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Misperceptions of Nonmedical Prescription Drug Use: A Web Survey of College Students

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Abstract

Objectives—This study compared undergraduate students' perceived versus actual prevalence rates of nonmedical use of marijuana, prescription opioids and prescription stimulants.

Methods—In 2005, a randomly selected sample of 3,639 college students self-administered a Web survey regarding their substance use behaviors and attitudes (68% response rate).

Results—The majority of undergraduate students overestimated the prevalence of nonmedical use of prescription stimulants (70.2%) and prescription opioids (69.9%) and marijuana use (50.5%) among peers on their campus. The mean difference between perceived versus actual past year use was considerably greater for nonmedical use of prescription stimulants (mean difference = 12.2, 95% CI = 11.7 – 12.7) and prescription opioids (mean difference = 8.8, 95% CI = 8.3 – 9.2) than marijuana (mean difference = 2.9, 95% CI = 2.2 – 3.6). Multivariate regression analysis revealed overestimation of nonmedical use of prescription drugs was significantly associated with gender and medical use of prescription drugs.

Conclusions—The findings provided strong evidence of misperception of nonmedical prescription drug use among college students. Future research and prevention efforts should assess the impact of correcting misperceived norms on reducing nonmedical prescription drug use.

Keywords

Perception; Substance use; Prescription drugs; College students; Survey research

1. Introduction

The nonmedical use of prescription drugs (NMUPD) has increased over the past decade among U.S. college students (e.g., Johnston et al., 2007; McCabe et al., 2007). The annual prevalence of any NMUPD (i.e., stimulants, opioids, sedatives, or tranquilizers) among U.S. college students increased from 8.3% in 1996 to 14.6% in 2006 while the prevalence of marijuana declined over this same time period (Johnston et al., 2007). The nonmedical use of prescription stimulants is more prevalent among U.S. college undergraduate students than their same-age peers not attending college while the nonmedical use of prescription opioids is more prevalent

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among young adults not attending college (e.g., Herman-Stahl et al. 2007; Johnston et al., 2007; SAMHSA, 2005). There is evidence that the nonmedical use of prescription stimulants and opioids is more prevalent among particular subgroups of U.S. college students and types of colleges (e.g., Johnston et al., 2007; McCabe et al., 2005a, 2005b).

Past research indicates a discrepancy between the actual and perceived prevalence rates of alcohol consumption among college students (e.g., Baer, 1994; Kypri & Langley, 2003; Berkowitz & Perkins, 1986) as well as substances other than alcohol such as cigarette smoking, marijuana and other illicit drug use (e.g., Kilmer et al., 2006; Page, 1998; Perkins et al., 1999; Wolfson, 2000). College students tend to overestimate drinking and other drug use levels of their peers; this misperception has been found to be more extreme in certain subgroups such as heavy drinking students (e.g., Perkins & Wechsler, 1996; Pollard et al., 2000) and residents of fraternities and sororities (e.g., Baer, 1994; Baer, Stacy & Larimer, 1991). The overestimation of drinking has also been observed in other countries including New Zealand university students (Kypri & Langley, 2003) and in the Canadian general population (Wild, 2002). Perkins and colleagues (1999) used data from 48,168 college students attending 100 different U.S. colleges and universities to examine the difference between actual and perceived drug use among U.S. college students (Perkins et al., 1999). College students generally overestimated their peers' use of illicit drugs such as marijuana, cocaine, hallucinogens, and inhalants.

Approximately 14.6% of U.S. college students report nonmedical use of at least one prescription drug class (i.e., stimulants, opioids, sedatives, tranquilizers) in the past year while approximately 30.2% report marijuana use (Johnston et al., 2007). The annual prevalence in the general population of individuals aged 18 to 25 in the U.S. is 15.5% for nonmedical use of at least one prescription drug class (i.e., stimulants, opioids, sedatives, tranquilizers) and 28.0% for marijuana use (SAMHSA, 2007). At least one college study examined the annual prevalence of medical and nonmedical use of prescription drugs and found the following: sleeping medication (3.3% medical use and 2.0% nonmedical use), sedative/anxiety medication (3.4% medical use and 2.9% nonmedical use), stimulant medication (2.2% medical use and 5.4% nonmedical use), and pain medication (24.4% medical use and 9.3% nonmedical use) (McCabe et al., 2006). Thus, the nonmedical use/medical use ratio for stimulant medication among college students was much higher than other classes of prescription drugs including pain medication, sleeping medication or sedative/anxiety medication, suggesting stimulant medication is the only prescription drug class with a higher proportion of nonmedical users than medical users (McCabe et al., 2006).

