



Short Communication

Adolescents' nonmedical use and excessive medical use of prescription medications and the identification of substance use subgroups



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HIGHLIGHTS

- We conducted a Web-based survey of substance use among adolescents.
- Results from latent class analyses showed four classes.
- Two groups had higher nonmedical and excessive medical use of prescription drugs.

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ABSTRACT

The purpose of this study was to identify subgroups of adolescents based on their past 12 months use of tobacco, alcohol, marijuana, illicit drugs, and nonmedical use and excessive medical use of prescription medications. A cross-sectional Web-based survey of adolescents from two middle and high school districts in Southeastern Michigan was conducted. The sample included 2,744 middle school (7th and 8th grade) and high school (9th through 12th grade) students. Participants had a mean age of 14.8 years ($SD = 1.9$ years); 50.4% were female, 64.1% were Caucasian, and 30.6% were African American. Participants completed measures of the past 12 months of substance use, parental monitoring, parental substance use, and internalizing and externalizing problems. Exploratory latent class analysis (LCA) indicated four classes. The largest class was composed of participants with low probabilities of using any substances (low/no use class), and the smallest class was composed of participants with relatively high probabilities of using all substances (multiple substances class). A third class included participants with high probabilities of using tobacco, alcohol, and marijuana (TAM). The fourth class consisted of participants with relatively high probabilities of alcohol use, nonmedical prescription drug use, and excessive medical use of prescription drugs (ANM). Female gender predicted membership in the ANM and multiple substance classes, and parental monitoring, parental substance use problems, internalizing, and externalizing problems uniquely predicted membership in all three high-risk risk classes. Results indicated three high-risk subgroups of adolescents, each characterized by a different pattern of substance use. Two risk groups are characterized by relatively high probabilities of nonmedical use and excessive medical use of prescription medications.

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1. Introduction

Nonmedical use of prescription medications (NUPM) is a growing public health concern (Compton & Volkow, 2006; Jones, 2012). Despite declines in some forms of drug use among U.S. teenagers in the previous 5 years, the use of marijuana, tobacco, and controlled medications has either increased or remained relatively high among adolescents (Johnston, O'Malley, Bachman, & Schulenberg, 2012). In 2011, the overall annual rate for nonmedical use of psychotherapeutics by 12–17 year olds in the United States was 7.0% (SAMHSA,

2012). Evidence showed that NUPM and excessive medical use of prescription medications (EXPM) is associated with several adverse outcomes, including psychiatric disorders (Becker, Sullivan, Tetrault, Desai, & Fiellin, 2008) and other substance use and high-risk behaviors (Boyd, Teter, West, Morales, & McCabe, 2009; McCabe, West, Teter, & Boyd, 2012).

With few exceptions, most studies have examined adolescent substance use, NUPM, and EXPM with a variable-centered approach. By contrast, person-centered approaches aim to identify distinct subgroups or categories of individuals (Collins & Lanza, 2010). For example, Boyd, Young, Grey, and McCabe (2009) distinguished subtypes of nonmedical prescription drug users based on patterns of and motivations for use. Several other studies have also taken person-centered

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approaches to NUPM subtypes (Boyd, Teter, et al., 2009; Boyd, Young, et al., 2009; McCabe et al., 2012).

The identification of common and specific risk factors for adolescent substance use can be facilitated by combining variable- and person-centered approaches. Generally, the risk factors are similar for alcohol, tobacco, and other drugs (ATOD) and include personality and family-related variables (Saraceno, Munafó, Heron, Craddock, & Van Den Bree, 2009; van den Bree & Pickworth, 2005). Although there is substantial co-occurrence of NUPM and EXPM with other forms of substance use (Catalano, White, Fleming, & Haggerty, 2011), risk factors associated with NUPM and EXPM may be different (e.g., Schepis & Krishnan-Sarin, 2008).

The identification of distinct subgroups based on patterns of ATOD, NUPM, and EXPM might clarify the common and specific risk factors for various patterns of use. Accordingly, the present study sought to identify distinct subgroups of adolescents based on their recent use of ATOD, NUPM, and EXPM. First, we sought to identify distinct subgroups of adolescents based on their recent (i.e., past 12 months) use of ATOD, NUPM, and EXPM. Second, we used a variable-centered approach to test for common and specific risk factors for latent subgroup membership. Finally, based on the consistent observation of gender differences in substance use, we tested the general hypothesis that associations between risk and protective factors and class membership would vary by gender.

