

**THE EFFECTS OF COUNTERFACTUAL THINKING
ON ATTITUDES AND INTENTIONS TOWARD ADHD MEDICATION
USE**

An Undergraduate Research Scholars Thesis

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ABSTRACT

The Effects of Counterfactual Thinking on Attitudes and Intentions Toward ADHD Medication Use. (May 2014)

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ADHD medication, known by many students as the “study drug,” has recently increased in popularity. Students and athletes take these medications to increase alertness and concentration, but these individuals may not realize the consequences of taking ADHD medication. More research is needed to determine effective ways to dissuade students from using ADHD medication inappropriately. One possible means of influencing attitudes toward ADHD medication use may be counterfactual thinking. Counterfactual thoughts are mental representations of alternatives to past occurrences (Roese, 1997; Smallman & Roese, 2009). The current study investigates how generating counterfactuals influences behavioral intentions and attitudes towards ADHD medications. In this study, participants first read a scenario in which they imagined themselves taking a non-prescribed ADHD medication as a study aid, which elicited either a positive or a negative outcome. Afterward, some participants were asked to imagine how the event might have turned out differently and to list counterfactual thoughts. Finally, all participants completed self-report measures of attitudes, subjective norms, perceived behavioral control, and behavioral intentions related to ADHD medication use. The results indicate that, regardless of whether the scenario included a positive or negative outcome, generating counterfactual statements led to more positive attitudes, subjective norms, and intentions towards future ADHD medication use. In addition, in the negative scenario, positive attitudes were correlated with the use of third person pro-

nouns in their counterfactual statements while in the positive scenario, positive attitudes were correlated with the use of first person pronouns in their counterfactual statements. These results suggest that generating counterfactual thoughts related to ADHD medication use leads to more positive opinions about it, but perceived closeness may also be an important factor to consider.

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CHAPTER I

INTRODUCTION

ADHD medication use by college students has increased over the past several years (Smith & Farah, 2011) because students believe it will help them study, increase their alertness, or cause them to “get high” (Teter, McCabe, Cranford, Boyd, & Guthrie, 2005). One study of university students showed that the use of ADHD medication without a prescription peaked at 25% of the student body population at a single university, with 10% of colleges having a pervasiveness of up to 35% (McCabe, Knight, Teter, & Wechsler, 2005). This study shows that these medications are relatively easy to get without a prescription and suggests that a substantial proportion of students are potentially risking their health in exchange for superior performance in school. The side effects associated with the use of ADHD medication include headaches, stomachaches, irritability, sadness, reduced appetite, sleep difficulty, dizziness, dependence, and difficulty getting along with others (Rabiner et al., 2009). When students use ADHD medication without the supervision of a medical professional, these side effects could have much greater consequences. Of particular concern is that many students are not even aware of these side effects and thus may not be adequately prepared to deal effectively with them when they do occur.

One possible way to influence students’ behavior regarding ADHD medication use is through the Theory of Planned Behavior (TPB; Ajzen, 1991). According to the TPB, behaviors are predicted by intentions; the stronger an intention to perform a behavior, the more likely a person will perform the behavior. In turn, intentions are predicted by behavior-relevant attitudes, subjective norms (i.e. the perception of the behavior which is influenced by close others), and perceived

behavioral control (the amount of control one feels over engaging in the behavior). Therefore, if one can change behavior-relevant attitudes, subjective norms, and perceived behavioral control, they can change the behavioral intention and possibly the behavior itself.

Previous research has shown that the TPB can successfully influence substance use behaviors. For example, Zetser and Ajzen (2014) found that the TPB predicted behavioral intentions towards drug and alcohol use, which subsequently predicted the completion of treatment for drug and alcohol addiction. Studies have also demonstrated that the TPB is quite effective in predicting behavioral intentions, perceived behavioral control, and attitudes regarding the use of alcohol and tobacco in students (McMillan & Conner, 2003). In terms of heavy drinking in college students, studies have found that the TPB is a strong predictor of the decision to consume large amounts of alcohol (Northcote, 2011). Similarly, the TPB has also been applied to the use of illicit substances in young people. In a study examining the efficacy of the TPB in predicting marijuana use in young mothers, results found that the TPB was a very strong model for predicting behavioral intentions, citing that attitudes of marijuana use influenced intentions which in turn influenced substance use (Morrison et al., 2010). The TPB has also effectively predicted the intentions and use of other substances such as amphetamine, ecstasy, and LSD (McMillan & Conner, 2003). While the TPB is an excellent model for understanding how attitudes, subjective norms, perceived behavioral control, and intentions influence behavior, it is important to consider that it may also be further developed by additional factors. One possible way to change behavior-relevant attitudes, subjective norms, perceived behavioral control, and subsequent intentions may be through counterfactual thinking, which has been shown to trigger changes in both behav-

