and Drug Survey from their college campus, including statistics on violence, forced sexual intercourse, and additional consequences associated with excessive drinking. This informational intervention component was designed in order to highlight unknown facts and prevalence rates regarding campus drinking behaviors. Next, participants engaged in a decisional balance exercise where they generated cons and pros for drinking less. If participants did not generate pros existing from Migneault et al.'s (1997) validated decisional balance measure for reducing drinking in adolescence, The Decisional Balance Inventory, the facilitator presented ones that were not mentioned to the group. Examples from the inventory include: "People seem to like me better when I am drinking", "I do things better when I drink", and

"Drinking keeps my mind off problems" (Migneault et al., 1997). Participants then rated the personal importance of each pro and con. The group proceeded with a discussion on situations that may lead to excessive drinking and allowed students to explore their own high-risk situations and what could potentially arise from them. In addition, the group also talked about alcohol expectancies, particularly the social effects within a college environment (i.e. "It helps me socialize better at parties," "I am more friendlier to the opposite sex"). Facilitators then presented participants with literature that suggests how positive expectancies, rather than the alcohol, can lead to the social enhancement effects experienced by college students. Lastly, participants wrote down an alcohol-related behavioral goal for the next 30 days. These goals aimed to either maintain safe levels of use or reduce alcoholic consumption. For the next 3 months after the intervention, participants completed monthly drinking logs on how many drinks they consumed per day. Results indicated that all participants that participated in the intervention reduced drinking behaviors. Interestingly, participants who reported the heaviest use of alcohol reduced their drinking the most.

Another study by Fromme and Corbin (2004) evaluated a Lifestyle Management Class (LCM) targeting alcohol prevention among voluntary and mandated college students. Participants who were mandated to participate were referred due to disciplinary infractions, such as public intoxication or possession charges, and had to do so before registering for the following semester's courses. Researchers were interested in evaluating the efficacy of peer- and professional- led group interventions. Both peer and professional LMC leaders received training in group motivational interviewing techniques prior to the intervention. The LMC material was compiled into a manual for all facilitators. The professional leaders were doctoral graduate students and the peer facilitators were volunteers who earned course credit for their time and

effort. The LMC consisted of two sessions that aimed to: increase awareness about drinking consequences, patterns, and alternatives, highlight misinterpretations about drinking behaviors on campus, increase motivation to change current behaviors, and teach skills in behavioral self-management. The intervention group participants completed a variety of assessments relating to alcohol use and intention to change behaviors both before and after the intervention. The control group received assessments only. Results of this study indicated that the peer-led and professional-led intervention groups were comparably effective for all students. Like LaBrie et al. (2005) and Labrie et al. (2006), Fromme and Corbin's (2004) study suggested that motivational enhancement techniques could be effective in reducing drinking, even among students who might have been reticent to change. Further, Fromme and Corbin's (2004) findings suggested that interventions need not be led by credentialed professionals in order to be effective.

Current Study

Although previous research has documented the prevalence rates and risk factors associated with NMPSU, there is only one existing study evaluating the effectiveness of prevention efforts targeting NMPSU and no studies examining intervention efforts in a college sample. This study will build upon previous college-based interventions that have been proven successful in reducing alcohol consumption among college students (Labrie et al., 2007). More specifically, there is no current research that evaluates the effectiveness of group-based motivational interviewing for NMPSU. Accordingly, we adapted a group-based motivational interview intervention for NMPSU and synthesized it with components of the Generation Rx psychoeducational intervention. Building upon materials from Generation Rx, our intervention integrated a decisional balance exercise (i.e., examining pros and cons of use) from the motivational enhancement literature, promoted discussion around challenging positive and

negative expectancies, and explored academic self-efficacy (i.e., promoting alternative study strategies to deal with overwhelming situations). Although previous group-based motivational interviewing interventions have only targeted alcohol use, we believe the components underlying our collaborative intervention have the ability to help students examine ambivalence toward stimulant use behavior and to thus prevent or reduce NMPSU.

Hypotheses

In light of the literature reviewed, the following hypotheses were advanced:

(1) Among group motivational interview participants who reported NMPSU, these participants will report a reduction in use compared to NMPS users in the control group.

(2) Immediately following the group and one month later, NMPS users will report a greater readiness to change behavior; non-users will report weaker intentions to use if they received the group intervention.

(3) Group motivational interview participants will demonstrate an increase in negative expectancies compared to control, and a decrease in positive expectancies.

(4) Group motivational interview participants will evidence an increase in self-efficacy for studying compared to control group participants.

Method

Participants

A total of 31 male (*n*=9) and (*n*=22) female Trinity College students participated in both the baseline and follow-up assessment of this study. Figure 1 provides details on participant flow, from the screening survey, to randomization, to eventual participation, and data analysis. Sixteen participants were randomized to, and attended one of two control group sessions; fifteen participants randomized to the NMPSU intervention attended one of two intervention groups.

The mean age of participants was 20 with a standard deviation of 1.6. Participants reported on their race/ethnicity as follows: 84% White/non-Hispanic, 3% African American/Black, 3% Asian/Pacific Islander, 6% Hispanic/Latino, and 3% Other. 39% were freshman, 16% sophomores, 10% juniors, and 35% seniors. Of the sample, 20% (*n*=6) of participants reported a diagnosis of ADHD or ADD and 19% (*n*=6) of participants were prescribed a stimulant medication. 65% (*n*= 20) of individuals reported a history of NMPSU, while 35% (*n*=11) reported never engaging in NMPSU.

Measures

Expectancies for prescription stimulant effects. Looby and Earleywine's (2010) Prescription Stimulant Expectancy Questionnaire-II is a 45-item measure that assesses 4 domains of expectancies: expected cognitive enhancement, anxiety and arousal, social enhancement, and guilt and dependence. Cognitive (20 items) and social enhancement (9 items) expectancies comprise the positive expectancy items, while anxiety and arousal (11 items) and guilt and dependence (5 items) comprise the negative expectancy items. Using a 5-point scale (0=*never*, 4=*very often*), participants are instructed to rate the extent to which they would expect to experience certain feelings, symptoms, or consequences of using prescription stimulants non-medically. The items were ordered with conditional phrasing so that both users and non-users could report on their expectancies. Sample questions from the cognitive enhancement subscale include: "I [would] learn/work more efficiently" and "My work [would] seem more interesting". Items from the social enhancement subscale include: "I [would] feel more confident in myself" and "I [would] enjoy parties more". Items from the anxiety and arousal subscale include: "I [would] feel twitchy" and "My heart [would] race". Items from the guilt and dependence subscale include: "I [would] worry that I'm addicted to it" and "I [would] feel like I'm cutting

corners to do well". Responses are summed, producing a separate score for each domain of the subscale. Participants completed the PSEQ-II at baseline and at follow-up. The reliability of the subscales in the current study was good to excellent at both time points (see Table 1).

Readiness to change/intentions to use. LaBrie, Quinlan, Schiffman, and Earleywine (2005) developed readiness to change rulers in order to assess how participants felt about changing alcohol and condom use. We modified LaBrie et al.'s (2005) change ruler in order to specify the measure to how participants felt about changing their stimulant use. The Readiness to Change Ruler assessed the likelihood, ranging from 0=*definitely no* to 100=*definitely yes*, that the participant would partake in NMPSU in the next six months. Participants completed this measure at three time points: in the baseline questionnaire, at the conclusion of the in-person group, and at the one-month follow-up.

Prescription stimulant use and motives. Weyandt et al. (2009) developed the Stimulant Survey Questionnaire (SSQ) for the purpose of assessing participants' patterns of use in more detail. This scale consists of 40-items designed to measure participants' knowledge about the potential negative effect effects of prescription stimulants (e.g. "Using prescription stimulants daily is harmless"). The SSQ is divided in four domains: self-reported prescription stimulant use (e.g. "I have taken prescription stimulants to help me lose weight"), perception of prevalence of prescription use among peers (e.g. "Prescription stimulants are as easy to get as alcohol"), knowledge of atypical stimulant use among peers (e.g., "I know students who smoke prescription stimulants"), and perception of safety of stimulants (e.g., "Prescription stimulants are safer than alcohol"). For the purpose of our study, we used only 19 items from the original scale, using the majority of questions from the self-reported prescription stimulant use subscale. Questions from the subscales of perception of safety of stimulants and perception of prevalence of prescription

use among peers were also included. Questions from the knowledge of atypical stimulant use among peers subscale was omitted because of their lack of relevance to our study. Examples of self-reported prescription stimulant use items include: "I have used prescription stimulants for nonmedical purposes," "I have taken prescription stimulants to focus better in class," and "I have taken prescription stimulants to feel energetic". Items from the perception of safety of stimulants subscale include the following: "Using prescription stimulants daily is harmless." Items from the perception of prevalence of prescription use among peers subscale include: "Prescription stimulant use on campus is a problem" and "I hide my prescription stimulant medication so that no one will take it." Our rating scale consisted of the 5-point Likert scale explained above: 1=*never* to 5=*always*. The SSQ was administered at baseline and the one-month follow-up and a subset of questions (i.e. regarding use and motives) were only administered at participants with a history of NMPSU.

Self-efficacy for learning. Zimmerman and Kitsantis' (2005) 57-item Self-Efficacy for Learning Form assesses participants' perceived academic self-efficacy in 5 domains: reading, test preparation, study efficiency, note-taking, and writing abilities. The items on the scale are intended to evaluate participants' ability to cope with stressful academic situations. Each question is answered on an 11-point scale ranging from 0=*definitely cannot do* to 10=*definitely can do*. For the purpose of this study, we only utilized the 14-item study self-efficacy subscale from the full-scale measure. Study-related behaviors have been most often cited as the behaviors NMPS users are trying to augment by taking the medication. Sample items from this subscale include: "When another student asks you to study together for a course in which you are experiencing difficulty, can you be an effective study partner?, "When you have missed several classes, can you make up the work within a week?", and "When you discover that your

homework assignments for the semester are much longer than expected, can you change your other priorities to have enough time for studying?" Reliability of the subscale was good at baseline and follow-up (see Table 1).

Non-medical prescription stimulant use. Participants reported on whether they had used prescription stimulants non-medically a) ever, b) in the last year, c) in the prior semester, and d) in the past month.

Participant evaluations of group intervention. This measure was included in order to assess participant reactions to the group environment. The measure was distributed in the one-month follow up survey to the students who participated in the intervention group. The measure was derived from Fromme and Corbin's (2004) study on the prevention of heavy alcohol use through a group intervention. This measure consisted of five questions: 1. The group facilitators presented information clearly, 2. The group facilitators responded to participants' ideas respectfully, 3. I felt comfortable disclosing personal or sensitive information in the group, and, 4. The information I learned in the group was interesting and/or thought provoking. Participants responded on a 5-point Likert scale (1=*strongly disagree* and 5=*strongly agree*). The last question was open ended and asked participants to provide feedback as to how the intervention group might be improved for further studies.

Design and Procedure

Study recruitment. In order to qualify to participate in the study, students were asked to fill out a brief screening survey. This survey consisted of five questions inquiring about the five specific risk factors outlined in the literature, namely: male gender, Greek life involvement, GPA below 3.5, binge drinking in the past two weeks, and past month cannabis use. In order to qualify, participants need to meet 2 out of the 5 risk factors in order to be at risk for NMPSU or abuse.

NMPSU motivational enhancement intervention. Facilitators used a manual created for this study meant to promote fidelity in the implementation of the intervention. Two 60-minute intervention sessions were attended by two different groups of students. The sessions were conducted by the same two undergraduate facilitators who received approximately 1-hour of motivational interviewing training by a doctoral-level MI trainer at the University of North Dakota. Facilitators began the group by administering and explaining the consent form. Participants who consented completed the baseline survey online. After taking10-15 minutes to complete the baseline survey, facilitators discussed group rules, encouraging a safe environment for students to share personal opinions.

