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Polydrug use among urban adolescent cigarette smokers

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Abstract

Purpose—Adolescent smokers are at increased risk for polydrug use, which is associated with more consequences than use of a single drug. Here we classified subgroups of polydrug use among urban adolescent cigarette-smokers; described the sociodemographic, smoking, and depression correlates; and identified three-year outcomes associated with subgroup membership.

Methods—Adolescent cigarette smokers ($N = 176$; $M_{\text{age}} = 16.1$; 35% male; 27% white) completed surveys assessing drug use, smoking characteristics, demographics, and depressive symptoms at baseline and 12, 24, and 36 months follow-up.

Results—Almost all participants (96%) reported using, on average, two ($SD = 0.97$) substances (including other tobacco products) in addition to cigarettes. Latent class analysis revealed two distinct classes of polydrug users. “*Limited Range Use*” (84%) class members reported current use of other tobacco, alcohol, and marijuana, as did “*Extended Range Use*” class members (16%) who also reported current use of “harder drugs” (i.e., cocaine/crack, hallucinogens, ecstasy, and misused prescriptions). The classes did not differ on demographics or baseline likelihood of marijuana ($\chi^2 = 0.25$; $p < 0.62$) or alcohol use ($\chi^2 = 3.3$; $p < 0.07$). At baseline, a larger proportion of *Extended Range Use* class members reported both smoking the entire cigarette and symptoms of clinical depression. *Extended Range Use* class membership at baseline predicted higher mean depression scores at 24 and 36 months.

Conclusion—Adolescent cigarette-smokers who reported extended range use (18%) also reported symptoms of clinical depression at baseline and follow-up. These findings indicate a need for early monitoring of depression symptoms and prevention and cessation interventions targeting this high-risk group.

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Author disclosures

MR designed the parent study and wrote the protocol. KD conducted the analyses in consultation with DR and KM. KM completed the first draft of the manuscript, including all parts, and KD, DR, and MR reviewed and revised subsequent drafts of the manuscript. All authors contributed to and have approved the final manuscript. All four authors declare that they have no conflict of interest.

Keywords

Adolescent; Polydrug use; Smoking; Substance use; Tobacco

1. Introduction

Adolescent cigarette smokers are more likely than their nonsmoking peers to drink alcohol and use other drugs, (Chang, Sherritt, & Knight, 2005) and they are more likely to report polydrug use (concurrently using two or more substances) (Chen, Unger, Palmer, et al., 2002; Kandel & Kandel, 2014). Polydrug use in adolescence is common; for example, 41% of U.S. 10th graders ($\mu_{\text{age}} = 16$) reported concurrent use of tobacco, alcohol, and marijuana in 2010 (Conway, Vullo, Nichter, et al., 2013). Polydrug use is associated with worse health and social outcomes (Fallu, Brière, & Janosz, 2014; Kelly, Evans-Whipp, Smith, et al., 2015) compared to single-substance use, including cognitive deficits (Hanson, Medina, Padula, et al., 2011) and substance-related legal, relational, and work problems in young adulthood (Griffin, Bang, & Botvin, 2010). Moreover, adolescent smokers and polydrug users are more likely to report symptoms of depression. Early onset depression is promoted by early onset polydrug use, (Felton, Kofler, Lopez, et al., 2015) and is independently associated with negative health outcomes (Maslowsky, Schulenberg, O'Malley, et al., 2014).

Negative outcomes from adolescent polydrug use are exacerbated by smoking, which is independently associated with increased risk for lifetime nicotine dependence (US Department of Health and Human Services, 2012) and substance use disorders, including alcohol dependence, in early adulthood (Brook, Brook, Zhang, Cohen, & Whiteman, 2002). Use of a single substance (e.g., alcohol, marijuana, or other drugs) anytime during childhood, adolescence, and emerging adulthood predicts major depressive disorder at age 27, (Brook et al., 2002) and both current and lifetime nicotine dependence are associated with persistent depressive symptoms (Hu, Davies, & Kandel, 2006). Each of these outcomes is linked to enduring physical, social, and mental health problems, the consequences of which are more severe for adolescents who initiate early (Fallu et al., 2014; Taylor, Malone, Ianoco, et al., 2002). Hence, it is important to identify dominant patterns of polydrug use among adolescent smokers to best inform prevention and cessation interventions in this high-risk population.