ioral intentions (Roese, 1994; Smallman, 2013; Smallman & Roese, 2009) as well as future behaviors (Morris & Moore, 2000; Nasco & Marsh, 1999; Page & Colby, 2003).

Counterfactual thoughts are mental representations of alternatives to past occurrences. Counterfactual statements generally take the form of ‘if-then’ conditional propositions in which the ‘if’ specifies a personal action and the ‘then’ specifies a goal (Roese, 1997; Smallman & Roese, 2009). Counterfactual statements can be either upward or downward in direction. An upward counterfactual thought describes an alternative that is better than reality while a downward counterfactual thought describes an alternative that is worse than reality (Epstude & Roese, 2008; Page & Colby, 2003). For example, in the current study, an upward counterfactual could be “If I hadn’t taken the medication, I would not have ended up in the hospital.” Similarly, a downward counterfactual could be “If I hadn’t taken the medication, I wouldn’t have done as well on my test.” Counterfactual statements can also be either additive or subtractive in structure. An additive statement adds something to the situation while a subtractive counterfactual takes something away. For example, an additive counterfactual could be “If I had known about the side effects of the medication, I would not have taken it” because the participant adds their knowledge to the situation. A subtractive counterfactual could be “If I didn’t take the medication, I would not have been able to stay up and study for my test” because the participant is taking away the action of taking the medication. Thinking about how past outcomes could have been different may influence plans for future behavior and can thus lead to changes in behavioral intentions (Roese, 1994; Smallman, 2013; Smallman & Roese, 2009) and future behaviors (Morris & Moore, 2000; Nasco & Marsh, 1999; Page & Colby, 2003; Roese, 1994).

Prior research has explored which types of counterfactual thoughts are most likely to lead to changes in both behavioral intentions and behaviors. Known as functional counterfactual thinking (Epstude & Roese, 2008), research suggests that when participants imagine ways in which a situation could have been better (e.g., generate upward counterfactual thoughts), they will learn from their mistakes and perform better in the future, especially when they are responsible for the change (Morris & Moore, 2000). Counterfactual thinking has been shown to influence both behavioral intentions and behaviors related to smoking, flying simulations, and studying. For example, in a study that focused on generating counterfactual thoughts in regards to an adverse smoking scenario, Page and Colby (2003) found that elaborating on a scenario, such as the one regarding smoking, is one factor that motivates smokers to quit smoking. This is relevant to the proposed research project because it discusses a behavior that may have harmful health effects, and examines whether showing these effects to participants will affect whether or not they wish to change their actions. Additionally, Morris and Moore (2000) used counterfactual thinking to observe effects on learning by studying how aviation pilots learned to avoid accidents by simulating almost having a collision. They found that participants were more likely to gather skills for improvement in the future when they responded to the simulation with self-focused, upward counterfactuals. Also, counterfactual thinking has been applied in the university setting, specifically with exams. In a study that evaluated exam performance in relation to counterfactual thinking, Nasco and Marsh (1999) found that generating upward counterfactual thoughts led students to perform better on a subsequent exam. Accordingly, with prior research showing counterfactual thinking can influence both relevant behavioral intentions and behavior, the current research investigates whether counterfactuals influence attitudes and intentions toward the use of ADHD medication.

