EXAMINING THE RELATIONSHIP BETWEEN NORMATIVE BELIEFS, MISUSE OF PRESCRIPTION MEDICATIONS AND GENDER IN COLLEGE STUDENTS

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Abstract: **Introduction:** Misuse of prescription medications (MPM) is a significant health concern, particularly among college students who demonstrate particularly high rates of misuse. Research has noted many variables related to college student substance use behaviors, and one of note is normative perceptions of misuse (i.e., perceptions of misuse among peers). The current study aims to examine the relationship between college student normative beliefs regarding MPM in relation to four different prescription medications (opioids, stimulants, tranquilizers, and sedatives) and actual rates of misuse.
Methods: 397 college students (*M* age = 20.7, 70% female, 74.1% White) participated in the study.
Results: The sample significantly overestimated rates of misuse of all four categories of medication among peers. Significant differences were found such that descriptive and injunctive normative beliefs differed between misusers and nonusers of prescription stimulants, and descriptive normative beliefs differed between misusers and nonusers of prescription tranquilizers. There were no differences found in descriptive or injunctive norms between misusers and nonusers of either prescription opioids or sedatives. Contrary to the hypothesized results, there were gender differences among descriptive norms of all categories of prescription medications. There were no gender differences in injunctive norms for any substance. Finally, there were no gender differences in rates of misusing any prescription medication.
Discussion: The current study shows changes in normative beliefs across college students relative to past research, specifically that misusers and nonusers of opioids do not significantly differ in their normative beliefs about prescription opioid misuse and that male and female college students have different normative beliefs about substance use behaviors. Implications for intervention are discussed.

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CHAPTER I

INTRODUCTION

Over 6% of the total population aged 12 and older reported misusing a psychoactive prescription medication (which are separated into four categories: opioid pain relievers, tranquilizers, sedatives, or stimulants) at least once in the past year (SAMHSA, 2017). Those aged 18-25 had the highest rates of misuse in 2017, with 14.4% of the age group reporting misusing a psychoactive prescription medication on at least one occasion (SAMHSA, 2017). Within this age group, results from the Monitoring the Future National Survey from 1975-2018 show differential patterns of recreational use of psychoactive prescription medications by education level (Schulenberg et al., 2017). Specifically, noncollege students used sedatives (e.g. barbiturates) twice as often as their college peers, and pain relievers at similar rates (Schulenberg et al., 2017). However, the survey found that college students had significantly higher amphetamine (i.e. Ritalin, Adderall) use, with 8.5% of college students misusing annually while only 4.8% of noncollege students used amphetamines annually (Schulenberg et al., 2017).

The study by Schulenberg and colleagues was part of a nationwide examination into the epidemic of misuse of prescription medications (MPM), such as opioids, throughout the United States. Examinations of trends of MPM show that from 2003-2013, misuse of prescription opioids decreased, misuse of prescription stimulants increased, and there were no significant changes in rates of misuse for prescription tranquilizer/sedative medications (McCabe et al., 2014).

There are many factors related to MPM, and one particular factor that has emerged as a reliably important predictor is an individual's set of social normative beliefs about prescription misuse. There are two main types of normative beliefs: descriptive and injunctive norms. A descriptive norm is a measurement of one's perception of how common certain behaviors or beliefs are amongst one's peers (Cialdini, Kallgren, & Reno, 1991). A consistent relationship between descriptive norms and drinking behavior has been found in the research for over three decades (Borsari & Carey, 2001, Krieger et al., 2016), showing that individuals who estimate higher levels of peer alcohol use are more likely to use higher levels of alcohol themselves. The relationship found between descriptive norms and alcohol use has been found with MPM as well, with Kilmer et al. (2015) demonstrating that those who overestimate their peers' prescription stimulant misuse are more likely to misuse prescriptions stimulants themselves.

Injunctive norms are beliefs about others' (such as academic peers or parents) approval or disapproval of certain behaviors or beliefs (Cialdini, Kallgren, & Reno, 1991). There have been mixed findings in the literature regarding the relationship between injunctive norms and substance use behaviors (e.g. alcohol use), possibly due to inconsistencies in measurement and methodology throughout the injunctive norms literature (Krieger et al., 2016).

Further evidence for the relationship between social norms and substance use behavior is Wolfson's *False Consensus Effect*, which is the tendency for one to overestimate the likelihood of peers engaging in behaviors and having attitudes similar to their own (Wolfson, 2000). Wolfson found that college students who use cannabis and/or amphetamines were more likely to overestimate use of cannabis and/or amphetamines than nonusers (2000). Nargiso, Ballard, and Skeer (2014) conducted a systematic review of the literature surrounding MPM among adolescents, and found there was a significant relationship between peer and friend approval of substance use (including MPM) and participants using substances themselves. Researchers found that adolescents' past year MPM significantly decreased in relation to their perceived disapproval of MPM by their friends (Ford & Hill, 2012). Studies have also shown that

adolescents were more likely to report past year MPM if they perceived that their friends approved of the behavior (Ford, 2008).

Borsari and Carey (2001) completed a meta-analysis that found a strong relationship between gender, alcohol use, and normative beliefs regarding alcohol use, wherein males were more likely to engage in higher rates of drinking as well as having more permissive normative beliefs regarding alcohol. This relationship has not been found in the MPM literature, and there are inconsistent findings in regards to gender differences of both use and normative perceptions of use.

McCabe (2008) found that college students were significantly more likely to overestimate misuse of prescription stimulants and opioids than they were marijuana. However, studies (i.e., McCabe et al., 2014) have shown that rates of use of both substances have changed since the previous study's data collection time (2005), and it is possible that student perceptions have changed in relation to rates of use. Edwards (2018) found that college student' perceptions of their close friends' prescription opioid use was related to the student's past 30 day and past year use of prescription opioids. They did not find a relationship between student's past 30 day or past year use and their perceptions of acquaintance prescription opioid use (Edwards, 2018).