Typically, studies of polydrug use among adolescents employ variable-centered analysis rather than characterizing actual use patterns or risk profiles of individuals. Use patterns and risk profiles can be effectively investigated using latent class analysis (LCA), a statistical method that identifies subgroups that cannot be directly observed (i.e., "latent"). A recent systematic review of studies that identified latent classes of adolescent polydrug use (Tomczyk, Isensee, & Hanewinkel, 2016) concluded LCA delivers "solid information" on polydrug use during adolescence. Additionally, subgroups that had a higher probability of current or more frequent smoking were associated with more intense patterns of drug use (including alcohol), (Tomczyk, Hanewinkel, & Isensee, 2015) poorer health, higher levels of psychological distress, and risky sexual behavior including a greater number of sexual partners (Bohnert, Walton, Resko, et al., 2014; Connell, Gilreath, & Hansen, 2009). LCA

has also been employed successfully to identify subgroups based on patterns of precursors to adolescent substance use relapse (Ramo, Prince, Roesch, et al., 2012) and to model adolescent high-risk behavioral outcomes (i.e., cigarette use, marijuana use, violent behavior, and delinquent behavior) associated with alcohol use initiation patterns (Komro, Tobler, Maldonado-Molina, et al., 2010). Our study is unique in that all participants were smokers and most reported households with high maternal educational attainment, which is typically associated with lower levels of smoking and drug use (Caldwell, 1994).

We used LCA in data collected from a cohort of urban adolescent smokers and sought to classify underlying subgroups of polydrug use and describe smoking and sociodemographic correlates of class membership. We then compared classes on drug use prevalence, smoking, and depression outcomes at 12, 24, and 36 months follow-up. We hypothesized that distinct classes of polydrug use would emerge and that classes characterized by use of a wider variety of substances would be associated with heavier cigarette smoking patterns (greater quantity and frequency of smoking, greater nicotine dependence, fewer quit attempts, lower self-efficacy for quitting or reducing smoking), and more extensive depression symptomatology at baseline and all follow-up time points.

2. Methods

2.1. Participants

Data for this study were derived from a 36 month prospective cohort study conducted at University of California San Francisco (UCSF). The study was designed to examine the influence of nicotine metabolism rate on smoking trajectory among adolescents. Data collection for this study ended in May 2015 and detailed methods have been published elsewhere (Rubinstein, Shiffman, Moscicki, et al., 2013). Briefly, 202 adolescent cigarette smokers from the San Francisco Bay Area were recruited between December 2009 and June 2012. Trained study personnel screened interested adolescents (e.g., those who responded to study fliers or online advertisements or who were referred by a current study participant) over the telephone. Inclusion criteria included age 13–17 years, smoking 1–5 cigarettes per day (cpd), and living in or near San Francisco, California.

Of the 202 adolescents enrolled 26 were found to be nonsmokers or to have quit smoking prior to enrollment and were excluded from the analyses, resulting in a final sample size of $N = 176$ for this study. Thirty-four participants were also found to smoke >5 cpd, and were included in the analyses. Adolescents who were invited to participate provided their written assent and the informed consent of one parent before taking part in the study. The UCSF Institutional Review Board approved the study procedures.

2.2. Measures

2.2.1. Demographics—Participants self-reported age, gender, and race/ethnicity.

2.2.2. Socioeconomic status—Maternal educational attainment (high school graduate or less; some college to college graduate; graduate/professional degree; don't know/does not apply) was used as a proxy for socioeconomic status.

2.2.3. Drug use—Participants reported past three-month use of cigar, pipe, chewing tobacco, snuff, alcohol, marijuana, cocaine/crack, ecstasy, methamphetamine, heroin, and other drugs (with write-in space to specify which “other” drugs). For each drug category, six response choices were dichotomized into “current use” (frequency of more than once a month) and “no current use” (frequency of less than or equal to once a month).

2.2.4. Cigarette smoking characteristics—Participants reported days smoked in the past 30 and amount of each cigarette usually smoked. Nicotine dependence was assessed using the modified Fagerstrom Tolerance Questionnaire (mFTQ), which has been validated for use in adolescent smokers (Prokhorov, De Moor, Pallonen, et al., 2000). The mFTQ is scored continuously from 0 to 9 (0–2: no dependence; 3–5: moderate dependence; 6–9: high dependence). Self-efficacy to quit or reduce cigarette smoking was assessed with two items: “If you decided to quit smoking completely, how sure are you that you would be able to do it?” and “If you wanted to cut down now, how sure are you that you would be able to do it?” (Scored from 1 “not at all” to 4 “very.”)