The current study was designed to examine the effects of counterfactual thinking on attitudes and intentions related to the use of ADHD medication. That is, the goal was to test whether generating counterfactual thoughts in response to a positive or negative ADHD medication scenario would influence attitudes about and intentions towards the non-prescribed use of these medications. In this study, participants were asked to read a scenario about the use of non-prescribed ADHD medication that lead to either an improvement in a class grade (positive outcome) or a drop in class grade (negative outcome). Next, half of the participants were asked to generate counterfactuals about the event. Finally, all participants answered questions about attitudes, subjective norms, perceived behavioral control, and behavioral intentions. For the negative scenario, the prediction is that counterfactual thinking will decrease students' attitudes, subjective norms, and intentions towards the non-prescribed use of ADHD medications.

CHAPTER II

METHODS

Participants

Undergraduate students ($N = 176$) participated for partial course credit in their psychology course. Participants ranged in age from 18 to 24 years ($M = 18.6$, $SD = .88$), 54% were women, and most were Caucasian (87.5%; 15.9% Hispanic). This study used a 2 x 2 between-subjects design to manipulate scenario (scenario outcome: positive vs. negative) and counterfactual thought (thought listing: counterfactual vs. no counterfactual).

Design

On arrival, the experimenter greeted participants and directed them towards individual computer terminals. Participants were told that they would be working on a reading comprehension task, in which they would read a scenario and answer some questions related to the scenario. Participants were instructed to read either a positive or negative scenario in which they imagined themselves taking their roommate's prescribed ADHD medication. In the positive scenario the participant was told that the medication allowed them to stay up longer and study for an exam, which led them to do well on the exam the next day. In the negative scenario, participants read that they had an aversive physical reaction to the medication, which required them to seek medical attention. Because they spent time in the hospital, they did not have the opportunity to study and did poorly on an exam the next day.

After reading the scenario, participants in the counterfactual conditions completed a thought-

listing task. Participants were told that after an experience, people sometimes cannot help thinking ‘what if...’ or ‘if only...’ and imagining how things might have gone differently. They were then instructed to list anything they could think of that would have changed the outcome of the incident. Participants then completed a self-report measure of attitudes, subjective norms, perceived behavioral control, and behavioral intentions. Finally, participants answered a series of demographic questions and were dismissed.

Measures

All participants answered questions regarding attitudes, subjective norms, perceived behavioral control, and behavioral intentions towards ADHD medication that were adapted from Orbell, Blair, Sherlock, and Conner (2001) and Umeh and Patel (2004).

Attitude was measured using nine bipolar items. Participants were asked to complete the lead statement “*I find ADHD medication*” (unenjoyable-enjoyable, unsociable-sociable, unpleasant-pleasant, harmful-beneficial, unnecessary-necessary, not-worthwhile-worthwhile, unimportant-important, dangerous-safe, bad-good). Scales were 7-point bipolar scales with each word used as the scale anchors (e.g., unenjoyable [1] to enjoyable [7]).

Subjective norms were measured using four bipolar items. Participants determined the extent to which they agreed or disagreed with the following statements: “*I feel under social pressure to take ADHD medication,*” “*My parents think that I should take ADHD medication,*” and “*Significant others in my life think I should use ADHD medication.*” Responses were assessed on a 7-point Likert scale (strongly disagree [1] to strongly agree [7]). In addition, the statement “*When*

it comes to taking ADHD medication, most of my friends' attitude is" was assessed on a 7-point Likert scale (very discouraging [1] to very encouraging [7]).

Perceived Behavioral Control was measured using five bipolar items. Participants were asked to read a statement or question and then determine where they felt they fell on the respective scale. Scales were 7-point bipolar scales with each word used as the scale anchors. These statements were "*How confident are you that you could get some ADHD medication if you wanted to?*" (unconfident [1] to confident [7]), "*How sure are you that you could obtain ADHD medication if you wanted to?*" (unsure [1] to sure [7]), "*For me to get a hold of ADHD medication is:*" (difficult [1] to easy [7]), "*How much control do you have over whether you do or do not take ADHD medication?*" (no control [1] to complete control [7]), "*Within the next two months, how much control do you feel you have over taking ADHD medication?*" (no control [1] to complete control [7]).

