Curbing Nonmedical Use of ADHD Medications On College Campuses: A Social Norms Based Approach

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December 20, 2018

Abstract

Using an established theoretical framework for diagnosing, measuring, and changing collective patterns of human behavior as well as existing empirical evidence, I propose a strategy for intervening on the widespread behavior that is the nonmedical use of prescription stimulant ADHD medications (e.g. Adderall®, Ritalin®, Vyvanse®, etc.) by undergraduate students at American universities. Specifically, I make the case that by endeavoring to uncover, measure, and then change the beliefs and expectations such students have surrounding prescription stimulant usage—especially that of their peers—it may be possible to curb illicit and injurious usage of these drugs on college campuses, with lasting effects.

Keywords: behavior change, social norms, nonmedical use of prescription stimulants, college students, Adderall, ADHD

Table of Contents

1. Introduction

The Diagnostic and Statistical Manual of Mental Disorders (DSM-5) defines Attention-Deficit/Hyperactivity Disorder (ADHD) as, "a persistent pattern of inattention and/or hyperactivity-impulsivity that interferes with [an individual's] functioning or development" (American Psychiatric Association, 2013). ADHD is commonly associated with persistence in symptoms such as difficulty "remaining focused during lectures, conversations, or lengthy reading," "managing sequential tasks," and "keeping materials and belongings in order," and thus has tremendous negative impacts on the day-to-day social, educational, and/or occupational affairs of affected individuals (ibid., 2013).

Cross-national meta-analysis of survey data suggests that on average, ADHD is present in about 5.29% of children ages seventeen and under (Polanczyk et al., 2007), and about 2.5% of adults, worldwide (Simon et al., 2009). For the purposes of this study though, I hone in my analysis of ADHD and the treatment thereof on college students between the ages of 18 and 22 (i.e. undergraduates) solely in the United States. In this specific sub-population, meta-analysis of empirical estimates puts ADHD prevalence between about 2 and 8% (DuPaul et al., 2009).[1]

In terms of treatment, the disorder is typically mediated via pharmacotherapy, psychosocial/behavioral therapy, or a combination of both (Geffen & Forester, 2018). For the purposes of this paper though I leave considerations of psychosocial/behavioral therapies aside, and focus largely on the treatment and mistreatment of ADHD with pharmaceutical drugs such as methylphenidates (e.g. Ritalin®; Concerta®) and amphetamines (e.g. Adderall®; Vyvanse®). This is because the problem I intend to address using social norm interventionism lies not with the psychosocial/behavioral therapy of ADHD, but in the pharmacotherapy thereof.

[1] It should be noted that these estimates are almost a decade old, and come from qualitative measures largely based on self-reported survey data, whereby prevalence is inferred from the rate at which college students reported having symptoms in line with clinical diagnosis of ADHD.

More specifically, the problem addressed herein has to do with the collective pattern of behavior that is the nonmedical use of prescription ADHD medications (e.g. Adderall, Ritalin, etc.) in undergraduate college populations in the United States, which for the sake of brevity I denote throughout this paper as "NMUPS" (i.e. nonmedical use of prescription stimulants).[1] In this specific population, anywhere between 5 and 35 percent of individuals who are not prescribed medication for ADHD report to having taken ADHD medication(s) within the past year, and these numbers are likely to be much higher if we consider lifetime instances of usage, and underreporting due to social desirability bias (Wilens et al., 2008).

This of course is a huge issue with tremendous legal, economic, policy, and perhaps most critically, medical implications. In terms of legality, stimulant drugs used to treat ADHD such as Adderall and Ritalin are classified by the United States government as Schedule II controlled substances meaning that they, (a) have a high potential for abuse, (b) have an accepted medical use, and (c) can lead to severe psychological/physical dependence if abused (see 21 U.S.C § 812). Accordingly, these medications may only be possessed if prescribed to an individual by a licensed medical practitioner, and invalid possession of these drugs is a crime punishable by up to one year in prison, a $1000 fine, or both, for first time offenders (see 21 U.S.C § 844).[2]

Medically speaking, drugs such as Adderall and Ritalin have been clinically

[1] My usage of NMUPS may differ from the literature in that I define it solely as the use of prescription stimulants, specifically ADHD medications (e.g. Adderall, Ritalin, Vyvanse, Concerta, etc.), by non-prescribed persons. I exclude from my considerations nonmedical use of other prescription stimulants (i.e. those not used in the treatment of ADHD) as well as the nonmedical use or misuse of such medications by those who hold prescriptions.