2.2.5. Depression—Depressive symptoms were measured with the Center for Epidemiological Studies-Depression, Revised scale (CESD-R), which has been found to be an accurate and valid measure of depression using algorithmic classification methods (Van Dam & Earleywine, 2011) scored continuously (from 0 to 60). A score of at least 16 indicates the existence of clinically significant depression symptoms (Haroz, Ybarra, & Eaton, 2014).

2.3. Data analyses

Analyses were conducted in three stages. First, baseline frequencies of reported current drug use (including tobacco products other than cigarettes) were examined. Disparate frequencies across the 11 drug categories necessitated the creation of a smaller number of meaningful categories. Cigar (n = 67); pipe (n = 17); chewing tobacco (n = 4); and snuff (n = 3) were combined to create “other tobacco.” Cocaine/crack (n = 3), methamphetamine (n = 0), ecstasy (n = 18), heroin (n = 0), and other drugs (n = 17) were combined to create “harder drugs,” named for meaningfulness and easy identification. This resulted in four categories: 1) other tobacco, 2) alcohol, 3) marijuana, and 4) harder drugs.

Second, changes in use status (i.e., into use and out of use) for each of the four drug categories from one time to the next (i.e., from baseline to 12 months, from 12 to 24 months, and from 24 to 36 months) were examined. Significant change was tested for by McNemar’s test for correlated proportions and revealed little change. Based on these results no further modeling of change was conducted.

Third, LCA was used to identify latent classes of adolescent polydrug use based on current use (yes/no) at baseline of the above four categories using MPlus version 7.31 (Muthén & Muthén, 2012). Latent class analysis fits finite mixture models to data to detect latent clusters of observations (i.e., “classes”). Given K classes, LCA estimates the probability of each observation belonging to each class (“conditional response probabilities”) and class assignment for each observation is based on the highest conditional response probability.

LCA model fit was evaluated using the Lo–Mendell–Rubin likelihood ratio (LMR) test; Bayesian information criterion (BIC) (Raftery, 1995); and Akaike’s information criterion (AIC) (Akaike, 1992). A statistically significant LMR p -value indicates improvement in fit with the inclusion of one more class. Low BIC and AIC values indicate a better model fit, and as such, the model with the lowest AIC and BIC is generally preferred. We also considered the entropy value (0–1) to assess the clarity of the classification of individuals into classes; values closer to 1 are desirable (Muthén & Muthén, 2012). Finally, we considered the average posterior probabilities (values from 0 to 1), which provide a class-specific measure of how well class membership within the sample was predicted by the indicators; values >0.70 indicate adequate class assignment accuracy and good separation (Nagin & Odgers, 2010).

Baseline correlates and outcomes hypothesized to be associated with class membership at 12, 24, and 36 months follow-up were compared. Pearson’s chi-squared (or Fisher’s exact where appropriate) tests were used to identify differences in proportions and mean scores were compared using the t -statistic (Muthén, 2004). Since our investigation was largely exploratory, all differences were considered significant by a 2-tailed test for independent samples at the level of $p < 0.05$.

3. Results

3.1. Baseline characteristics of sample

Demographics, cigarette smoking characteristics, drug use frequencies, and CESD-R scores are presented in Table 1. While 98% ($n = 170$) of participants reported current use of at least one drug in addition to cigarettes and 68% ($n = 120$) reported current use of 2–4 drugs, just 7% ($n = 13$) reported using solely another tobacco product in addition to cigarettes. Specific “other” drug(s) used were: psilocybin (mushrooms; $n = 7$), misused prescription painkillers ($n = 6$), nitrous oxide ($n = 3$), LSD ($n = 2$), amphetamines ($n = 1$), hash ($n = 1$), and “triple c’s” (Corcidin cough & cold; main psychoactive ingredient dextromethorphan; $n = 1$). Over one-third of participants had mFTQ scores indicating [moderate (31.3%; $n = 55$) and high (5%; $n = 8$)] nicotine dependence and 42% of the sample ($n = 74$) had CESD-R scores indicating depression.