Behavioral intentions were measured using seven bipolar items. Participants determined the extent to which they agreed or disagreed with the following statements: "*I will probably use ADHD medication sometime in the future,*" "*It is unlikely that I will take ADHD medication in the next two months,*" "*I intend to take ADHD medication in the next two months,*" "*I intend to use ADHD medication in the next two months,*" "*I will take ADHD medication in the next two months,*" and "*Within the next two months, I will try ADHD medication.*" Responses were assessed on a 7-point Likert scale (strongly disagree [1] to strongly agree [7]). In addition, the question "*How likely is it that you will take ADHD medication in the next two months?*" was assessed on a 7-point Likert scale (unlikely [1] to likely [7]).

Coding

Counterfactuals were coded for content. Two independent judges coded each response. They were instructed to code a response as a counterfactual only when there was clear evidence that an alternative to reality had been considered ($\kappa=.37$; 95% CI: .15-.59; 93% agreement). Next, the direction of each counterfactual response was coded as to whether it contained an upward counterfactual (better alternative to reality) or downward counterfactual (worse alternative to reality) ($\kappa=.74$; 95% CI: .65-.83; 89% agreement). Additionally, the structure of each counterfactual was coded as to whether the counterfactual was additive (inserted a new element into the situation) or subtractive (removed an existing element in the situation) ($\kappa=.79$; 95% CI: .71-.86; 89% agreement). Finally, each counterfactual was coded as to whether it was written using first person pronouns (e.g., I or me) or second/third person pronouns (e.g., you, he/she, the student) ($\kappa=.81$; 95% CI: .74-.88; 91% agreement). Discrepancies between judges were resolved by a third independent judge.

CHAPTER III

RESULTS

First, the counterfactual statements generated in response to the positive and negative scenarios were examined. The effect of scenario outcome did not significantly influence the total number of counterfactuals generated, $F(1, 86) = .38, p = .54$. Regardless of whether they saw a positive or negative scenario, they generated a similar number of counterfactual statements ($M = 2.83, SD = 1.08$ and $M = 2.98, SD = 1.07$). Similarly, scenario outcome did not significantly influence the number of additive ($F(1, 86) = .90, p = .35$) or subtractive ($F(1, 86) = .09, p = .77$) counterfactuals generated. Regardless of whether they saw a positive or negative scenario, they generated a similar number of additive counterfactual statements ($M = 1.38, SD = .94$ and $M = 1.59, SD = 1.17$) and subtractive counterfactual statements ($M = 1.46, SD = 1.18$ and $M = 1.39, SD = 1.04$).

However, scenario outcome did significantly influence the direction of the counterfactual statements. Those who saw the negative scenario wrote significantly more upward counterfactuals compared to those who saw the positive scenario ($F(1, 86) = 55.96, p < .001; M = 2.98, SD = 1.07$ vs. $M = 1.17, SD = 1.17$). Additionally, those who saw the positive scenario wrote significantly more downward counterfactuals compared to those who saw the negative scenario ($F(1, 86) = 85.91, p < .001; M = 1.67, SD = 1.14$ vs. $M = 0.00, SD = 0.00$). Accordingly, participants who saw a negative scenario were more likely to imagine more positive alternative outcomes whereas participants who saw a positive scenario were more likely to imagine more negative alternative outcomes. Finally, scenario outcome did not significantly influence the number of counterfactual statements using first-person pronouns ($F(1, 86) = .21, p = .65$) or second and

third-person pronouns ($F(1, 86) = .002, p = .96$). Regardless of whether they saw a positive or negative scenario, they generated a similar number of counterfactual statements using first-person pronouns ($M = 1.33, SD = 1.63$ and $M = 1.50, SD = 1.80$) and second and third-person pronouns ($M = 1.46, SD = 1.62$ and $M = 1.48, SD = 1.57$).

Next, the self-report measures were combined to form four indexes. The attitudes subset consisted of nine items ($\alpha = .93$), the subjective norms subset consisted of four items ($\alpha = .63$), the perceived behavioral control subset consisted of five items ($\alpha = .75$), and the intentions subset consisted of seven items ($\alpha = .97$). A 2(scenario outcome: positive vs. negative) x 2(thought listing: counterfactual vs. no counterfactual) ANOVA test was conducted on each subset (attitudes, subjective norms, perceived behavioral control, and intentions).

