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Identifying "social smoking" U.S. young adults using an empirically-driven approach

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HIGHLIGHTS

- Three latent classes were identified from six social smoking measures.
- Classes included young adult nonsmokers, social smokers, and smokers.
- Social smokers were most likely to report using tobacco mainly or only with others.
- Smokers and social smokers had similar prevalence of tobacco and e-cigarette use.
- Social factors may drive progression to regular tobacco use in social smokers.

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ABSTRACT

The phenomenon of "social smoking" emerged in the past decade as an important area of research, largely due to its high prevalence in young adults. The purpose of this study was to identify classes of young adult ever smokers based on measures of social and contextual influences on tobacco use. Latent class models were developed using social smoking measures, and not the frequency or quantity of tobacco use. Data come from a national sample of young adult ever smokers aged 18–24 (Truth Initiative Young Adult Cohort Study, N = 1564). The optimal models identified three latent classes: Class 1 – nonsmokers (52%); Class 2 – social smokers (18%); and Class 3 – smokers (30%). Nearly 60% of the "social smoker" class self-identified as a social smoker, 30% as an ex-smoker/tried smoking, and 12% as a non-smoker. The "social smoker" class was most likely to report using tobacco mainly or only with others. Past 30-day cigarette use was highest in the "smoker" class. Hookah use was highest in the "social smoker" class. Other tobacco and e-cigarette use was similar in the "social smoker" and "smoker" classes. Past 30-day tobacco and e-cigarette use was present for all products in the "non-smoker" class. Young adult social smokers emerge empirically as a sizable, distinct class from other smokers, even without accounting for tobacco use frequency or intensity. The prevalence of hookah use in "social smokers" indicates a group for which the social aspect of tobacco use could drive experimentation and progression to regular use.

1. Introduction

The phenomenon of "social smoking," or smoking primarily in social contexts (Schane, Glantz, & Ling, 2009b), emerged in the past decade as an important area of research, largely due to the high prevalence of this behavior in college students, a group of young adults who often engage in a variety of health-risk behaviors at high rates (Schane, Glantz, & Ling, 2009a). More broadly, social smoking young adults comprise a subset of nondaily (occasional) smokers who report cigarette use in social situations or when drinking alcohol with others (Berg et al., 2012; Berg et al., 2009; Hoek, Maubach, Stevenson, Gendall, & Edwards, 2013; Moran, Wechsler, & Rigotti, 2004; Schane et al., 2009a; Shiffman, Kirchner, Ferguson, & Scharf, 2009) and national surveys estimate the prevalence of social smoking between 51% and 80% in young adult

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(college and non-college) smokers (Jiang, Lee, & Ling, 2014; Lisha, Delucchi, Ling, & Ramo, 2015; Moran et al., 2004; Song & Ling, 2011; Villanti, Rath, & Vallone, 2012). There are two main concerns with the long-term tobacco use behaviors of social smoking young adults: (1) that, like light and intermittent young adult smokers, approximately half will become heavy smokers in a short period (White, Bray, Fleming, & Catalano, 2009); or (2) that they will maintain a stable low-level smoking pattern throughout adulthood (Schane et al., 2009b). Both smoking patterns can lead to tobacco-related disease or death (Schane, Ling, & Glantz, 2010; U.S. Department of Health and Human Services, 2014). To the extent that they resist identifying themselves as "smokers" (Berg et al., 2009; Choi, Choi, & Rifon, 2011; Hoek et al., 2013; Levinson et al., 2007; Ridner, Walker, Hart, & Myers, 2010), young adult "social smokers" will continue to elude traditional tobacco prevention or cessation interventions.

Primary socialization theory (PST) posits that individuals learn normative and deviant behavior from a small number of social influences that change dynamically with development from childhood to adolescence and young adulthood (Oetting, 1999). In line with this theory, recent studies have identified a number of social influences on smoking behavior in young adults, including: living with a smoker (Klein, Forster, & Erickson, 2013), having close friends who smoke (Klein et al., 2013), and the number of one's friends who smoke (Dietz, Sly, Lee, Arheart, & McClure, 2013). A study of smoking trajectories among college student smokers also showed positive associations between perceived close-friend approval of smoking, exposure to a social smoking environment, and large increases in number of cigarettes smoked (Colder, Flay, Segawa, & Hedeker, 2008). Similarly, a systematic review of longitudinal population-based studies of adolescent and young adult smokers showed that *not* having friends who smoke and being able to resist peer pressure to smoke were robust predictors of quitting in these age groups (Cengelli, O'Loughlin, Lauzon, & Cornuz, 2012).

The social context is another important influence on smoking in young adults. Studies on cue reactivity in adult and young adult smokers indicate that non-daily smokers are more highly influenced to smoke by situational contexts, including smoking by others and drinking alcohol, compared to daily smokers (Ferguson, Shiffman, Dunbar, & Schuz, 2016; Shiffman, Dunbar, & Ferguson, 2015; Shiffman et al., 2014; Shiffman, Li, et al., 2015; Thrul, Buhler, & Ferguson, 2014). Bar/club attendance and alcohol use in young adults have also been associated with current smoking (Dietz et al., 2013) and reduced cessation behavior among very light smokers (Jiang & Ling, 2013).