The literature on MPM is vast, but there is little research into the complex motivations that lead college students to engage in these behaviors. Given the extant research supporting social norms as a predictor of other substance misuse such as alcohol and marijuana, it is plausible that norms would also influence college student MPM as well. The current study therefore aims to fill this gap in the literature by examining the complex relationship between descriptive norms, injunctive norms, and misuse of prescription medications (opioids, stimulants, tranquilizers, and sedatives) among college students. It is hypothesized that students engaging in MPM are more likely than those not engaging in MPM to overestimate the rates at which the average college student engages in MPM, as well as overestimating the approval of MPM among the average college student. It is further hypothesized that these relationships will not differ by gender.

CHAPTER II

METHODOLOGY

Participant Selection and Recruitment

The current study will utilize a convenience sample of undergraduate students from a large Midwestern university. Participants must be 18 years or older in order to participate, and will be compensated with research credits required for psychology courses through the university.

Procedures

Participation will be based on self-selection into the study through the SONA research recruitment system, after which the students will be directed to an online Qualtrics survey that includes all study measurements. Research credits will be awarded automatically after completing the survey in order to maintain the confidentiality of survey responses.

Measures

Demographic Information. Participants will be asked to report demographic information such as age, gender, sexual orientation, race/ethnicity, class standing, and Greek system involvement.

Personal Misuse of Prescription Medications. Measurements of personal MPM will be modeled after McCabe (2008), utilizing questions regarding use of each of the four most common

categories of misused prescription medications (opioids, stimulants, sedatives, and tranquilizers). Participants will be asked how many times in the past 12 months they have misused each type of medication, with answers ranging from 1 (No Occasions), to 7 (40 or More Occasions). In addition, examples for category of prescription medication will be included in the question – for example, when for measuring how often a student has misused prescription opioids, they will be asked "On how many occasions in the past 12 months have you used a Prescription Opioid (pain medications such as OxyCotin, hydrocodone, oxycodone, Vidocin, Tylenol 3 with codeine, Percocet, Darvocet, or morphine) without a prescription, in higher quantities/more frequently than prescribed, or in any way not directed by a physician".

Normative Beliefs about Peer Misuse of Prescription Medications. Participants will answer questions regarding their perceptions of the average college student's misuse of each category of prescription medications (descriptive norms). Participants will be asked what percentage of university students on their campus they believe have misused each type of prescription medication within the past 12 months on a sliding scale from 0-100%. In addition, participants will be given the same examples of medications in each category as those listed in the Personal Misuse section. For example, participants will be asked "Please estimate the percentage of (university) students who in the past 12 months used a Prescription Stimulant (ADHD medications such as Adderall, Ritalin, Concerta, Dexedrine, ProCentra, or Vyvanse) without a prescription, in higher quantities/more frequently than prescribed, or in any way not directed by a physician on at least one occasion". Participants will also be asked to report their perceptions of the percentage of students who engage in regular misuse of each prescription medication. "Please estimate the percentage of (university) students who in the past 12 months used a Prescription Sedative (insomnia medication, such as Ambien [zolpidem], Seconal [secobarbital], Butisol [butabarbital], Doral [quazepam], Flurazepam, and Lunesta [eszopiclone]) without a prescription, in higher quantities/more frequently than prescribed, or in any way not directed by a physician on *more than one* occasion".

Participants will also answer questions regarding their perception of how acceptable the average college student believes it is to misuse each category of prescription medications (injunctive norms) on a sliding scale from 0-100%. Participants will be provided identical examples of medications in each category as those included in previous descriptive norm questions. For example, participants will be asked "Please rate how acceptable the average (university) student believes it is to use a Prescription Tranquilizers (benzodiazepines, such as Valium [diazepam], Ativan [lorazepam], Xanax [alprazolam], and Soma [muscle relaxant]) without a prescription, in higher quantities/more frequently than prescribed, or in any way not directed by a physician".

Validity Items. The last section of the survey will be composed of five validity questions to assess participant's honesty throughout the survey. Participants will be informed that they will be compensated for their participation in the survey regardless of their responses regarding honesty during the survey. For the first four questions, participants will be shown a statement and asked to select whether it is "true or false" in regards to their participation in the survey. The questions are "I read the instructions carefully prior to completing relevant items", "I answered all items honestly and accurately", "I answered items randomly without reading the items", and "My responses are an accurate reflection of my views". Finally, the participants will be asked "Is there any reason we should NOT use your data? You will still receive full credit for participating in this study", and will be asked to select "yes or no". Those who select "yes" will be provided an additional open response question that states "Please provide the reason why we should not use your data (i.e., lied, randomly answered):".

CHAPTER III

RESULTS

Sample characteristics

All statistics utilized Levene's Test for Equality of Variances and utilized the appropriate statistic based on the results of the analysis. Detailed demographic information can be found in Table 1. The final sample (N = 397) was primarily female (n = 278, 70%) with a mean age of 20.7 (SD= 11.78). Participants predominantly identified as Caucasian or White (n= 294, 74.1%), Hispanic or Latino (n= 29, 7.3%), Biracial/Mixed (14, 3.5%), African American or Black (n= 15, 3.8%), Pacific Islander (n= 2, 0.5%), American Indian (n= 34, 8.6%), or Other (n= 3, 0.9%). The majority of participants had no current or previous Greek affiliation (n= 259, 64.3%). Of the total sample, 39.3% of the sample reported lifetime misuse of at least one of four prescription medications, 46 reported lifetime prescription opioid misuse (11.6%), 61 reported lifetime prescription stimulant misuse (15.4%), 35 reported lifetime prescription tranquilizer misuse (8.8%), and 14 reported lifetime sedative misuse (3.5%). Comorbid misuse was also measured, and 78.1% of the sample reported they never misused any prescription medications in their lifetime (n=310), 10.8% reported lifetime misuse of one prescription medication (n=43), 6.3% reported lifetime misuse of two prescription medications (n= 25), 3.3% reported lifetime misuse of three prescription medications, and 1.5% reported lifetime misuse of all four prescription medications measured (n=6). In sum, the highest prevalence of medication misuse in the sample

was for stimulants, followed closely by opiates, and then tranquilizers. The least misused medication was sedatives. Most individuals only misused one medication although a small percentage of individuals in the sample have misused all four medication classes.