2. Materials and method

2.1. Sample

All 7th- to 12th-grade students attending five schools in South-eastern Michigan were invited to participate, and 2,744 respondents completed the survey. Based on American Association for Public Opinion Research guideline 2, the response rate was 61.7%. The final sample consisted of 2,744 secondary school students (50.4% female). Participants' mean age was 14.8 years ($SD = 1.9$ years). The racial/ethnic distribution of the sample was 64.1% White, 30.6% African American, 3.6% Asian, 1.3% Hispanic, and 0.4% from other racial/ethnic categories. High school students (9th–12th grades) made up 65.1% of the sample.

2.2. Measures

Past 12 months nonmedical use of prescription medications (NUPM) was assessed with items asking about frequency of nonmedical use of sleeping, anti-anxiety, stimulant, pain, and addiction medication and asthma inhaler. A single binary variable was created, indicating if the participant reported nonmedical use of at least one of the six medications on at least one occasion in the past 12 months.

Past 12 months excessive medical use of prescription medications (EXPM) was assessed by asking those who reported being prescribed a particular medication in the past 12 months about frequency of using too much of their prescribed medication. In addition to the six

controlled drug classes noted above, participants were also asked about excessive use of prescribed anti-depressant medication. We calculated a single binary variable, indicating if the participant reported excessive medical use of at least one of the seven medications on at least one occasion in the past 12 months.

Alcohol, tobacco, marijuana, and illicit drug use were measured with three items from the Monitoring the Future study (Johnston et al., 2012). Participants were asked about their frequency of marijuana, cigarette, and alcohol use during the past 12 months. Binary variables were created for any use on at least one occasion in the past 12 months.

Internalizing and externalizing problems were assessed with the Youth Self-Report (YSR; Achenbach & Rescorla, 2001). Designed for ages 11–18 years, the YSR includes 112 items that assess emotional, behavioral, and social problems. In the current sample, coefficient alphas for the internalizing and externalizing scales were 0.90 and 0.89, respectively.

Parental monitoring was assessed with five items from the Monitoring the Future study (Johnston et al., 2012) along with an additional item asking about parents' monitoring of computer time. Participants were asked to indicate how often their parents engaged in specific monitoring behaviors during a typical week. Cronbach's alpha for the parental monitoring scale was 0.71.

Parent substance use problems was measured with the 6-item version of the Children of Alcoholics Screening Test (CAST; Jones, 1983). We adapted the CAST items so that they asked about alcohol and drug use.

3. Results

The most prevalent form of past 12-months substance use was alcohol, with about 25% of students reporting at least one occasion of alcohol use in the past 12 months. Prevalence rates for the past 12 months tobacco and marijuana use were about the same at approximately 11%. Nonmedical use (about 8%) and excessive medical use (about 6%) of prescription medications had slightly lower prevalence rates than tobacco and marijuana use, and illicit drug use had the lowest past 12-months prevalence at about 2.4%.

3.1. Exploratory latent class analyses

Latent class analyses were conducted with the SAS PROC LCA program (Lanza, Collins, Lemmon, & Schafer, 2007). Results from LCA of the past 12 months use of the six substances indicated that, compared to the baseline model ($G^2 = 1781.1$, $AIC = 1793.1$, $BIC = 21828.5$), a 4-class solution provided the best fit to the data ($G^2 = 35.1$, $AIC = 89.1$, $BIC = 248.6$) and yielded interpretable classes. Item-response probabilities and latent class membership probabilities for all six substance use variables are presented in Table 1. The largest class (76.3%) had zero or very low probabilities of using any substances in the past 12 months (the "low/no use class"). The smallest class (4.2%) included participants with relatively high probabilities of using all substances at least once during the past 12 months (the "multiple use class"). The third class

Table 1

Item-response probabilities for latent class membership for past 12-months substance use at wave 1.

Item	Latent class solution			
	Low/no use class (76.3%)	Tobacco, alcohol, marijuana (TAM) class (11.5%)	Alcohol, NUPM, EXPM (ANM) class (8.0%)	Multiple substances class (4.2%)
Past 12 months tobacco use	0.01	0.64	0.03	0.80
Past 12 months alcohol use	0.09	0.88	0.52	0.95
Past 12 months marijuana use	0.02	0.58	0.01	0.96
Past 12 months other illicit drug use	0.01	0.01	0.02	0.47
Past 12 months nonmedical use of any prescription drug	0.03	0.05	0.34	0.33
Past 12 months medical misuse of any prescription drug	0.03	0.08	0.24	0.62

NUPM = nonmedical use of prescription medications; EXPM = excessive medical use of prescription medications.

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