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Emily Baker

The Ohio State University

Molly Downing

The Ohio State University

Nicole C. Kwiek

The Ohio State University

Erica Regan

The Ohio State University

Julia Dionne

Ohio Department of Mental Health & Addiction Services

See next page for additional authors

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Differences in Nonmedical Use of Prescription Stimulants Among Fraternity- and Sorority-Affiliated Students

Authors

Emily Baker, Molly Downing, Nicole C. Kwiek, Erica Regan, Julia Dionne, and Tessa Miracle

DIFFERENCES IN NONMEDICAL USE OF PRESCRIPTION STIMULANTS AMONG FRATERNITY- AND SORORITY- AFFILIATED STUDENTS

EMILY BAKER, PH.D., MOLLY DOWNING, PH.D., NICOLE CARTWRIGHT KWIEK,
PH.D., ERICA REGAN, JULIA DIONNE, TESSA MIRACLE

The current study reviewed data from the 2022 College Prescription Drug Study of 4,967 undergraduate students to examine differences in lifetime and past-year misuse of prescription stimulants, academic motivations and consequences of misuse, and misperceptions of prescription stimulants. Results indicate that fraternity- and sorority-affiliated students are more likely to report misusing a prescription stimulant in their lifetime and within the past year than nonaffiliated students. Fraternity and sorority members are more influenced by academic reasons and social norms than nonaffiliated students, with gender identity further predicting level of risk. Implications for prevention programming for fraternity and sorority members are discussed.

Keywords: prevention, prescription stimulants, fraternity, sorority

Prescription drug misuse remains a health crisis. In 2020, 16.1 million Americans aged 12 years and older misused a prescription drug within the past year; Two million of whom misused a prescription drug for the first time (Substance Abuse and Mental Health Services Administration [SAMHSA], 2021). Prescription drug misuse, or the non-medical use of prescription drugs (NMUPD), involves intentional or unintentional use of prescription medications in any way not directed or intended by the prescriber, including use without a prescription, use of greater or smaller amounts than prescribed, and more frequent or longer use of a medication than prescribed (SAMHSA, 2020). The NMUPD is associated with social, legal, and physical consequences and increases one's risk of experiencing drug overdose, the leading cause of accidental death in the United States (Mattson et al., 2021; Witcraft et al., 2020).

College Student Non-Medical Prescription Drug Use

Young adults aged 18 to 25 years old consistently report misusing prescription medication more than any other age group (McCabe et al., 2018), and college students experience a unique risk among this group. In fact, recent research suggests that between 9% and 25% of college students reported misusing some type of prescription drug at least once in their lifetime (SAMHSA, 2021), and one in every seven college students have reported misuse of prescription drugs in the past year (Iloabuchi et al., 2021). Although most students do not misuse prescription drugs, the rate of NMUPD appears to be interwoven into campus culture and the college student experience.

Previous research has examined how and why college students are misusing prescription drugs at this escalating rate. College students face unique strains that increase their overall risk to mental health and substance use issues, including navigating increased independence, academic stress, and challenges in interpersonal relationships (Norman & Ford, 2018; Rodriguez, 2016). Students report using prescription drugs to improve grades and studying habits, enhance social situations, relieve pain or anxiety, improve sleep, or simply to “get high” (Phillips & McDaniel, 2018). Further, college students are more likely to perceive prescription drugs as easier to access and safer to use than illicit drugs (Weyandt et al., 2009), and 62% of college students know a peer who misused prescription drugs in the past year (Iloabuchi et al., 2021). The perceived access and social norms surrounding prescription drug use on campus increase college student risk. However, for college students, the most widespread misperception may be the safety and usefulness of prescription stimulants, such as Adderall®, Ritalin®, Dexedrine®, and Vyvanse®.

Non-medical Use of Prescription Stimulants

Prescription stimulants pose a unique and specific threat to college students’ physical and mental wellness. Traditional-aged college students (ages 18-25 years old) are more likely to misuse prescription stimulants than their non-college counterparts, who instead report higher rates of prescription pain relievers and sedatives (Schulenberg et al., 2021). In fact, stimulants are the only prescription drug type with higher rates of misuse among college-enrolled students than among unenrolled peers of the same age (McCabe et al., 2018). In the last two decades, the reported lifetime prevalence of the non-medical use of prescription stimulants has ranged from 5% to 25% of students (Arria et al., 2018; Garnier-Dykstra et al., 2012; Weyandt et al., 2018; SAMHSA, 2021). For a more accurate and representative estimate, a 2015 meta-analysis of 30 prevalence studies estimated that 17% of college students misuse stimulants in their lifetime (Benson et al., 2015). This rate is particularly concerning because the risk of lifetime stimulant dependency increases the earlier in a life a person begins their non-medical use of prescription stimulants (Arria et al., 2018).