Normative Beliefs

One-sample *t*-test analyses were conducted to examined differences between the sample's perceived rates of past year misuse of each of the four categories of prescription medications when compared to the rates of actual use found among the sample. The sample significantly overestimated rates of past year misuse of prescription opioids among their fellow college students $t(402) = 19.47$, $p<.001$. The sample significantly overestimated rates of past year prescription stimulant misuse among their peers $t(402) = 27.12$, $p <.001$. The sample also significantly overestimated past year rates of prescription tranquilizer misuse among college students $t(402) = 18.27$, $p<.001$. Finally, the sample significantly overestimated rates of past year misuse of prescription sedatives among their peers $t(402) = 22.99$, $p<.001$. These results were consistent with the hypothesis that students would overestimate rates of use of all four categories of prescription misuse among their peers.

Independent *t*-test analyses were conducted to examine differences between misusers' and nonusers' descriptive normative beliefs about each of four categories of prescription drug misuse amongst peers in accordance with hypothesis 1. Overall, both lifetime misusers (M=51.2, SD = 21.18) and nonusers (M=44.40, SD = 22.48) overestimated rates of past year misuse of prescription stimulants, which were found to be 15.4% according to the study sample. As hypothesized, there were significant differences found in perceived rates of past year misuse of prescription stimulants such that misusers (M = 51.2, SD = 21.18) perceived higher rates of stimulant misuse than nonusers (M = 44.40, SD = 22.48), $t(398) = 2.514$, $p = .012$.

Overall, both misusers (*M*=39.35, SD = 21.92) and nonusers (*M*=26.08, SD = 19.85) of prescription tranquilizers overestimated rates of past year misuse of prescription tranquilizers among their peers, which were found to be 8.80% according to the study sample Also as hypothesized, there were significant differences in perceived rates of prescription tranquilizer misuse among misusers (*M*=39.25, SD = 21.92) and nonusers (*M*=26.08, SD = 19.85) with misusers perceiving significantly higher rates of past year peer misuse $t(398) = 3.76$, $p < .001$.

Both misusers (*M*=32.50, SD = 18.57) and nonusers (*M*=28.66, SD = 17.88) of prescription opioids overestimated rates of past year misuse of prescription opioids among their peers, which were found to be 11.60% according to the study sample. Contrary to the study hypotheses, analyses revealed that there were no differences in perceived rates of past year peer prescription opioid misuses among misusers (*M*=32.5, SD = 18.57) and nonusers (*M*=28.66, SD = 17.88), $t(397) = 1.363$, $p = .174$.

Both misusers (*M*=26.29, SD = 21.22) and nonusers (*M*=25.87, SD = 19.48) of prescription sedatives dramatically overestimated rates of past year misuse of prescription sedatives among their peers, which were found to be 3.50% according to the study sample. Also contrary to hypotheses, there were no significant differences in perception of peer prescription sedative use between misusers (*M*=26.29, SD = 21.22) and nonusers (*M*=25.87, SD = 19.48) $t(398) = .087$, $p = .938$.

Independent *t*-test analyses were conducted to examine differences between misusers' and nonusers' injunctive normative beliefs about the acceptability of each of four categories of prescription drug misuse amongst peers in accordance with hypothesis 2. There were significant differences found between perceived levels of peer approval of prescription stimulant misuse with misusers (*M* = 58.64, SD = 20.83) perceiving higher rates of prescription stimulant misuse approval than nonusers (*M* = 44.68, SD = 25.03), $t(398) = 4.11$, $p < .001$. Similarly, there were

significant differences in perceived rates of peer approval of prescription tranquilizer misuse with misusers (*M*=36.49, SD = 23.95) perceiving higher rates of peer approval than nonusers (*M*=26.91, SD = 21.32), *t*(397) = 2.51, *p* = .012. There were also no differences in perceived rates of peer approval of prescription opioid misuse. Finally contrary to hypothesized results, there were no differences in peer approval of prescription sedative misuse among misusers (*M*= 38.07, SD = 23.91) and nonusers (*M*=27.66, SD = 21.66), *t*(396) = 1.86, *p* = .064.

In sum, college students who have misused stimulant and tranquilizer medication perceive higher rates of use in their peers, and those who have misused prescription stimulants also perceive higher rates of approval of prescription stimulant misuse among peers.

Gender Differences

Gender differences were examined in accordance with hypothesis 3. As indicated in Table 2, there were no significant gender differences in rates of lifetime use of any category of prescription medications, with all *p*-values greater than .153.

Beliefs about peer misuse *at least once* were examined across gender, and there were no significant gender differences found with regards to beliefs surrounding using either opioids or sedatives at least once. Results show that there were significant gender differences in beliefs about using stimulants at least once, with females perceiving higher rates of peer misuse (*M*= 47.53, SD = 47.53) than males (*M* = 40.63, SD = 20.80), *t*(220.34) = -2.88, *p* = .004. There was also a significant gender difference found between perceptions of prescription tranquilizer misuse on at least one occasion, with females perceiving higher rates of misuse (*M*=28.94, SD = 20.76) than males (*M*=22.78, SD = 17.60) *t*(236.16)= -3.20, *p* = .002. (see Table 3).

Significant gender differences were found for all categories of prescription misuse when examining beliefs about peers misusing *more than once*. When examining beliefs about peers misusing opioids on more than one occasion, females were found to perceive significantly higher rates of perceived misuse (M = 27.78, SD = 18.41) than males (M = 23.30, SD = 18.05), $t(386) = -2.60$, $p = .010$. Females' (M = 44.33, SD = 23.49) perceptions of peers' rates of prescription stimulant misuse on more than one occasion was significantly higher than males' perceptions of peers' rates (M= *34*.73, SD = 19.86), $t(236.69) = -4.09$, $p < .001$. There was a significant gender differences found between perceptions of peers' rates of prescription tranquilizer misuse on more than one occasion, with females (M = 25.40, SD = 20.61) perceiving higher rates of misuse among their peers than males (M = 18.73, SD = 16.73), $t(246.66) = -3.32$, $p = .001$. Finally, there were significant gender differences found between perceptions of peers' misuse of prescription sedatives on more than one occasion, with females (M = 23.99) perceiving higher rates of misuse among their peers than males (M = 19.53), $t(390) = -2.06$, $p = .040$.