The first stage of intervention consisted of a viewing a five-minute DVD. The script for the skit was derived from the Adderall Dilemma toolkit and the skit was acted out by students at the University of North Dakota (Looby, 2015). The skit depicted two college students conversing over Adderall. One student, Jamie, was trying to pressure her friend, Taylor, who has a prescription for her ADHD diagnosis, into giving her Adderall in order to study for two exams. The two conversed over whether Taylor should give her Adderall to Jamie in order to help her stay awake and study for her two huge exams. After viewing the skit, students discussed five questions relating to the skit including the following: 1. What would you do if you were Taylor? Why would you want to share with Jamie? Why wouldn't you? 2. Jamie says it's been hard to study because: "…I mean, I just had other things to do. Plus, I'm really tired, and I haven't been feeling good…" To what extent do you think "cognitive enhancers" (i.e., prescription stimulants) improve cognitive performance among people *without* ADHD? 3. What alternative study strategies should Jamie consider? 4. Jamie says, " …I'm just taking it this one time..." How likely is that? Jamie also says that a friend "…told me they'd never study without it again."

How might using Adderall affect Jamie's ability to develop the skills and habits necessary to be a successful professional in the long run? 5. Jamie claims knowing people who have used Adderall non-medically without harm, so she feels comfortable misusing Taylor's prescription stimulant. But Taylor notes that "… the pharmacist where I pick it up is always reminding me of the side effects it has..." So, is there any risk in using a prescription medication like Adderall without medical supervision? After discussing question two, whether or not stimulants have an effect on cognitive performance, the facilitators presented the outcomes of the Ilieva et al. (2013) study explaining how healthy participants who took Adderall did *not* perform significantly better on tasks, including memory, inhibitory control, creativity, and components of standardized tests, than people who received a placebo. Visual slides of outcome data depicted graphs of SAT Math, SAT Verbal, word recall, and perceived enhancement. Facilitators explained that this study showed, however, that participants who received Adderall believed that the drug improved their performance. That is, even though they didn't show better performance, they believed that the Adderall led them to perform better on the study's tests of memory, creativity, etc. After asking the third question on effective study methods, we paused to distribute an "Alternative Study Skills" worksheet where students generated their own ideas regarding useful study skills and then shared these ideas with the group. Facilitators wrote ideas on the board while people shared so that other students could gain insight into additional skills. We spent around five minutes on each question and urged everyone in the group to share throughout the duration the discussion.

The second portion of the intervention was dedicated to a decisional balance exercise, which was the component most consistent with Motivational Enhancement theory. This type of exercise is meant to help students explore both potential positive and negative effects of substance use. To illustrate how to complete a decisional balance, a handout from *Group*

Treatment for Substance Abuse Manual, was distributed that had a sample pros/cons list assessing a hypothetical person's advantages and disadvantages of alcohol use. This sample sheet also showed how each benefit and drawback could be assigned a level of importance for that individual. Facilitators had participants complete a similar exercise with respect to non-medical prescription stimulant use. Specifically, participants generated both positive and negative effects they would expect from NMPSU and rated each outcome on a 1-4 scale (1=*slightly important*, 4=*very important*) to note how important that consequence was to them. Participants were reminded that even if they had never misused prescription stimulants, they should consider the specific benefits and drawbacks they might expect if they were to use them. After they completed the handout, students were asked to share their pros and cons and their importance ratings. Facilitators asked questions in order to clarify participants' ideas and to promote deeper thinking about the significance of each of the consequences. The point of this exercise was to listen to participants' ambivalence, empathetically reflecting both their pros and cons. Participants were given the readiness to change assessment in paper form at the end of the group.

Control group. We conducted two control group sessions. Participants arrived in a classroom and were briefed on the consent. After they consented to participate, they were asked to take a 10-15 minute survey on their laptops. Lastly, they were asked to fill out a readiness for change ruler on a piece of paper, which was later collected by the control group facilitator.

One-month follow-up. 33 days after the initial group (either control or intervention), all participants were emailed a link to an online follow-up survey consisting of the same questions from the first survey. In order to receive course credit, participants had to attend the group

session and complete the follow-up survey; if participants were seeking monetary compensation, $5 gift cards were distributed.

Data Analysis

In order to examine the study hypotheses, I employed several statistical tests. Although not specific to my hypotheses, I ran correlational analyses to examine bivariate relations between the study variables. In order to test whether NMPS users experienced a reduction in use following participation in the intervention group, I ran a 2 (Group) X 2 (Time) analysis of variance. Similarly, to examine my second hypothesis that NMPS users would report a greater readiness to change behavior if they participated in the intervention, I ran a 2 (Group) X 2 (Time) analysis of variance with the change ruler data from the first and second time points and another analysis using the change ruler data from the first and third (i.e., one month later) time points. Because we had so few non-users, I was not able to use an ANOVA to explore whether nonusers reported weaker intensions to use following the group intervention. Finally, I used 2 (Group) X 2 (Time) analysis of variance tests to test whether intervention participants demonstrated an increase in negative expectancies compared to control, and a decrease in positive expectancies, and to determine whether group motivational enhancement participants evidenced an increase in self-efficacy for studying over control group participants.

Results

Participant Flow

As detailed in Figure 1, 45 of 59 participants screened in and randomized to participate in either the intervention or the control group. Due to scheduling conflicts and lack of participant responses to invitations to join the group, ultimately fifteen participants received the intervention and sixteen participants completed the control group. All thirty-one participants completed the

30-day follow-up survey. Additionally, 65% of our sample reported a history of NMPSU. See Table 1 for a complete list of demographic statistics.

Correlations

With respect to prescription stimulant expectancies, gender correlated positively with expectations of anxiety and arousal; specifically, females were more likely to endorse this expectancy prior to the intervention. Cognitive and social enhancement expectancies were correlated as well, suggesting that endorsing one type of positive expectancy (i.e., cognitive enhancement) was associated with a higher probability of also endorsing the other (i.e., social). Despite being nonsignificant, several correlations are of note, given that with a larger sample the *p*-values associated with these correlations likely would have been significant. First, grade point average was inversely correlated with a history of NMPSU (r= -.21), as well as cognitive enhancement expectancies at Time 1 (r= -.23), suggesting that those with lower GPAs were more likely to endorse having ever used prescription stimulants non-medically and were more likely to expect improvements in cognitive functioning following NMPSU. Lastly, when examining study self-efficacy at T2 and cognitive enhancement at T2, as self-efficacy increases so does expectations for cognitive expectancies.

Analyses of Variance

Change in NMPSU. I hypothesized that among group motivational enhancment participants who reported NMPSU, these participants will report a reduction in use compared to NMPS users in the control group. Table 4 shows the transition of participants to user or non-user by baseline use and study group. Specifically, we performed a 2 (GROUP: Control/Treatment) X 2 (TIME: Baseline/Follow-up) between/within subjects Analysis of Variance. The values of use were derived from the SSQ measure of use between treatment and control group, respectively

over time. There was no main effect of time: $F(1,16)=2.870$, $R^2=.152$. Additionally, there was no main effect of group: $F(1,16)=5.001$, $R^2=.238$. There was no interaction effect between group and time: $F(1,16)=.487$, $R^2=.030$.

Behavioral intentions. I hypothesized that immediately following the group and one month later, NMPS users will report a greater readiness to change behavior (i.e., lower likelihood of engaging in NMPSU in the next six months, as compared to their baseline rating); non-users would report weaker intentions to use if they received the group intervention. Specifically, we performed a 2 (GROUP: Control/Treatment) X 2 (TIME: Baseline/Follow-up) between/within subjects Analysis of Varience. Figure 1 displays the means of intentions to use over time, respectively by group (T1 and T2). There was no main effect of time, $F(1,15)=1.003$, $R^2=.063$. There was no main effect of group, $F(1,15)=1.316$, $R^2=.081$. Lastly, there was no significant interaction between group and time $F(1,15)=2.189$, $R^2=.127$. Additionally, among nonusers, there was no significant reduction in intentions to use.

Positive expectancies. I hypothesized that group motivational enhancment participants would demonstrate a decrease in positive expectancies compared to control. The positive expectancy domain was split into sub categories including, cognitive and social enhancment. For the purpose of statistical analysis, we combined both sub categories to create a composite positive expectancies variable. The means, standard deviations, *F* and *p*-values are shown in Table 3. Specifically, we performed a 2 (GROUP: Control/Treatment) X 2 (TIME: Baseline/Follow-up) between/within subjects Analysis of Variance. Figure 2 displays the means of positive expectancies overtime, respectively by group (T1 and T2). There was no main effect of time: $F(1,29)=.046$, $R^2=.002$. Additionally, there was no main effect for group: $F(1,29)=.665$, $R^2=.022$. However, the interaction effect was marginally significant: $F(1,29)=2.91$, $p<.10$. That is,

positive expectancies declined in the treatment group over time compared to control. These findings suggest that students receiving the intervention regarded the cognitive and social effects of prescription stimulants less favorably than before the intervention.

Negative expectancies. I hypothesized that group motivational enhancment participants will demonstrate an increase in negative expectancies compared to control. The negative expectancy domain was divded into sub catergories including, guilt and dependence and anxiety and arousal. For the purpose of statistical analysis, we combined both sub categories to create negative expectancies. The means, standard deviations, *F* and *p*-values are shown in Table 3. Specifically, we performed a 2 (GROUP: Control/Treatment) X 2 (TIME: Baseline/Follow-up) between/within subjects Analysis of Varience. Figure 3 displays the means of negative expectancies overtime, respectively by group (T1 and T2). There was no main effect of time: $F(1,29)=.907$, $R^2=.030$. Additionally, there was no main effect for group: $F(1,29)=4.193$, $R^2=.126$. The interaction effect between group and time was not significant: $F(1,29)=1.866$, $R^2=.060$.

Study self-efficacy. I hypothesized that group motivational enhancment participants would evidence an increase in self-efficacy for studying compared to control group participants. The means, standard deviations, *F* and *p*-values are shown in Table 3. Specifically, we performed a 2 (GROUP: Control/Treatment) X 2 (TIME: Baseline/Follow-up) between/within subjects Analysis of Variance. Figure 4 displays the means of study self-efficacy overtime, respectively by group (T1 and T2). There was no main effect of time, $F(1,29)=3.059$, $R^2=.095$. There was no main effect of group, $F(1,29)=2.262$, $R^2=..072$. Lastly, there was no significant interaction between group and time $F(1,29)=.018$, $R^2=.001$. Contrary to our hypothesis, study self-efficacy did not improve for participants in the treatment group.

Discussion

Contrary to the majority of our hypotheses, our intervention did not change NMPSU and the majority of its correlates, including intentions to use, negative expectancies, and study self-efficacy. Although only a trend, the measure of positive expectancies appeared to decrease among intervention participants only. These results suggest that students who were in the intervention group regarded the cognitive and social effects of prescription stimulant use less favorably than before they participated in the intervention group. The decisional balance exercise of rating the pros and cons of use, in addition to the information we presented regarding the lack of cognitive enhancement among non-ADHD diagnosed individuals who take prescription stimulants non-medically, could have positively impacted participants' positive expectancy beliefs following the intervention. Meaning, they could have come to view the supposed positive effects as less likely or less positive following exposure to the intervention.

In terms of correlations, anxiety and arousal was positively correlated with female gender. This correlation is interesting as it exemplifies that women embody certain expectancies more prominently than men do. In particular, female participants viewed anxiety and arousal expectancies more negatively than male participants, suggesting that some expectancies may differ by gender.

One notable finding, namely that we did not have a significant change effect on NMPSU, was similar to that of Lobby et al.'s (2013) expectancy challenge study. Similar to our findings, Looby et al. (2013) had a statistically significant effect on reducing positive expectancies immediately after her brief intervention but the weakening of expectancies did not persist over the 6-month follow-up. However, the fact that they were weakened at the end of Looby et al.'s (2013) intervention and we showed a marginal decline at our 1-month follow-up suggests that

NMPSU-related cognitions can change via an intervention. Additionally, Looby et al. (2013) did not significantly alter incidence of use at the 6-month follow-up period. This result aligns with our lack of ability to alter intentions to change behaviors through our intervention. According to Labrie et al. (2005), an expectancy challenge should produce a change in substance use. However, Looby et al. (2013) and our interventions did not produce significant behavioral changes in comparison to the reduced in heavy drinking exemplified by Labrie et al. (2005). The distinction between motivations to change drinking behavior opposed to stimulant behaviors requires further investigation in order to determine why one substance use behavior would change and why the other would not.