[2] I leave aside sanctions for the diversion of prescription ADHD medication to non-prescribed users because they are mostly irrelevant to the demand-side social norms intervention that I later propose. I focus my proposal on a demand-side intervention because I believe supply-side behavior to be less socially conditional than demand-side behavior. Essentially, I posit that the main driver of supply-side behavior is the monetary incentive; students sell their prescription medication mostly in an effort to make money. Thus, I believe buyers would be more responsive than sellers to a non-monetary behavioral intervention such as a social norm campaign. Furthermore, I posit that buyers are much more likely to give reliable data in a survey intended to truly diagnose and measure behavior because of the asymmetry in legal sanctions that buyers and sellers face in this domain. Essentially, buying may seem less illegal than selling because the sanctions are much less stringent. Thus, I expect that buyers would be more willing than sellers to provide accurate information.

demonstrated to effectively mediate symptoms of ADHD such as inattention, impulsivity, and fidgetiness (Lakhan & Kirchgessner, 2012). However, like all prescription drugs, medical use of these stimulants comes with a variety of side effects, including but not limited to: loss of appetite, insomnia, and irritability (Ahmann et al., 2001). Furthermore, nonmedical use of these drugs has been associated with more serious health issues including but not limited to, "psychosis, myocardial infarction, cardiomyopathy, and even sudden death" (Lakhan & Kirchgessner, 2012). One longitudinal study of emergency department visits involving prescription stimulants actually found there to be a strong correlation between NMUPS and hospitalization associated with NMUPS (Chen et al., 2016). This study found that between 2006 and 2011, the share of adult emergency room visits involving drugs such as Adderall increased from 0.34% to 0.87%, which amounts to a 156% increase over the 5 year period (ibid., 2016).

Despite the legal and health incentives against NMUPS, such is still a pervasive behavior, and the problem is especially acute in U.S. college populations. As mentioned above, a review of the literature suggests that between 5 and 35 percent of all non-prescribed college students in the United States have used some sort of ADHD medication in the last year, and these numbers are surely higher if we consider lifetime instances of usage (Wilens et al., 2008).[1]

In view of these facts, it can be said that the formal institutions—legal, political, and economic—of U.S. society have failed to prevent NMUPS, and are ill equipped to intervene on this behavior as well. Accordingly, what is to follow in this paper serves as a proposal for diagnosing, measuring, and then intervening on NMUPS in college populations, using informal institutions, social norms interventionism in particular. Specifically, I will make the case that by endeavoring to uncover, measure, and then change the beliefs and expectations of U.S. college

[1] These numbers are also likely to be higher today, ten years since Wilens et al. (2008) was published, as the overall prevalence of both medical and nonmedical prescription stimulant use has steadily trended upwards since at least as far out as 1996 when reliable data were first collected (Lakhan & Kirchgessner, 2012).

students surrounding prescription ADHD stimulant usage, we may be able to curb illicit, nonmedical usage of these drugs on college campuses, with lasting effects.

2. Behavioral Drivers: Beliefs & Expectations

2.1 Introduction

To intervene on the widespread behavior that is NMUPS by American college students via social norms interventionism we must first understand the drivers of said behavior. The following section will introduce the key components to an established theoretical framework, namely, Bicchieri (2016), which will allow us to gain such an understanding. In particular, this section will focus on the beliefs—both factual and personal normative—as well as the (social) expectations—both empirical and normative—that factor into students' decisions to engage in NMUPS. Using this framework and existing empirical evidence, I will show that both beliefs and social expectations factor into these decisions. Thus, it will ultimately be argued that widespread NMUPS by American college students is a socially conditional behavior that can therefore be improved upon via social norms based interventionism.

2.2 Factual Beliefs

First, let us consider the factual beliefs (FBs) involved with NMUPS. FBs are defined in Bicchieri (2016)'s theory of social norms as, "beliefs about states of affairs." Essentially, FBs are beliefs pertaining to how the world actually is, absent any normative or social considerations.

Accordingly, it is undoubtable that FBs are apart of non-prescribed college students' decisions to use ADHD medications. These beliefs we can reasonably guess most likely center on things including: (1) one's own psycho-behavioral limitations (i.e. self-diagnosis of ADHD), (2) the efficacy of medications such as Adderall or Ritalin in ameliorating things like inattention, impulsivity, et cetera, and (3) the relative safety of such drugs and their use.