While there is ample evidence for misperceptions about use in several categories of drugs among college students, previous research has not examined the perceptions of the two most commonly misused classes of prescription drugs, prescription opioids (e.g., hydrocodone, oxycodone) and prescription stimulants (e.g., methylphenidate, amphetamine/dextroamphetamine). Despite the current research indicating increases in NMUPD among college students, it remains unknown whether college students accurately estimate the extent of NMUPD among their peers and these perceptions compare to other drug use such as marijuana. The main objective of the present exploratory study was to examine the actual versus perceived estimates of marijuana use and nonmedical use of prescription opioids and stimulants among undergraduate students.

2. Method

2.1. Study population and data collection

The Institutional Review Board approved the protocol for this study and all respondents gave informed consent online. The study was conducted during January and February of 2005,

drawing on a total undergraduate population of 20,138 full-time students (10,339 women and 9,799 men). A simple random sample of 5,389 full-time undergraduate students was drawn from the Registrar's Office. A Web-based survey method was employed; similar methods have been shown to be feasible and effective for research on alcohol and other drug use in college student samples (e.g., Kypri, Gallagher & Cashell-Smith, 2004; McCabe et al., 2002). The entire sample was mailed a \$2.00 bill along with a notification letter describing the study and inviting them to self-administer the Student Life Survey (SLS) by typing a link and using a unique password to access the Web survey which prevented multiple submissions. The Web survey was maintained on an Internet site running under the secure socket layer protocol to ensure security and privacy. Non-respondents to the notification letter were sent an invitation e-mail and up to four reminder e-mails.

By participating in the survey, students became eligible for a sweepstakes that included cash prizes, travel vouchers, field passes to athletic events, and electronic game and music devices. The final response rate was 68%, which exceeds the average response rate for national college-based alcohol and other drug studies (Presley & Pimentel, 2006; Wechsler et al., 2002). Furthermore, of those who started the Web survey, the proportion of respondents who completed the entire survey was 97% (completion rate). The Web survey was designed so that respondents did not receive questions that were not relevant to them and respondents were asked to correct inconsistent responses. For example, skip patterns were embedded so that specific drug-related questions were only asked to those students who reported drug use and validation checks were embedded to deter false responding.

2.2. Measures

Nonmedical use of prescription opioids was assessed with the following question—"On how many occasions in the past 12 months have you used the following types of drugs, not prescribed to you?" Pain medication (i.e., opioids such as Vicodin, OxyContin, Tylenol 3 with codeine, Percocet, Darvocet, morphine, hydrocodone, oxycodone). The response scale ranged from (1) No occasions to (7) 40 or more occasions.

Perception of nonmedical use of prescription opioids was assessed with the following question—"Please estimate the percentage of (name of university) students who, in the past 12 months used pain medication (i.e., opioids such as Vicodin, OxyContin, Tylenol 3 with codeine, Percocet, Darvocet, morphine, hydrocodone, oxycodone) that was not prescribed to them." Respondents were asked to estimate a numeric percentage ranging from 0 to 100%.

Nonmedical use of prescription stimulants was assessed with the following question—"On how many occasions in the past 12 months have you used the following types of drugs, not prescribed to you?" Stimulant medication (e.g., Ritalin, Dexedrine, Adderall, Concerta, methylphenidate). The response scale ranged from (1) No occasions to (7) 40 or more occasions.

Perception of nonmedical use of prescription stimulants was assessed with the following question—"Please estimate the percentage of (name of university) students who, in the past 12 months used stimulant medication (e.g., Ritalin, Dexedrine, Adderall, Concerta, methylphenidate) that was not prescribed to them." Respondents were asked to estimate a numeric percentage ranging from 0 to 100%.