Socio-demographic differences may play a role in the prevalence of stimulant misuse among college students. Nonmedical stimulant misuse is higher among traditionally aged students, White students, male-identifying students, students involved in fraternities and sororities, and students with lower GPAs (Bavarian, et al., 2015; Benson et al., 2015; Teter et al., 2010). Additionally, students who have previously misused other substances, such as alcohol, cannabis, ecstasy, and cocaine, are more likely to misuse prescription stimulants (Korn et al., 2019; Pino et al., 2017; Rabiner et al., 2010). Intersecting psychosocial factors further predict nonmedical prescription stimulant use, including heightened anxiety, impulsivity, restlessness, stress, and diminished concentration (Bennett & Holloway, 2017; Rolland & Smith, 2017). Regardless of these documented differences in prevalence, academic strain is a significant

predictor across all college students and is the primary motive for misusing stimulants on campus (Weyandt et al., 2009).

Most students engage in stimulant misuse for academic rather than recreational purposes (Cook et al., 2021), which corresponds with the considerable academic stress that college students endure. College students' desire to improve academic performance and grade point average, cope with demands of the academic environment, and/or alleviate stress associated with studying are strong motivators and predictors of stimulant misuse (Arria et al., 2018; Johnston et al., 2016; Ross et al., 2018; Wilens et al., 2017). Despite the desire to improve academic performance, stimulant misuse is not significantly correlated with improved grades or cognitive functioning (Arria et al., 2018; Arria et al., 2017; Weyandt et al., 2013). Rather, it is associated with greater dysfunction of inhibition, self-monitoring, and initiation (Wilens et al., 2017). College students who misuse stimulants are more likely to report higher rates of depressive symptoms, alcohol or other drug misuse, psychological distress, physical injury and sickness, and risky behaviors (Arria et al., 2018; Hermos et al., 2009; Pillow et al., 2014; Teter et al., 2010; Weyandt et al., 2009).

Sorority and Fraternity Life Student Risk

One group at particular risk are students affiliated with fraternity and sorority life on campus. Studies have found that fraternity and sorority affiliation is linked to increased overall alcohol intake and likelihood to binge drink, use cannabis, and misuse medication (DeSantis et al., 2010; McCabe et al., 2018; Vidourek et al., 2019). This holds true for prescription stimulant misuse. In fact, Witcraft and colleagues (2020) found that compared to nonaffiliated students, fraternity, and sorority life students misuse prescription stimulants at higher rates, despite no differences in rates of prescription drug misuse overall. Yet, fraternity and sorority members are more likely to report peer prescription misuse than nonmembers, with stimulants as the most misused drug class among their peers.

The increased risk for fraternity and sorority students may be due to several reasons. DeSantis et al. (2010) examined motives and perceived benefits of nonmedical stimulant use in fraternity and sorority life students and found that students reported an even greater ease of access to stimulants within fraternity and sorority houses and increased openness about nonmedical stimulant use among affiliated peers. Yet, fraternity and sorority life students perceive less need for intervention than nonmembers (Iloabuchi et al., 2021). The combined impact of increased access to prescription drugs through affiliated peers and the perceived social acceptability of nonmedical use of prescription stimulants can create a high-risk environment for college students. Specifically, these factors make social reasons for prescription stimulant misuse potentially more prevalent or impactful for fraternity and sorority students where peer support and norms are emphasized and valued. Similar to studies on fraternity and sorority social norms on binge

drinking and other drug misuse, social reasons for stimulant misuse may function differently for affiliated students and just as important as the more commonly reported academic reasons.

Like nonaffiliated students, fraternity and sorority members report academic purposes as their primary motive for stimulant misuse, including increasing productivity, helping with studying, and improving grades (DeSantis et al., 2010; Dussault & Weyandt, 2013). However, fraternity and sorority students report additional social reasons for non-medical stimulant use. These reported motives include reasons related to peer interactions, such as peer pressure, as well as reasons based in social norms, such as believing they were safer and/or less addictive than other drugs (Dussault & Weyandt, 2013; Weyandt et al., 2009). Fraternity and sorority life provides many undergraduate students with community, social identity, and shared purpose. The brotherhood/sisterhood and community values are primary reasons students seek and join fraternity and sorority chapters (Fouts et al., 2010). While the community ideals of fraternity and sorority life organizations are a strong protective factor, inaccurate social norms within the community may increase risk of students who engage in high-risk behaviors, including trying alcohol and other drugs (Barry et al., 2016; Biddix, 2016). With increased social and academic reasons, socialization, and misperceptions of prescription stimulants, fraternity and sorority life students are at unique risk and need tailored prevention and intervention strategies.

Prevention research has explored multiple risk factors for prescription stimulant misuse among college students, including examining differences by fraternity/sorority affiliation and gender. However, recent research has not explored the interaction of these factors in predicting the risk of misusing, and updated research on risk factors and rates of misuse are needed following the COVID-19 global pandemic. Further, previous research on prescription stimulant misuse focuses primarily on academic reasons for misuse among college students. As social organizations with influential group norms, fraternity/sorority-affiliated students may experience differences in their reasons for use based on the influence of social norms. Thus, this study seeks to examine differences in prescription stimulant misuse patterns, including academic reasons and consequences from misuse and misuse influenced by social norms, by fraternity/sorority affiliation and gender.