In fact, Rabiner et al., (2010) supplies explicit empirical evidence showing that non-prescribed college students that use ADHD medications do in fact hold the first aforementioned FB. This study finds that self-reported attention difficulties, "contribute to the onset of nonmedical ADHD medication use," where higher scores "on a 5-point scale ranging from *strongly disagree* to *strongly agree*," for statements such as, "it is difficult for me to concentrate on my academic work," can be used to reliably predict NMUPS in a population of college students (Rabiner et al., 2010). A number of other studies also demonstrate that perceived limitation in one's own abilities to concentrate, be attentive, fulfill academic obligations, and the like, is a key motivator of NMUPS (e.g. Rabiner et al., 2009; Teter et al., 2005).[1]

Along similar lines, there is also explicit empirical evidence demonstrating that these individuals largely hold the second aforementioned FB. For example, Bavarian et al. (2013) shows that college students who believed that taking ADHD medications would improve their academic success were more likely to use such medications.

As to the third FB above, intuitively we'd expect that nonmedical users of ADHD medications view NMUPS (at least in moderation) as relatively safe. Evidence to support this idea actually already exists as well. For example, a qualitative interview of 175 college students on NMUPS found that not one person "sought out information from health professionals, medical or pharmaceutical reference guides, or even Internet sites before taking their first dose" (DeSantis et al., 2008). Furthermore, only 2% thought that NMUPS was "very dangerous," while a whole 81% believed such to be either "not dangerous at all," or just, "slightly dangerous" (ibid., 2008). Thus, both implicitly and explicitly, these nonmedical users believed ADHD medications to be safe for ingestion.

[1] See Wilens et al. (2008) for a meta-analytic review of literature on the characteristic motivations for prescription stimulant misuse.

2.3 Personal Normative Beliefs

Bicchieri (2016)'s theory of social norms defines personal normative beliefs (PNBs) as, "beliefs that express a person's positive or negative evaluation of particular behaviors." These are subjective beliefs held by individuals regarding *what should be* (as opposed to FBs that evaluate *what is*), and thus aren't necessarily empirically testable. It is also possible to subcategorize these beliefs into "prudential" and "moral" PNBs. The first, prudential PNBs, are beliefs about *what should be* absent any moral/ethical considerations (Bicchieri, 2015). Crucially, these beliefs are contingent upon one's perception of a need that one has. For example, if someone is cold they may believe that a hot cup of tea will warm them up and thus drink tea.

On the other hand, moral PNBs are beliefs about *what should be* in view of some moral/ethical consideration. In this case, the crucial point is that moral PNBs rely upon a perception one has of what is morally right and wrong. For example, if one thinks cussing is morally right (wrong) they may choose to cuss (refrain from cussing) in their speech.

Existing data on the explicit involvement of prudential PNBs in NMUPS by college students is wanting. Nowhere does the literature offer existing data on non-prescribed college student's explicit evaluation of the need-fulfilling properties of ADHD drugs. For example, no existing survey measures students' evaluations of statements such as, "a student should take ADHD medication if it helps them to study, even if they are not prescribed such medication."

However, in line with the aforementioned FBs involved, in the context of this behavior it is all but certain that prudential PNBs play a role. The literature demonstrates unequivocally that in this college-aged population, NMUPS is predominantly motivated by academic concerns such as trouble focusing, concentrating, studying for long periods of time, et cetera (Wilens et al. 2008). Given this, we can safely conclude that the belief that such medications can fulfill one's

need to concentrate better, focus more, study longer, et cetera is a strong driver of NMUPS.

On the other hand, measures of the involvement of moral PNBs in motivating this behavior do exist. In DeSantis & Hane (2010), 175 college students responding to a survey on this topic were asked to justify why they engaged in NMUPS. The most dominant justification surrounded an "I'm-doing-it-for-the-right-reasons" argument, which was basically the assertion that, "since the stimulants are being taken to promote a positive outcome, i.e., to get better grades, and not negative outcomes, i.e., getting high, then their use is morally justifiable" (DeSantis & Hane, 2010). Furthermore, Judson & Langdon (2009) found that higher agreeability with the statement, "it is ethical for students without diagnosed ADHD/ADD to use stimulant medication to concentrate," strongly correlated with self-reported NMUPS.

2.4 Empirical Expectations

As defined by Bicchieri (2016)'s social norms framework, empirical expectations (EEs) are, "beliefs about how other people are going to act or react in certain situations." Thus, EEs are social expectations one has regarding the future behavior of others, based on past observation(s).

In the context of the behavior considered herein, there is great reason to suspect that EEs factor into non-prescribed college students' decisions to use ADHD medications. For one, college is a highly competitive place where academics (e.g. curved grades), on-campus opportunities (e.g. course enrolments) and post-graduate opportunities (e.g. job offers) alike are often viewed as zero-sum games. This environment leads many students to evaluate their own psycho-behavioral abilities relative to their peers, and when such an evaluation is unfavorable (e.g. one thinks that their peer's can concentrate/focus longer than they can), college students are demonstrably more likely to engage in NMUPS (Rabiner et al., 2010).