Marijuana use was assessed with the following question—"On how many occasions in the past 12 months have you used the following types of drugs?" Marijuana or hashish. The response scale ranged from (1) No occasions to (7) 40 or more occasions.

Perception of marijuana use was assessed with the following question—“Please estimate the percentage of (name of university) students who, in the past 12 months used marijuana or hashish.” Respondents were asked to estimate a numeric percentage ranging from 0 to 100%.

2.3. Data analysis

To determine estimates of the *actual* prevalence rates of marijuana use and nonmedical use of prescription opioids and stimulants, the number of students reporting each of these behaviors was divided by the total number of students in the final sample. Differences between subgroups of students (e.g., males and females) in terms of *actual* use (measured via binary indicators) were determined using chi-square tests. Different subgroups of students (e.g., nonmedical users and non-users) were also contrasted in terms of mean reported values on the *perceived* percentages, using two-sample t-tests and one-way ANOVA (when more than two subgroups were compared). The difference between the estimated percentage of students actually using a given drug and each student's *perceived* percentage of students using a given drug was also computed for each student, and descriptive statistics were computed for these three difference measures.

The three difference measures were then considered as continuous dependent variables in three multiple regression models, where predictors of interest included gender, race/ethnicity, class year, fraternity / sorority membership, and medical use of the particular prescription drug being modeled (only applicable for the outcomes involving nonmedical use of prescription opioids and stimulants). The fitted regression models were investigated thoroughly to ensure that multicollinearity of the correlates was not having a negative impact on the standard errors of the estimated coefficients, and standard regression diagnostics were examined to determine whether assumptions of normality and constant variance for the residuals were reasonable. All statistical analyses were carried out using SPSS 15.0, and $p < 0.05$ was considered significant.

2.4. Sample

The final sample consisted of 3,639 undergraduate students and the demographic characteristics of the sample closely resembled the overall undergraduate student population. For example, the mean age of the sample and population was 20 years of age. In addition, the final sample of full-time undergraduate students consisted of 54% women, 46% men, and the racial/ethnic breakdown was 67% White, 12% Asian, 6% African American, 4% Hispanic, 1% Native American and 10% other racial/ethnic groups. The population of full-time undergraduate students was made up of 51% women and 49% men and the racial/ethnic breakdown was 65% White, 14% Asian, 6% African American, 4% Hispanic, 1% Native American and 10% other racial/ethnic groups.

3. Results

3.1. Actual vs. perceived prevalence of nonmedical use of prescription stimulants

Although the actual past year prevalence of nonmedical use of prescription stimulants among undergraduate students at this university was estimated to be 6.0%, the sample perceived the average of past year nonmedical use of prescription stimulants on campus to be considerably higher (mean = 20.0%, median = 15.0%). The majority of undergraduate students overestimated the prevalence of past year nonmedical use of prescription stimulants among their peers. Indeed, 70.2% of the overall sample perceived the nonmedical use of prescription stimulants was higher than the actual rate of 6.0%.

Past year nonmedical users of prescription stimulants perceived the prevalence of past year nonmedical use of prescription stimulants was relatively high (35.2%) compared to past year

non-users (19.1%), ($t(3477) = 12.2, p < .01$). Although the actual past year prevalence for nonmedical use of prescription stimulants did not differ significantly as a function of gender (women = 5.3% and men = 6.7%), the mean perceived rate of nonmedical use of prescription stimulants was significantly higher for undergraduate women (22.8%) than for undergraduate men (16.8%), ($t(3487) = 9.5, p < .01$).

Past-year nonmedical use of prescription stimulants was significantly more prevalent among fraternity/sorority members (12.0%) compared to non-members (5.0%), ($\chi^2(1) = 35.7, p < .01$). Similarly, fraternity/sorority members also perceived a higher rate of nonmedical prescription stimulant use ($M = 27.7%$) compared to non-members ($M = 18.8%$), ($t(3453) = 9.6, p < .01$). Past-year nonmedical use of prescription stimulants was significantly more prevalent among past-year medical users of prescription stimulants (30.6%) compared to non-users (5.1%), ($\chi^2(1) = 125.7, p < .01$). Medical users of prescription stimulants also perceived a higher rate of nonmedical prescription stimulant use ($M = 34.4%$) compared to non-users ($M = 19.5%$), ($t(3474) = 8.2, p < .01$).