Limitations

One major limitation encountered in this study was the small participant pool (n=31). If we had had a larger sample size of students, this intervention could have had more power to detect significant results. If we had a larger participant pool, we believe we could have yielded statistically significant results in terms of decreasing positive expectancies, a hypothesis that resulted in marginal significance. Due to our limited sample size, we had few significant correlations among the study measures. If we had a larger sample size and replicated the correlations, we would expect that more of them would have reached the threshold of significance, given that many were in the .2 - .3 range.

Additionally, we recruited participants on campus from psychology courses and through flyers in popular student areas. Because we offered extra credit, the majority of students participating came from psychology courses, while a minority of students were recruited through the flyers and word of mouth. This could have biased our results because psychology students often learn about the effects of stimulants and may have previous knowledge on intervention

strategies. Therefore, they may not be as susceptible to gaining from the intervention as an individual in a different major.

Additionally, because there are typically only 35-40 new psychology majors each year at Trinity College, the students in the groups may have had prior contact with each other. This also could have produced biased results because knowing a classmate or having a friend in the same group could either facilitate disclosure or make one feel uncomfortable. If a student felt uncomfortable, he or she may have felt self-conscious throughout the group perhaps leading to lower levels of participation and/or self-disclosure, which could limit the impact of our intervention. Due to Trinity's small campus size, it would be difficult to get a group of students who had never interacted. When reflecting on the two groups, it was apparent that a smaller group size (n=6) compared to (n=9) promoted more conversation among participants. During the larger group, there were a few participants who felt comfortable disclosing and dominated the session. In contrast, the smaller group size facilitated more discussion among participants and students did not seem uncomfortable asking for clarification if they did not understand or providing positive feedback to someone's comment they may not have agreed with. The smaller group size allowed for a more cohesive and openness environment during the 60-minute session and allowed for all participants to share equally.

Aside from participant characteristics, another limitation we encountered was the limited follow-up period. We believe NMPSU behavior is more frequent during certain times of the semester. Many students engaged in this behavior under stress during finals when time is limited. Our follow-up survey was distributed to students 30 days after the initial group, right after Trinity's spring break recess. Therefore, students were just arriving back on campus and were likely not in a panicked and stressful state where they needed a boost (i.e., NMPSU) in order to

complete their work. Due to our limited follow-up period, our intervention may not have yielded statistically significant results because we did not assess participants at an at-risk time period where our intervention could have had an influence over participants when they may have been more tempted by the behavior.

Lastly, the randomization between the control and treatment groups did not yield groups that were as even as we hoped on the study variables. At baseline, the control group was balanced with eight nonusers and eight users, while the treatment group had twelve users and three nonusers. Because of the uneven randomization of users and nonusers in the treatment group, it could have been more difficult to produce a change in the treatment group in comparison to the control group. Relatedly, although not statistically significant, the participants in the treatment group started at a lower level of academic self-efficacy in comparison to the control group. Due to this imbalance in randomization, it was an up-hill battle for the intervention to produce increased levels of academic self-efficacy, in comparison to the control group, because intervention participants were less confident in their study skills to begin with.

Future Research

In light of the study's limitations, there are several aspects of the intervention that might be improved for future research. Future studies might utilize one of the specific strategies we employed so that the intervention is more focused. For example, we might administer the decisional balance only since this intervention has shown promise in changing heavy drinking (LaBrie et al., 2005, 2006). Our intervention, which combined components of the *Adderall Dilemma* toolkit and Motivational Enhancement, may have been more beneficial for participants if the 60-minute group did not try and combine both of these elements. Interestingly, the *Adderall Dilemma* toolkit has not yet been evaluated in a college sample in terms of its ability to

alter expectancies and behavior. Both components have positive aspects, such as educating participants on the dangers of NMPSU and the opportunity to allow participants to reflect on personal pros and cons of use, but because the decisional balance exercise has been proven to decrease heavy drinking in a college sample, it would be interesting to create an intervention that focuses primarily on this strategy. Despite support for implementing an intervention utilizing the decisional balance exercise, the *Adderall Dilemma* does seem to be a successful mechanism for educating participants on the potential negative side effects of use and the lack of research supporting the cognitive benefits of NMPSU in healthy individuals. With this in mind, the toolkit could be especially beneficial for participants who had never used before because of its psychoeducational components. Additionally, it may be difficult for nonusers to meaningfully connect with the decisional balance exercise because they have never experienced the pros and cons associated with the behavior. For a future study, it may be beneficial for researchers to target either users or nonusers and to tailor a specific intervention to their needs. Although stimulant use has a high prevalence rate on campus, because NMPSU is not a social behavior, students who do not engage may not know of the consequences or feelings associated with the behavior. This is in stark contrast to someone who has never drank heavily before, because there are a variety of side effects associated with the behavior that are well known to society. This could explain why Labrie et al. (2005) and Labrie et al. (2006) did have an effect on college students' behaviors in both problematic drinkers and non-problematic drinkers.

An additional area of necessary research is why the decisional balance has an effect on heavy drinking but does not seem to alter NMPSU. It is important to start by examining the differences in the two behaviors. Alcohol is often used for social purposes - to enhance social gatherings and produce feelings of disinhibition. Stimulant use on college campuses occurs

primarily for academic reasons. Although it is not a social substance as alcohol might be, stimulant use does seem to be more prevalent in different specific social contexts. For example, a previous study showed that Greek life involvement was a key risk factor for use (Minot, 2014). Additionally, if a particular social group is at higher risks than others, it can also be assumed that that higher-risk group has fewer barriers in obtaining prescription stimulants. It would be interesting to include a particular measure in a future intervention that evaluated a participant's evaluations of the frequency of NMPSU in their peer group and their perceptions of how their peers view NMPSU. It would be helpful to see whether they partake in use because of pressure from their friends or how they envision others viewing them (professors, parents, etc.) if they use. If the behavior is common among their friends, asking about their professors, parents, and future employers' potential reactions to their NMPSU may spark different way of viewing stimulant use. It would be interesting to adapt the PSEQ-II to reflect participant's views on what individuals other than their peers would think about use. It would be fascinating to examine and alter questions based on both positive and negative expectancies on perceived use. If I were to speculate, there would be more negative expectancies (guilt, anxiety) associated with perceived use in comparison to positive. A negative expectancy perception might be "my professor may look down upon my work if I use" while a positive expectancy might be "my parents would do the same thing if they had the same amount of work."

It would be interesting to conduct an intervention study across college campuses nationwide examining whether prevalence rates, comparing low and high, have any differences of effects in terms of effectiveness of an intervention. Due to Trinity College's 37% prevalence rate, it would be interesting to examine whether an intervention strategy would yield statistically significant results on a college campus where the behavior is less embedded in the social context.

Whereas drinking behaviors are prevalent on most college campuses, it is clear that stimulant use rates are uneven across different types of campuses and geographic regions.

Another future direction for intervention research on Trinity College's campus could be going into non-psychology courses and recruiting participants. After this intervention, a number of psychology students participated or at least learned about the intervention through posted flyers or in class presentations. Therefore, a future study might utilize classes that have more remote relevance to this topic. Some courses might include neuroscience, sociology, and anthropology. Additionally, I think it might be interesting to recruit students from economics and public policy and law because of the future directions these students might take after graduation. In a recent New York Times article, there is a rising prevalence rate of use among healthy adults seeking increased productivity in a workplace setting (Schwarz, 2015). In stressful high expectation work environments, workers are looking to stimulants during long hours for an extra boost in order to complete their assignments. This is where it would be beneficial to target students in all academic areas and not just psychology students who may have prior knowledge on stimulant use. Intervening with this behavior in college could potentially curb use later in life when emerging adults are in work environments where they may be tempted to take a pill for cognitive enhancement.

Implications

Implications for this study include further research on stimulant behavior on college campuses. Is stimulant use for cognitive purposes something that students believe needs to change on college campuses? When reviewing the group transcripts, it was clear that some participants thought of stimulants as a crutch or felt as if it was cheating. Despite these opinions, if it is a behavior that seems to be helping students rather than hindering their performance,

where is the motivation to change that behavior? In order to decrease use, how do you help students explore ambivalence towards a behavior they may not see as dangerous or a bad decision? From this intervention and Looby et al. (2014) it appears that that motivational enhancement does not change stimulant use behavior, yet it is effective in reducing heavy drinking. Further research on the differences in these two substance use behaviors is necessary in creating future studies. It is apparent that a new approach, a "hook" for students, is needed in order to progress in intervention strategies targeting this particular behavior.

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Table 1

Demographic Characteristics of Participants

Characteristic	*n*	Percentage (%)
Gender		
Male	9	29
Female	22	71
Race/ethnicity		
White/non Hispanic	26	84
African American/Black	1	3
Asian/Pacific Islander	1	3
Hispanic/Latino	2	6
Other	1	3
Class Year		
Freshman	12	39
Sophomore	5	16
Junior	3	10
Senior	11	35
Greek Life[a]		
Yes	8	27
No	22	73
Level of Mother's Education		
High school graduate	3	10
Postsecondary school other than college	1	3
Some college	6	19
College degree	12	39
Some graduate school	1	3
Graduate degree	8	26
Level of Father's Education		
High school graduate	2	7
Postsecondary school other than college	1	3
Some college	1	3
College degree	12	39
Some graduate school	0	0
Graduate degree	15	48
GPA		
2.0-2.24	1	3
2.25-2.49	1	3
2.75-2.99	4	13
3.0-3.24	6	19
3.25-3.49	11	36
3.50-3.79	7	23
3.8 or above	1	3

Have you ever been formally diagnosed with ADHD or ADD?[a]		
Yes	6	20
No	24	80
Are you currently prescribed stimulants?		
Yes	6	19
No	25	81
History of NMPSU		
Yes	20	65
No	11	35

Note. $N = 31$. [a]$N = 30$ (one participant did not respond). GPA = Grade point average; ADHD=Attention Deficit/Hyperactivity Disorder; ADD=Attention Deficit Disorder; NMPSU=Non-medical prescription stimulant use.

Table 2

Correlations among Study Variables

	Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1	Gender (male=0, female=1)	--												
2	GPA	.186	--											
3	Greek Life participant (1=yes; 2=no)	-.066	.044	--										
4	History of NMPSU	.268	-.212	-.146	--									
5	Cognitive Enhancement T1	.339	-.228	-.081	.280	--								
6	Cognitive Enhancement T2	.325	-.162	-.066	.114	.716**	--							
7	Social Enhancement T1	.309	.017	-.033	.128	.367*	.220	--						
8	Social Enhancement T2	.342	.007	-.063	.068	.336	.644**	.629**	--					
9	Guilt and Dependence T1	.084	-.083	.216	-.311	.041	.286	-.012	.261	--				
10	Guilt and Dependence T2	.102	-.171	.245	-.164	.169	.483**	.106	.443*	.745**	--			
11	Anxiety and Arousal T1	.453*	.252	.121	-.028	-.003	.156	.197	.350	.367*	.325	--		
12	Anxiety and Arousal T2	.351	-.074	.092	.016	.297	.558**	.316	.688**	.374*	.585**	.651**	--	
13	Study self-efficacy T1	.090	.180	-.012	-.189	-.143	.023	-.155	-.055	-.043	-.034	.097	.104	--
14	Study self-efficacy T2	.182	.032	-.015	-.109	.027	.268	-.238	.039	.062	.106	.110	.274	.855**

Note. *Correlation is significant at the 0.05 level (2-tailed). **Correlation is significant at the 0.01 level (2-tailed).

Table 3

Descriptive Statistics, Internal Consistency Reliabilities, and Two-Way ANOVA Results for Study Measures

	Control Group *n*=16		Treatment Group *n*=15				
Study Measure	$M(SD)_{T1}$	$M(SD)_{T2}$	$M(SD)_{T1}$	$M(SD)_{T2}$	α^a	*F*	*p*
PSEQ - Positive Expectancies	85.21(24.0)	91.08(22.76)	84.70(19.0)	80.15(18.62)	.95	2.908	.099
PSEQ - Negative Expectancies	47.44(10.10)	48.12(11.98)	41.93(11.85)	38.08(12.11)	.87	1.866	.182
PSEQ - Cognitive Enhancement	68.80(20.60)	68.69(17.32)	69.33(15.30)	63.97(14.21)	.95	2.578	.119
PSEQ - Social Enhancement	18.44(7.68)	22.38(7.67)	15.17(5.06)	16.20(5.44)	.87	1.850	.184
PSEQ - Guilt and Dependence	13.00(4.12)	12.69(4.91)	11.53(5.49)	10.13(4.97)	.75	.0735	.398
PSEQ - Anxiety and Arousal	31.56(8.13)	32.63(8.70)	27.87(8.97)	25.86(7.40)	.89	1.420	.243
Study Self-Efficacy	74.24(11.04)	71.70(14.04)	66.92(14.29)	63.95(18.40)	.88	.018	.894

Note. $N = 31$. α^a = average of T1 and T2 alpha levels. *F*- and *p*-values correspond to ANOVA statistics for the interaction effect (GROUP X TIME). PSEQ=Prescription Stimulant Expectancy Questionnaire.