Similarly, the competitive culture of the college environment can, and in fact does, lead

many students to view prescription stimulants such as Adderall and Ritalin as "smart pills"—study aids that help one to gain a competitive edge over one's peers, or to level oneself with peers who currently hold a competitive edge (Lakhan & Kirchgessner, 2012; Rabiner et al., 2009). In fact, one qualitative study of the beliefs involved with college students' NMUPS ultimately concludes that, despite NMUPS being a voluntary act, students largely feel as though they have "no other choice but to engage in [it]… especially in a competitive academic environment where their peers might be engaging in [it]" (Forlini & Racine, 2009).

With cultural aspects and considerations of competitiveness aside, at a more fundamental level we can simply uncover empirical expectations by looking at the beliefs individuals have about others' behavior. In the context of NMUPS, this means we could look at whether or not, and to what degree, college students think their peers engage in NMUPS. One study of nearly 4000 randomly selected undergraduates did just that, ultimately finding that more than 70% of students overestimated the NMUPS of their peers (McCabe, 2008). This suggests that not only do college students generally hold the empirical expectation that their peers engage in NMUPS, but that these expectations are a ways away from the reality of the situation.

2.5 Normative Expectations

Bicchieri (2016)'s framework defines normative expectations (NEs) as, "beliefs about other people's personal normative beliefs." Thus, NEs are beliefs about beliefs. For example, if I believe that most people (who are relevant to me) believe that I should shower at least once per day, then I have a normative expectation of showering at least once daily.

In the context of NMUPS on college campuses, it is not hard to imagine that NEs are at play. For many students who engage in NMUPS, the normative expectation of getting good grades (i.e. a belief that other people believe I should get good grades) may be important.

Though no empirical evidence that I can find exists to support this idea, I don't think it is too outlandish to say that most students have felt at some point the pressure that originates in the expectations of one's parents or teachers to succeed academically. With this, perhaps many individuals are driven to using ADHD medications in an effort to meet these expectations.

Similarly, a normative expectation that it is okay to engage in NMUPS (i.e. a belief that other people think that it is okay) is by no means a stretch of the imagination. Repeatedly, it has been found that college students hold such an expectation in the context of alcohol and other drug (e.g. marijuana) usage, where such an expectation—perceiving that other people (e.g. friends, parents, classmates, etc.) approve of substance use—is actually predictive of alcohol and other drug using behaviors (Neighbors et al., 2007; LaBrie et al., 2010).

In fact, in the context of NMUPS on college campuses a couple of studies have already looked at the role of this specific normative expectation. The first, Judson & Langdon (2009), found that higher agreeability with the statement, "my friends believe it is ok for students without ADHD to use stimulant meds" correlated with NMUPS. Similarly, Silvestri & Correia (2016) found that individuals who believed that their close friends, parents, and/or other school peers approved of NMUPS correlated positively with actual use of such drugs.

2.6 Social Conditionality

Given the preponderance of empirical evidence I assert that for most nonmedical users of ADHD medications in U.S. undergraduate college populations, such behavior is socially conditional upon both empirical expectations and normative expectations. This is not to say that FBs and PNBs don't matter, just that the characteristic motivational profile for students partaking in this collective pattern of behavior includes more than FBs and/or PNBs by themselves.

3. Behavioral Diagnosis

3.1 Diagnostic Framework

Bicchieri (2016)'s framework provides four classifications of human behavior based on which of the aforementioned behavioral drivers (i.e. FBs, prudential PNBs, moral PNBs, EEs, and NEs) are at play for a given collective pattern of behavior. These include: customs, moral norms, descriptive norms, and social norms.

A custom is defined as a rule of behavior such that people prefer to follow it regardless of what others do or think, simply because doing so meets one or more personal needs (Bicchieri, 2015). Thus, customs are largely contingent upon prudential PNBs, and have zero social conditionality.

The second, a moral norm, is defined as a rule of behavior such that people prefer to follow it regardless of what others do or think, simply because they think it is the right (i.e. moral) thing to do (ibid., 2015). Thus, moral norms are largely contingent upon moral PNBs, and like customs, moral norms have zero social conditionality.

Third is a descriptive norm, "a pattern of behavior such that individuals prefer to conform to it on condition that they believe that most people in their reference network conform to it," (Bicchieri, 2016). Thus, descriptive norms are largely contingent upon EEs, and therefore have some element of social conditionality, though only on what others do, not on what others believe.