3.2. Actual vs. perceived prevalence of nonmedical use of prescription opioids

Although the actual past year prevalence for nonmedical use of prescription opioids on the campus was 7.4%, the sample perceived that the prevalence of percentage of past year nonmedical use of prescription opioids was much higher (mean = 18.2%, median = 15.0%). Similar to prescription stimulants, the majority of undergraduate students overestimated the prevalence of past year nonmedical use of prescription opioids among their peers. Indeed, 69.9% of the overall sample perceived the nonmedical use of prescription opioids was higher than the actual rate of 7.4%.

Past year nonmedical users of prescription opioids perceived the past year prevalence of nonmedical use of prescription opioids to be significantly higher ($M = 23.7%$) than non-users ($M = 17.7%$), ($t(3476) = 5.6, p < .01$). Although the actual past year prevalence for nonmedical use of prescription opioids did not differ by gender (men = 7.4% and women = 7.5%), undergraduate women perceived that the past year prevalence was significantly higher ($M = 20.4%$) than men ($M = 15.6%$), ($t(3488) = 8.8, p < .01$).

Results showed a significant association between race/ethnicity and past-year nonmedical use of prescription opioids, ($\chi^2(4) = 13.7, p < .01$). Rates were highest among Whites (8.3%), Hispanics (8.1%), African Americans (5.7%) and lowest among Asians (3.5%). A one-way ANOVA of the perceived prevalence rates of nonmedical use of prescription opioids showed a main effect for race/ethnicity, ($F(4, 3485) = 5.0, p < .01$), and perceived prevalence rates were higher among Blacks ($M = 22.2%$) compared to Asians ($M = 18.6%$), Hispanics ($M = 18.6%$), Whites ($M = 18.1%$), and Others ($M = 15.7%$). There were no significant differences between fraternity/sorority members and non-members in the actual or perceived prevalence of nonmedical prescription opioid use. However, past-year nonmedical use of prescription opioids was significantly more prevalent among past-year medical users of prescription opioids (18.4%) compared to non-users (4.3%), ($\chi^2(1) = 174.6, p < .01$). Medical users of prescription opioids also perceived a higher rate of nonmedical prescription opioid use ($M = 20.4%$) compared to non-users ($M = 17.5%$), ($t(3465) = 4.2, p < .01$).

3.3. Actual vs. perceived prevalence of marijuana use

The actual past-year prevalence for marijuana use among undergraduate students was 35.5% while the perceived past-year prevalence of marijuana among undergraduate students was slightly higher (mean = 38.5, median = 39.0). Relative to prescription opioids and stimulants, fewer undergraduate students overestimated the prevalence of past year marijuana use among

their peers. Approximately 50.5% of the overall sample perceived marijuana use was higher than the actual rate of 35.5%.

Past year marijuana users perceived the overall rate of marijuana use was $M=46.1\%$, while non-users perceived the overall mean rate was $M=34.3\%$, $t(3477)=15.8$, $p < .01$. Although the actual past year prevalence for marijuana use did not differ significantly by gender (men = 36.8% and women = 34.4%), undergraduate women perceived the past-year prevalence of marijuana use to be higher ($M=41.8\%$) than men ($M=34.8\%$), ($t(3515)=9.6$, $p < .01$).

Results showed a significant association between race/ethnicity and past-year marijuana use, ($\chi^2(4)=93.2$, $p < .01$), and rates were highest among Hispanics (45.6%) and Whites (39.7%) and lowest among African Americans (23.2%) and Asians (19.2%). A one-way ANOVA of the perceived prevalence rates of marijuana use showed a main effect for race/ethnicity, ($F(4, 3512)=21.9$, $p < .01$), and perceived prevalence rates were higher among Whites ($M=40.5\%$), Hispanics ($M=40.3\%$), and Blacks ($M=38.7\%$) compared to Others ($M=32.9\%$) and Asians ($M=32.7\%$). There were no significant associations between class year and actual or perceived prevalence of marijuana use. In contrast, past-year marijuana use was more prevalent among fraternity/sorority members (58.3%) compared to non-members (32.0%), ($\chi^2(1)=121.7$, $p < .01$). Similarly, perceived prevalence of marijuana use was higher among fraternity/sorority members ($M=44.5\%$) compared to non-members ($M=37.6\%$), $t(3481)=6.5$, $p < .01$.