Gender differences regarding beliefs about acceptability of the misuse of prescription medications (i.e. injunctive norms) were examined. As indicated in Table 3 there were no significant gender differences in rates of perceived acceptability of any of the 4 categories of prescription misuse, with all p-values higher than .273.

CHAPTER IV

CONCLUSION

This study extended past research by examining descriptive normative beliefs and the relation of descriptive normative beliefs with actual substance use behaviors among college students. Specifically, results of the current study indicated that there were significant differences in perceptions of peer substance use between misusers and nonusers of prescription stimulants and prescription tranquilizers, with misusers of both categories perceiving higher rates of misuse compared to non-users. In other words, those who had misused either prescription stimulants or tranquilizers in their lifetime were more likely to believe higher rates of their peers also engaged in misuse of the same substance, when compared to those who had never engaged in misuse. There were no significant differences in perceptions of peer misuse of prescription opioids or sedatives across misusers and nonusers. It is possible that the lack of significant differences in perceptions of misuse between users and nonusers of prescription sedatives is related to the small number of participants from the current sample who engaged in misuse of prescription sedatives ($M = 14$).

Misusers of prescription stimulants perceived higher rates of peer approval of stimulant misuse, but there were no differences in perceived approval found across misusers and nonusers of other substances.

The current study demonstrated significant gender differences in perceptions of peer substance use, with females perceiving higher rates of peer misuse of both prescription stimulants and tranquilizers. Results also indicated that males and females differed significantly in their perceptions of repeated misuse of prescription medications in their peers, with females perceiving higher rates of peers' misuse on more than one occasion for all four measured substances. Analyses did not reveal gender differences in rates of misuse or in rates of perceived approval of MPM (Misuse of Prescription Medications) for any of the measured substances.

Taken together, these findings suggest that descriptive and injunctive normative perceptions differentially relate to college student MPM depending on the substance examined, which coincides with previous findings. Specifically, the differences found in perceptions of peer misuse of prescription stimulants across users and nonusers were consistent with the findings of Silvestri and Correia (2016) who found that college students who misused prescription stimulants perceived significantly higher perceptions of past-year misuse of prescription stimulants among their peers. Kilmer and colleagues (2015) similarly found that college students who perceived inflated rates of prescription stimulant misuse among their peers were more likely to engage in prescription stimulant misuse themselves. Interestingly, the current study found that prescription stimulants were the most likely substance to be misused of the four prescription medication categories measured, and that on average, students perceived the highest rates of peer misuse and peer approval of misuse of this category. These results capture important trends in the misuse of prescription stimulants as well as demonstrating normative beliefs as a possible influence of these changes.

The current study also separately examined misuse of prescription sedatives and tranquilizers, and found that there were significant differences in perceptions of peer misuse between misusers and nonusers of prescription tranquilizers; however, there were no significant differences between misusers and nonusers of prescription sedatives. Very few prior studies have

examined normative perceptions of sedatives and tranquilizers, and those that did often collapsed examinations of misuse of prescription sedatives and tranquilizers into one category (Lehne et al., 2018). The current study separated sedatives and tranquilizers into different categories, thus providing a novel insight into the differences in perceptions of these substances. Additionally, by separating the variables the current study was able to identify rates of misuse for both prescription sedatives and tranquilizers, which provides valuable information about rates of misuse of these substances. This information can also be utilized to inform treatment methods, such as personalized feedback techniques, related sedative and tranquilizer misuse among college students.

In addition, the current study conducted novel examinations into whether perceptions of misuse on more than one occasion would differ from perceptions of use on one occasion. Results indicated that for all four categories of substances, females perceived higher rates of misuse on more than one occasion than males, including for substances (i.e. opioids and sedatives) where there were no gender differences for use on at least one occasion. This novel finding suggested gender differences in college student perceptions of repeated use of prescription medications among peers.

The findings of gender differences across perceptions of misuse of stimulants and tranquilizers are contrary to both the findings in the alcohol literature and the findings of past MPM literature. Borsari and Carey (2001) conducted a meta-analysis and consistently found that men are more likely to engage in higher rates of drinking and have more permissive normative beliefs regarding alcohol. Compared to this finding, the MPM literature has shown inconsistent findings related to gender differences in normative beliefs regarding MPM (McCabe, 2008; Kilmer et al., 2015). The results of the current study could be influenced by the high proportion of females to males in the sample (70% female), and more representative samples are recommended for future research.

Contrary to the findings of the current study that misusers and nonusers of prescription opioids did not differ in perceptions of peer misuse, McCabe (2008) found that misusers of prescription opioids were significantly more likely to overestimate rates of misuse of prescription opioids among their peers. The insignificant results of the current study could be related to the general decline in the misuse of prescription opioids, wherein prescription opioids are no longer the most common prescription medication misused among college students (McCabe et al., 2014).

Certain limitations should be taken into account when considering the results of the current study. The study was conducted among predominantly White females in their early 20s, and thus does not provide a representative sample of college students. Additionally, the current study had insufficient participants to examine differences among participants with gender identities other than "male" and "female", thus a gender binary was used to examine gender differences. Additionally, the data collected was cross-sectional in nature, and thus it is not possible to infer causal relationships between normative beliefs and MPM behaviors.

