



Social contexts of momentary craving to smoke among Korean American emerging adults



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HIGHLIGHTS

- We examine how sociocultural contexts influence craving among Korean American young light smokers.
- We model within-subject covariation between social contexts and craving.
- Being with Korean friends (vs. alone) increased craving, especially immediately prior to smoking (vs. non-smoking).
- Increased craving associated with Korean friends may represent social settings that involve cigarette smoking.

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ABSTRACT

Introduction: Korean American emerging adult (KAEA) smokers represent a culturally and developmentally unique population constituted of primarily light, intermittent smokers. Sociocultural contexts might play an important role in contributing to instances of acute cigarette craving and motivation to smoke in this population; yet, research testing such hypotheses is scant. The current study tests whether and how social contexts are associated with the craving among KAEA smokers.

Methods: Seventy-eight daily KAEA smokers, who smoke 4 + cigs/day, participated in a 7-day ecological momentary assessment (EMA), in which participants responded to both signal-contingent (random) and event-contingent (smoking) prompts to answer surveys on their mobile phones (prompt-level $n = 1377$; 603 random + 774 smoking prompts). Nicotine dependence was measured at baseline; cigarette craving, negative affect, presence of others smoking, social contexts were measured with EMA.

Results: Modeling of within-participant variation and covariation showed that being with Korean friends (vs. alone) was associated with increased levels of momentary craving. This association between Korean friends and craving disappeared when adjusted for presence of others smoking, which was a strong predictor of momentary craving. The positive association between Korean friends and craving was amplified immediately prior to smoking (vs. non-smoking random) instances.

Conclusions: Being with Korean friends might serve as a culturally-specific salient smoking cue, which might have been learned throughout their smoking history. Our data also showed that increased craving associated with Korean friends may represent social settings that primarily involve cigarette smoking. Given our findings on cigarette use among KAEA's social network, addressing cigarette use as a group behavior might be a fruitful intervention strategy.

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1. Introduction

Emerging adulthood (18–25 years of age; Arnett, 2005) is associated with an increased risk of smoking, with the highest prevalence rate (30.6%) relative to any other age group (Substance Abuse and Mental Health Services Administration, 2014). Emerging adult smokers tend to be “light” or “intermittent” smokers (Brook et al., 2008; McDermott, Dobson, & Owen, 2007; White, Bray, Fleming, & Catalano, 2009), self-

identify as “social” smokers (Schane, Glantz, & Ling, 2009; Song & Ling, 2011), are less motivated to attempt cessation (Messer, Trinidad, Al-Delaimy, & Pierce, 2008), and are also less likely to receive advice from healthcare providers regarding smoking (Tong, Ong, Vittinghoff, & Pérez-Stable, 2006), relative to more established, older adult smokers. Further, despite low levels of exposure and nicotine dependence (Shiffman, Ferguson, Dunbar, & Scholl, 2012), light smokers report craving to smoke and difficulties in cessation attempts (Rubinstein, Benowitz, Auerback, & Moscicki, 2009). In fact, a majority of low-level young adult smokers persist light smoking over extended periods or transition into heavy smoking (White et al., 2009), both of which

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substantially increase risk for cardiovascular disease and lung cancer (Schane et al., 2009). Hence, it is important to understand the factors implicated in light/intermittent smoking among emerging adults in order to inform the development of interventions that may promote cessation and prevent the persistence and escalation of smoking into older adulthood.

It is plausible that the immediate precursors of craving among these young, less-dependent, light smokers might be more strongly motivated by context-dependent, situational factors rather than purely pharmacophysiological processes in chronic regular smokers. The latter group might follow a stereotypical pattern associated with regulation of blood nicotine levels and episodes of craving provoked by smoking deprivation. In contrast, low levels of nicotine dependence among younger light smokers could indicate contextual motivators for their desire to smoke, such as social and smoking-related cues. Such context-dependent factors underlying intermittent patterns of smoking lend themselves to real-time ecological momentary assessments (EMA) of instances of smoking and the contexts that surround such instances (Shiffman, Kirchner, Ferguson, & Scharf, 2009). This approach allows for assessing momentary “triggers” on craving which may vary within an individual across various contexts. The literature on real-time contextual correlates of smoking in emerging adults is sparse (Piasecki, Richardson, & Smith, 2007; Piasecki, Trela, Hedeker, & Mermelstein, 2014), as available EMA studies have often focused on older, established adult smokers (Shiffman et al., 2002, 2007, 2009) or adolescents (Weinstein, Mermelstein, Shiffman, & Flay, 2008).