3.4. Multivariate analysis: Multiple regression analysis of the difference between perceived and actual nonmedical use of prescription stimulants

Multiple regression analysis was conducted to assess the relationships of gender, race/ethnicity, class year, Greek membership, and medical use of stimulants with the difference between perceived and actual nonmedical use of prescription stimulants (see Table 1). Dummy variables were created to represent the race/ethnicity and class year variables. For the dependent measure, higher positive scores indicate overestimation of the prevalence of the nonmedical use of prescription stimulants relative to its actual prevalence rate. Results showed that the set of predictors explained 5.7% of the variance in the difference between perceived and actual nonmedical prescription stimulant use, adjusted $R^2 = .057$, ($F(10, 3299)=21.1$, $p < .01$). Unstandardized coefficients and their standard errors are reported in Table 1. There were no effects of race/ethnicity or class year on the difference between perceived and actual nonmedical prescription stimulant use. There was a significant relationship of gender, and results showed that, when controlling for the other predictors in the model, females overestimated the prevalence of nonmedical prescription stimulant use by 5.7% relative to males. In addition, fraternity/sorority members overestimated the prevalence of nonmedical prescription stimulant use by 7.4% relative to non-members. Finally, results showed that past-year medical users of prescription stimulants overestimated the prevalence of nonmedical prescription stimulant use by 13.5% relative to those who did not use prescription stimulants.

3.5. Multivariate analysis: Multiple regression analysis of the difference between perceived and actual nonmedical use of prescription opioids

A similar multiple regression analysis was conducted in order to assess the relationships of gender, race/ethnicity, class year, Greek membership, and medical use of opioids with the difference between perceived and actual nonmedical prescription opioid use. Results showed that the set of predictors explained 3.0% of the variance in the difference between perceived and actual nonmedical prescription opioid use, adjusted $R^2=.03$, ($F(10, 3395)=11.4$, $p < .01$). As seen in Table 1, there were no effects of class year or Greek membership on the difference between perceived and actual nonmedical prescription opioid use. There was a significant relationship of gender, and results showed that, controlling for other predictors in the model, females overestimated the prevalence of nonmedical prescription opioid use by 4.6% relative

to males. In addition, Blacks overestimated the prevalence of nonmedical prescription opioid use relative to whites and Others. Finally, results showed that past-year medical users of prescription opioids overestimated the prevalence of nonmedical prescription opioid use by 2.7% relative to those who did not use prescription opioids.

3.6. Multivariate analysis: Multiple regression analysis of the difference between perceived and actual marijuana use

A final multiple regression analysis was conducted in order to assess the relationships of gender, race/ethnicity, class year, and Greek membership with the difference between perceived and actual marijuana use. Results showed that the set of predictors explained 5.2% of the variance in the difference between perceived and actual marijuana use, adjusted $R^2 = .052$, ($F(9, 3446) = 22.2$, $p < .01$). As seen in Table 1, there was no relationship of class year with the difference between perceived and actual marijuana use. There was a significant relationship of gender, and results showed that, when controlling for other predictors in the model, females overestimated the prevalence of marijuana use by 6.5% relative to males. In addition, Blacks overestimated the prevalence of marijuana use relative to Asians and Others. Finally, results showed that fraternity/sorority members overestimated the prevalence of marijuana use by 5.4% relative to non-members.

4. Discussion

The majority of undergraduate students in the present study overestimated the prevalence of nonmedical use of prescription stimulants, prescription opioids and marijuana among their peers. The misperceptions found in the present study add further evidence to a wealth of research that indicates college students generally overestimate the prevalence of alcohol use (e.g., Baer, 1994; Kypri & Langley, 2003; Presley et al., 1996), and other drug use among their peers (e.g., Kilmer et al., 2006; Perkins & Berkowitz, 1986; Presley et al., 1996).