Table 4

Transition to User or Non-User Status by Baseline Use and Study Group

	Control Group		**Treatment Group**	
	Users	*Nonusers*	*Users*	*Nonusers*
Baseline	8	8	12	3
One-month follow-up	• 1 user also reported use at follow-up • 1 transitioned to nonuser	• 3 people who were nonusers previously reported use during the follow-up period	• 2 users also reported use at follow-up	• 1 person who was a nonuser previously reported use during the follow-up period

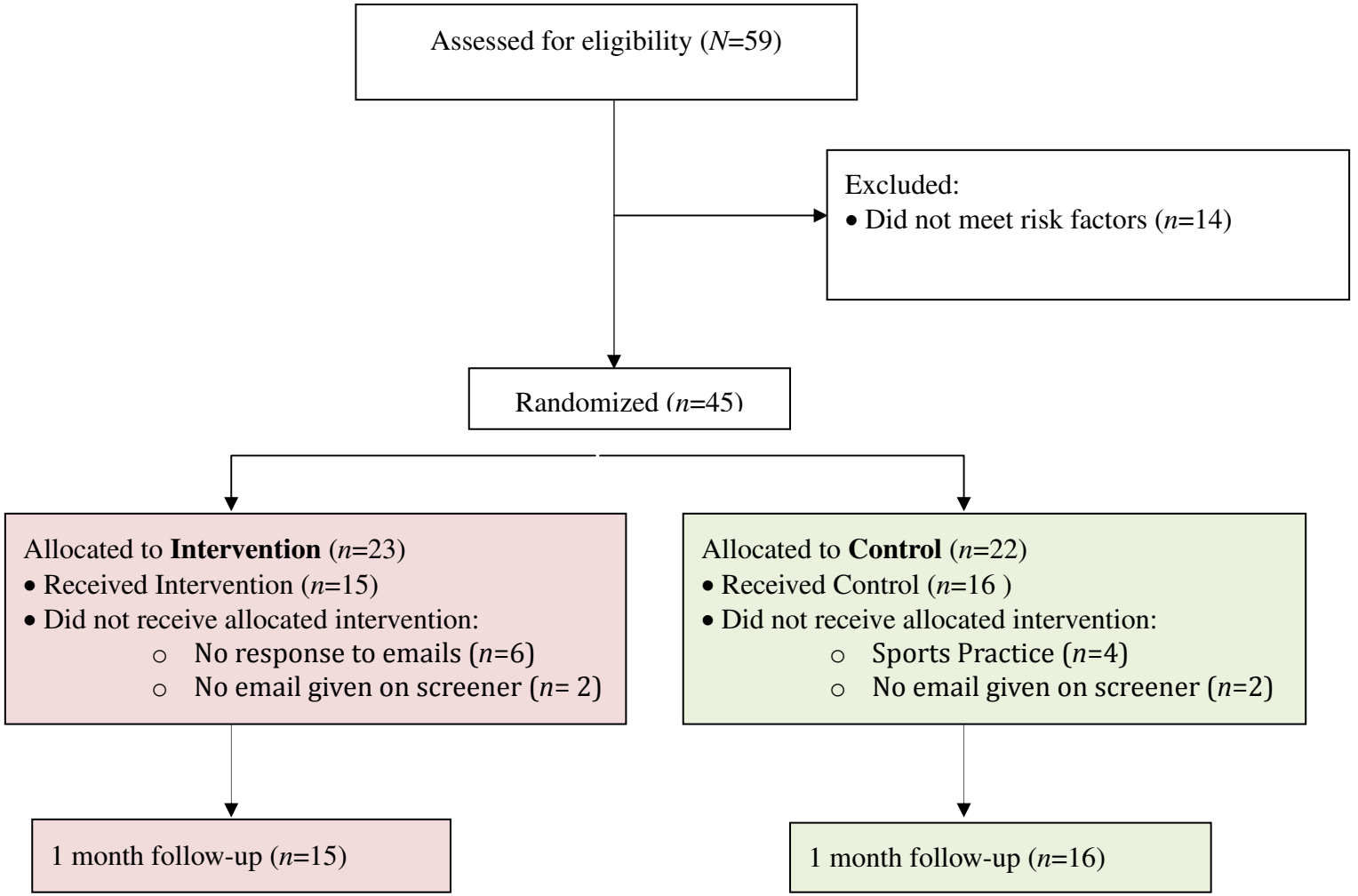


Figure 1. Participant flow. This figure illustrates participant flow from enrollment, allocation, follow-up, and analysis.

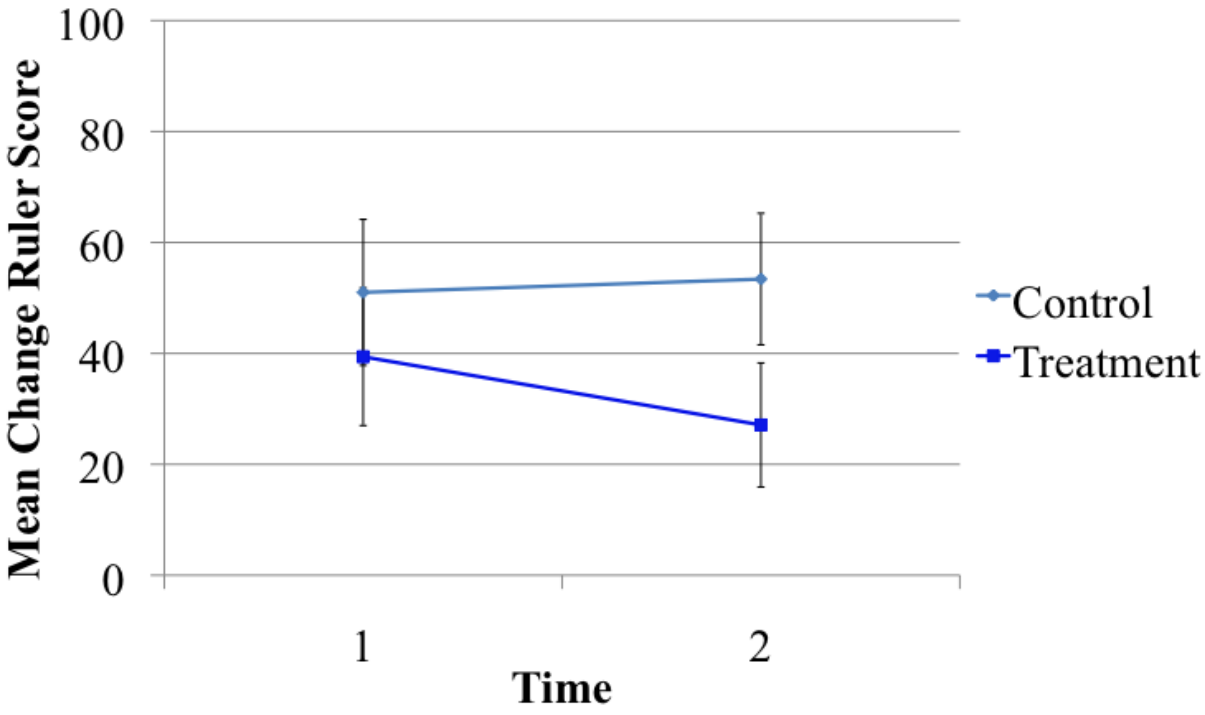


Figure 2. Change in Intentions to use among NMPS Users. This figure illustrates the mean change ruler scores of the control and treatment groups over time (time 1 and time 2). There were no main effects of time or group and no significant interaction effect.

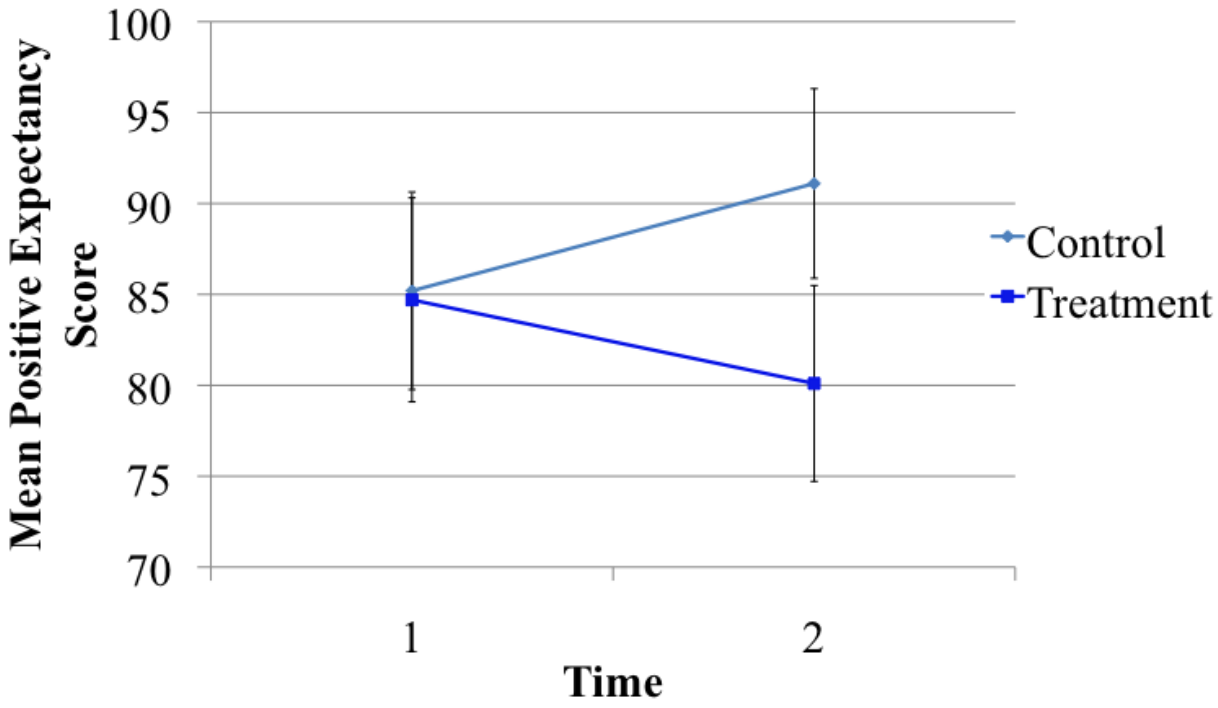


Figure 3. Change in positive expectancies by group and time. This figure illustrates the mean positive expectancy scores of the control and treatment groups over time (time 1 and time 2). There were no main effects of time or group; the interaction effect was marginally significant: $F(1,29)=2.91$, $p<.10$.