EMA data on craving in emerging adult smokers is virtually absent from the literature, which is an important omission for several reasons. Craving and other related constructs (e.g., urge, desire to smoke) reflect the subjective manifestation of one's immediate motivation to smoke. Tiffany's (1990) cognitive model of drug use motivation proposes that among chronic drug-dependent users, the subjective (conscious) experience of craving becomes less frequent due to well-practiced learned automatized sequences that underlie drug motivation and lead to drug use in the absence of conscious awareness. By contrast, individuals early in the drug use trajectory who have not yet developed dependence more often experience subjective craving along with drug use motivation (Tiffany, 1990), making craving particularly relevant for the emerging adult populations. Craving is included in the DSM-5 as one of the key symptom criteria for tobacco use disorder diagnosis (American Psychiatric Association, 2013) and one of the primary motivational processes involved in smoking maintenance and relapse risk (Piasecki, 2006). Hence, craving may be a prodromal indicator of later tobacco use disorder among the population of emerging adult smokers who otherwise have a fairly brief smoking history and potentially few or no other signs of dependence. Thus, understanding the correlates of craving per se (and not solely current smoking frequency and dependence) among emerging adults may provide unique and meaningful information about the factors that play a role in later tobacco use disorder early in the smoking trajectory.

Recent experimental, laboratory studies found that smoking-related cues (i.e., sights, smells, locational contexts associated with smoking that evoke learned/conditioned, drug-seeking responses; Ferguson & Shiffman, 2009) produce craving among nondependent/intermittent smokers comparable to that of dependent, heavy smokers (Shiffman et al., 2013; Wray, Gass, & Tiffany, 2014). Anecdotally, light smokers report that situational contexts (e.g., “socializing”) and internal states (e.g., experiencing “negative affect”) are contexts that “made them smoke” (Shiffman et al., 2009). More research is needed to parse out relative effects of such internal vs. external cues on craving among younger light smokers.

Sociocultural contexts might also contribute to momentary craving and motivation to smoke among young adults. Korean Americans emerging adults (KAEAs), for instance, are often immersed in environments where smoking is not only highly prevalent (~36% among males) but culturally-accepted and encouraged (Huh, Sami,

Abramova, Spruijt-Metz, & Pentz, 2013). Smoking is closely intertwined with Korean culture (Factbook, 2013) and this cultural sentiment appears to be strongly preserved among Korean immigrants and their offspring (Huh et al., 2013) in spite of successful tobacco control efforts in the U.S. Hence, understanding immediate precursors to smoking and the real-time patterns of light, intermittent use among KAEAs is an important question of public health significance.

Recent qualitative research indicates KAEA smokers report that culturally-specific social contexts (e.g., being around Korean friends) influence craving to smoke, leading to frequent smoking in group settings (Huh, Thing, Abramova, Sami, & Unger, 2014). Further, KAEAs refer to joining their Korean friends to smoke while the friends smoke as common cultural courtesy (Huh et al., 2013). KAEAs tend to perceive smoking as a culturally-rewarding “social” behavior and severely overestimate smoking prevalence (>70%) for Korean Americans (vs. ~40% for Caucasian Americans) (Huh, Thing, et al., 2014). Spending time with Korean smoker friends repeatedly paired with one's own smoking may become a highly salient smoking cue and thus increase motivation to smoke. Additionally, how sociocultural contexts are related to acute craving may vary as a function whether one has initiated smoking a cigarette at a given moment. When a smoker has not used a cigarette and may experience some levels of nicotine withdrawal, for instance, interacting with others who happen to be smoking might serve as a more potent external cue for momentary craving, relative to when momentary craving has been satiated.

Our previous EMA study in a prior sample has shown that being with friends promotes the likelihood of smoking among KAEA and enhances the effect of negative mood on likelihood of smoking (Huh, Shin, et al., 2014). The current study extends this previous work by examining factors that may contribute to experiencing momentary craving in an independent KAEA sample ($N = 78$). Here, we test whether and how within-person covariation between social/smoking contexts and craving to smoke operates among KAEA smokers, over and beyond internal states commonly associated with craving (i.e., negative affect). Specifically, we investigated the following hypotheses: 1) being with Korean friend and being around smokers would be associated with increased momentary craving to smoke, 2) associations between social/smoking cues and craving would be stronger in instances that immediately precede smoking (vs. instances not immediately preceding smoking, to be tested via interaction effects), and 3) associations between social/smoking cues and craving would be more robust for those who are less nicotine-dependent because more dependent smokers are suspected to have smoking patterns that are tied primarily to pharmacological nicotine regulation and less influenced by environmental cues (also to be tested via cross-level interaction effects).

2. Methods

2.1. Participants

From November 2013 through May 2014, daily KAEA smokers were recruited through social media, study advertisement materials, and word-of-mouth. Inclusion criteria were: 1) 18–25 year-old Korean/Korean American, 2) daily smokers who smoked 4+ cigs/day, without using other nicotine products, 3) had been smoking for at least 2 years, and 4) use English and/or Korean languages. Of the 126 individuals who were assessed for eligibility, 15 did not meet the inclusion criteria due to age ($n = 5$), ethnicity ($n = 4$), location ($n = 2$), smoking status ($n = 1$), and device incompatibility ($n = 3$). During an unexpectedly prolonged debugging/adjustment period of the EMA app, 24 eligible participants no longer wished to participate. Additionally, 8 participants dropped out in mid-study; 1 participant was excluded for failing to provide the minimum level of cigarette use (~4 cigs/day). Despite low compliance for random prompts due to technical glitches, we included data collected from two participants, as they provided

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