



## Subtypes of nonmedical prescription drug misuse

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### ABSTRACT

This study used three characteristics (i.e., motive, route of administration, and co-ingestion with alcohol) of nonmedical prescription drug misuse across four separate classes (i.e., pain, sedative/anxiety, sleeping, and stimulant medications) to examine subtypes and drug related problems. A Web survey was self-administered by a randomly selected sample of 3639 undergraduate students attending a large midwestern 4-year U.S. university. Self-treatment subtypes were characterized by motives consistent with the prescription drug's pharmaceutical main indication, oral only routes of administration, and no co-ingestion with alcohol. Recreational subtypes were characterized by recreational motives, oral or non-oral routes, and co-ingestion. Mixed subtypes consisted of other combinations of motives, routes, and co-ingestion. Among those who reported nonmedical prescription drug misuse, approximately 13% were classified into the recreational subtype, while 39% were in the self-treatment subtype, and 48% were in the mixed subtype. There were significant differences in the subtypes in terms of gender, race and prescription drug class. Approximately 50% of those in subtypes other than self-treatment screened positive for drug abuse. The odds of substance use and abuse were generally lower among self-treatment subtypes than other subtypes. The findings indicate subtypes should be considered when examining nonmedical prescription drug misuse, especially for pain medication.

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### 1. Introduction

Nonmedical prescription drug misuse has increased significantly over the past decade in the United States (Blanco et al., 2007; Johnston et al., 2007; McCabe et al., 2007a; SAMHSA, 2007). The three largest national epidemiological studies of nonmedical prescription drug misuse are the National Survey on Drug Use and Health (NSDUH), Monitoring the Future (MTF), and National Epidemiologic Survey on Alcohol and Related Conditions (NESARC). Collectively, these three studies reveal that nonmedical prescription drug misuse is most prevalent among young adults 18–25 years old (Kroutil et al., 2006; McCabe et al., 2006a; SAMHSA, 2006, 2007), including surprisingly high rates among college students (Herman-Stahl et al., 2007; Johnston et al., 2007; McCabe et al., 2005a, b, 2007a; SAMHSA, 2005).

Despite the increase in the prevalence of nonmedical prescription drug misuse, considerable gaps in knowledge remain regarding heterogeneity and adverse consequences associated with nonmedi-

cal prescription drug misuse due to limitations in measurement. For example, prevalence rates from the three above-mentioned studies fail to distinguish between subtypes of individuals who report nonmedical prescription drug misuse to self-treat medical conditions (e.g., prescription pain medication to relieve pain) and those who report nonmedical prescription drug misuse for recreational purposes (e.g., co-ingest prescription pain medication with alcohol to get high). Previous studies suggest many important characteristics associated with nonmedical prescription drug misuse that influence drug abuse potential including motives, routes of administration, and co-ingestion with other drugs (Boyd et al., 2006; Compton and Volkow, 2006a,b; Lankenau et al., 2007; McCabe et al., 2006b, 2007b; McCabe and Teter, 2007; Teter et al., 2005, 2006; Volkow and Swanson, 2003; White et al., 2006). Within the context of nonmedical prescription drug misuse, self-treatment is motivated by the desire to alleviate symptoms consistent with the prescription drug's pharmaceutical main indication and does not involve co-ingestion with alcohol or other drugs or non-therapeutic routes of administration (Boyd and McCabe, 2008).

Increasingly, researchers recognize that motives and other characteristics associated with nonmedical prescription drug misuse are crucial to identify meaningful subtypes (Boyd et al., 2006; Compton and Volkow, 2006a,b; McCabe et al., 2007b; Zaczyn and Lichtor, 2008). Just as research on motives and other

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characteristics have helped to identify subtypes of drinking behaviors (Cooper, 1994; Cooper et al., 1995; Schulenberg et al., 1996), marijuana use (Schulenberg et al., 2005; Simons et al., 1998; Zvolensky et al., 2007), and cocaine use (Weiss and Mirin, 1986), an improved understanding of nonmedical prescription drug misuse will help identify subtypes of individuals at greatest risk for adverse consequences. Previous research suggests self-treatment motivates a substantial portion of nonmedical prescription drug misuse while recreational use also motivates a considerable portion of misuse among adolescents and young adults (Babcock and Byrne, 2000; Barrett et al., 2005; Boyd et al., 2006; Carroll et al., 2006; Johnston and O'Malley, 1986; McCabe et al., 2007a,b; Rabiner et al., in press; Teter et al., 2005, 2006; White et al., 2006). In order to fully comprehend the risks associated with nonmedical prescription drug misuse, it is necessary to understand the motives because those who engage in self-treatment may face different consequences than those who misuse for recreational purposes.

