



Identifying patterns of tobacco use among US middle and high school students: A latent class analysis

Mansoo Yu^{a,*}, Paul Sacco^b, Hye Jeong Choi^c, Jenna Wintemberg^c

^a School of Social Work, Public Health Program, University of Missouri, Columbia, USA

^b School of Social Work, University of Maryland, USA

^c Department of Health Sciences, University of Missouri, Columbia, USA



HIGHLIGHTS

- Very low risk students are less likely to be exposed to smoking in a car or home.
- Very low risk students are more likely to receive parental disapproval.
- Lifetime poly-users are more likely to perceive easy access to tobacco products.
- Lifetime poly-users are less likely to receive advice from healthcare providers.
- Latino and Asian youth were more likely to use multiple products in the past month.

ARTICLE INFO

Keywords:

Latent class analysis

Tobacco

Smoking

Youth

Poly-tobacco

ABSTRACT

Objectives: This study sought to (a) understand patterns of tobacco use among US middle and high school students based on their lifetime or current use of tobacco products: cigarettes, cigars, chewing tobacco, pipes, e-cigarettes, and hookah tobacco, and (b) examine differences in the underlying patterns by sociodemographic and tobacco-related characteristics (e.g., exposure to tobacco products, tobacco advertising, parental disapproval of tobacco use and feedback from healthcare providers).

Methods: We analyzed self-report data from the 2013 National Youth Tobacco Survey ($n = 18,046$). Latent Class Analysis was conducted to identify patterns of tobacco use and tested how sociodemographic and tobacco-related characteristics are associated with such patterns.

Results: Four subtypes of tobacco use were identified: “Very Low Risk (VLR),” “Lifetime Smoking (LS),” “Lifetime Multiple Tobacco Use (LMT),” and “Past Month Multiple Tobacco Use (PMT).” Latino and Asian American youth were more likely to be in PMT. Compared with students in LS, students in VLR were less likely to receive advice not to use tobacco from their healthcare providers, but more likely to have parental disapproval of smoking. Students in LMT (vs. LS) were more likely to use tobacco coupons and promotional materials, report greater access to tobacco, and receive advice from a healthcare professional. Students in PMT (vs. LS) were more likely to use coupons, take part in tobacco promotions, and be exposed to smoking in a vehicle.

Conclusions: Our study suggests that it may be important to consider the underlying patterns and correlates of tobacco use in designing tobacco control programs for youth.

1. Introduction

In recent years, cigarette smoking has declined, yet use of other tobacco products among middle school and high school students has increased (CDC, 2016). Further, use of multiple tobacco products is prevalent among youth (Kowitt et al., 2015; USDHSS, 2012). Youth who use multiple tobacco products are more likely to continue using multiple products over time (Kaufman, Land, Parascandola, Augustson,

& Backinger, 2015), and are at higher risk for developing nicotine dependence (Arrazola et al., 2015; Cavazos-Rehg, Krauss, Spitznagel, Grucza, & Bierut, 2014). Despite evidence regarding the negative consequences associated with poly-tobacco use, scant research has been conducted on patterns of tobacco use, including poly-tobacco use, and how sociodemographic and tobacco-related characteristics (e.g., exposure to tobacco advertising, healthcare professional advice, etc.) are associated with such patterns.

* Corresponding author at: School of Social Work, Public Health Program, 720 Clark Hall, University of Missouri, Columbia, MO 65211-4470, USA.
E-mail address: yuma@missouri.edu (M. Yu).

Prior research suggests that tobacco-related factors may be associated with patterns of tobacco use. For example, exposure to tobacco advertising is associated with cigarette smoking status (Yu, Chavez, Olate, & Peters, 2016; Yu, 2011). Physical (Paul et al., 2010) and psychological (Yu, Hahm, & Vaughn, 2010) accessibility to tobacco is associated with regular cigarette smoking and poly-tobacco use. Frequency of secondhand smoke (SHS) exposure in home increases odds that youth become daily smokers (Darling & Reeder, 2003), and in-vehicle SHS exposure predicts susceptibility to initiation and smoking (Healey et al., 2015). On the other hand, smokers who received advice to quit smoking are more likely to make a quit attempt (Schauer, Halperin, Mancil, & Doescher, 2013) and quit smoking (Zhang et al., 2016). Parental disapproval of smoking is negatively associated with adolescent smoking behaviors (Kim & Chun, 2016; Kong, Camenga, & Krishnan-Sarin, 2012).