The present study found that the proportion of students who overestimated nonmedical use of prescription stimulants (70.2%) and prescription opioids (69.9%) was higher than the proportion of those who overestimated marijuana use (50.5%). Based on a social norms framework, one could argue that the overestimation of NMUPD leads to misperceived norms which may promote such behavior (Perkins, 2002) and contribute to recent increases in NMUPD among college students (Johnston et al., 2007; McCabe et al., 2007). Additionally, it is possible that increases in NMUPD could influence the formulation of social norms and there is also evidence for a mutual-influence relationship: perceived norms predicting later substance use as well as substance use behaviors predicting later perceived norms (Neighbors et al., 2006). More research is needed to examine the temporal relationships between perceived norms of NMUPD and actual NMUPD behaviors as a way of better understanding the origin of misperceptions.

There are several possible explanations for why people tend to overestimate other's behavior (e.g., Ross, Greene & House, 1977; Sherman et al., 1983; Wolfson, 2000). The study found evidence for "false consensus effect" or the tendency to overestimate the extent to which others share one's own attitudes and behaviors. This concept has been used to explain the misperception of substance use behaviors such as cigarette smoking, marijuana and amphetamine use (e.g., Sherman et al., 1983; Wolfson, 2000). For example, Sherman and colleagues (1983) found that peoples' estimates of cigarette smoking were highly associated with the number of their friends who smoked (Sherman et al., 1983). Further, Wolfson (2000) examined the actual and perceived usage of marijuana and amphetamines (e.g., pep pills, speed) among college students. Wolfson (2000) found that students tended to overestimate the actual rates of amphetamine and marijuana use and overestimates were the

greatest among those who used each of these drugs. The author concluded that overestimation is influenced by one's own drug use and social network of friends (Wolfson, 2000).

The present study provides new evidence that misperceptions of nonmedical use of prescription stimulants and prescription opioids are greater than misperceptions of marijuana use. With respect to the discrepancy in misperceptions between NMUPD and marijuana, students could be influenced by a later average age of onset for NMUPD relative to marijuana, the increased medical availability of prescription medications, and the impact of popular press and direct marketing (SAMHSA, 2007). The well-documented increase in the medical availability of prescription medications appears especially relevant for the increase in NMUPD among U.S. college students because college students are largely responsible for their own medication management and rely heavily on their peers as the main source for NMUPD (McCabe & Boyd, 2005; McCabe et al., 2006). For example, over 90% of nonmedical users of prescription stimulants obtained these drugs without a prescription from college peers and nonmedical users reported easy perceived availability of prescription stimulants "...getting Adderall and Ritalin are probably easier than getting alcohol on this campus" (McCabe et al., 2006). Interestingly, there is growing evidence that nonmedical users of prescription opioids and stimulants are part of the illicit drug using population (e.g., McCabe et al., 2005a, 2005b; McCabe & Teter, 2007; Teter et al., 2003).

The present study revealed several important factors that were associated with the difference between perceived and actual NMUPD and marijuana use. First, members of social fraternities and sororities overestimated nonmedical use of prescription stimulants and marijuana use. These findings are in line with previous research that has found perceptions of drinking norms are particularly exaggerated among members of social fraternities and sororities (Baer, 1994; Baer, Stacy & Larimer, 1991). Some researchers have raised concerns regarding the efficacy of using a social norms approach to substance abuse prevention within high risk groups such as fraternities. Due to the lack of a healthy norm in this population, students are more influenced by peers in their own social networks and heavy substance abuse is the norm in the social fraternity population (Carter & Kahnweiler, 2000). Second, gender was an important factor in the misperception of nonmedical use of prescription drugs and marijuana. Women were consistently more likely than men to overestimate nonmedical use of prescription drugs and marijuana use. For example, multivariate analysis showed that females overestimated the prevalence of nonmedical use of prescription stimulants by 5.7%, prescription opioids by 4.6% and marijuana use by 6.5%, relative to males. Finally, the medical users of prescription drugs overestimated the nonmedical use of prescription opioids and stimulants. For instance, results showed that past-year medical users of prescription stimulants overestimated the prevalence of nonmedical prescription stimulant use by 13.5% relative to those who did not use prescription stimulants. These factors should be carefully considered in any future research and prevention efforts that attempt to correct misperceptions and reduce NMUPD among college students.