Research Aims

Utilizing survey data on undergraduate students at 15 institutions in the United States, the current study aims to examine differences by gender and fraternity/sorority affiliation in four key areas:

- 1) Prevalence of prescription stimulant misuse (lifetime and past year),
- 2) Academic motives of misuse (help study or improve grades),
- 3) Perceived academic consequences of misuse (positive impact or negative impact on grades), and

- 4) Motives of use based on perceived social norms (they felt safer than street drugs, felt less addictive than street drugs, experienced pressure by others to use)

We examined these variables for differences between fraternity- and sorority- affiliated students and nonaffiliated undergraduate students, and between cisgender male and cisgender female undergraduate students. We also examined these variables for an interaction effect of fraternity/sorority affiliation and gender.

Methods

Participants and Procedures

An online, anonymous survey on the topic of the non-medical use of prescription drugs was distributed to random samples of undergraduate, graduate, and professional students at 15 public and private colleges throughout the United States in February and April 2022. Students had to be 18 years or older to participate and consented to participation at the beginning of the online survey. The survey received 6,510 responses (a 11% response rate), which includes all undergraduate, graduate, and professional student participants. Since this study is interested in only undergraduate students, we restricted the sample to include only undergraduate students who completed all variables of interest, which included answering survey items regarding misusing prescription stimulants in their lifetime, in the past year, motivations for consequences of use, and demographic information. Thus, the sample for this study is 4,967 undergraduate respondents.

Measure

The survey instrument asked detailed questions about students' non-medical prescription drug use, frequency of use, motivations for use, consequences of use, and demographic information. The present study focuses on prescription stimulant misuse, specifically, lifetime misuse, misuse in the last 12 months, whether respondents stated that they used stimulants for one or more of four academic/social motives for misusing, and whether respondents reported that stimulant misuse contributed to a positive or negative impact on their academics. All outcome variables were included as dichotomous variables (no use vs. misuse). The following questions were analyzed:

1. Have you ever used a prescription stimulant (e.g., Ritalin, Adderall, Dexedrine) for non-medical reasons (e.g., it was not prescribed for you, you only used it for the experience or feeling it caused, or you used it in a way other than the prescriber intended or ordered)?
 - a. Answer options: Yes, No, I'd rather not say
2. How many times would you estimate that you have used prescription stimulants for non-medical reasons in the last 12 months?
 - a. Answer options: 0 times, 1-2 times, 3-9 times, 10-19 times,

20-49 times, 50-99 times, 100 or more times, or I'd rather not say

- b. Recoded into dichotomous variable: no use (0 times) vs. misuse (1-100+ times)
3. Why have you used prescription stimulants for non-medical reasons?
 - a. Answer options: To help study or improve grades, because I felt pressured by others, because they felt safer than street drugs, and because they felt less addictive than street drugs
 4. Have you ever experienced the following effects from your non-medical use of prescription stimulants (e.g., Ritalin, Adderall, Dexedrine)?
 - a. Answer option: Experienced a positive impact on your academics as a result of your use
 - b. Answer option: Experienced a negative impact on your academics as a result of your use

Analytic Strategy

SPSS Version 26 was used to examine all research questions. First, propensity score matching analysis was completed to adjust for confounding variables that may influence participants' membership or affiliation with fraternity and sorority life. The confounding variables used in propensity score matching were age, race/ethnicity, institution, self-reported grade-point average, parental education level, and enrollment status. The matched sample was used for all further analyses. We examined descriptive statistics for the frequency and percentage of all categorical variables to determine homogeneity across reference groups. Multiple logistic regressions were used to estimate associations between gender and/or fraternity/sorority affiliation and the identified outcome variables (lifetime use, past-year use, reasons for use, consequences of use), with a separate logistic regression for each outcome variable. Then, we calculated the predicted probability (odds ratio) of students' self-reported lifetime and past-year misuse, reasons for misuse, and consequences of misuse based on gender, F/S affiliation, and the interaction of gender and F/S affiliation.

Results

Of the 6,510 students who completed the 2022 College Prescription Drug Study, 76.2% of the respondents ($n = 4,967$) were undergraduate students. Of those, 21.8% of respondents (1,081 students) reported being an active member of fraternity and sorority life on their campus. In terms of gender identity, 64.8% ($n = 3,220$) of undergraduate respondents identified as female, 30.2% ($n = 1,502$) identified as male, and 4.6% ($n = 229$) identified as another gender or agender. Due to the study's focus on fraternity-affiliated males and sorority-affiliated

females, students who responded as another gender or agender were not included in the analysis. Thus, 26.1% ($n = 839$) of female-identifying students reported affiliation with a sorority, and 13.5% ($n = 203$) of male-identifying respondents reported affiliation with a fraternity.