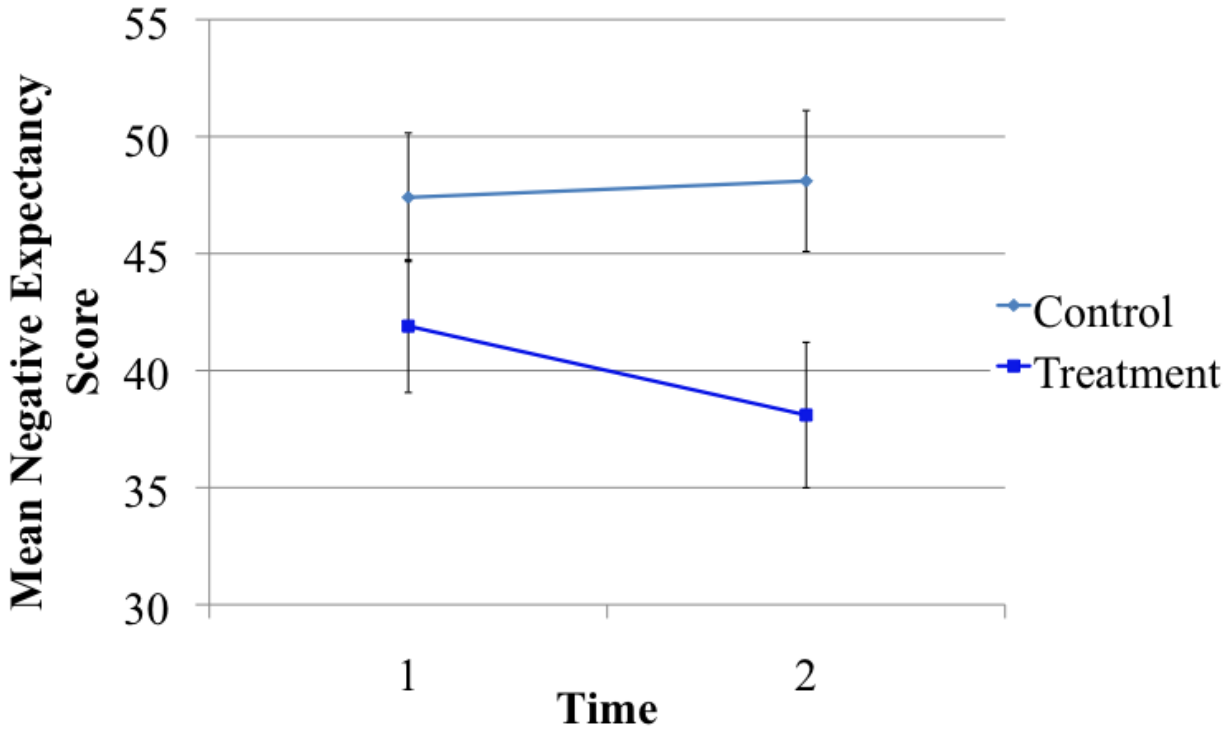


Figure 4. Change in negative expectancies by group and time. This figure illustrates the mean negative expectancy scores of the control and treatment groups over time (time 1 and time 2). There were no main effects of time or group and no significant interaction effect.

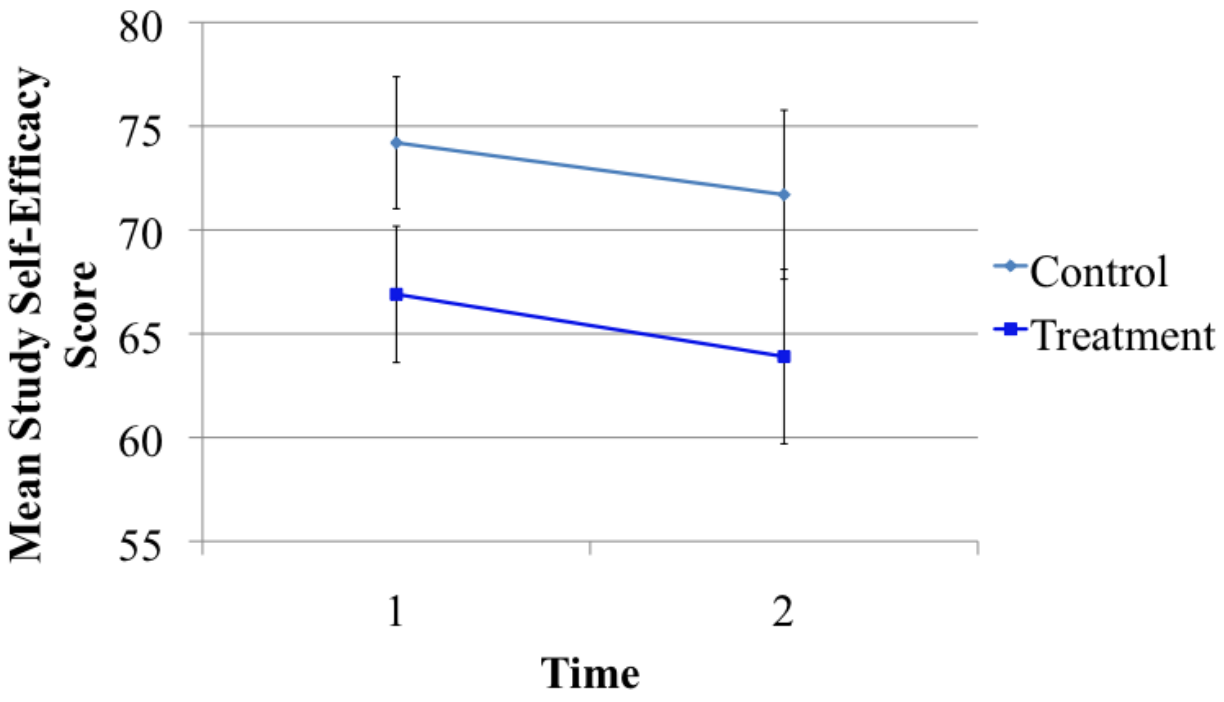
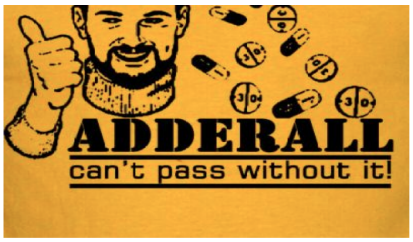


Figure 5. Change in study self-efficacy by group and time. This figure illustrates the mean study self-efficacy scores of the control and treatment groups over time (time 1 and time 2). There were no main effects of time or group and no significant interaction effect.

Appendix A

What Do You Think About Study Drugs?



We're interested in learning more about your attitudes regarding the non-medical use of prescription stimulant drugs like Adderall and Ritalin.

- We're recruiting BOTH study drug users and non-users
- Attend one group session and complete two brief follow-up online surveys
- Receive course credit OR a $5 Goldberg's Gift Card for your participation!
- **Find out if you are eligible by completing a brief screening survey: http://tinyurl.com/trinstudydrugs**

For more info, please contact the Lab Coordinator: Dana Engle at TrinityStudyDrugs@gmail.com

Questions? Contact Dana Engle: TrinityStudyDrugs@gmail.com Screening survey: http://tinyurl.com/trinstudydrugs

Appendix B

Trinity College
Consent for Participation in Research

Attitudes about Prescription Stimulants

Purpose of this Research

Stimulant medications such as Ritalin and Adderall are commonly prescribed for the treatment of Attention Deficit Hyperactivity Disorder (ADHD); however, sometimes these medications are utilized without a prescription (non-medical use). The purpose of this research study is to better understand students' ideas about the non-medical use of these medications. You are being asked to participate in this study because you are part of a group of adults who may be more likely to use stimulant medication. Approximately 40 people will take part in this study at Trinity College.

Procedures

This study requires you to come to one group session ranging from 30-60 minutes and to complete 2 follow-up online surveys (one in late March and one in mid-June), each taking approximately 10-15 minutes. During today's group session, you will complete several brief questionnaires about your study habits and behavior around stimulant medication. Also, you may discuss your beliefs about prescription stimulant medication. If you participate in a discussion, the discussion may be audiotaped to ensure the group leaders are doing what they are supposed to be doing and to better interpret the study data. You would never be individually identified in the recording. Following today's group, you will be contacted via e-mail (and text, if you consent) reminding you to complete each of the follow-up surveys. We will send you a link to both online follow-up surveys via e-mail.

Risks:

The risks involved in participating in this study are minimal. You may become uncomfortable answering some of the questions regarding your substance use. You do not have to answer any questions that you are uncomfortable answering. If you are uncomfortable during the study and no longer wish to participate, you are free to leave at any time. Since you are providing sensitive information, there is a very minimal chance that this information could be exposed to outside parties. We take numerous steps to ensure that this does not happen. Your name will never be associated with the information that you provide.

If you engage in a discussion, you are encouraged to only disclose information that you are comfortable sharing with your peers. Your name will not be made known to the others in the group. To minimize any legal risk, we instruct group members not to disclose what was said in the group to anyone else. We also encourage you not to use your name.

Benefits:

Although you may not receive direct benefit from your participation, others may ultimately benefit from the knowledge obtained from this research regarding the factors that influence students' attitudes about, and behaviors around prescription stimulants.

Compensation

If you are seeking research participation credit or extra credit for a course, you can earn that credit by participating in today's group and the March online follow-up survey. If you are not seeking credit,

you will receive a $5 Goldberg's gift card for your participation today and a $5 Goldberg's gift card via campus mail for completing the March online survey. All participants who complete the online survey in June will be entered into a drawing for two $50 Amazon gift cards.

Confidentiality:
All information obtained in this study will be treated confidentially and privately to the extent permitted by law. Records from the study are kept locked in file cabinets and identified by study numbers to preserve confidentiality. Only the research team will have access to these records. The information obtained in this study will be used for research purposes and your name will never be publicly disclosed at any time. Any information that is obtained in this study and that can be identified with you will remain confidential and will be disclosed only with your permission or as required by law. Records will be kept in our laboratory for a minimum of 3 years and then shredded and destroyed.

Voluntary Participation:
Your participation in this project is voluntary. Even after you agree to participate in the research, you may decide to leave the study at any time without penalty. You may choose not to answer any questions and may refuse to complete any portions of the research for any reason. Your decision whether or not to participate will not affect your current or future relations with Trinity.

Questions/Concerns:
If you have any questions or concerns, please contact the Principal Investigators, Dana Engle (student), at Dana.Engle@trincoll.edu or Laura Holt, Ph.D. (faculty) at Laura.Holt@trincoll.edu (860-297-4019). If you would like to receive feedback about the study results, please contact Ms. Engle or Prof. Holt after May 13th, 2015. We will provide group results only, not individualized results.

This study has been approved by the Institutional Review Board at Trinity College. If you have questions about your rights as a research participant, or further questions about the study, please feel free to contact the chair of Institutional Review Board, James Hughes, Ph.D. (James.Hughes@trincoll.edu, 860-297-2376).

Your signature indicates that this study has been explained to you, that your questions have been answered, and that you agree to take part in this study. You will receive a copy of this form.

_____ _____
Participant Name (please print) Trinity Box # (for gift card)

_____ _____
Participant Signature Date

_____
Preferred e-mail address for follow-up surveys (please write legibly)

May we send a **text** reminder for the March/June surveys? _____
☐ NO ☐ YES ⋯⋯► Phone #

_____ _____
Signature of Researcher Who Obtained Consent ***Date***

Appendix C

Trinity College
Debriefing Form
Attitudes about Prescription Stimulants

PRINCIPAL INVESTIGATOR: Laura Holt PHONE: 860-297-4019

We greatly appreciate your participation in this study. You have made an important contribution to the field of psychology and specifically to the understanding of what kinds of interventions can be most helpful in affecting students' attitudes about prescription stimulants and their stimulant use.

The purpose of this study was to test whether participating in a group-based intervention focused on prescription stimulants made it less likely that students would use these drugs in the future (or less likely that they would start if they had never used before the study). Some of you were enrolled in a "control" intervention, in which you gathered with a group of other participants to complete the study questionnaires, but you did not talk about prescription stimulants with others or discuss effective strategies for studying. We withheld this information from you initially because we wanted all participants to be equally motivated to participate in the group to which they were assigned.

All persons participating in this study had to endorse at least two of the following characteristics to be eligible: college student, male gender, GPA below 3.5, participant in Greek life, past month marijuana use, heavy drinking episode in the last 2 weeks, and previous use of prescription stimulant misuse. We focused on these characteristics because research has shown that they are associated with greater risk for prescription stimulant misuse.

Regardless of the condition to which you were assigned, we hope that this study provided a valuable opportunity to reflect on your attitudes and behaviors. If you do have any questions or concerns about this study, please feel free to contact the Principal Investigator of this study, Laura Holt (Laura.Holt@trincoll.edu; 860-297-4019). If you are concerned about your substance use for any reason, we encourage you to contact the Trinity College Counseling Center (at 860-297-2415); there are counselors there who are available to meet with students for any and all concerns free of charge and/or refer you to resources closer to your residence over the summer.

Thank you again for your participation in this study!