3.2. Changes in use status over time

Overall, the proportion of participants reporting current use in any drug category was stable over the course of the study period (3 years). The only significant change occurred from baseline to 12 months when out of $N = 148$, 39% changed other tobacco use-status; 30% went from no current use to current use while 9% changed from current use to no current use; this difference in proportion was statistically significant (McNemar’s $S = 16.86$ $p < 0.0001$). Given the lack of observed change, no further modeling of change was conducted.

3.3. Latent class analysis model selection

The AIC, BIC, and LMR p -value suggested a two-class model fit the data slightly better than a one-class model (Table 2). The entropy value of 0.81, while lower than that for the three-class solution, indicated acceptable classification quality. The average individual posterior

probabilities for being assigned to a specific latent class indicated clear separation into two classes (0.954 for class 1 and 1.0 for class 2). Given high classification quality and large difference in proportion of other drug use across categories, the two-class solution was favored.

3.4. Descriptions of latent classes

Fig. 1 shows the percent of participants who reported current use of other tobacco, alcohol, marijuana, and harder drugs at baseline and 12-, 24-, and 36-months follow-up, by class. Class 1 was more representative of the entire cohort and was thus labeled *Limited Range Use* ($n = 147$; 84%). The second class was labeled *Extended Range Use* ($n = 29$; 16%) since all members reported using harder drugs in addition to other tobacco, alcohol, and marijuana at baseline.

3.5. Baseline characteristics of latent classes

There were no differences between *Extended Range Use* and *Limited Range Use* class members in age ($t(174) = 0.718$; $p = 0.47$), gender ($\chi^2(1, N = 176) = 1.59$, $p = 0.21$), race/ethnicity ([$df = 3$, $N = 176$], Fisher's exact $p = 0.45$), maternal educational attainment ([$df = 3$, $N = 174$], $p = 0.62$), or likelihood of marijuana use ([$df = 1$, $N = 176$], $p = 0.35$; Table 1). A larger proportion of *Extended Range Use* class members reported smoking the entire cigarette ($\chi^2(1, N = 175) = 5.17$, $p = 0.023$), while both groups had mean mFTQ scores indicative of mild nicotine dependence ($t(174) = 1.30$; $p = 0.20$), and reported similar, moderate perceived self-efficacy to quit ($t(149) = 0.52$; $p = 0.96$) or reduce ($t(149) = 0.20$; $p = 0.84$) smoking. *Extended Range Use* members, on average, reported current use of a greater number of drugs ($t(174) = 9.33$; $p < 0.001$) and had higher mean CESD-R scores ($t(164) = 2.12$; $p = 0.035$) than members of the *Limited Range Use* class.

3.6. Outcomes at 12-, 24-, and 36-months

There were no between-group differences in cigarette smoking characteristics or nicotine dependence. The proportion of participants in each class reporting harder drug use converged over the study period. The proportion of the *Extended Range Use* class who reported using harder drugs fell at 12 (17.69% from 100% to 42.31%) and 24 months (20.57% from 42.31% to 21.74%) while the proportion of *Limited Range Use* class grew (from 0% to 12.5% to 13.76%). The proportion of both classes that reported harder drug use at 36 month follow up was smaller than at all three preceding time points for the *Extended Range Use* class (16.67%) and smaller than at 12- and 24 months for the *Limited Range Use* class (7.32%). (Fig. 1) Higher mean depression scores were predicted by *Extended Range Use* class membership compared to *Limited Range Use* class membership at 12 (17.64 ± 10.72 vs. 15.82 ± 9.49 ; $p = 0.40$), 24 (20.68 ± 13.02 vs. 14.31 ± 10.09 ; $p = 0.04$) and 36 (19.20 ± 11.48 vs. 13.98 ± 10.04 ; $p = 0.02$) months.

4. Discussion

There were two dominant patterns of polydrug use in this sample of urban adolescent smokers, differentiated by early use of harder drugs. Importantly, in the three years after the classes were identified using baseline polydrug use patterns, patterns converged with harder

drug use reported by members of both classes; still each year, a larger proportion of *Extended Range Use* class members were depressed. These findings suggest a need for early substance use prevention interventions and tobacco cessation programming among urban adolescent smokers. Efforts should include depression screening to identify adolescents who may be at higher risk for early initiation of polydrug use and experimentation with harder drugs.