To examine the main and interaction effects of fraternity/sorority-affiliation and self-reported gender identity on multiple outcome variables, we used multiple logistic regression analyses. Prior to regression analyses, propensity score matching using the nearest-neighbor 1:1 matching method in SPSS was completed to adjust for confounding variables on participants' self-reported affiliation with fraternity and sorority life.

Table 1

Descriptive Statistics on Key Demographic Variables

	<i>n</i>	%
Gender		
Cisgender Males	570	23%
Cisgender Females	1792	72.3%
Another Gender	107	4.3%
F/S Affiliation		
F/S Affiliated	1779	71.8%
Not Affiliated	698	28.2%
Race/Ethnicity		
Asian/Asian American	83	3.4%
Black/African American	136	5.5%
Hispanic/Latino	204	8.2%
Native American	4	.2%
Middle Eastern/Arab American	90	3.6%
White	1508	60.9%
Multiracial	283	11.4%
Other	339	13.7%
Class Rank		
First year	707	28.5%
Second year	532	21.5%
Third year	559	22.6%
Fourth year	542	21.9%
Fifth+ year	137	5.5%

Propensity scores were calculated with six variables: age, race/ethnicity, institution, self-reported grade-point average, parental education level, and enrollment status. Propensity score analysis effectively balanced the variances between observed fraternity/sorority-affiliated student group and non-affiliated student group (F/S: $M = .2170$, $SE = .04736$, $n = 1407$, Non-F/S: $M = .2173$, $SE = .04688$, $n = 698$). A paired-samples t-test comparing fraternity/sorority-affiliated and non-affiliated students had similar variances on the Levene's Test ($F = .038$, $p = .846$) and the paired-sample t-test was not significant ($t = .186$, $df = 2103$, $p = .426$).

We completed logistic regression analyses on the matched sample 2,443 participants rather than the original sample of 4,967 participants. Due to running several logistic regressions, we utilized a Bonferroni adjustment of .01 to further accommodate for increased risk of Type I error. Table 1 shows the descriptive statistics for the sample for self-reported gender identity, F/S affiliation status, race/ethnicity, and undergraduate class rank within the matched dataset. Within the matched dataset, most participants identified as cisgender female and affiliated with a fraternity or sorority. The sample included participants from 15 institutions in various regions (primarily in the Midwest and southeastern United States). As the key variables, Table 2 presents the percentage of students who reported ever using a prescription stimulant for a non-medical reason and misusing within the past year by fraternity/sorority affiliation and sex.

Table 2

Prescription Stimulant Misuse by Fraternity/Sorority Affiliation and Gender Identity

	Lifetime Misuse		Past-year Misuse	
	<i>n</i>	%	<i>n</i>	%
All Students	468	19.0%	174	7.4%
F/S-Affiliated	385	21.2%	150	8.4%
Non-F/S-Affiliated	85	12.2%	37	5.3%
Cisgender Females	282	15.7%	106	5.9%
F/S-Affiliated	236	17.2%	89	6.5%
Non-F/S Affiliated	46	11.0%	17	4.0%
Cisgender Males	166	29.1%	68	11.9%
F/S-Affiliated	130	38.6%	49	14.5%
Non-F/S-Affiliated	36	15.5%	19	8.2%

Logistic regression was used to analyze the relationship between F/S affiliation, gender identity, and lifetime nonmedical use of prescription stimulants. Table 3 shows the regression results for both lifetime misuse and past-year misuse. The first logistic regression model was statistically significant ($\chi^2 = 94.733$, $df = 3$, $p < .001$), and explained 16.3% of the variance in lifetime misuse of prescription stimulants (Nagelkerke $R^2 = .163$). The odds of ever misusing a prescription stimulant are higher for fraternity/sorority-affiliated students ($OR = 2.409$, 95%CI [1.843-3.15]) and for cisgender males ($OR = 2.119$, 95%CI [1.621-2.771]). Similarly, the interaction of fraternity/sorority affiliation and gender identity was statistically significant, with further increased odds of fraternity males ever misusing a prescription stimulant ($OR = 2.035$, 95%CI [1.190-3.479]).

Table 3 also presents the results of past-year nonmedical use of prescription stimulants. The logistic regression was also statistically significant ($\chi^2 = 30.043$, $df = 3$, $p < .001$), and explained 31.0% of the variance in prescription stimulant misuse within the past 12 months (Nagelkerke $R^2 = .310$). Cisgender male students were twice as likely to report nonmedical use of prescription stimulants than cisgender females ($OR = 2.272$, 95%CI [1.546-3.340]). Similarly, fraternity/sorority-affiliated students were nearly twice as likely to report past-year misuse ($OR = 1.775$, 95%CI [1.208-2.609]). However, the interaction between fraternity/sorority affiliation and gender identity was not significant for past year misuse.