While previous studies have considered individual characteristics associated with nonmedical prescription drug misuse (e.g., motives, route of administration, and co-ingestion with other drugs), these characteristics have not been considered simultaneously in an attempt to examine subtypes of prescription drug misuse. Identifying different subtypes and related drug problems can help detect individuals at higher risk for developing substance use disorders and distinguish those who may need appropriate treatment for other health conditions and disorders (e.g., pain, ADHD, anxiety, sleep disorders), which is critical for informing clinical practice and designing effective prevention efforts.

Based on previous studies, we hypothesize self-treatment subtypes for nonmedical prescription drug misuse will be associated with less substance use and fewer substance related problems than recreational and other subtypes. The objectives of the present study are to (1) utilize multiple characteristics of nonmedical prescription drug misuse simultaneously across four separate classes (i.e., pain, sedative/anxiety, sleeping and stimulant medications) to examine three possible subtypes of nonmedical prescription drug misuse (self-treatment, recreational, and mixed); (2) assess the association between the subtypes of nonmedical prescription drug misuse and drug related problems.

## 2. Methods

### 2.1. Study design

The present study was conducted in 2005, drawing on a total undergraduate population of over 20,000 undergraduate students attending a large public research university located in the U.S. After receiving Institutional Review Board approval and a Certificate of Confidentiality, a simple random sample of 5389 undergraduate students was drawn from the total undergraduate population. The entire sample was mailed a pre-notification letter with \$2 enclosed describing the study and inviting students to self-administer a Web survey by using a URL address and unique password. Informed consent was obtained online from each participant. Nonrespondents were sent up to three reminder e-mails. The Web survey was maintained on an Internet site running under the secure socket layer protocol to ensure privacy and security. By participating in the survey, students became eligible for a sweepstakes that included cash and other prizes. The final response rate was 68% and the completion rate was 97%.

### 2.2. Sample

The final sample consisted of 3639 undergraduate students (53.6% women and 46.4% men). The demographic characteristics of the sample closely resembled the overall student population at this university. The mean age of students in the sample was 19.9 years old (S.D. = 2.0). The racial/ethnic distribution of the sample was 67.4% White, 12.1% Asian, 6.0% African American, 4.5% Hispanic and 10.2% from other ethnic categories. The sample was made up of 28.5% freshmen, 23.4% sophomores, 23.1% juniors and 25.0% seniors.

### 2.3. Measures

Nonmedical prescription drug misuse was assessed with the following question: "On how many occasions in (a) your lifetime or (b) the past 12 months have you used

the following types of drugs, not prescribed to you?" There were separate questions for each of the following four classes of prescription drugs: (a) pain medication (i.e., opioids such as Vicodin®, OxyContin®, Tylenol 3® with codeine, Percocet®, Darvocet®, morphine, hydrocodone, and oxycodone); (b) stimulant medication (e.g., Ritalin®, Dexedrine®, Adderall®, Concerta®, methylphenidate); (c) sleeping medication (e.g., Ambien®, Halcion®, Restoril®, temazepam, and triazolam); and (d) sedative/anxiety medication (e.g., Ativan®, Xanax®, Valium®, Klonopin®, diazepam, and lorazepam). The response scale for each prescription drug class was (1) no occasions, (2) 1–2 occasions, (3) 3–5 occasions, (4) 6–9 occasions, (5) 10–19 occasions, (6) 20–39 occasions, and (7) 40 or more occasions.