Lastly, a social norm is defined within Bicchieri (2016)'s framework as,

> "A rule of behavior such that individuals prefer to conform to it on condition that they believe that (a) most people in their reference network conform to it (empirical expectation), and (b) that most people in their reference network believe they ought to conform to it (normative expectation),"

where one's reference network is "the range of people who [one] care's about when making particular decisions."

3.2 Exceptions

Of course, different individuals may have different motivations for engaging in NMUPS. It is not unreasonable to think that for some students NMUPS constitutes a custom, where drugs such as Adderall or Ritalin are only used in order to fulfill a need one feels that they have, such as the need to focus/concentrate better in one's studies.

For others, it could be the case that EEs factor in but not NEs; where one's decision to engage in NMUPS is only made because one thinks others relevant to them also engage in it. For these individuals, simply thinking that other students engage in the behavior is enough for them to adopt it, regardless of whether or not that's due to competition related pressures.

3.3 Diagnosis

Given these exceptions, Bicchieri (2016)'s diagnostic framework, as well as my hypothesis about the conditionality of preference, I posit that on the whole, the collective pattern of behavior that is nonmedical use of ADHD medications by U.S. undergraduate college students is a social norm.

4. Behavioral Measurement

4.1 Introduction

Despite the strong theoretical and antecedent empirical evidence pointing towards the workings of a social norm in the case of NMUPS among American college undergraduates, new measurements calibrated specifically by Bicchieri (2016)'s framework should be taken to firmly establish whether the collective pattern of behavior constitutes a social norm. In particular, this means that we need to measure the EEs and NEs of students with respect to NMUPS. Moreover, we need to affirm the social conditionality of students' actual preferences for engaging (or not engaging) in NMUPS.

According to Bicchieri (2016)'s framework, there are three general ways of going about this: (1) direct observation of the behavior, (2) observation of behavior in lab experimental games, and (3) self-reported questionnaires. Each comes with their strengths and weaknesses, though for the purpose of measuring NMUPS in college undergraduate populations, I submit that the latter, the questionnaire, is the measurement mechanism of choice.

The problem with direct observation of NMUPS is simple: it is impractical, and in fact, highly difficult to observe a behavior that is illegal and privately committed. For similar reasons, I also stay away from proposing the use of experimental games, at least in the initial uncovering of whether or not a social norm is at play. It may be difficult in this hypothetical and sterile setting to infer any meaningful information as to what beliefs actors hold, especially when the dynamics of one's reference network must be exogenously assigned or artificially induced. However, these games may be useful after uncovering that a social norm is in fact at play to test the parameters for norm obedience (e.g. rewards, punishments, etc.) (Bicchieri, 2016).

Using a questionnaire though, we can systematically uncover all of the relevant beliefs that were mentioned in Section 2. A questionnaire will also allow us to pose direct hypothetical scenarios to students asking them to imagine a world with different NMUPS norms and then to assess how likely they would be to engage in NMUPS in such a world, which will again help us to determine if the socially conditional beliefs in fact translate to socially conditional behaviors.[1]

Along with giving their answers to the questions listed, respondents would ideally indicate whether or not they engage in NMUPS, so that comparisons could be drawn between students who engage in NMUPS and those who do not, with respect to all of the given beliefs. This would also allow us to directly compare peoples EEs about their peers' engagement in NMUPS with the actual prevalence rate, where again the former is predicted to be much greater

[1] The answers to questions such as 10a and 10b in the questionnaire below may help us to uncover this.

than the latter. We would also ideally incentivize these responses so as to elicit genuine answers, and uncover the reality of the situation. This is especially true for questions 9a and 9b below.

Again, we care little about measuring moral PNBs, as the existence of a moral norm for NMUPS is highly unlikely. I also leave aside deeper consideration of FBs because while they are interesting to understand, the questionnaire is predominantly meant to elicit students' empirical and normative expectations, so as to confirm, or conversely rule out the conditionality of behavior and ultimately the existence of a social norm.

4.2 Potential Questionnaire

Evaluate the following statements using the following 5-point scale:				
1	**2**	**3**	**4**	**5**
Strongly Disagree	**Somewhat Disagree**	**Neither Agree nor Disagree**	**Somewhat Agree**	**Strongly Agree**