Table 3

Logistic Regression Results for Lifetime and Past-year Prescription Stimulant Misuse

	B	SE	Wald	df	p	OR	95% CI	
							L	U
Lifetime Use								
F/S Affiliation	.879	.137	41.29	1	<.001	2.409	1.843	3.150
Gender Identity	.751	.137	30.12	1	<.001	2.119	1.621	2.771
F/S Affiliation*Gender	.710	.274	6.74	1	.009	2.035	1.190	3.479
Constant	-1.458	.068	454.04	1	<.001	.233		
Past-Year Use								
F/S Affiliation	.574	.197	8.53	1	.003	1.775	1.208	2.609
Gender	.821	.197	17.44	1	<.001	2.272	1.546	3.340
F/S Affiliation*Gender	.153	.393	.151	1	.697	1.167	.539	2.518
Constant	-2.507	.098	650.69	1	<.001	.082		

Note: Reference group for F/S Affiliation is non-affiliated students, reference group for gender identity is cisgender females.

We also analyzed reasons and consequences for stimulant misuse among students who reported ever misusing a prescription stimulant at some point in their life. Table 4 presents the results of three logistic regression models for academic reasons (misusing to study or improve grades) and the perceived academic consequences (i.e., perceived positive effect on grades or perceived negative effect on grades). For academic reasons, the logistic regression model was statistically significant ($\chi^2 = 83.791$, $df = 3$, $p < .001$), and explained 16.4% of the variance in prescription stimulant misuse to help them study or improve grades (Nagelkerke $R^2 = .164$). Again, fraternity/sorority-affiliated students were twice as likely to report misusing prescription stimulants to help them study or improve grades than non-affiliated students ($OR = 2.181$, 95%CI [1.627-2.924]), and cisgender males were twice as likely to report misusing to study or improve grades than cisgender females ($OR = 2.295$, 95%CI [1.712-3.076]). The interaction effect between fraternity/sorority affiliation and gender identity was statistically significant ($OR = 2.223$, 95%CI [1.237-3.994]).

Students were more likely to report that their stimulant misuse had a positive effect on their grades. The logistic regression for perceived positive effect on grades was statistically significant ($\chi^2 = 14.889$, $df = 3$, $p = .002$), and only explained 4.1% of the variance in perceived positive effect on grades due to stimulant misuse (Nagelkerke $R^2 = .041$). With Bonferroni adjustment, only gender identity was statistically significant for perceived positive consequences. Cisgender males were twice as likely to perceive that their stimulant misuse had a positive effect on their grades than cisgender females ($OR = 2.141$, 95%CI [1.471-3.116]). The logistic regression model examining perceived negative effects on grades was not statistically significant ($\chi^2 = 2.244$, $df = 3$, $p = .523$). In this model, fraternity/sorority-affiliated students were twice as likely to report perceived negative effects on their grades than non-affiliated students ($OR = 2.302$, 95%CI [1.474-8.187]).

Finally, we examined the differences in three social norms for misuse of prescription stimulants (misuse because they believed it was less addictive than other drugs, because they believed it was safer than other drugs, or because they were pressured by others). The first logistic regression model examining the belief that prescription stimulants were less addictive was not significant ($\chi^2 = 6.634$, $df = 3$, $p = .085$), and neither fraternity/sorority affiliation nor gender identity were statistically significant predictors. The second logistic regression model was statistically significant ($\chi^2 = 11.769$, $df = 3$, $p = .008$), but only explained 3.9% of the variance in prescription stimulant misuse due to the belief that it was safer (Nagelkerke $R^2 = .039$). Fraternity/sorority-affiliated students were nearly 2.5 times as likely to perceive prescription stimulants as safer to use than other drugs when compared to non-affiliated students ($OR = 2.481$, 95%CI [1.215-8.614]). Further, cisgender males were over 4 times as likely to perceive prescription stimulants as safer than other drugs than cisgender females ($OR = 4.307$, 95%CI [1.240-14.955]). The interaction between fraternity/sorority affiliation and gender identity

Table 4

Logistic Regression Results for Academic Reasons and Consequences of Prescription Stimulant Misuse

	<i>B</i>	<i>SE</i>	<i>Wald</i>	<i>df</i>	<i>p</i>	<i>OR</i>	95% CI	
							<i>L</i>	<i>U</i>
Improve Grades/Study								
F/S Affiliation	.780	.150	27.21	1	<.001	2.181	1.627	2.924
Gender Identity	.831	.150	30.87	1	<.001	2.295	1.712	3.076
F/S Affiliation*Gender	.799	.299	7.14	1	.008	2.223	1.237	3.994
Constant	-1.708	.075	521.79	1	<.001	.181		
Positive Effect on Grades								
F/S Affiliation	.520	.191	5.39	1	.028	1.683	1.156	2.449
Gender	.761	.191	15.80	1	<.001	2.141	1.471	3.116
F/S Affiliation*Gender	.862	.383	5.06	1	.024	2.367	1.118	5.015
Constant	-2.390	.096	623.00	1	<.001	.092		
Negative Effect on Grades								
F/S Affiliation	.834	.807	9.067	1	.009	2.302	1.474	8.187
Gender	.192	.807	12.057	1	.812	1.212	.249	5.889
F/S Affiliation*Gender	-.841	1.613	.272	1	.602	.431	.018	10.183
Constant	-5.283	.403	171.62	1	<.001	.005		

Note: Reference group for F/S Affiliation is non-affiliated students, reference group for gender identity is cisgender females.

was not statistically significant ($OR = .572$, 95%CI [.047 -6.894]).