Motivations for prescription drug misuse were assessed by asking respondents to provide the reasons why they used each class of prescription drugs nonmedically. Respondents who reported nonmedical prescription drug misuse were asked to select all that apply from a list of motives based on previous research (e.g., Johnston and O'Malley, 1986; McCabe et al., 2005c; Teter et al., 2005). Five motivations were listed for all four-prescription drug classes: because it gives me a high, because it counteracts the effects of other drugs, because of experimentation, because it's safer than street drugs, and because I'm addicted. In addition, for the sleeping, sedative/anxiety, and pain medication classes, two other motivations were provided: because it helps me sleep and because it helps decrease anxiety. For the stimulant medication class, four additional motivations were included: because it helps me concentrate, because it helps increase my alertness, because it helps me study, and because it helps me lose weight. For the pain medication class, the motivation "because it relieves pain" was also provided.

Using a variable-centered approach, if respondents only endorsed the motivation that is most consistent with the drug's pharmaceutical main indication (i.e., nonmedical misuse of sleeping medication to sleep, nonmedical misuse of sedative/anxiety medication to decrease anxiety, nonmedical misuse of pain medication to relieve pain, and nonmedical misuse of stimulant medication to help concentrate or increase alertness), they were characterized as demonstrating self-treatment motivations. In addition, respondents were considered engaging in self-treatment motivations if they also endorsed the main indication and an additional motivation(s) that is related with the drug's pharmaceutical indication (e.g., nonmedical misuse of sleeping medication to help sleep and decrease anxiety, nonmedical misuse of sedative/anxiety medication to decrease anxiety and help sleep, nonmedical misuse of pain medication to relieve pain and help sleep, and nonmedical misuse of stimulant medication to help concentrate/increase alertness and help study). If respondents only endorsed motivations consistent with recreational misuse, they were characterized as engaging in recreational motivations (i.e., because it gives me a high, because it counteracts the effects of other drugs, because of experimentation, because it's safer than street drugs, and because I'm addicted). Finally, if respondents endorsed combinations of self-treatment and recreational motives they were considered having mixed motivations.

Co-ingestion of prescription drugs and alcohol was assessed with the following question: "In the past 12 months how many days have you used prescription pain medication (i.e., opioids such as Vicodin®, OxyContin®, Tylenol 3 with codeine, Percocet®, Darvocet®, morphine, hydrocodone, and oxycodone), not prescribed to you by a doctor at the same time you were drinking alcohol?" Respondents were asked to enter the number of days in a text box. The same question was asked for co-ingestion of alcohol and each of the other three prescription drug classes. Binary variables were created for (a) co-ingestion of each prescription drug class and alcohol and (b) no co-ingestion.

Routes of administration were assessed by asking respondents to report how they used each of the following drug classes: (a) pain medication (i.e., opioids such as Vicodin®, OxyContin®, Tylenol 3® with codeine, Percocet®, Darvocet®, morphine, hydrocodone, oxycodone) and (b) stimulant medication (e.g., Ritalin®, Dexedrine®, Adderall®, Concerta®, and methylphenidate). Respondents were asked to select all that apply from a list of five routes of administration: orally, snorting, smoking, injecting, and inhaling. Binary variables were created for routes of each prescription drug class consisting of (a) oral only and (b) non-oral routes.

Using a variable-centered approach, self-treatment subtypes were characterized by motives consistent with the drug's pharmaceutical main indication, oral only routes of administration, and no co-ingestion with alcohol. Recreational subtypes were characterized by recreational motives only, oral or non-oral routes of administration, and co-ingestion or no co-ingestion with alcohol. Mixed subtypes consisted of other combinations of motives, routes of administration, and co-ingestion.

Past-year use of marijuana and other drugs – including cocaine, LSD, psychedelics other than LSD, heroin, crystal methamphetamine, inhalants and ecstasy – was measured with the following question for each substance: "On how many occasions in the past 12 months have you used the following types of drugs?" The response scale for each substance ranged from (1) no occasions to (7) 40 or more occasions. The use of any of the eight substances in the past year was summed to create an index of past year illicit drug use.

The Drug Abuse Screening Test (DAST-10) is a self-report instrument that can be used in clinical and non-clinical settings to screen for potential abuse and dependence on a wide variety of substances other than alcohol (Skinner, 1982). Respondents who used drugs other than alcohol in the past 12 months were asked about ten drug use related problems they might have experienced in the past 12 months (e.g., inability to stop using drugs, illegal activities to obtain drugs, blackouts as a result of drug use, medical problems as a result of drug use, withdrawal

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