Appendix D

Attitudes about Prescription Stimulant Misuse:

A Group Intervention Manual

Laura Holt

Trinity College, Hartford, CT

**Much of the material in this manual is adapted from:

Velasquez, Maurer, Crouch, & DiClemente's 2001 *Group Treatment for Substance Abuse: A Stages-of-Change Therapy Manual*

The Ohio State University College of Pharmacy's *Generation Rx Initiative*: http://pharmacy.osu.edu/outreach/adderall-dilemma

Two days before the scheduled group:

☐ E-mail all participants reminding them of:
- their scheduled group time
- group location
- bring a laptop to complete study measures – let you know if they don't have a laptop immediately.
- your contact information

Day of Group: Checklist of materials needed:

☐ 20 informed consent forms (with Study ID#s on first page)
- 10 participants sign and return
- 10 to allow participants to retain copy

☐ 10 Research Participation sheets (participants must sign and return if they want course credit)
☐ 10 Pros/Cons & Study Self-Efficacy sheets (with Study ID#s on first page)
- you will copy these sheets when participants have completed them

☐ 10 sheets with change rulers (participants should complete this at the end and return it to you)
☐ DVD with Adderall Skit
☐ Powerpoint slides with discussion questions and results from Ilevia et al. study
☐ Mobile whiteboard/easel
☐ Mobile projector and screen
☐ Audio recorder

(1) Welcome and Informed Consent (5 minutes)

Begin the session by introducing yourself. Inform participants of the following:

- if you consent to participate, you will spend the next 60 minutes completing a survey and discussing the topic of "study drugs" with your classmates
- you will be asked to share your attitudes about these substances and potential benefits and drawbacks of using them, but you will not be required to disclose whether you have used these substances

Distribute hard copies of the informed consent. Don't collect the informed consent forms until after everyone has finished the online survey (they need the informed consent forms to get their ID#). Before having anyone sign, please read the following:

- In addition to today's survey, you will be asked to complete a brief online assessment the week after spring break and the third week in June, which will be sent to you over e-mail. To earn course credit, you will need to participate in today's group and complete the March survey. If you aren't seeking course credit, you will receive a $5 Goldberg's gift card for today and the March survey. Please write your box number on the informed consent if you are expecting a gift card. Everyone who completes the June survey will be entered into a drawing for 2 $50 Amazon gift cards.
- Please read the form carefully. If you do not wish to participate for any reason, please step out of the room. Thank you for learning more about the study.
- Do you have any questions about the consent form or the study?

- If you agree to participate, please initial and date all pages at the bottom, print and sign your name at the end, and provide your cell number if we can text you with a reminder to complete the March/June surveys.
- We've provided an extra copy of the informed consent for you to take with you
- If you expect to get research participation credit for a class like PSYC 101 please **write your name, e-mail, and circle your class name on the Research Participation sheet** provided so we can inform your professor that you participated.

(2) Baseline questionnaire (10-12 minutes)

- please take the next 10-12 minutes to complete the survey
- direct participants to the survey at the following URL: http://tinyurl.com/studydrugs2015b
- **direct participants to enter the ID# from their consent form at the top of the online survey – it's the first question (and the only required question).**

NOTE: it's critical that students enter the ID# from their consent form; otherwise, we have no way of tracking participants over time and distributing their compensation.

(3) Establish group rules; obtain consent for audiotaping (5 minutes)

- By adhering to the following rules, we can ensure this is a safe environment where people feel comfortable participating:

  - refrain from interrupting or talking while others are talking
  - maintain confidentiality outside the group - *what's said in the group stays in the group*
  - don't use your last name (to preserve your confidentiality)
  - don't be hesitant to share differences of opinion; respect that others may hold different opinions from yours

- Do you consent to the group being audiotaped? Audiotaping helps to ensure that the group facilitators are covering all the topics appropriately and it also helps us to better interpret the study data

IF ALL PARTICIPANTS CONSENT TO AUDIOTAPING, PLEASE TURN ON DIGITAL RECORDER

(4) Skit (5 minutes)

Why Talk About Study Drugs?

The National Council on Patient Information and Education reports that:

- By sophomore year, about half of you will have been offered the opportunity to misuse a prescription drug;
- 90% of college students who used Adderall non-medically in the past year also reported binge drinking, and these students were also five times as likely to have abused a prescription painkiller in that time
- More than half (54%) of undergraduates who are prescribed stimulant medications

have been asked to sell, trade or give away their medication in the past year.

- A recent survey of Trinity College students found that 37% reported misusing prescription stimulants at some point in college.

Let's think about this issue by watching a short skit and then discussing your views.

Play DVD with skit and narration

Narrator: In her article entitled "The Prescription of a New Generation," author Meika Loe writes that "U.S. college students today are among the first to be raised in a society where prescription drugs are an everyday commodity – socially branded and advertised directly to consumers – not unlike cars and blue jeans." She suggests that this phenomenon may contribute to the misuse of common prescription stimulants among college students who are "pharming to get by," meaning "they believe that with the help of prescription stimulants they can block out distractions to concentrate on academic performance and become smart and studious on demand."

So we ask the question – what motivates the desire to use prescription stimulants without a prescription or to use them in a way that they aren't prescribed?

It's Monday night. Taylor, a college sophomore, is in the dorm working on homework and listening to music. Taylor is interrupted by Jamie, a friend who is a first-year student.

Jamie: Hey, Taylor!

Taylor: Hey, what's up?

Jamie: Not too much, just studying for two awful exams tomorrow.

Taylor: You have *two* exams tomorrow? Bummer!

Jamie: Tell me about it – AND, they're in my two hardest classes, AND they're both in the morning!

Taylor: Whoa – I am not jealous.

Jamie: Yeah, right? So listen, speaking of all this… remember how the other day we were at dinner and you mentioned something about having ADHD?

Taylor: Oh, yeah. Why?

Jamie: So, like… do you take any medicine for that?

Taylor: Well… yeah. I take Adderall.

Jamie: Oh man, that's good. So listen, I need to ask for a huge favor. Tomorrow is going to be so awful, and I have so much left to study – could you give me just a couple of them?

Taylor: Oh, wow. I don't know, I mean, I've never actually let anyone else take one before.

Jamie: Don't worry; it's not a big deal. I mean, you probably don't remember to take it *every* day, right? So you probably have a few left over?

Taylor: I guess…

Jamie: See, you won't even miss them.

Taylor: Well, it isn't just that. Why didn't you just start studying sooner?

Jamie: I mean, I was studying earlier; but then Emily wanted to go get dinner, and then we ran into Dan and Cory, so we hung out with them for a bit – I mean, I just had other things to do. Plus, I'm really tired, and I haven't been feeling good ever since that party last weekend… I just need a boost, ya know? Taylor, please?

Taylor: Listen, I want to help you - it's just that Adderall is legit. I have to get a new prescription for it every month, and the pharmacist where I pick it up is always reminding me of all of these side effects it has…

Jamie: Taylor, I don't think it's really that big of a deal. Lots of the kids at my high school used it all the time. I have friends here now who do it, and obviously they're surviving – one of them even told me they'd never study without it again. I don't even think any of them have had any of these, so called, "side effects" at all.

Taylor: Yeah, but what if YOU did have side effects? I even do sometimes! And Jamie, do your friends really use it all the time? Now that I think about it, I'm pretty sure the reason I have to get a new prescription every month is because it can be abused…

Jamie: Abused? Like a drug? Seriously? I've never heard of anyone really being addicted to Adderall. Besides, I'm just taking it this one time, Taylor. And think about it, YOU take it every day, right? If you can take it, why can't I?

Taylor: Because I actually have ADHD, Jamie!

Jamie: I mean, I think I do, too. I'm always getting distracted, which is why I hate studying so much. Taylor, I'm not arguing with you, I just don't want you to think it's such a big deal. I promise I'll be fine, and honestly, without it I don't know if I'll even pass these exams. Please Taylor? C'mon, please?

(5) Skit Discussion, Expectancy Challenge, and Self-Efficacy Building (20 minutes)

Post discussion questions (one at a time)

1) What would you do if you were Taylor? Why would you want to share with Jamie? Why wouldn't you?

2) Jamie says it's been hard to study because: "…I mean, I just had other things to do. Plus, I'm really tired, and I haven't been feeling good…" To what extent do you think "cognitive enhancers" (i.e., prescription stimulants) improve cognitive performance among people *without* ADHD?

- Research examining whether these drugs actually improve cognitive performance among people without ADHD has been very mixed.

- A recent, randomized controlled trial examining the effects of Adderall on memory, inhibitory control, creativity, and components of standardized tests among people who don't have a diagnosis of ADHD showed that participants who took Adderall did not perform significantly better on these tasks than people who received a placebo.

- This study showed, however, that participants who received Adderall believed that the drug improved their performance. That is, even though they didn't show better performance, they believed that the Adderall led them to perform better on the study's tests of memory, creativity, etc.

**Facilitators should present slides of outcome data from Ilevia et al. (2013) study (e.g., SAT Math/SAT Verbal/number correct on digit span/embedded figures task)

3) What alternative study strategies could Jamie consider?

Facilitators should write these ideas on the chalkboard or a flip chart and add suggestions below as necessary. Consider targeting specific items on Zimmerman's scale.

- Stay current with class material and work. Review a little every day.
- Establish good study habits and a regular study schedule. Set aside extra time before important tests or deadlines.
- Use healthier "stimulants" – snacks, exercise, and even caffeine in moderation.
- Use your other available resources (TAs, professors, tutors, friends, etc.) to get help when needed.
- Establish a study group to help reinforce your learning.

**Ask participants to write down one or more study strategies they discussed that might be helpful to them in the future on the attached worksheet.

4) Jamie says, " …I'm just taking it this one time…" How likely is that? Jamie also says that a friend "…told me they'd never study without it again." How might using Adderall affect Jamie's ability to develop the skills and habits necessary to be a successful professional in the long run?

5) Jamie claims knowing people who have used Adderall non-medically without harm, so she feels comfortable misusing Taylor's prescription stimulant. But Taylor notes that "… the pharmacist where I pick it up is always reminding me of the side effects it has…" So, is there any risk in using a prescription medication like Adderall without medical supervision?

Notes: Prescription stimulants, like all medications, come with side effects or unwanted reactions to the drug. The most common side effects are generally mild and include headache, dizziness, increased heart rate, nausea, abdominal pain, loss of appetite, dry mouth, agitation, anxiety, and insomnia; however, the actual percentage of patients experiencing each and the severity of the side effects may vary. More serious side effects are less common, but have been reported. These include: an increased risk of serious cardiovascular events (such as abnormal heart rhythm, high blood pressure, and even

heart attack or stroke); an exasperation of psychiatric conditions (such as mania, bipolar disorder, or anxiety disorders); visual disturbances; and a lowered seizure threshold. The package insert for Adderall XR® contains the following serious "blackbox" warning:[3] "Misuse of amphetamines may cause sudden death and serious cardiovascular adverse reactions."

Adderall and other prescription stimulants are classified as a "Schedule II" controlled substance by the U.S. Drug Enforcement Agency (DEA) due to a high potential for abuse. Stimulants like Adderall are also known to have addictive potential, especially when they're being used without medical supervision. The package insert for Adderall XR® contains the following serious warning: "Amphetamines have a high potential for abuse; prolonged administration may lead to dependence."

6) Some people think that using a prescription stimulant for academics is like using anabolic steroids for athletics – that they're both "cheating". How are these situations alike? How are they different?

1 www.talkaboutrx.org/college_resource_kit.jsp

2 Loe, Meika (2008). The Prescription of a New Generation, Contexts, vol. 7, no. 2, pp. 46-49.

3 http://pi.shirecontent.com/PI/PDFs/AdderallXR_USA_ENG.PDF

(6) Pros/Cons of Prescription Stimulant Use (15-20 minutes)

- When we are considering whether or not to do something, it can be helpful to consider the "pros" and "cons." For example, if you were considering whether to maintain a long-distance relationship while at Trinity, what might be some benefits of maintaining a relationship? Drawbacks?

- We are going to do an exercise focused on prescription stimulant use, called "decisional balancing." This type of exercise can be helpful in exploring your ideas about substance use and making well-thought-out decisions.

- Distribute sample Decisional Balance from *Group Treatment for Substance Abuse*. Ask students to review the sample pros/cons, in addition to the way in which this person (Carolyn) noted the importance of each pro/con to him/her.

- Tell students you would like them to complete a similar exercise with respect to non-medical prescription stimulant use. Ask students to take out the "Pros and Cons" handout for Prescription Stimulants. Remind them that even if they have never misused prescription stimulants, we would like them to consider the specific benefits and drawbacks they might expect if they were to use them. They should also assign ratings of importance (1="slightly important" to 4="very important" to each pro/con they identify.