Potential survey question:	**Relevant belief:**	**Higher agreeability indicates:**
1a. It is safe for college undergraduates to use ADHD medications (e.g. Adderall) without a prescription.	FB	Greater misperception of NMUPS dangers.
1b. It is safe for college undergraduates to use ADHD medications (e.g. Adderall) without being diagnosed as ADHD.	FB	Greater misperception of NMUPS dangers.
2a. It is okay for college undergraduates to use ADHD medications (e.g. Adderall) without a prescription for school-related purposes (e.g. studying).	PNB	More positive evaluation of NMUPS.
2b. It is okay for college undergraduates to use ADHD medications (e.g. Adderall) without a prescription for non-school-related purposes (e.g. partying).	PNB	More positive evaluation of NMUPS.
3a. (Name of university) undergraduates who are not prescribed ADHD medications (e.g. Adderall) use ADHD medications to get an edge over their fellow students.	EE	Greater conditionality upon others' actions.
3b. (Name of university) undergraduates who are not diagnosed with ADHD use ADHD medications (e.g. Adderall) to get an edge over their fellow students.	EE	Greater conditionality upon others' actions.
4a. My friends believe that it is okay for college undergraduates without ADHD to use ADHD medications (e.g. Adderall) for school-related purposes (e.g. studying).	NE	Greater conditionality upon others' thoughts/beliefs.
4b. My friends believe that it is okay for college undergraduates without ADHD to use ADHD medications (e.g. Adderall) for non-school-related purposes (e.g. partying).	NE	Greater conditionality upon others' thoughts/beliefs.
5a. Other (name of university) undergraduates believe that it is okay for college undergraduates without ADHD to use ADHD medications (e.g. Adderall) for school-related purposes (e.g. studying).	NE	Greater conditionality upon others' thoughts/beliefs.
5b. Other (name of university) undergraduates believe that it is okay for college undergraduates without ADHD to use ADHD medications (e.g. Adderall) for non-school-related purposes (e.g. partying).	NE	Greater conditionality upon others' thoughts/beliefs.
6a. My parents would approve of me using ADHD medications (e.g. Adderall) for school-related purposes (e.g. studying).	NE	Greater conditionality upon others' thoughts/beliefs.

6b. My parents would approve of me using ADHD medications (e.g. Adderall) for non-school-related purposes (e.g. partying).	NE	Greater conditionality upon others' thoughts/beliefs.

Potential Survey Question:	**Relevant Belief:**	**Answer indicates:**
7. For which of the following reasons is it okay for non-prescribed college undergraduates to use ADHD medications (e.g. Adderall)? Select all that apply: • To study • To party • To stay awake • To lose weight • To get high • ... • Other: _____	PNB	The reasons for which one evaluates NMUPS positively or negatively.
8. It is okay for college undergraduates to use ADHD medications without a prescription (select one): • Never • Once a day • Once a week • Once a month • Only on special occasions (e.g. during finals)	PNB	The rate/amount of NMUPS at which one evaluates NMUPS positively or negatively.
9a. Please estimate the percentage of (name of university) undergraduate students who, in the past 12 months, used stimulant medication (e.g. Adderall) that was not prescribed to them. If your guess is correct, you will earn a $X bonus.	EE	Beliefs about prevalence of NMUPS (in general).
9b. Please estimate the percentage of (name of university) undergraduate students who will use stimulant medication (e.g. Adderall) that is not prescribed to them during the upcoming finals (midterm) examination period. If your guess is correct, you will earn a $X bonus.	EE	Beliefs about prevalence of NMUPS (during special occasions)
10a. Imagine that almost all (name of university) students used ADHD medications (e.g. Adderall) without a prescription, and that almost none said it was wrong to use Adderall without a prescription. Would you be likely to use Adderall, unlikely to use Adderall, or equally likely as you are now?	EE & NE	Whether conditionality of beliefs translates to conditionality of behavior.
10b. Imagine that almost no (name of university) students used ADHD medications (e.g. Adderall) without a prescription, and that almost all (name of university students) said it was wrong to use Adderall without a prescription. Would you be likely to use Adderall, unlikely to use Adderall, or equally likely as you are now?	EE & NE	Whether conditionality of beliefs translates to conditionality of behavior.

4.3 Comments

The proposed questionnaire is not meant to be exhaustive, nor is it finalized; some questions we would omit for the sake of brevity, while others not listed we may want to consider including. There is also the matter of the wording and framing of these questions. For example do we want to refer to the behavior of "college undergraduates," "college students," or just

"students," when posing these questions, and do we want to refer to NMUPS as "non-medical use of prescription stimulants," "using without a prescription," or "using without being diagnosed." These issues, while semantic, are important because they may lead to different measurements. Thus, the questionnaire serves as a general template of what we seek answers to.[1]

5. Behavioral Intervention

5.1 Introduction

According to Bicchieri (2016)'s framework, to be successful at engendering norm change, an intervention must, above all else, supplant an existing norm with a new one. To do this, a given intervention can focus on changing people's FBs, PNBs, EEs, or NEs, or a combination of the four. In the following section, I make the argument that given the truth of my aforementioned hypothesis, which says that NMUPS is a social norm, then it is entirely possible to change this malignant norm by intervening on students' FBs, EEs, and NEs.[2]

5.2 Factual Belief Intervention

In endeavoring to change solely FBs, an intervention generally disseminates true factual information that is currently not widely known/believed by the population (Bicchieri, 2016). This essentially constitutes an information campaign meant to make people aware of some fact about the world, or to change individuals' mistaken beliefs surrounding some fact about the world.