Finally, the last logistic regression model was statistically significant ($\chi^2 = 12.623$, $df = 3$, $p = .006$), but only explained 5.6% of the variance in prescription stimulant misuse due being pressured by others (Nagelkerke $R^2 = .056$). The odds of misusing a prescription stimulant due to being pressured by others are higher for fraternity/sorority-affiliated students ($OR = 1.783$, 95%CI [1.156-2.423]) and for cisgender males ($OR = 2.134$, 95%CI [1.711-3.122]). Similarly, the interaction of fraternity/sorority affiliation and gender identity was statistically significant, with further increased odds of fraternity males ever misusing a prescription stimulant ($OR = 2.389$, 95%CI [1.138-5.015]).

Table 5

Logistic Regression Results for Social Norms for Prescription Stimulant Misuse

	B	SE	Wald	df	p	OR	95% CI	
							L	U
Believed it was less addictive								
F/S Affiliation	7.54	1039.2	.000	1	.994	1.882	1.627	2.924
Gender Identity	8.32	1039.2	.000	1	.994	2.295	1.712	3.076
F/S Affiliation*Gender	-17.41	2078.3	.000	1	.993	2.223	1.237	3.994
Constant	-8.923	519.58	.000	1	.986	.181		
Believed it was safer								
F/S Affiliation	1.909	.635	2.047	1	.002	2.481	1.215	8.614
Gender	1.460	.635	5.287	1	.001	4.307	1.240	14.955
F/S Affiliation*Gender	-.559	1.27	.194	1	.660	.572	.047	6.894
Constant	-4.600	.318	209.85	1	<.001	.010		
Pressured by others								
F/S Affiliation	.620	.198	7.389	1	.004	1.783	1.156	2.423
Gender	.680	.191	15.786	1	<.001	2.134	1.711	3.122
F/S Affiliation*Gender	.864	.392	5.023	1	.002	2.389	1.138	5.015
Constant	-2.390	.089	623.00	1	<.001	.092		

Note: Reference group for F/S Affiliation is non-affiliated students, reference group for gender identity is cis gender females.

Discussion

This study found numerous group differences by fraternity and sorority life affiliation and gender. Both male and female students affiliated with fraternity/sorority life were more likely to report both lifetime and past-year use, regardless of gender. This is consistent with previous research indicating that fraternity and sorority students are at increased risk for substance misuse (Welsh et al., 2019), specifically misuse of prescription stimulants (Witcraft et al., 2020). Further, the results found that cis gender males are at higher risk for prescription stimulant misuse in their lifetime, which is also consistent with prior studies (Bavarian et al., 2015). The interaction between fraternity/sorority affiliation and gender was significant for several logistic regression models, including the prediction of lifetime misuse. Thus, being affiliated with fraternity and

sorority life has a bigger impact on prescription drug misuse for male students than female students. While non-affiliated males reported higher rates of lifetime and past-year misuse of prescription drugs than non-affiliated females, fraternity and sorority affiliation did not increase their level of risk proportionately due to the interaction effect. This finding suggests that there are important differences in how males experience and are impacted by F/S affiliation compared to females, and those differences may be explained by the varying reasons and social norms regarding prescription drug misuse within fraternities compared to sororities. Regardless, the interaction of both gender identity and fraternity/sorority affiliation indicates that affiliated male students may need additional targeted support.

Our second research aim examined how academics intersect with the nonmedical use of prescription stimulants for affiliated and nonaffiliated undergraduate students. Previous research found that students report misusing prescription stimulants primarily to assist them in studying, concentrating, and completing academic tasks, and thereby improve their grades (Arria et al., 2017b; Clegg-Kraynok et al., 2011). However, the actual effect on students' grades is unclear, with prior research indicating that students' grades are not significantly impacted as a result of the non-medical use of stimulants (Arria et al., 2017). This study's results highlight the differences in both reported academic reasons and academic consequences between fraternity/sorority-affiliated students and nonaffiliated students. Specifically, fraternity/sorority-affiliated students are more likely to report using stimulants to help them study or improve their grades than non-affiliated students, which provides context for the different rates of lifetime and past-year use for affiliated students.

However, when examining these academic differences by gender, important patterns emerge. Cisgender males, regardless of F/S-affiliation, are more likely to report that they experienced a positive effect on their grades as a result of their prescription stimulant misuse than cisgender females. The significant interaction effect between F/S affiliation and gender suggests that F/S affiliation is more influential of this positive perception on grades for male students than female students. Thus, affiliated male students are more likely to perceive positive effects on their grades as a result of their prescription stimulant misuse than affiliated females. On the other hand, F/S-affiliated students, regardless of gender, are more likely to perceive negative effects on their academics as a result of their prescription stimulant misuse. This is conflicting with the positive perception reported by fraternity-affiliated males, suggesting that gender dynamics plays a significant role in influencing misperceptions of misuse for affiliated students.