- After participants have shared some ideas, offer additional ideas (on a slide?) from the positive and negative expectancy subscales of the PSEQ. Ask participants to write down any items that resonate with them – they also should assign importance levels to these items.

- Weigh the decisional balance:
  - ask participants to reflect on the relative balance of items in the pros and cons column; if there are only 1-2 items in one column, consider whether those items are rated as more important

- Ask for volunteers to share their pros and cons and how important they are. Starting with the pros often leads people to spontaneously discuss the cons. Listen to participants' ambivalence, empathetically reflecting both their pros and cons. (It is important NOT to judge people's responses.) Listen carefully when clients express ambivalence and reflect this back to them by summarizing when they have finished:
    - "On the one hand, prescription stimulants could help you pull an all-nighter and read a boring text; on the other hand, you wouldn't like how jittery you would feel."
    - "On the one hand, these drugs might help you to feel more creative or be more confident in your work; on the other hand, you're concerned that you might start to depend on them."
- Ask for elaboration on some of the cons (e.g., "Can you tell me why not becoming dependent on stimulants would be important to you?" "What would it mean if you came to depend on them?" or "Why would you be concerned about coming to depend on them?"

☐ COPY THE PROS/CONS AND STUDY SELF-EFFICACY SHEETS BEFORE PARTICIPANTS DEPART. RETURN THE SHEETS TO PARTICIPANTS BEFORE THEY LEAVE.

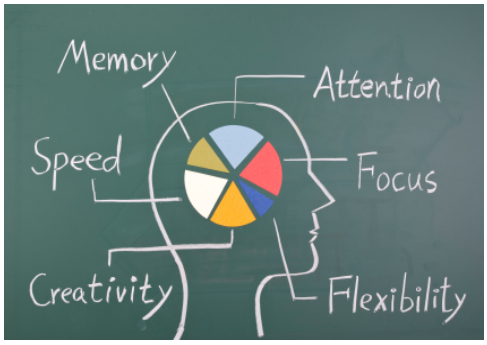
(7) Close the Session

- Ask if there are any final comments
- Thank everyone for their participation – remind them that prescription stimulant use is a complex issue and, more than anything, we want them to help them to make well informed decisions about their own behavior.
- Remind participants that they will be receiving an invitation to an online survey in March and June. Their participation in these surveys is vitally important to the study and participation in the March survey is required to receive research credit.

WORKSHEETS

- STUDY SELF-EFFICACY LIST
- PROS/CONS HANDOUT
- CAROLYN'S SAMPLE PROS/CONS
- POST-INTERVENTION CHANGE RULER

Effective Study Skills



Write down study skills that have helped you in the past to complete assignments and include any new skills you have learned here that you might try in future situations.

_____

_____

_____

_____

_____

_____

_____

Pros and Cons of Stimulant use

Part 1: Identifying the Pros and Cons

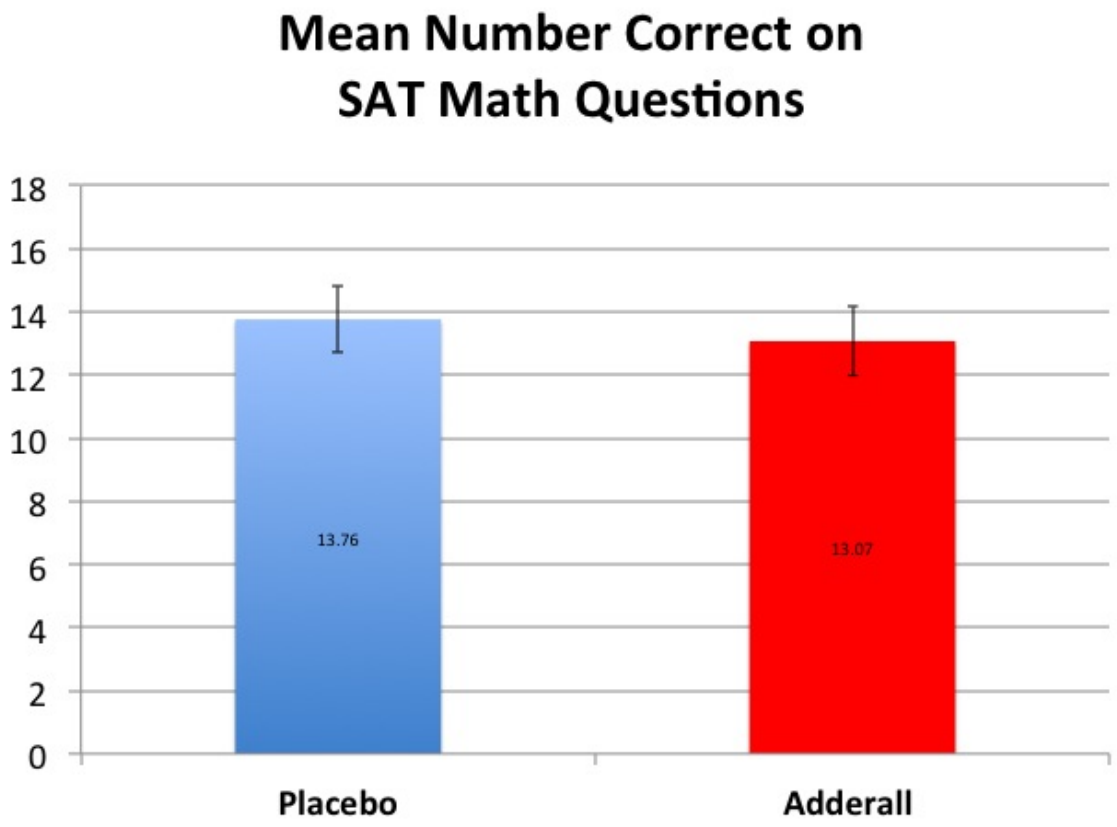
Pros: (The good things about stimulant use)		**Cons:** (The not so good things about stimulant use)
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

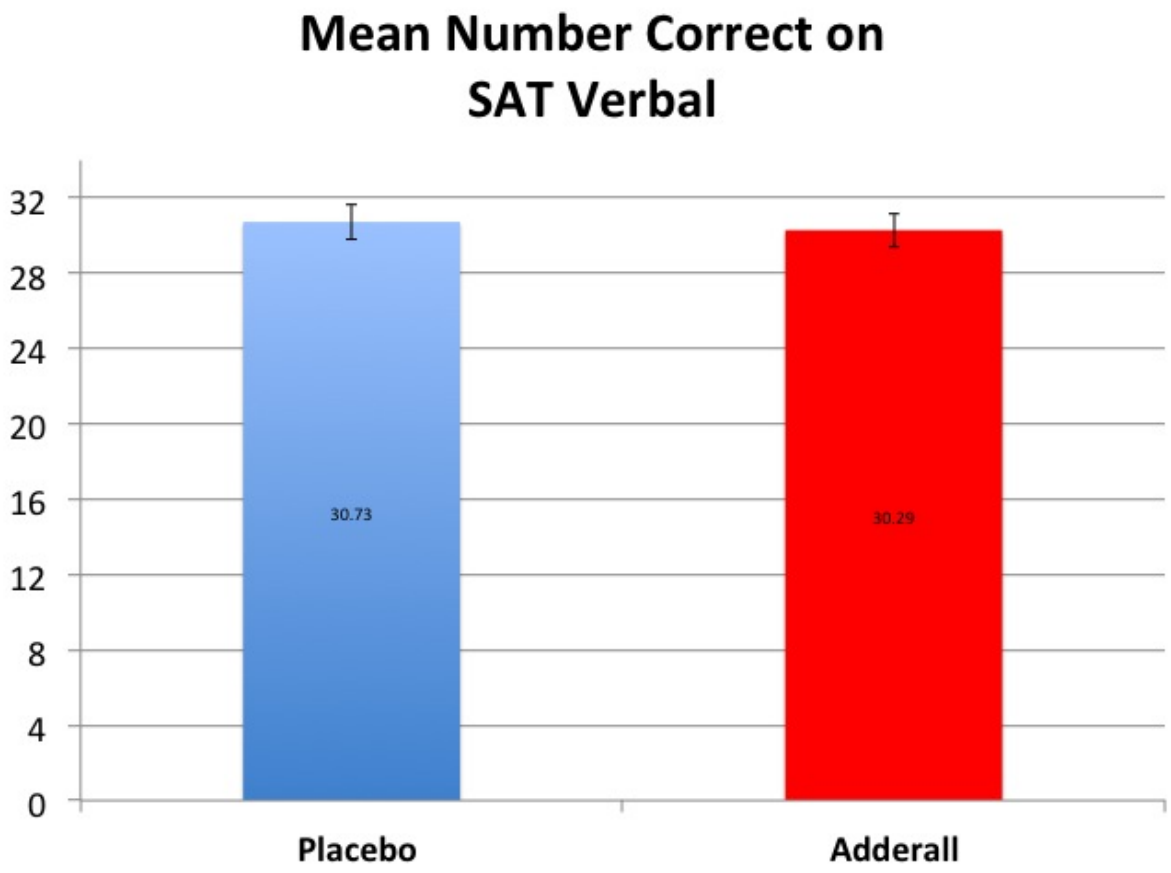
Part 2: Assigning Importance to the Pros and Cons

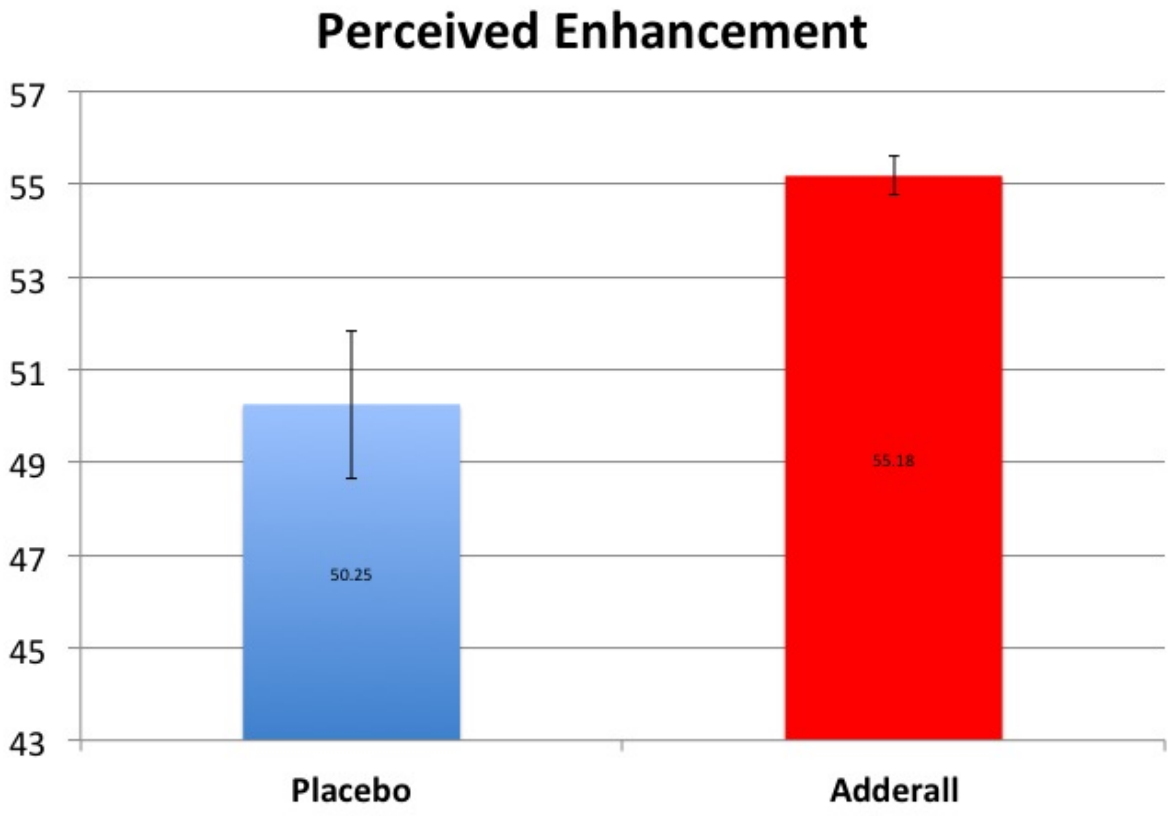
How important is each item to you in making a decision about stimulant use? (Put a rating next to each item.) If you have never used, you may choose to only rate the cons