Our hypothesis that classes characterized by use of a greater number and variety of drugs would be associated with cigarette smoking characteristics indicative of heavier smoking was not confirmed. Classes did not differ in quantity or frequency of smoking nor in level of reported nicotine dependence, suggesting that “lighter” patterns of smoking (e.g., nondaily, 5 cpd) and lower levels of nicotine dependence in adolescence can be as much a risk for polydrug use as heavier, more severe patterns of smoking. These findings provide support for the idea that light and nondaily smoking are normal smoking patterns among young people (Schane, Glantz, & Ling, 2009) and point to a need for addressing these lighter patterns with the same fervor as heavier patterns.

That the patterns of current polydrug use and light smoking, together with low levels of nicotine dependence were maintained among virtually all of these urban adolescent smokers runs contrary to the literature that reports a positive and causal association between drug use and smoking in adolescents (Piasecki, Trela, Hedeker, et al., 2014) and young adults (Krukowski, Solomon, & Naud, 2005). Instead, our results comport with reports suggesting persistent use patterns of tobacco, alcohol, marijuana, and other drugs may begin in adolescence. Regular polydrug use with adolescent onset put youth at risk for lifelong and disordered use (as well as psychiatric disorders) (Brook et al., 2002) and our finding of sustained co-use of multiple drugs and cigarettes serves to underscore the need for early prevention and cessation interventions among urban adolescent smokers.

Overall prevalence of symptoms indicative of clinical depression was high in this sample ranging from a low of 37% at 36 month-follow up and a high of 49% at 12 months (42% at baseline and 40% at 24 months). This is higher than past year major depressive disorder in the National Comorbidity Survey (7.5%) (Avenevoli, Swendsen, He, et al., 2015). That 96% of this sample reported using drugs could help explain this disparity given higher odds of major depressive disorder among those with substance use disorder (3.42 for girls, 2.44 for boys) (Avenevoli et al., 2015). Further, older adolescents and girls are at higher risk of depression (Felton et al., 2015; Avenevoli et al., 2015). This sample was 65% female and aged 16 at baseline (with participants being followed through age \approx 19), suggesting high risk for depression.

That a two class model fit our data best, and that nearly all participants (96%) reported polydrug use, runs contrary to a 2016 systematic review of studies using LCA to identify classes of adolescent polysubstance use by Tomczyk et al. that reported 74% of included studies found three to four classes and that polysubstance use subgroups were the smallest (Tomczyk et al., 2016). This sample of adolescent smokers also had a slightly higher prevalence of current alcohol (68%) and marijuana (76%) use when compared to findings from the 2014 SAMHSA National Survey on Drug Use and Health (58% and 52%,

respectively) (Substance Abuse and Mental Health Services Administration (SAMHSA), 2015). These differences could be due partly to our sample being comprised of urban-dwelling adolescents who were largely referred by one another and likely engage in similar risk behaviors (i.e., polydrug use). The relative lack of differences in demographic, smoking, and drug use characteristics between the classes is likely due to overall sample homogeneity, which is typical of other groups of high risk adolescents in ethnically diverse urban areas who are connected by proximity and shared behaviors.

Classes were clearly differentiated by early use of harder drugs and greater depression symptoms that persisted for three years in the *Extended Range Use* group. Members of this group may be at risk for worse health outcomes, pointing to a need for drug use prevention and smoking cessation interventions as early as middle school in this vulnerable group. Given the strong and reciprocal relationship between depressive symptoms and polydrug use in adolescence, (Maslowsky et al., 2014) it is possible some *Extended Range Use* class members may exhibit independent substance use and clinical depression, while others are experimenting with both harder and a larger variety of drugs to cope with negative emotions (McConnell, Memetovic, & Richardson, 2014). Over half of *Extended Range Use* class members reported CESD-R scores over the cutoff for clinical depression at each time point and the lack of significant between-class difference at 12 months owes to more *Limited Range Use* class members reporting higher CESD-R scores. As these adolescents approach young adulthood, it is not surprising that the difference in proportion reporting current use of harder drugs narrows since “emerging adulthood” (age 18–25) is a time of marked increase in experimentation with drugs (Arnett, 2000). Further, the convergence of the probability of reporting current use of harder drugs may also indicate that early use of harder drugs is not necessarily tied to long term use and not all adolescents using hard drugs at young ages are candidates for substance use disorder treatment. Given high rates of depression, mental health treatment may be more appropriate. Finally, it is possible that depressive symptoms endorsed at baseline among *Extended Range Use* class members were treated, lessening the need for harder drugs to cope with negative emotions.