Regarding attitudes, there was a significant main effect of counterfactual thought, $F(1, 172) = 4.44, p = .04$. However, both the main effect of scenario outcome ($F(1, 172) = .15, p = .70$) and the scenario outcome by thought-listing interaction ($F(1, 172) = 2.71, p = .10$) were not significant. Accordingly, participants who generated counterfactuals had more positive attitudes toward medication ($M = 3.36, SD = 1.38$) than participants in the control condition ($M = 2.96, SD = 1.27$). However, post-hoc analysis revealed that this effect was driven mainly by the negative scenario condition ($M = 3.50, SD = 1.29$ vs. $M = 2.75, SD = 1.20; F(1, 81) = 7.50, p = .008$). Additionally, there were two correlations between attitudes and pronoun use. In the positive condition, there was a negative correlation between attitudes and the use of second/third person, $r = -.30, p = .04$. Although the finding is marginal, in the negative condition, there was a negative correlation between attitudes and the use of first person, $r = -.28, p = .08$.

Similarly, there was a significant main effect of counterfactual thought on subjective norms, $F(1, 172) = 6.34, p = .013$. However, both the main effect of scenario outcome ($F(1, 172) = .35, p = .55$) and the scenario outcome by thought-listing interaction ($F(1, 172) = 2.25, p = .14$) were not significant. As with the attitudes measures, participants who generated counterfactuals believed that others in their lives viewed taking medication more positively ($M = 2.57, SD = 1.04$) than participants who did not generate counterfactuals ($M = 2.20, SD = .83$). Additionally, there were two significant correlations between subjective norms and pronoun use. In the positive condition, there was a positive correlation between subjective norms and using the first person in counterfactual statements, $r = .29, p = .04$. Also in the positive condition, there was a negative correlation between subjective norms and the use of the second or third person, $r = -.31, p = .03$.

For perceived behavioral control, the main effect of counterfactual thought ($F(1, 172) = 1.10, p = .30$), the main effect of scenario outcome ($F(1, 172) = 1.09, p = .30$), and the counterfactual by scenario outcome interaction ($F(1, 172) = .07, p = .80$) were all non-significant. Accordingly, participant's beliefs about the ease of obtaining ADHD medication were not influenced by the scenario outcome, generating counterfactual thoughts, or the interaction between these measures. In other words, participants perceived behavioral control beliefs were unchanged by the study's manipulations.

Lastly, there was a significant main effect of counterfactual thought on intentions, $F(1, 172) = 4.25, p = .04$. However, both the main effect of scenario outcome ($F(1, 172) = .00, p = .99$) and

the scenario outcome by thought-listing interaction ($F(1, 172) = 0.004, p = .95$) were not significant. Accordingly, participants who generated counterfactuals had stronger intentions to use ADHD medication in the future ($M = 2.26, SD = 1.64$) than those who did not generate counterfactuals ($M = 1.78, SD = 1.44$).

CHAPTER IV

DISCUSSION

The non-prescribed use of ADHD medication has become increasingly prevalent, especially in the university setting. As many as 35% of students could be using these medications in order to improve focus or increase studying (McCabe et al., 2005; Teter et al., 2005). This behavior is especially problematic because of the ease with which students can obtain them, the fact that students use these medications without a prescription, and the possible unintended side effects (Rabiner et al., 2009). The increased prevalence in ADHD medication in universities and the issues that arise from its non-prescribed use prompted the current research. Prior research on the Theory of Planned Behavior and counterfactual thinking led to the idea that a counterfactual manipulation might have an effect on students' attitudes, subjective norms, perceived behavioral control, and intentions towards the non-prescribed use of ADHD medication.

The Theory of Planned Behavior states that behaviors are best predicted by intentions, which in turn is influenced by attitudes, subjective norms, and perceived behavioral control. In addition, stronger intentions to perform a behavior will result in a greater chance of an individual performing a certain behavior (Ajzen, 1991). The present research used this theory to test whether attitudes, subjective norms, and perceived behavioral control toward ADHD medication influenced participants' intentions to take ADHD medication. The current study also manipulated counterfactual thinking, which has been shown to lead to changes in behavioral intentions (Roese, 1994; Smallman, 2013; Smallman & Roese, 2009) and future behaviors (Morris & Moore, 2000; Nasco & Marsh, 1999; Page & Colby, 2003). Prior research has indicated that counterfactual thinking

can result in learning and better performance in the future, specifically in regards to smoking, flying simulations, and test-taking (Page & Colby, 2003; Morris & Moore, 2000; Nasco & Marsh, 1999).