Future research should continue to examine the differences in perceptions related to misuse of sedatives and tranquilizers, as the current study found that these substance categories detected different beliefs among college students. Specifically, the current study found that misuse of prescription tranquilizers was related to higher rates of misperceptions of peer use of that substance, while there was no relationship found between misuse of prescription sedatives and perceptions of prescription sedative misuse among peers. Separating the categories will also help to gather further information in changes in rates of use of each substance over time among college student populations. These findings may also have treatment implications wherein different treatment methods may be differently effective for different types of prescription medications based on how influential normative beliefs are on patters of misuse. Additionally, further examinations into perceptions of repeated use could provide further insight into whether

college students perceive rates of repeated or regular use differently than they perceive use on a singular or irregular pattern.

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APPENDICES

Table 1. Participant Demographic Variables (n=397)

Age (Years)	20.7 (11.78)
Gender	
Male	111(28%)
Female	278 (70%)
Trans male/Trans man	1 (.3%)
Trans female/ Trans woman	2 (.5%)
Genderqueer/Gender non-conforming	4 (1%)
Agender	1 (.3%)
Race Ethnicity	
Caucasian or White	294 (74.1%)
Hispanic or Latino	29 (7.3%)
Biracial/Mixed	14 (3.5%)
African American or Black	15 (3.8%)
Pacific Islander	2 (.5%)
American Indian	34 (8.6%)
Other	3 (.9%)
Greek Affiliation	
Yes, currently	120 (29.8%)
Yes, previously but not currently	24 (6.0%)
No	259 (64.3%)
Lifetime Prescription Misuse Rates (Yes)	
Opioid	46 (11.6%)
Stimulant	61 (15.4%)
Tranquilizer	35 (8.8%)
Sedative	14 (3.5%)
Lifetime Comorbid Prescription Misuse (Yes)	
No Use	310 (78.1)
One Medication	43 (10.8%)
Two Medications	25 (6.3%)
Three Medications	13 (3.3%)
Four Medications	6 (1.5%)

Note. Continuous variables are means and standard deviations M(SD) and categorical

Table 2. Normative Beliefs Regarding Misuse of Prescription Among College Students.

Lifetime Use	% Peers Use Once Descriptive Norm Possible range: 0-100%	% Peers Use More than Once Descriptive Norm Possible range: 0-100%	Acceptability Injunctive Norm Possible range: 0-100%
Opioid			
Users	32.50 (18.57)	27.85 (18.41)	29.87 (20.63)
Nonusers	28.66 (17.88)	25.9 (18.92)	31.08 (21.59)
Stimulant			
Users	51.20 (21.18)*	45.87 (20.57)	58.64 (20.83)*
Nonusers	44.40 (22.48)*	40.7 (23.18)	44.68 (25.03)*
Tranquilizers			
Users	39.35 (21.92)*	30.28 (19.87)	36.49 (23.95)
Nonusers	26.08 (19.85)*	22.99 (19.93)	26.91 (21.32)
Sedatives			
Users	26.29 (21.22)	22.21 (18.84)	38.07 (23.91
Nonusers	25.87 (19.48)	22.8 (19.50)	27.10 (21.66)

Note. Data presented as M(SD)

*Indicates a significant independent *t*-test difference ($p < .05$) between users and non-users of each substance use group.

Table 3. Normative Beliefs Regarding Substance Misuse Use and Acceptability in Young Adults by Gender.

Gender	Lifetime Use	% Peers Use Once Descriptive Norm Possible range: 0-100%	% Peers Use More than Once Descriptive Norm Possible range: 0-100%	Acceptability Injunctive Norm Possible range: 0-100%
Opioid				
Male	9 (8.1%)	26.36 (18.05)	23.30 (18.41)*	30.51 (23.04)
Female	36 (12.8%)	30.29 (17.84)	27.78 (18.79)*	31.28 (20.92)
Stimulant				
Male	19 (17.1%)	40.63 (20.80)*	34.73 (19.86)*	44.78 (24.01)
Female	41 (14.6%)	47.53 (22.86)*	44.33 (23.49)*	47.76 (25.26)
Tranquilizers				
Male	7 (6.3%)	22.78 (17.60)*	18.73 (16.73)*	25.66 (20.71)
Female	28 (10.0%)	28.94 (20.76)*	25.40 (20.61)*	28.33 (22.05)
Sedatives				
Male	4 (3.6%)	23.55 (18.71)	19.53 (17.48)*	26.85 (21.45)
Female	9 (3.2%)	26.74 (19.67)	23.99 (19.96)*	27.59 (21.99)

Note. Data presented as M(SD)

*Indicates a significant independent *t*-test difference ($p < .05$) between users and non-users of each substance use group.

REVIEW OF THE LITERATURE

Misuse of Prescription Medications

Misuse of prescription medications (MPM) is a major public health concern in the United States, with SAMHSA reporting that in 2017 over 6% of the U.S. population over the age of 12 misused a prescription medication on at least one occasion (SAMHSA, 2017). MPM is defined as the inappropriate use of a psychoactive medication, which includes using a medication without a prescription from a physician, taking a medication in higher quantities and/or more frequently than prescribed, or using a medication in a way not directed by a physician (SAMHSA, 2017).

There are four categories of psychoactive prescription medications most commonly misused: opioids (pain relievers, such as hydrocodone and oxycodone), stimulants (ADHD medications, such as amphetamines and methylphenidate), tranquilizers (often referring to anti-anxiety medications, such as benzodiazepines), and sedatives (mainly insomnia medications, such as barbiturates; Hughes, Williams, Lipari, Bose, Copello and Kroutil, 2016). The rates of misuse vary for each category of prescription medications, and SAMHSA cites that there is particular concern for those ages 18-25, as they had the highest rates of MPM in 2017, with 14.4% reporting engaging in MPM on at least one occasion (SAMHSA, 2017).

Misuse of Prescription Opioids

According to Griesler, Hu, Wall, and Kandel (2019), there was a decrease in both the number of opioid prescriptions written, as well as a decrease in rates of misuse of opioids from 1999-2017. This finding is consistent with the findings of McCabe, West, Teter, & Boyd (2014) who also found a decrease in the misuse of prescription opioids from 2003-2013 among college students. However, deaths resulting from an overdose of prescription opioids significantly increased from 3,442 deaths in 1999 to 17,029 deaths in 2017 (Griesler et al., 2019).