There are clearly differences in perceptions and reasons for use across both F/S affiliation and gender. Without examining gender as a factor, it appears that fraternity and sorority students are aware of the negative impact of prescription stimulant misuse on their grades, and yet affiliated males are still significantly more likely to use them in

hopes of improving their academics. It may be that F/S-affiliated students are more likely to misuse prescription stimulants for studying, but affiliated males are more likely to perceive positive effects, while affiliated females are more likely to perceive negative effects. Previously, Ross et al. (2018b) found that college students in general perceived the benefits of prescription stimulant misuse to outweigh the risks of use, which helps explain continued use despite negative consequences. It may be that students are simply not equipped with alternative strategies for studying or time management. Additionally, the short-term positive benefits of stimulants (i.e., increased focus) may be more influential on students' decision to use a prescription stimulant for academic purposes than the long-term negative impact on their grades. Further, the social norm of using prescription stimulants to study and the widespread belief that the nonmedical use of prescription stimulants can improve academic performance may be a stronger influence than their own experience, particularly in fraternities and sororities. Further qualitative research can provide further insights into students' reasons for misuse and how social norms and academic perceptions regarding stimulant misuse interact. However, the current results highlight the occurrence of pluralistic ignorance and how misperceptions and acceptability may differ depending on a student's peer group or gender dynamics. For fraternity/sorority-affiliated students, the nonmedical use of prescription stimulants may be a particularly influential injunctive norm.

In fact, previous research suggests that perceived peer group approval of substance use is positively correlated with increased misuse, yet distal referents (e.g., referencing a typical university student) have less of an impact on use patterns (Dumas et al., 2018; Graupensperger et al., 2020; Neighbors et al., 2008). The social norms of a student's close peer group are particularly influential, whether it is serving academic purposes or not. Thus, the social nature of fraternity and sorority life may foster more prominent positive and negative social norms. For example, the intensive peer exposure incorporated into the fraternity/sorority culture can serve as a protective factor providing strong social support as well as a risk factor by normalizing specific risky behaviors among close peers, depending upon the fraternity/sorority social norms and group values.

Due to their significant influence in fraternity/sorority life, this study also examined the influence of social norms on students' decision to use prescription stimulants for non-medical reasons. We examined three social norms that influenced decision to misuse - belief that prescription stimulants were safer than other "street" drugs, belief that prescription stimulants were less addictive than other "street" drugs, or perceived pressure from peers to use a prescription stimulant. The results showed differences by fraternity/sorority life affiliation and gender on the belief that it was safer and perceived pressure by peers. Fraternity/sorority-affiliated students were significantly more likely to feel pressured by their peers and believe misperceptions regarding prescription stimulants' safety. These findings echo previous research

that fraternity and sorority members are more likely to believe misperceptions regarding the safety of prescription stimulants and rate of peer misuse (Dussault & Weyandt, 2013), perhaps due to the influence of injunctive norms and the influential peer relationships and culture.

The results indicated that cisgender male students also have heightened risk, particularly F/S-affiliated males, due to perceived peer pressure. The interaction effect indicates that F/S-affiliated males were more likely to misuse due to feeling pressured by others, and that F/S life affected affiliated males' and females' experience of peer pressure in different ways. Previous research consistently demonstrates that male college students misuse substances at higher rates than female college students, whether affiliated with fraternity or sorority life or not (Walters et al., 2018; Wilsnack et al., 2018). However, the findings from this study suggest that F/S affiliation does not impact male and female baseline misuse rates in the same way, but rather affiliated males and affiliated females have different reasons and experiences of F/S life that impact their rates of prescription drug misuse. Specifically, the key interaction effects found in this study paint a picture of different dynamics and contributors to prescription drug misuse between males and females affiliated with fraternity and sorority life. These factors are important to consider when tailoring prevention programming for student groups, as fraternities may benefit from a different prevention approach than sororities. Tailoring programs for F/S-affiliated students without considering the different gender dynamics may be less effective for preventing prescription drug misuse than it is for preventing alcohol misuse or other substances. Understanding the dynamics and experiences of different student groups and identities is necessary to develop prevention programs that leverage group strengths and target specific risk factors effectively.

The influence of social norms in fraternity/sorority life may increase the spread of misperceptions regarding stimulant use. However, it may also improve the effectiveness and reach of prevention programs targeting social norms of prescription drug misuse. In fact, previous research demonstrated that peer-led prevention programs can positively impact the social norms of risky behaviors use fraternity/sorority culture (Abadi et al., 2020). Peer-led prevention is preferred among college students in general (Ross et al., 2018) and may be even more effective within close peer groups like fraternities and sororities. Prevention specialists have the potential to leverage the cultural strengths of fraternity and sorority life by utilizing peer influence to shift perceptions of substance misuse and other high-risk behaviors. Using stimulants to enhance academics or as a result of peer influence and misperceptions implies a strong influence of inaccurate social norms on college campuses. Social perceptions and norms are more influential among close peer groups, placing fraternity/sorority members at unique risk (Dumas et al., 2018; Graupensperger et al., 2020; Neighbors et al., 2008). However, peers may be the strongest influence in maintaining positive and more accurate social norms in fraternity/sorority life.