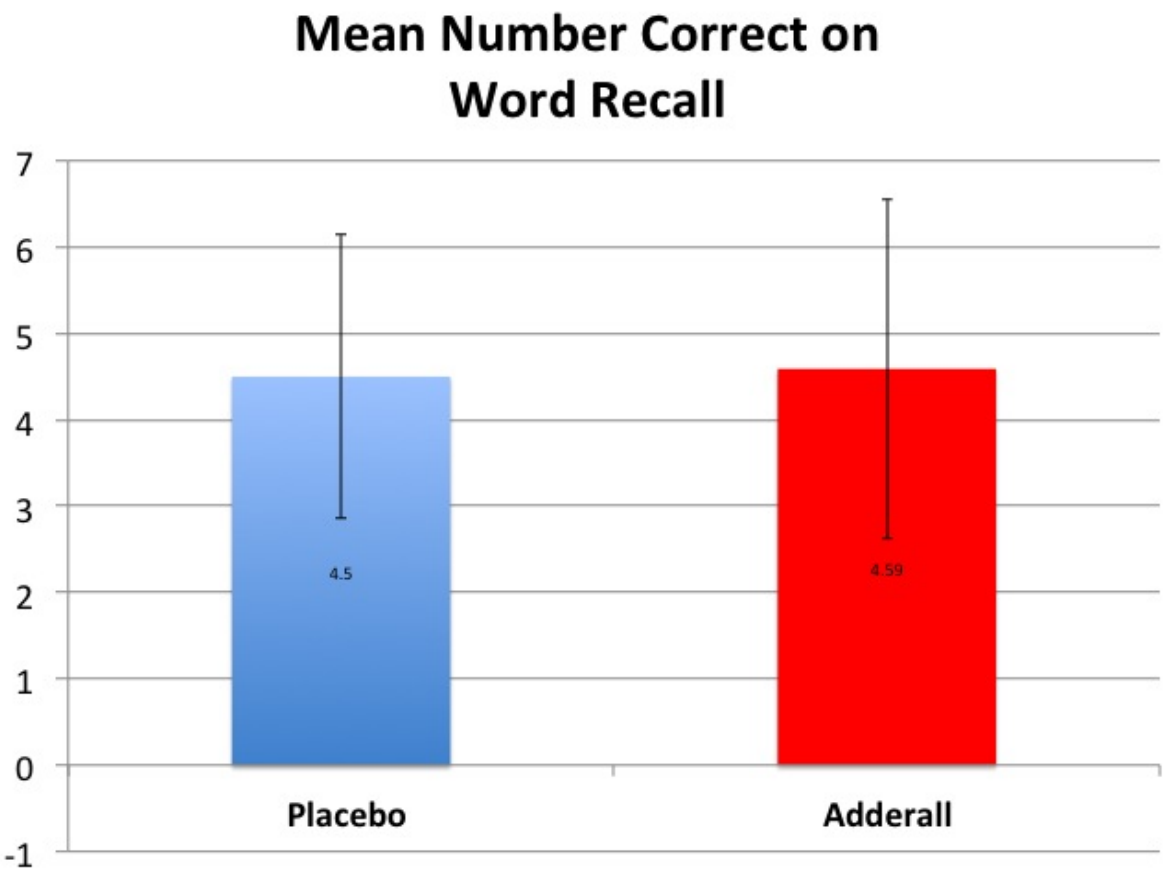
1= Slightly important
2= Moderately important
3= Very important
4= Extremely important

Slides from Ilieva et al. (2013) study to be presented in group:




Mean Number Correct on SAT Verbal
32
28
24
20
16
12
8
4
0
30.73
30.29
Placebo
Adderall


Perceived Enhancement
57
55
53
51
49
47
45
43
50.25
55.18
Placebo
Adderall


Mean Number Correct on Word Recall
7
6
5
4
3
2
1
0
-1
4.5
4.59
Placebo
Adderall

Appendix E

Q14 Directions: Please rate how often you would expect to experience these effects if you were to use prescription stimulants that were not prescribed to you (or if you were to use them differently from how they are prescribed), such as Adderall, Ritalin, or Concerta.

	Never (0)	Somewhat (1)	Sometimes (2)	More Than Often (3)	Very Often (4)
Distractions would disappear	❍	❍	❍	❍	❍
I would absorb material the first time through	❍	❍	❍	❍	❍
I would feel very happy	❍	❍	❍	❍	❍
I would ignore distractions more easily	❍	❍	❍	❍	❍
I would pay attention really well	❍	❍	❍	❍	❍
I would be able to study/work for hours	❍	❍	❍	❍	❍
I would not be able to hold still	❍	❍	❍	❍	❍
I would not sleep even if I wanted to	❍	❍	❍	❍	❍
I would enjoy parties more	❍	❍	❍	❍	❍
I would not end up daydreaming	❍	❍	❍	❍	❍
I would enjoy studying/working a lot more	❍	❍	❍	❍	❍
I would feel drained the next day	❍	❍	❍	❍	❍
Conversing with others would be easier	❍	❍	❍	❍	❍
I would feel like I can't get through the day without it	❍	❍	❍	❍	❍

I would feel like I'm cutting corners to do well	❍	❍	❍	❍	❍
I would feel sick to my stomach	❍	❍	❍	❍	❍
I would feel high	❍	❍	❍	❍	❍
I would be friendlier	❍	❍	❍	❍	❍
I would learn/work very efficiently	❍	❍	❍	❍	❍
I would need fewer breaks when I study/work	❍	❍	❍	❍	❍
I would worry that I'm addicted to it	❍	❍	❍	❍	❍
I would be all amped up	❍	❍	❍	❍	❍
I would feel more confident in myself	❍	❍	❍	❍	❍
I would come to see it as a crutch	❍	❍	❍	❍	❍
My ability to focus would be better	❍	❍	❍	❍	❍
My concentration would be excellent	❍	❍	❍	❍	❍
My focus would be crystal clear	❍	❍	❍	❍	❍
My head would hurt	❍	❍	❍	❍	❍
I would be free to be myself and do whatever I wanted to do	❍	❍	❍	❍	❍
My mind would not wander	❍	❍	❍	❍	❍
My mind would be razor sharp	❍	❍	❍	❍	❍
My thoughts	❍	❍	❍	❍	❍

would follow more logically					
I would feel more relaxed in social situations	❍	❍	❍	❍	❍
My work would seem more interesting	❍	❍	❍	❍	❍
My heart would race	❍	❍	❍	❍	❍
I would focus very well	❍	❍	❍	❍	❍
I would not be able to calm down	❍	❍	❍	❍	❍
I would feel twitchy	❍	❍	❍	❍	❍
I would feel as though everything is right in the world	❍	❍	❍	❍	❍
It would not be trouble to sit still	❍	❍	❍	❍	❍
I would feel guilty for taking it	❍	❍	❍	❍	❍
I would get nervous and edgy	❍	❍	❍	❍	❍
My thoughts would be able to stay on track better	❍	❍	❍	❍	❍
I would laugh more	❍	❍	❍	❍	❍
My memory would be better	❍	❍	❍	❍	❍

Q22 For the following, please rate how often these statements pertain to you

	Never (1)	2	3	4	Always (5)
I have sold prescription stimulants to other students.	❍	❍	❍	❍	❍
I have given prescription stimulants to other students.	❍	❍	❍	❍	❍
I have been pressured into letting someone else have my prescription stimulant medication.	❍	❍	❍	❍	❍
Using prescription stimulants occasionally is harmless.	❍	❍	❍	❍	❍
Using prescription stimulants daily is harmless.	❍	❍	❍	❍	❍
Prescription stimulant use on campus is a problem.	❍	❍	❍	❍	❍
I feel I am knowledgeable about the effects and potential side effects of prescription stimulants.	❍	❍	❍	❍	❍
I hide my prescription stimulant medication so that no one will take it.	❍	❍	❍	❍	❍

Q20 How often have you used prescription stimulants that were not prescribed to you, such as Adderall, Ritalin or Concerta? (OR if you have a prescription for one of these medications, how often have you used the medication in a way that was different from how it was prescribed?)

	Please select all that apply:
at some point in your life	❍
within the last year	❍
during the fall 2014 semester	❍
in the last month	❍
never	❍

Q21 For the following, please rate how often these statements pertain to you

	Never (1)	2	3	4	Always (5)
I have used prescription stimulants for nonmedical purposes.	❍	❍	❍	❍	❍
I have snorted prescription stimulants.	❍	❍	❍	❍	❍
I have taken prescription stimulants to focus better in class.	❍	❍	❍	❍	❍
I have taken prescription stimulants to perform better on tests.	❍	❍	❍	❍	❍
I have taken prescription stimulants to help me socialize better.	❍	❍	❍	❍	❍
I have taken prescription stimulants to help me lose weight.	❍	❍	❍	❍	❍
I have taken prescription stimulants to perform better on schoolwork.	❍	❍	❍	❍	❍
I have taken prescription stimulants to feel energetic.	❍	❍	❍	❍	❍
I have taken prescription stimulants to feel better	❍	❍	❍	❍	❍

about myself					
I have taken prescription stimulants to "get high."	❍	❍	❍	❍	❍
I have tried someone else's prescription stimulants.	❍	❍	❍	❍	❍

Q18 Have you ever been formally diagnosed with ADHD or ADD?
❍ Yes
❍ No

Q17 Are you currently prescribed stimulants, for example Adderall, Ritalin, or Concerta, for a psychological or medical condition?
❍ Yes
❍ No

Q27 If you do not have ADHD/ADD and/or you don't have a prescription for stimulants, to what extent, either positively or negatively, do you believe prescription stimulants would affect your academic performance?
_____

Q28 Please choose the response that best reflects your experience with your academic work.

	Definitely cannot do it			Probably cannot		Maybe		Probably can			Definitely can do it
When you have trouble remembering complex definitions from a textbook, can you reword them so that you will recall them?	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
When you have tried unsuccessfully to study for an hour, can you set and attain an important study goal during your remaining time?	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
When you find your homework assignments vary greatly in length each day, can you adjust your time schedule to complete them?	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
When you notice that you are getting behind in your homework during the week, can you catch up during the	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍

next weekend?											
When another student asks you to study together for a course in which you are experiencing difficulty, can you be an effective study partner?	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
When you have missed several classes, can you make up the work within a week?	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
When problems with friends and peers conflict with school work, can you keep up with your assignments?	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
When a homework assignment, such as learning vocabulary words, is repetitive and uninteresting, can you make it into an exciting challenge?	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
When you feel moody or restless during	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍

studying, can you focus your attention well enough to finish your assigned work?											
When you are trying to understand a new topic, can you associate new concepts with old ones sufficiently well to remember them?	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
When you have time available between classes, can you motivate yourself to use it for studying?	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
When you find yourself getting increasingly behind in a new course, can you increase your study time sufficiently to catch up?	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
When you are angry about a course because of a teacher's demanding requirements, can you find a way to channel your	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍

anger to help you succeed?											
When you discover that your homework assignments for the semester are much longer than expected, can you change your other priorities to have enough time for studying?	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍

Q46 How likely is it that you will use prescription stimulants that are not prescribed to you, such as Adderall, Ritalin, or Concerta, in the next 6 months? (Or if you are prescribed one of these medications, how likely is it that you will use them in a way that they are not prescribed in the next 6 months?)

_____

Q10 As part of this study, did you participate in a discussion with other students and two facilitators about study drugs?

❍ YES

❍ NO

Q11 Please share your reactions regarding the group experience:

	strongly disagree	disagree	neither agree nor disagree	agree	strongly agree
the group facilitators presented information clearly	❍	❍	❍	❍	❍
the group facilitators responded to participants' ideas respectfully	❍	❍	❍	❍	❍
I felt comfortable disclosing personal or sensitive information in the group	❍	❍	❍	❍	❍
the information I learned in the group was interesting and/or thought-provoking	❍	❍	❍	❍	❍

Q12 We would like your feedback on how could the discussion group could be improved in future studies. Is there is additional information about study drugs you would have liked to learn about or discuss? Could the format of the group be changed in some way to make the group more productive or inviting? Any constructive feedback about the group is welcome.