Despite a decline in misuse rates, prescription opioids continue to pose a major public health threat, with some research suggesting that those most at risk for engaging in the misuse of prescription opioids are young and emerging adults (Harries, Lust, Christenson, Redden, & Grant, 2018). The 2015 National Survey on Drug Use and Health found that 7.3% of those 18-25 misused prescription opioids, which is higher than the national average of 4.7% for the overall population (Harries et al., 2018; Hughes et al, 2016). In addition, 28% of people admitted to publicly funded substance abuse programs for non-heroine opioid use from 2002-2010 were ages 18-24 (Harries et al., 2018). Harries et al. (2018) also found that college students who reported misusing prescription opioids or having misused prescription opioids in the past were significantly more likely to report having used heroine or other opioids as well as having increased rates of problems with alcohol and gambling. When comparing college students who misuse prescription opioids to their peers who did not misuse prescription opioids, misusers were found to be over four times more likely to report frequent binge drinking, and over 13 times more likely to report using cocaine in the past year (McCabe, Teter, Boyd, Knight, & Wechsler, 2005). The data suggests that although overall rates of prescription opioid misuse have decreased in the past decade, many who do misuse prescription opioids are still experiencing significant negative outcomes such as misuse of other substances and overdoses.

Misuse of Prescription Stimulants

Unlike the decline in rates of misuse of prescription opioids, research has shown an *increase* in the availability and misuse of prescription stimulants among college students, with rates of misuse ranging from 13-23%, compared to the national average of 2% of the population misusing (McCabeet al., 2014; Weyandt et al., 2016; Helmer et al., 2016; Hughes, Williams, Lipari, Bose, Copello & Kroutil, 2016). Kilmer, Geisner, Gasser, and Lindgren (2015) suggest that the college environment may be ideal for prescription stimulant misuse due to acceptability of prescription stimulant misuse amongst students and easier accessibility via students sharing medications. In addition, the literature has consistently shown that students report misusing prescription stimulants in order to experience cognitive enhancement and improve their academic performance (Ross et al., 2018; Weyandt et al., 2016). Despite the goal of improved academic performance, Silvestri and Correia (2016) found that misuse of prescription stimulants increased the likelihood of college students experiencing academic problems, in addition to engagement in illegal activities in order to obtain prescription stimulants and increased rates of consequences related to alcohol and other substances. This literature shows there is a concerning increase in the misuse of prescription stimulants in recent years, particularly among college students.

Misuse of Prescription Sedatives and Tranquilizers

Much less research has been conducted examining the misuse of prescription sedatives and tranquilizers, and often the two are combined into one category as opposed to being examined separately. The research that has been conducted has found results suggesting that the misuse of sedative and tranquilizers poses a significant health concern in the US. According to the 2015 National Survey on Drug Use and Health, 2.3% of the population over age 12 reported past year tranquilizer misuse, and .6% reported past year sedative misuse (Hughes, Williams, Lipari, Bose, Copello & Kroutil, 2016). Rates of past year and past month misuse were highest

among young adults ages 18-25, with 5.8% reporting tranquilizer misuse and 1.8% reporting sedative misuse (Schepis, Teter, Simoni-Wastila, & McCabe, 2018). Schepis et al. (2018) report that from 2003-2012 sedative/tranquilizer use disorder treatment rates increased 67% in the US, with a significant area of concern arising in the common simultaneous misuse of opioids and tranquilizer medications. Boggis and Feder (2019) provide further support for the concern of combined misuse of opioids and tranquilizers, reporting that between 2002-2014, 28% of those who misused opioids also reported misusing tranquilizers. This finding is significantly higher than rates of tranquilizer misuse among those who did not report misusing opioids, which was less than 1% of the population (Boggis & Feder, 2019). Ford and McCutcheon (2012) report that although Ambien, one of the most common sedatives prescribed for patients with insomnia, is marketed as safer and less likely to cause dependency than drugs such as Valium, there is still a strong potential for misuse and dependence. Among the adolescents in Ford and McCutcheon's study, 1.4% reported misusing Ambien at some point (2012). In addition to risks of dependence, Ambien can also be related to adverse health consequences, especially when used concurrently with alcohol; between 2004-2009, emergency room reports saw a 155% increase in mentions of Ambien (Ford & McCutcheon, 2002).

Normative Beliefs

One important factor in the study of substance use motivations is an individual's normative beliefs, which can be separated into two categories – descriptive and injunctive norms. Descriptive norms are an individual's perception of how common a behavior is among one's peers, i.e. how many of one's peers regularly engage in substance use (Cialdini, Kallgren, & Reno, 1991). Cialdini (1988) describes descriptive norms as a "decisional shortcut", wherein individuals trust that the behaviors of the majority in a given situation are effective and appropriate. The relationship between descriptive norms and behaviors has been documented as

early as 1956 with the classic conformity studies that found that participants would knowingly answer incorrectly to questions in order to match the consensus of the group (Asch, 1956).

Injunctive norms refer to an individual's perception of how acceptable a behavior is among one's peers, i.e. how acceptable do one's peers believe it is to regularly engage in substance use (Cialdini, Kallgren, & Reno, 1991). Injunctive norms are thought to influence behaviors through perceived anticipation of social punishment or reward in response to one's behavior (Cialdini, Kallgren, & Reno, 1991). Kallgren, Cialdini, & Reno (1989) demonstrated the relationship between injunctive norms and behavior by showing that focusing participants' attention on injunctive norms to reduce littering did reduce participants' chances of littering.