This study possessed important strengths and limitations. First, this study represents the first known investigation to focus on misperceptions of nonmedical use of prescription stimulants (e.g., Ritalin, Dexedrine, Adderall, Concerta, methylphenidate) and prescription opioids (e.g., Vicodin, OxyContin, Tylenol 3 with codeine, Percocet, Darvocet, morphine, hydrocodone, oxycodone) among college students. Second, the present study compared the misperceptions of NMUPD and marijuana use. Finally, the sample was large enough to conduct multivariate analysis and examine several important characteristics associated with the difference between perceived and actual NMUPD and marijuana use.

Although data for the present study were collected in 2005, there were no significant changes in the prevalence of nonmedical use of prescription opioids and stimulants among U.S. college

students between 2005 and 2006 (Johnston et al., 2007). The nonresponse rate of 32% could have introduced potential bias in the present study. Therefore, nonresponse bias was assessed by administering a short form of the questionnaire via telephone to a randomly selected sample of 750 students who did not respond to the original web survey, and 159 of these students responded. There were no significant differences in prevalence rates of 12-month alcohol use, binge drinking, 30-day cigarette smoking and other problem health behaviors between respondents and non-respondents. Based on the growing evidence that survey response rates have been declining in population-based and college-based studies (e.g., Groves et al., 2002; Wechsler et al., 2002), similar follow-up efforts to assess potential nonresponse bias will increasingly become important. Second, the sample from the present study was drawn from one university and the findings may not generalize to other college samples because previous research has found that rates of NMUPD vary across different types of U.S. colleges and universities. For example, the past-year prevalence at individual four-year U.S. colleges and universities ranged from 0% to 20% for nonmedical use of prescription opioids (McCabe et al., 2005a) and 0% to 25% for nonmedical use of prescription stimulants (McCabe et al., 2005b).

Based on the findings of the present study, future health education and prevention efforts should be considered that reduce misperceptions regarding NMUPD as part of a multifaceted approach to reduce prescription drug abuse among college students. Similar approaches have shown some success and hold theoretical promise for reducing alcohol misuse among college students (e.g., Mattern & Neighbors, 2004; Perkins, 2002) but require more comprehensive evaluation for reducing NMUPD.

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Table 1

Multiple regression analyses of the difference between perceived and actual nonmedical prescription stimulant use, nonmedical prescription opioid use, and marijuana use.

Predictor	Unstandardized Coefficients (SEs) for Perceived – Actual Nonmedical Stimulant Use	Unstandardized Coefficients (SEs) for Perceived – Actual Nonmedical Opioid Use	Unstandardized Coefficients (SEs) for Perceived – Actual Marijuana Use
Intercept	15.4 (1.4)**	15.6 (1.3)**	5.4 (1.6)**
Gender	-5.7 (0.6)**	-4.6 (0.6)**	-6.5 (0.7)**
Race: White	0.7 (1.4)	-3.5 (1.2)**	2.0 (1.6)
Race: Hispanic	-0.7 (2.0)	-3.3 (1.8)	1.6 (2.3)
Race: Asian	-1.2 (1.6)	-2.2 (1.4)	-5.6 (1.8)**
Race: Other	-2.7 (1.6)	-5.6 (1.5)**	-4.1 (1.9)*
Class Year: Sophomore	0.03 (0.9)	-0.90 (0.8)	0.70 (1.0)
Class year: Junior	0.30 (0.9)	0.73 (0.8)	-1.00 (1.0)
Class Year: Senior	-1.50 (0.8)	-0.86 (0.8)	-1.10 (1.0)
Greek Membership	7.4 (0.9)**	0.7 (0.8)	5.4 (1.1)**
Medical Use	13.5 (1.8)**	2.7 (0.7)**	NA
Adjusted R^2	.057**	.030**	.053**

Note. Reference category for race/ethnicity= Black. Reference category for class year = Freshman. Gender is coded 0=female, 1=male. Greek membership is coded 0=non-member, 1=member. Medical use is coded 0=no, 1=yes. For all difference scores, higher positive scores indicate overestimation of the prevalence of the use of that medication or drug relative to its actual prevalence rate.

SEs = standard errors (in parentheses)

* $p < .05$.

** $p < .01$.