Several studies have identified latent subgroups of cigarette smokers (Rose et al., 2007; Sutfin, Reboussin, McCoy, & Wolfson, 2009) or polysubstance users, including tobacco users (Conway et al., 2013; Quek et al., 2013; White et al., 2013) in adolescent and young adult samples. Other studies have focused on multiple tobacco product use in a national sample of adolescents (Nasim, Blank, Cobb, & Eissenberg, 2012) and in a Midwestern sample of young adults (Erickson, Lenk, & Forster, 2014). Our previous work has identified latent classes of combustible tobacco users, including a class of non-daily light social smokers (Villanti, Pearson, Cantrell, Vallone, & Rath, 2015), but none of these studies have examined whether social smoking emerges as a distinct class when looking at social and contextual influences on tobacco use in young adults.

The extent to which social influences drive the development – or deterrence – of smoking behavior in young adulthood is key to understanding the phenomenon of "social smoking." The purpose of this study was to identify clusters of ever smokers in a recent cohort of young adults based on measures of social and contextual influences on tobacco use and to determine common characteristics of these clusters, particularly social smoking young adults. Findings from this study were expected to identify the measures most relevant to identifying "social smokers" and inform intervention approaches to mitigate or harness social and contextual influences to reduce smoking in young adults.

2. Material and methods

The current study leverages data from seven consecutive, bi-annual waves of the Truth Initiative Young Adult Cohort Study (YA Cohort; July 2011–October 2014), a large contemporary cohort of U.S. young adults that includes information on trajectories of smoking behavior, social influences on smoking, and social and contextual influences on smoking behavior among young adults. The detailed methods of this study have been described elsewhere (Rath, Villanti, Abrams, & Vallone, 2012). The cohort is comprised of a nationally representative sample of young adults aged 18–34 drawn from GfK's KnowledgePanel® which is recruited via address-based sampling to provide a statistically valid representation of the U.S. population, including cell phone-only households. African American and Hispanic young adults were oversampled to ensure sufficient sample sizes for subgroup analyses and the survey was administered online in English and Spanish. This methodology has been reported previously (Chang & Krosnick, 2009; Yeager et al., 2011), and it has been used broadly in the peer-reviewed medical literature (Fowler, Gerstein, & Barry, 2013; Grande, Mitra, Shah, Wan, & Asch, 2013; Kumar, Quinn, Kim, Daniel, & Freimuth, 2012; Rhodes, Radecki Breitkopf, Ziegenfuss, Jenkins, & Vachon, 2015). The cohort is refreshed at each wave to retain the initial sample size.

The panel recruitment rate (RECR; The American Association for Public Opinion Research, 2015) ranged from 13.9%–14.9% across the seven waves. In 64 to 66% of the identified households, one member completed a core profile survey in which key demographic information was collected (profile rate—PROR). At each wave, only one panel member per household was selected at random to be part of the study sample, and no members outside the panel were recruited. The completion rate (COMR) ranged from 46.2% to 68.4% across waves. The cumulative response rate (CUMRR1) (a product of these three rates) ranged from 4.4% to 6.6% (Callegaro & DiSogra, 2008). This study was approved by the Independent Investigational Review Board, Inc. for Waves 1–3 (Protocol #20036-007) and Chesapeake Institutional Review Board, Inc. for Waves 4–7 (Protocol #20036020). Online consent was collected from participants before survey self-administration. The present analysis focused on a subset of participants 18–24 at study entry (N = 1564) who entered at any of the seven waves of data collection, reported ever smoking a cigarette, and provided complete responses on social smoking-related measures.

Among young adults aged 18–24 at study entry who had ever smoked a cigarette (n = 1564), 69% were aged 21 or older and 61% were female (Table 3). The majority of respondents were white, non-Hispanic (60%). Twelve percent were black, non-Hispanic, 2% were Hispanic, and 7% reported another race. Most participants had completed some college education (59%), with 29% reporting high school education, and 12% less than high school education. Twenty percent of the sample reported depressive symptoms and 22% reported anxiety symptoms in the past two weeks.

2.1. Measures

2.1.1. Variables in the latent class model

In line with PST, six social smoking measures comprised the latent class model: self-identified smoking status; confidence in resisting smoking in social situations; smoking at parties or social events; smoking at bars or restaurants; social smoking behavior; and alcohol use. All social smoking measures were assessed at study entry, regardless of wave of entry. Subgroups of participants based on self-identified smoking status were identified using the following item: "Which of the following best describes how you think of yourself?" with response choices of "smoker," "social smoker," "occasional smoker," "ex-smoker," "someone who tried smoking," and "nonsmoker." For analyses, self-identified "social smoker" and "occasional smoker" were collapsed into one category. Additionally, "ex-smoker" and "tried smoking" were