Future research should examine the effectiveness of peer-led preven-

tion programs focused on prescription stimulant misuse. One limitation of this study is the representativeness of the sample. Although the study consists of multiple campuses, this sample is neither nationally representative nor includes all national regions. Although institution, race/ethnicity, age, enrollment status, and parental education level were all controlled for through propensity score analysis, there are other confounding variables that may drive the observed differences more than fraternity/sorority affiliation or self-reported gender identity. A key demographic that needs further consideration is student's self-reported race/ethnicity. Fraternities and sororities are highly racialized organizations with vastly different experiences, social norms, and group values (Gillon, et al., 2019).

The current study did not collect information regarding the specific fraternity or sorority chapter of affiliation, and therefore were unable to differentiate fraternity/sorority affiliation further or examine the intersection of race/ethnicity within fraternity/sorority affiliation. Future research should examine the interaction of race/ethnicity with fraternity/sorority affiliation to further understand how specific fraternity/sorority life experiences predict or influence prescription stimulant misuse. Furthermore, the social norms, activities, and group values of fraternities and sororities vary by chapter, campus, and group. Grouping fraternity and sorority membership excludes the important differences in local experiences that exist across chapters and campuses. Future research should examine reasons and consequences for prescription stimulant misuse within unique fraternity/sorority chapters.

Additionally, the reasons for nonmedical use of prescription stimulants were identified by the researchers and listed as quantitative selections for this study. Future research should explore reasons for use among fraternity and sorority members using qualitative methodologies, which may expand these generalized categories and provide a deeper understanding of the misperceptions that influence misuse as well as the role of gender. Third, the study's sample included limited responses from students who identify as non-binary or transgender. Although many fraternity and sorority programs are divided by gender identity, the presence of non-binary and transgender students in these settings is needed to fully understand group differences and appropriately inform prevention programs.

In conclusion, membership in fraternities and sororities is a risk factor for substance misuse, including the non-medical use of prescription stimulants (Witcraft et al., 2020). The results of this study represent the need for specific prevention programs that target the unique risks for misuse in fraternity and sorority life. Fraternities and sororities have well-established social norms that appear to influence both academic and social reasons for non-medical use of prescription stimulants. Although they are currently at heightened risk, campus prevention professionals can leverage the power of established norms and the cohesiveness of the fraternity/sorority social network to inform widespread and targeted prevention.

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Author Biographies

Emily Baker (she/her), Ph.D., is the Behavioral Health Research Director at Marshall University Center of Excellence for Recovery. She previously served as a postdoctoral scholar at The Ohio State University and coordinated the 2022 administration of the College Prescription Drug Study. She received her Ph.D. in counselor education from The Ohio State University and is a Licensed Professional Clinical Counselor.

Molly Downing (she/her), Ph.D, is an Assistant Professor in the College of Pharmacy at The Ohio State University, the Associate Director for Generation Rx, and serves as a staff member within the Higher Education Center for Alcohol and Drug Misuse Prevention and Recovery. Her research interests include medication safety, prescription drug misuse prevention education for youth audiences, and instructional design for online educational experiences. She holds a Ph.D. in pharmacology from Vanderbilt University.

Nicole Cartwright Kwiek (she/her), Ph.D. is Clinical Professor and Associate Dean of Undergraduate Studies at The Ohio State University College of Pharmacy. Dr. Kwiek's research and community engagement activities focus on the use of pharmacology as a context to engage science learners of all ages. She co-founded and led Generation Rx for 15 years, a national educational initiative aimed at promoting awareness of safe medication-taking practices and the dangers of prescription drug misuse.

Erica Regan (she/her) is the Director of the Center for the Study of Student Life at Ohio State University. She is a leader in student affairs assessment and research, having led multi-institutional studies on financial wellness and prescription drug misuse. Dr. Regan strives to center student voices in assessment and make data actionable for partners.

Julia Dionne (she/her) is an accomplished population health researcher with 10+ years of research experience within the healthcare industry, academia, and government. Julia earned her dual master's degrees in Public Administration, health policy specialization, and Public Health, promoting health behaviors specialization, from Ohio State. Her current research focuses on assessing statewide mental health and substance use trends to inform the development of new systems, policies, and programs to increase access to treatment and support services.

Tessa Miracle (she/her) is a Research Scientist and the Pacific Institute for Research and Evaluation (PIRE). She earned her PhD from the University of Cincinnati and has focused her professional efforts on decreasing substance misuse by supporting community-based intervention, and currently serves as the evaluator for Ohio's Strategic Prevention Framework for Prescription Drug Misuse (SPF Rx).