Results from the current study indicate that, while scenario outcome did not influence the total number of counterfactuals generated or the number of additive or subtractive counterfactuals generated, it did influence the direction of the counterfactuals; participants in the negative scenario were more likely to imagine positive alternatives. This aligns with previous research, which suggests that when people experience a negative outcome to an event, they torment themselves fantasizing about how the outcome could have been better. Although this thought process is associated with several negative emotions, including dissatisfaction and self-blame (Nasco & Marsh, 1999), it may be useful because it can lead to improved performance in the future (Markman, Gavanski, Sherman, & McMullen, 1993; Roese, 1994). Conversely, participants in the positive scenario were more likely to imagine more negative alternatives. This also aligns with previous research, which indicates that downward counterfactuals may allow individuals to feel better about themselves by comparison to worse-off simulations of what might have occurred (White & Lehman, 2005). In this fashion, the downward counterfactuals permitted participants to feel better about taking the non-prescribed ADHD medication.

In regards to the attitude measures, participants who generated counterfactual statements had more positive attitudes toward using ADHD medication than participants in the control condition. This effect occurred mainly in in the negative scenario. Attitudes also appeared to be affect-

ed by the pronouns used in the counterfactual statements. In the positive condition, greater positive attitudes were associated with reduced use of second or third person pronouns, suggesting that associating oneself with the positive outcome of using ADHD medication without a prescription increases positive attitude. It is possible that using the third person in their counterfactual statements enabled participants to displace blame. This suggests that these associations are driving the effect that counterfactual thoughts are having on attitudes and behavioral intentions toward ADHD medication use.

With respect to the subjective norms measures, participants who generated counterfactual statements were more likely to believe that others in their lives viewed taking the medication more positively than participants in the control condition. This suggests that thinking of alternatives to an event, even a negative one, can lead people to think about the event more positively. Similar correlations to those discovered with regard to attitudes were found with regard to subjective norms. In the positive condition, positive subjective norms were negatively correlated with the use of the first person pronoun. When taken with the correlations found regarding attitudes, this suggests that positive subjective norms were connected with associating oneself with positive outcomes, while negative subjective norms were associated with distancing oneself from positive outcomes.

There were no significant main effects or interactions on perceived behavioral control. This is understandable in light of the Theory of Planned Behavior. While thinking counterfactually about the consequences of taking ADHD medication may lead to changes in attitudes and subjective norms, which may consequently lead to changes in behavioral intentions, one's ease of ob-

taining or taking ADHD medication is likely to stay the same. In other words, while thinking about the benefits or risks of taking ADHD medication may influence the way an individual feels about the behavior, this will not change whether the person can access the medication or not.

Participants who generated counterfactual statements had stronger intentions to use ADHD medication in the future than participants in the control condition. This was expected because of the TPB. The TPB demonstrates how attitudes, subjective norms, and PBC lead to behavioral intentions and how these intentions lead to behavioral change. Although there was no significant effect for PBC, there were significant effects for attitudes, subjective norms, and intentions. These results suggest that the TPB is effective in predicting use of ADHD medications.

It is important to note that there were two main limitations of this study. First, the present study did not measure actual behavior, which reduces the ability to conclude whether behavior itself would change. A study that examines actual behaviors in addition to behavioral intentions will greatly add to the body of knowledge on intentions to take ADHD medications. Additionally, this study used a scenario versus actual real-life experiences. Future researchers could possibly design a study that uses actual experiences with ADHD medication use to test whether it more strongly influences relevant attitudes, subjective norms, perceived behavioral control, and intentions.

Further investigation into this topic is essential because students are abusing ADHD medication at higher rates, unaware of the consequences. Many students are finding it easier to obtain these medications, and are using the medications as a method of improving academic performance.

Because students typically only see and hear about the benefits of taking ADHD medication, research will need to examine additional ways of addressing the negative consequences associated with abusing ADHD stimulant medications that effectively discourages such behavior. Furthermore, the research conducted in this study hopes to encourage others to explore options that help decrease the abuse of these medications.

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