Normative Beliefs and Alcohol Use

Much of the research on the relationship between normative beliefs and substance use behavior has centered around alcohol use. Borsari and Carey (2001) reported a review of the literature of peer influences on college drinking, providing an in-depth analysis of the research examining the relationship between normative beliefs and alcohol use. The authors report that the prominence of alcohol in college culture and widespread use in university social situations contribute to the saliency of alcohol-based normative beliefs (Borsari & Carey, 2001; Lac & Donaldson, 2018; Person & Hustad, 2014). The positive relationship between perceived peer drinking levels and personal alcohol use have been demonstrated consistently across the literature for decades, with higher perceived peer drinking levels and higher perceived peer approval of drinking relating to higher personal use (Borsari & Carey, 2001). Several studies demonstrate that students consistently overestimate the frequency and quantity of peer drinking, and assume that others drink more than themselves (Borsari & Carey, 2001; Foster, Neighbors, & Krieger, 2015; Collins & Spelman, 2013; Borsary & Carey, 2003).

The literature suggests that there is a two-step process of influence of peer norms over personal alcohol use, beginning with students perceiving a discrepancy between their own alcohol use and approval of alcohol use and the alcohol use and approval of use of others. After this misperception of a discrepancy between themselves and their peers, students will attempt to match their behaviors and attitudes to those they perceive to be more common in their peers, i.e. drinking more and approving of drinking more (Borsari & Carey, 2001). In addition to survey-based analyses of normative beliefs, research has also shown that addressing misperceptions of peer alcohol use is commonly utilized in a clinical setting (Borsary & Carey, 2001; Miller et al., 2005; Kilmer, Geisner, Gasser, & Lindgren, 2015).

Normative Beliefs and Misuse of Prescription Stimulants

In 2008, McCabe conducted a study and found that 6% of undergraduates reported past-year misuse of prescription stimulants, and that over 70% of the undergraduates sampled overestimated the rates of past-year misuse. The sample incorrectly estimated on average that 20% of students engaged in past-year misuse of prescription stimulants, with those who engaged in past year misuse of prescription stimulants estimating higher rates of misuse than those who did not engage in past-year misuse (McCabe, 2008).

There have been steady increases in the misuse of prescription stimulants in recent years, as evidenced by Silvestri and Correia (2016) who found that 22.9% of undergraduates reported past-year misuse of prescription stimulants. However, the researchers found consistent results with students reporting significantly higher perceptions of past-year misuse of prescription stimulants, with misusers reporting higher perceptions of past-year misuse than non-users (Silvestri & Correia, 2016). Kilmer et al. (2015) found that college students who perceived inflated rates of prescription stimulant misuse among their peers were more likely themselves to engage in prescription stimulant misuse. In addition, the researchers found that both normative

beliefs of higher rates of prescription stimulant misuse and personal prescription misuse were predictors of drinking risks (Kilmer et al., 2015).

Normative Beliefs and Misuse of Prescription Opioids

McCabe (2008) examined the misuse of prescription opioids among college students, and found that 7.4% report engaging in misuse. However, McCabe also found that sample perceived the percentage of misuse on their campus to be significantly higher than 7.4%, with those who engaged in misuse perceiving the highest rates of misuse (2008). A study of adolescent normative beliefs regarding the misuse of prescription opioids found that those who perceived peer approval of misuse were more likely to misuse, and those who perceived peer disapproval of misuse were less likely to misuse (Egan, Gregory, Osborne, & Cottler, 2019).

Normative Beliefs and Misuse of Prescription Sedatives and Tranquilizers

Despite the growing rates of misuse of prescription sedative and prescription tranquilizers, there is little research assessing normative beliefs about their misuse; furthermore, scant research examines sedatives and tranquilizers as independent classes of drugs. Lehne et al. conducted a study of university students across seven European countries and found that in 5/7 countries included in the survey, over half perceived that 51% or more of their same-sex peers had engaged in the misuse of sedatives and/or tranquilizers at least once in their lives (2018). In an examination of injunctive norms, Lehne et al. (2018) found that 45.1% of participants believed the majority (51% or more) of their same-sex peers approved of the misuse of prescription sedatives and tranquilizers. Finally, the researchers found that 97% of participants perceived the majority of their same-sex peers misused prescription sedatives and tranquilizers at either higher or identical rates to their own use, and that 92.6% of participants perceived the majority of their same-sex peers approved of the misuse of prescription sedatives and tranquilizers at identical or higher rates than their own approval.

Gender Differences in Normative Beliefs and MPM

Borsari and Carey (2001) found consistently across their meta-analysis that men are more likely to both engage in heavier rates of drinking and have more permissive normative beliefs regarding drinking than women. This finding is consistent with the general finding of a positive relationship between drinking behaviors and normative beliefs (Borsari & Carey, 2001). However, this relationship does not extend to the MPM literature. As demonstrated by Kilmer et al., (2015), though men reported higher rates of prescription stimulant misuse, women reported higher normative perceptions of misuse of prescription stimulants than men did. McCabe (2008) found that undergraduate women perceived higher rates of prescription stimulant and opioid misuse than undergraduate men, but there were no gender differences found for rates of misuse for either substance. These findings are all inconsistent with the expected positive relationship between normative beliefs and substance use.

Methodological Differences in Normative Beliefs Literature

Throughout the literature, there are a variety of measurements used to capture normative beliefs related to the misuse of prescription medications. One explanation for the methodological differences could be the diversity of research backgrounds that MPM researchers possess – for example, papers have been published by researchers trained in psychology, criminology, communications, public health, and nursing. While different approaches and perspectives can be beneficial to understanding the complex relationship between normative beliefs and individual misuse, problems can arise among widely varying methodologies as well. In particular, it is difficult to compare results across studies that utilize different measurements of normative beliefs, as it is possible that the studies are not both measuring the same construct. Some examples of methodological differences include the timeframe referenced (past 30 days vs past

year), target group referenced (average university student vs. close friend), and scale (i.e. measuring frequency of days used, or number of occasions used).