5. Limitations

First, LCA assigns individuals to the class to which they are most likely to belong based on their response pattern (i.e., responses to current drug use (y/n)); however, individuals often have a non-zero probability of assignment to other classes. Here, though, all members of class 2 (*Extended Range Use*) had a probability of zero for assignment to class 1. Still, caution must be used in generalizing about patterns of adolescent polydrug use from this study, as not all adolescent smokers will fall perfectly into one of the two classes identified here. Second, our sample size ($N = 176$) was smaller than the size of 500 traditionally recommended by some for LCA (Finch & Bronk, 2011); however, more recent research has shown that sample size >70 is sufficient (Wurpts & Geiser, 2014). Finally, this we conducted secondary analysis of data so findings were somewhat limited insofar as our frequency measure for drugs is not directly comparable to commonly used adolescent tobacco-use frequency (i.e., past 30 day use) and depression was the sole psychosocial variable that was measured. Future studies should include measures of important psychosocial correlates of

adolescent drug use such as externalizing behavior and sensation seeking (Patrick & Schulenberg, 2014).

6. Implications and contribution

The high prevalence of, and persistence of polydrug use over three years among urban adolescent smokers highlights the need for early cessation and prevention intervention efforts that target tobacco, alcohol, marijuana, and other drugs of abuse. These efforts should take into account that even adolescents who report only light or intermittent smoking may be using multiple drugs and that both patterns of light smoking and polydrug use can be chronic. Most adolescent smokers are primarily using alcohol and marijuana, but our findings reveal early use of harder drugs in a smaller subgroup as well, which could reflect early experimentation or attempts to self-medicate for depression. Urban adolescents should also be screened regularly, perhaps during the annual school registration process, for depression. Since depressive symptoms could be a precursor to more problematic drug use, identifying and counseling depressed adolescents could prevent progression to use of harder drugs or a greater number of drugs, or both. Cessation and prevention interventions should be implemented early, before smokers progress to polydrug use or smoking and polydrug use behaviors become ingrained, or both (Schane et al., 2009; Huh, Huang, Liao, et al., 2013).

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HIGHLIGHTS

- 96% of urban adolescent smokers (N = 169) from San Francisco reported polydrug use.
- Adolescents reporting only light/intermittent smoking may be using multiple drugs.
- 18% (n = 29) reported early use (age 16) of harder drugs and depressive symptoms.
- Depressive symptoms could precede more problematic drug use.
- Early prevention/cessation intervention including depression screening is called for.

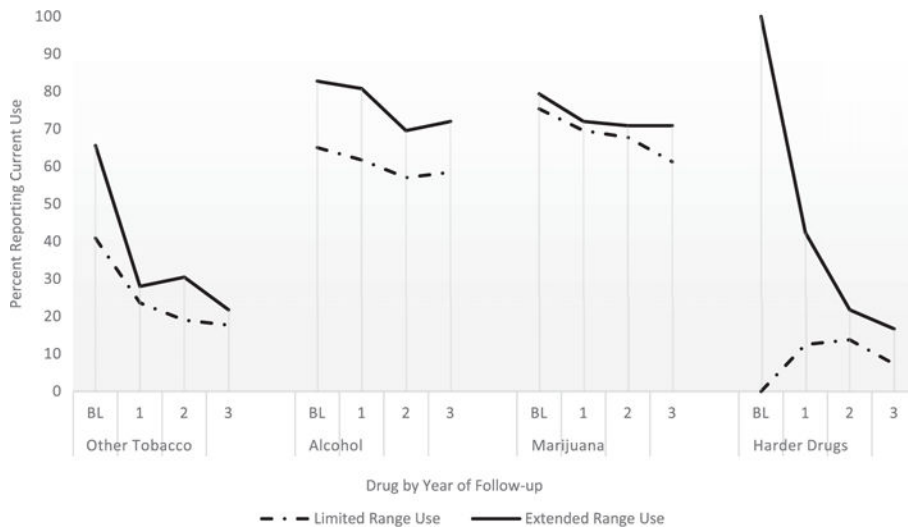


Fig. 1. Percent prevalence of current drug use by class, drug category, and time point among a cohort of adolescent cigarette smokers age 16.1 at baseline (N = 176).