Although very recent studies have characterized adolescent tobacco use patterns (Ali, Gray, Martinez, Curry, & Horn, 2016; Gilreath et al., 2016; Lee, Hebert, Nonnemaker, & Kim, 2015), less is known about how various tobacco-related factors are associated with patterns of tobacco use among youth. This is important, as factors for tobacco use may be different among subpopulations of youth based on experiences with tobacco products they use. Hence, the aims of this study are to examine, using latent class analysis, heterogeneity in underlying subtypes (i.e., patterns) of tobacco use based on six forms of tobacco products (cigarettes, cigars, chewing tobacco, pipes, e-cigarettes, and hookah pipes) among middle and high school students in the United States, and to examine how sociodemographic and tobacco-related characteristics are associated with these underlying subtypes of tobacco use (refer to Fig. 1: Conceptual Model).

2. Methods

2.1. Sample

We analyzed the 2013 National Youth Tobacco Survey (NYTS), a study of youth in middle and high schools (grades 6 through 12) across the fifty states and the District of Columbia (CDC, 2014). The survey utilized a multistage sampling design of youth within schools in participating states. Data in the NYTS were weighted to adjust for survey nonresponse, oversampling of non-Hispanic black and Hispanic students, and to reflect the general population of middle and high school students in the United States. In the 2013 NYTS, the overall response rate was 67.8%. The sample size of the 2013 was 18,406 students. Characteristics of the sample are provided in Table 1. Details of sampling design, sampling methods, and data collection methods are described elsewhere (CDC, 2014).

2.2. Measures

2.2.1. Latent class indicators

Six forms of tobacco (i.e., cigarettes, cigars, chewing tobacco, pipes, e-cigarettes, and hookah pipes) were included whereas bidis, kreteks, snus, and dissolvables were excluded due to very low levels of endorsement. A three-level ordinal variable was created, “never used (= 0),” “any lifetime use, but not in past-month (= 1),” and “past-month use (= 2)” for each indicator in the model.

2.2.2. Tobacco-related characteristics

Exposure to tobacco advertising was created by summing five sources of ads that youth reported having seen for tobacco products through the Internet, magazines, convenience stores/supermarket/gas station, outdoor advertising, and television/movie. Responses to each type were rated on a 5-point scale (0 = either never or didn't watch/

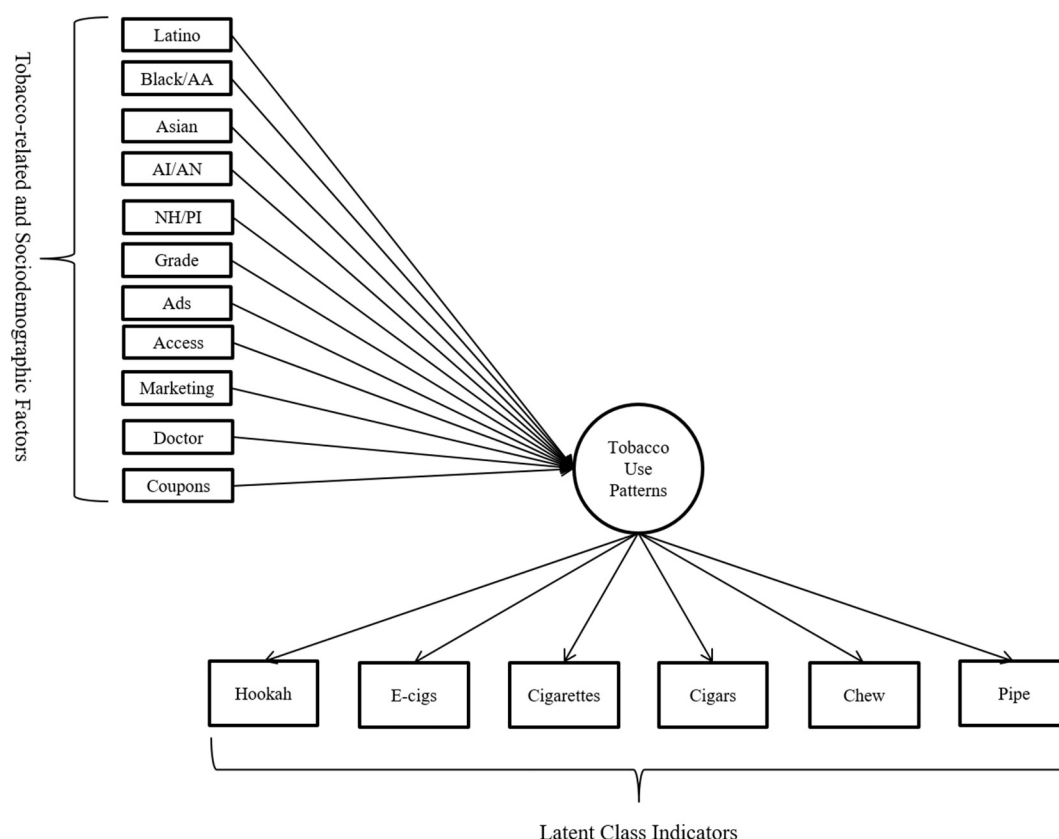


Fig. 1. Latent class model.

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