Given the information in Section 2.2 on FBs, in endeavoring to change NMUPS it may be worthwhile to include an informational campaign that underscores the dangers of NMUPS. It

[1] Perhaps the questions in their current form could be used in a pilot survey meant to uncover whether or not different measures do in fact result from wording/framing nuances.

[2] Note that I leave aside PNBs, as these should not be the focus of a social norm intervention. In accordance with Bicchieri (2016)'s framework, if you are able to successfully change EEs and NEs in the case of a social norm, then PNBs, while possibly slow to follow, will eventually fall in line. Essentially, people may be reluctant to change their own views on the behavior, yet commit to the new behavior because their preference for doing it is conditional on other people's actions/beliefs. Then, as the new behavior becomes the norm, naturally they will become less and less opposed to it until eventually their PNBs surrounding the behavior have changed.

also may be worthwhile to disseminate a message that essentially says that inattention difficulties, trouble studying for hours on end, and the like, do not equal ADHD. To the first point, the existing empirical evidence shows that despite NMUPS being a dangerous behavior, people do not widely know/think of it as such, and questions 1a and 1b from the questionnaire presented in Section 4.2 should allow for confirmation of this in a population of interest (DeSantis et al., 2008; Judson & Langdon, 2009). And to the second point, the clinical definition for ADHD diagnosis demonstrates that, despite inattentiveness, difficulty concentrating, and the like being linked with ADHD, having such symptoms does not necessarily mean one has the disorder. A whole host of other considerations are taken into account in clinical diagnosis, not the least that ADHD symptoms manifest themselves during childhood before the age of twelve, long before one would detect them in college (American Psychiatric Association, 2013).

Disseminating this information may be helpful in initiating belief change; it may start to get students to think more seriously about their own cognitive abilities and about the safety of ADHD medications. However, it should be mentioned that a norm-based intervention on NMUPS must take a more holistic approach to be effective. Again, assuming NMUPS is in fact a social norm, without addressing the social conditionality of people's engagement in it, any intervention will come up short in actually changing behavior (Bicchieri, 2016).

What is more, informational campaigns are notorious for backfiring, especially in a population of headstrong young adults such as college students (Schultz et al., 2007). For one, if this information in any way conveys that NMUPS is a more common practice than an individual originally thought, it may signal to that individual that they are apart of the minority, and thus trigger them to engage in (more) NMUPS (ibid., 2007). Similarly, if the information conveyed—and the authority of whoever conveys the information—are viewed as illegitimate, this may

trigger rebellion and induce greater NMUPS (Stibe & Cugelman, 2016). So, this component of the intervention is meant only to accompany the heavy lifting done in the intervention on individuals' EEs and NEs.

5.3 Empirical Expectation Intervention

In endeavoring to change solely EEs an intervention generally tries to convey the idea that the behavior is not as common as people think; that people are generally overestimating their peers' engagement in the behavior (Bicchieri, 2016). Using questions like 3a/3b and 9a/9b from the questionnaire in Section 4.2 and cross-referencing with the aggregated prevalence data, at least in theory, should demonstrate that overestimation of NMUPS prevalence is the case in any given college undergraduate population.

Having this data would allow for an informational campaign that serves to reshape peoples EEs, showing that in fact their beliefs are wrong—not everyone is engaging in NMUPS, and you are not missing out, failing to fit in, or losing an edge by not engaging in NMUPS. Furthermore, if the data is collected properly, a large sample size is utilized, and the message is conveyed by the right people (perhaps not a school's administration if they are held in low esteem) then I posit that college students would generally be receptive to the information being that it originates from a (seemingly) legitimate process.

5.4 Normative Expectation Intervention

In endeavoring to change solely NEs, an intervention generally tries to convey the idea that the behavior is not as highly regarded by one's reference network (e.g. friends, parents, classmates, etc.) as one thinks; that people are generally overestimating their friends, parents, and classmates' approval of the behavior (Bicchieri, 2016). By collecting data on questions such as 4a/4b, 5a/5b, and 6a/6b on the questionnaire in Section 4.2, we would be able to uncover just

how approving people think others are of NMUPS. This data could then be compared to respondents' answers to questions like 2a/2b, which would show the magnitude of this overestimation. If my hypotheses are correct and NMUPS in college populations truly is socially conditional upon others' thoughts/beliefs, then such an overestimation should be quite large.