Table 1Characteristics of adolescent smokers age ≈ 16 , full sample and by class, (N = 176).

Demographic variables	Full sample (N = 176)	Extended range use (N = 29)	Limited range use (N = 147)	Difference by class ^d
Age [M(SD)]	16.10 (0.96)	16.0 (0.83)	16.1 (0.99)	$p = 0.47$
Male (n, %)	61, 34.7	13, 44.8	48, 32.7	$p = 0.21$
Race/ethnicity (n, %)				$p = 1.00$
White	47, 26.7	8, 27.6	39, 26.5	$p = 0.68$
More than one race	43, 24.4	12, 31.0	46, 23.1	$p = 0.14$
Black	36, 20.5	4, 13.8	32, 21.8	$p = 0.75$
Hispanic	35, 19.9	5, 17.2	30, 20.4	$p = 0.81$
Maternal educational attainment (n, %)				$p = 1.00$
High school graduate	68, 39.1	11, 44.5	57, 37.7	$p = 0.90$
College graduate >high school graduate	64, 36.8	14, 48.3	50, 34.5	$p = 0.16$
Graduate/professional degree	18, 10.3	2, 6.9	16, 11.0	$p = 0.50$
Don't know/does not apply/missing	24, 13.8	2, 6.9	22, 15.2	$p = 0.24$
Cigarette smoking characteristics				
Age at first cigarette [M(SD)]	14.10 (1.60)	14.15 (1.57)	13.90 (1.45)	$p = 0.43$
Number of days smoked on out of last 30 [M(SD)]	18.00 (10.46)	20.0 (10.54)	17.6 (10.40)	$p = 0.25$
Cigarettes smoked per day [M(SD)]	2.99 (2.99)	3.52 (3.20)	2.88 (2.95)	$p = 0.30$
Usually smoke the whole cigarette (n, %)	81, 46.3	19, 65.5	62, 42.5	$p = 0.023$
mFTQ ^b [M(SD)]	2.51 (1.40)	2.86 (1.64)	2.44 (1.34)	$p = 0.20$
Ever quit smoking for at least one day (yes) (n, %)	112, 64.0	17, 58.6	95, 65.1	$p = 0.79$
Number of lifetime quit attempts [M(SD)]	5.60 (14.40)	7.44 (19.85)	5.23 (13.11)	$p = 0.49$
Perceived self-efficacy to quit smoking [M(SD)]	3.16 (0.93)	3.12 (1.14)	3.10 (0.98)	$p = 0.96$
Perceived self-efficacy to reduce smoking [M(SD)]	3.11 (1.01)	3.19 (1.06)	3.15 (0.91)	$p = 0.84$
Drug use frequencies ^c				
Number of drugs reported to be in "current use" [M(SD)]	2.02 (0.97)	3.28 (0.65)	1.77 (0.82)	$p < 0.001$
Current other tobacco use (n, %)	79, 44.9	19, 65.5	60, 40.8	$p = 0.015$
Current alcohol use (n, %)	117, 68.0	24, 82.8	93, 65.0	$p = 0.10$
Current marijuana use (n, %)	130, 76.0	23, 79.3	107, 75.4	$p = 0.83$
Current harder drug use (n, %)	29, 17.7	29, 100	0, 0	$p < 0.001$
Depressive Symptoms Scale Score [M(SD)]				
CESD-R ^d	15.34 (9.04)	18.61 (9.69)	14.67 (8.80)	$p = 0.035$

Bold type indicates statistical significant p -value.

^a p -Values reported for χ^2 difference in proportion (n, %) or independent samples t -test for equality of means, significance (2-tailed) [M(SD)].

^b Modified Fagerstrom Tolerance Questionnaire.

^c Categories are not mutually exclusive.

^d Center for epidemiologic studies, depression-revised.

Table 2

Model comparison.

Classes	AIC	BIC	LMR <i>p</i> -val	Entropy	Ns
1	807.132	807.147	–		176
2	806.890	806.924	0.0539	0.805	147 29
3	812.074	812.127	0.1032	0.915	124 36 16
4	820.884	820.955	0.7526	0.725	120 34 8 12

AIC: Akaike's information criterion; BIC: Bayesian information criterion; LMR: Lo-Mendall-Rubin.