The largest methodological difference that exists in the literature lies among studies asking students to provide a perceived percentage *of peers* that misuse in a given timeframe, and studies asking students to provide the *frequency in which the average peer* misuses during a given timeframe. For example, Lehne et al., (2018) and Helmer et al., (2016) both had participants refer to *how often* they think "most (at least 51%) …" of the same-gender students at their university misused prescription medications over a period of time. In contrast, McCabe (2008) and Silvestri and Correia (2016) had participants "estimate *the percentage of [university] students*…" who engaged in MPM over a period of time. Although all studies are referring to their questions as a measurement of descriptive norms, they are asking vastly different questions of their participants. Lehne et al., (2018) and Helmer et al., (2016) are both asking what percentage of participants perceive that the *majority* of their same-gender peers misuse prescription sedatives, while McCabe (2008) and Silvestri and Correia (2016) both allow participants to estimate for themselves the percentage of students that misuse.

Current Study

Further examination into the relationship between normative beliefs and the misuse of prescription medications is needed, including whether there are gender differences in this relationship. The current study will utilize systematic measurements of normative beliefs to improve inconsistencies found in the literature. In addition, more recent and accurate measurements of MPM on college campuses are warranted to examine potential changes in rates of misuse over time. Valuable insight into the misuse of prescription sedatives and tranquilizers, which are currently understudied, will be sought out. Finally, comparisons of normative beliefs across substances will be possible providing insight into students' beliefs about MPM overall.

Hypothesis 1: All students will overestimate descriptive norms, and students engaging in past year MPM will overestimate the rates of MPM among the average college student at significantly higher rates than students who have not engaged in MPM over the past year.

Hypothesis 2: Students engaging in past year MPM will overestimate rates of approval of MPM among the average college student at significantly higher rates than students who have not engaged in MPM over the past year.

Hypothesis 3: There will be no gender differences in MPM or normative beliefs regarding MPM.

Date:
Application Number: Proposal Title:

Principal Investigator: Co-Investigator(s): Faculty Adviser: Project Coordinator: Research Assistant(s):

Processed as: Exempt Category:

02/25/2021
IRB-21-102
Normative Beliefs and Prescription Medication Use

Emily Birkel Thad Leffingwell

Delaney Dunn, Susie Lopez Exempt

Oklahoma State University Institutional Review Board

Status Recommended by Reviewer(s): Approved

The IRB application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in 45CFR46.

This study meets criteria in the Revised Common Rule, as well as, one or more of the circumstances for which continuing review is not required. As Principal Investigator of this research, you will be required to submit a status report to the IRB triennially.

The final versions of any recruitment, consent and assent documents bearing the IRB approval stamp are available for download from IRBManager. These are the versions that must be used during the study.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol

must be approved by the IRB. Protocol modifications requiring approval may include changes to the title, PI, adviser, other research personnel, funding status or sponsor, subject population composition or size, recruitment, inclusion/exclusion criteria, research site, research procedures and consent/assent process or forms.

2. Submit a request for continuation if the study extends beyond the approval period. This continuation must receive IRB review and approval before the research can continue.
3. Report any unanticipated and/or adverse events to the IRB Office promptly.
4. Notify the IRB office when your research project is complete or when you are no longer affiliated

   with Oklahoma State University.

Please note that approved protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRB procedures or need any assistance from the Board, please contact the IRB Office at 405-744- 3377 or irb@okstate.edu.

Sincerely,
Oklahoma State University IRB

Department of Psychology
PARTICIPANT INFORMATION FORM

Normative Beliefs and Prescription Medication Use

Background Information

You are invited to be in a research study investigating perceptions of prescription medication use among college students. We ask that you read this form and ask any questions you may have before agreeing to be in the study. Your participation in this research is voluntary. There is no penalty for refusal to participate, and you are free to withdraw your consent and participation in this project at any time. You can skip any questions that make you uncomfortable and can stop the interview/survey at any time. Your decision whether or not to participate in this study will not affect your grades in school.

This study is being conducted by: Emily Warner, B.A.., Department of Psychology, Oklahoma State University, under the direction of Thad R. Leffingwell, Ph.D., Department of Psychology, Oklahoma State University.

Procedures

If you agree to be in this study, we would ask you to do the following things: Respond to survey questions about prescription medication use, alcohol use, and normative perceptions related to college students. This will be a one- time online survey to be completed in one sitting.

Participation in the study involves the following time commitment: 30 minutes

Compensation

You will receive .5 SONA credit as compensation for completing this survey. You will receive your SONA credit within 48 hours of completing the study.

Confidentiality

The information you give in the study will be anonymous. This means that your name will not be collected or linked to the data in any way. The researchers will not be able to remove your data from the dataset once your participation is complete. We will collect your information through an online survey. This information will be stored in a password-protected computer in a locked office. The research team works to ensure confidentiality to the degree permitted by technology. It is possible, although unlikely, that unauthorized individuals could gain access to your responses because you are responding online. However, your participation in this online survey involves risks similar to a person's everyday use of the internet. If you have concerns, you should consult the survey provider privacy policy at https://www.qualtrics.com/privacy-statement/.

Contacts and Questions

The Institutional Review Board (IRB) for the protection of human research participants at Oklahoma State University has reviewed and approved this study. If you have questions about the research study itself,

please contact the Principal Investigator at 402-630-7631, emily.birkel@okstate.edu, or the faculty adviser at thad.leffingwell@okstate.edu. If you have questions about your rights as a research volunteer or would simply like to speak with someone other than the research team about concerns regarding this study, please contact the IRB at (405) 744-3377 or irb@okstate.edu. All reports or correspondence will be kept confidential.

Statement of Consent

I have read the above information. I have had the opportunity to ask questions and have my questions answered. I consent to participate in the study.

If you agree to participate in this research, please click "I agree to participate."

VITA

Emily Warner

Candidate for the Degree of

Master of Science

Thesis: EXAMINING THE RELATIONSHIP BETWEEN NORMATIVE BELIEFS, MISUSE OF PRESCRIPTION MEDICATIONS AND GENDER IN COLLEGE STUDENTS

Major Field: Psychology

Biographical:

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Completed the requirements for the Master of Science in Psychology at Oklahoma State University, Stillwater, Oklahoma in May, 2023.

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2019 – Present: Tobacco Alcohol Health and Drinking Lab, Stillwater, OK
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