Equipped with this information, we can then begin to reshape people's NEs and essentially convey the idea that, "while you may think your friends/parents/classmates approve of taking Adderall for (non-)school-related purposes, they (e.g. 85%) don't." As in the case of EEs, if this data is collected scientifically, if the sample size is large enough that off the top of students' heads they view the study as legitimate, and if the information comes from a trusted source, then I believe that most college students would be receptive to the information. At the very least, the gears in their heads would start turning as they reflect upon their own past, and potential future, non-medical use of prescription stimulants.

6. Intervention Program Proposal

Putting it all together, here I propose one particular behavioral change campaign that could be effective at curbing NMUPS on college campuses. First of all, for a campaign to be successful, it must start with changing students' EEs (Bicchieri, 2016); if students don't first understand that they are currently overestimating their peers' engagement in NMUPS there is little that can be done to change their NEs, PNBs, and FBs alike, and ultimately their behavior.

To elicit this shift in EEs, I propose a multifaceted on-campus social marketing campaign adapted from those that have largely proven to be successful at ameliorating detrimental alcohol consumption behaviors by college students (e.g. DeJong et al., 2006). More specifically, I would like to exploit existing, student-run social marketing communications already employed on campuses, one being that which is commonly referred to as the "Stall Street Journal" (SSJ).

Essentially, the SSJ is an information bulletin posted weekly or monthly in bathroom stalls where students are more or less a "captive audience." In changing the norms of alcohol consumption, messaging via SSJs has already proved to be highly successful (Su et al., 2018).

Regardless of it's potential for success, the key here is not the SSJ itself. Rather, it is the fact that the information originates bottom-up from students and student-run organizations rather than top-down from some campus administrative organization such as an "Office of Alcohol and Other Drug Prevention." Again, top-down dissemination may have little impact, or in fact an adverse effect, if the information—and the organization disseminating the information—are viewed as paternalistic or illegitimate. One study of a campus social norm intervention on students' alcohol consumption found that nearly three quarters of students did not believe the empirical information presented to them (Polonec et al., 2009). Thus, we need to disseminate new norm information, but who the messengers are may be what really matters.

So who could these messengers be? As previously mentioned, student leaders and respected student organizations will be extremely helpful for seeing the dissemination of the new empirical information through. While exactly who these students and organizations are will vary from campus to campus, one constant are the residential dorm advisors ("RAs"). In fact, Perkins (2002) identifies RAs as potent normative influencers/messengers being that they wear the hats of both student and administrator, working within campus dormitory communities largely as behavior change agents.

After establishing new EEs, NEs and PNBs will surely follow. Again, highly regarded and well known student organizations and student leaders can and should be utilized to see this change through. By starting within smaller groups of students such as athletes, Greek-life members, or on specific halls in specific dorms as in the case of using RAs as behavior change

agents, re-norming and collective abandonment of NMUPS are much more likely to arise (Bicchieri, 2016). This will allow for collaborative discussion surrounding the norms of NMUPS in a comfortable setting where students can mobilize their core values and shared reasons to change—a strong one being the evidently high negative externalities on student mental health (Teter et al., 2010). It will also allow for higher awareness of the fact that (the majority) of others indeed want the norm to change and are working to in fact see that happen.

Furthermore, it will help to localize sanctioning systems. Again, having punishment for engaging in NMUPS come from the top-down has not worked too well in the past. So it is important that these sanctions are generated endogenously within these small groups where ideally it would become socially unacceptable and uncool to engage in NMUPS, much like how cigarette smoking is now viewed in America (Alamar & Glantz, 2006). Moreover, encouraging those actually affected by ADHD to sanction non-medical users may be a useful strategy, being that they actually have the disorder and don't just view prescription stimulants as "smart pills."

All in all, I propose here a multifaceted behavioral change campaign that begins with the widespread dissemination of empirical information regarding the actual prevalence of NMUPS. This information should originate from student leaders such as RAs and student-run organizations such as the popular social marketing bulletin known as the "Stall Street Journal." As empirical expectations begin to shift, it will then be helpful to introduce a more localized and deliberative process within student sub-groups (e.g. athletics, Greek life, etc.) that serves to mobilize students' shared reasons for collectively abandoning the toxic NMUPS norm that is undoubtedly contributing to the student mental health and prescription drug abuse crises on American college campuses.

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