

THESIS

MEASUREMENT AND LATENT CLASS TYPOLOGIES OF SMOKING PATTERNS IN COLLEGE
STUDENTS

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ABSTRACT

MEASUREMENT AND LATENT CLASS TYPOLOGIES OF SMOKING PATTERNS IN COLLEGE STUDENTS

Recently, there has been a reported decrease in smoking in many populations, but the prevalence of cigarette smoking in college samples is still high. Before effective prevention and intervention programs can be developed to address this issue, there was a need for more qualitative and quantitative research on what types of patterns of smoking are present on campus. Therefore, the goal of this present study was to investigate different types of smokers on campus, in particular different types of occasional smokers, using both survey and focus groups methods.

The survey was completed by 335 smokers ($M=18.58$ years; 63.9% female; 85.7% White/Caucasian) from Colorado State University. The survey included measures of smoker identity, age of initiation, current smoking behavior, reasons for smoking, desire to quit, addiction level, and alcohol use. To test whether reasons for smoking could produce different classes of smokers in the college population, a LCA was conducted using the modified reasons for smoking scale ($n=327$). The results revealed that a four class model (Loglikelihood= -2362.594; BIC=5136.275; AIC=4867.188; LRT= $p < .05$) was a good fit. The classes included addicted smokers (23.55%), non-endorsing smokers (18.04%), stress smokers (33.03%), and social smokers (25.38%). An advanced LCA with covariates was used to examine whether these classes differed on specific characteristics ($n=303$). Overall, the results revealed age of initiation, current smoking patterns, smoker type, and smoking cessation predicted class membership while current age and alcohol use did not.

To augment these findings with qualitative data, 41 individuals taken from the larger sample participated in focus groups based on their current smoking patterns (i.e., social smoker, regular smoker,

and occasional smoker groups). The focus groups indicated that there were light, regular, heavy, and nondaily/occasional smokers on campus which included, stress, social, and “drunk smokers”. These findings as well as the findings from the survey support the notion that there are different types of nondaily smokers with distinct smoking patterns in the college population. More specifically, both data sources revealed that stress smokers and social smokers were occasional smoker typologies that emerged as distinct classes and differed on key predictors. Two relatively new typologies also emerged: non-endorsing smokers and drunk smokers. More research is needed to make further conclusions about these groups of occasional smokers. The typologies revealed in the present study should be kept in mind when designing interventions for the college population. Additional implications and future directions are also discussed.

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Measurement and Latent Class Typologies of Smoking Patterns in College Students

Introduction

Over the past century, the negative effects of cigarette use have become well-known. For example, it is now clear that cigarette use substantially increases the risk of cardiovascular disease, respiratory disease, and multiple types of cancer; all of which may lead to a decrease in both life expectancy as well as quality of life (Center for Disease Control, 2005). Due to these illnesses, tobacco use remains the number one contributor to mortality in the United States (US Department of Health and Human Services, 2004). In addition, these smoking-related illnesses cost \$157 billion dollars in health expenses each year (Fiore et al., 2008).

It is important to note that there has been a reported decrease in smoking in many populations, but the prevalence of cigarette smoking in college samples is still high (Rigotti, Lee, & Wechsler, 2000; Foldes et al., 2010; Nichter et al., 2010). This is a problem since the college population constitutes one third of the young adult population (Johnston, O'Malley, & Bachman, 1999), and college is a period where unhealthy periodic behaviors may lead to more consistent patterns in later adulthood. For these same reasons, college may be a good time to intervene to avoid serious future health problems. After all, college students are easily accessible on a contained campus and may not have health care services readily available after graduation. However, before effective prevention and intervention programs can be developed, there is a need for more research on smoking onset, patterns, and progression in the college population (Saules et al., 2004).

Progression of College Smoking

It is well known that adolescence is a critical period for smoking initiation (Chassin, Presson, Rose, & Sherman, 1996), but initiation may also occur after adolescence. It has been reported that between 10% and 19% of college students who smoke initiate smoking in college (Everett et al., 1999; Wechsler, Rigotti, Gledhill-Hoyt, & Lee, 1998). Furthermore, some researchers argue that the initiation of smoking in college is increasing (Rigotti et al., 2000). More recently, Staten and colleagues (2007) found

that 24% of individuals who smoked had initiated in college. These individuals are usually referred to as late-onset smokers and tend to start smoking during their freshman and sophomore years (Chassin et al., 1996; Colder, Flay, Segawa, & Hedeker, 2008). Experimentation with smoking is even more common during the college years than is initiation and may be an extension of experimentation during adolescence (Chassin, Presson, Pitts, & Sherman, 2000). This is apparent since there are twice as many 18 to 19 year olds who are in the beginning stages of smoking than there are 18 and 19 year olds who smoke on a regular basis (First Look Report, 2000).

Since smoking has been found to be as addictive as heroin, cocaine, and alcohol (CDC, 2005), experimentation will likely lead to daily smoking as well as physical and psychological dependence for some individuals. For example, some researchers argue that up to 70% of experimenters will become daily smokers (Russell, 1990). There is also evidence to suggest that smoking progression from experimentation occurs during the college years regardless of when initiation occurred (Saules et al., 2004; Wechsler et al., 1998). One study documented that 54% of college students who smoke increased their smoking habits (Thompson et al., 2007). Different studies have found that up to 30% of those who have experimented with cigarettes become regular smokers later in their college years (Wechsler et al., 1998). More recently, one study found that 14% of occasional smokers become daily smokers while still in college and 50% of occasional smokers were still smoking after 4 years (Wetter et al., 2004). These results indicate that college students' cigarette smoking is in transition, often on an upward trajectory.

Similarly, rates of nicotine dependence have also been increasing in the young adult population (Patterson, Lerman, Kaufmann, Neuner, & Audrain-McGovern, 2004). This indicates that a good portion of those who experiment with cigarettes will become regular smokers due to the addictive nature of cigarettes and other factors that contribute to regular use. This supports Fagersatrom's (1978) model of physical dependence; the likelihood of dependence increases based on smoking history and amount of exposure. This may be due to the building of a tolerance, in which case the individual will have to increase the number of cigarettes smoked to get the same effect (Fagersatrom, 1978). However, this pattern of addiction has been found to vary by age. For example, research has shown that individuals who

initiate smoking in adolescence have a higher chance of becoming dependent, but those who initiate smoking during early adulthood may proceed to daily smoking more quickly (Breslau, 1995). Regardless of age, once one becomes addicted, it is harder to quit, and there is a greater likelihood that health issues will emerge with continued use.

These studies indicate that experimentation may be occurring early in the college years and progressing quickly to daily use and even dependence later on. Although this may be the case for many students, it is important to note that some individuals who experiment with smoking do not become regular smokers in college (e.g., Rigotti et al., 2000; Thompson et al., 2007). For these individuals, college could be a transitional stage into regular smoking later on in adulthood. It is obvious from these findings that college smoking behavior is fluid (Wetter et al., 2004) so it is important to continue to look at patterns in this population. Due to the rapid nature of smoking progression, it possible that college smokers are different from both adult and adolescent smokers in regard to their use and even attitudes about smoking.

Categorization of Smoking Patterns

Initially, researchers categorized smoking patterns by level of addiction (e.g., habitual smoker or addictive smoker; Ikard, Green, & Horn, 1969). Over the years, there have been multiple categorizations based on progression of use (e.g., Moskal, Dziuban, & West, 1999), the combination of progression of use and amount of use (e.g., Chassin et al., 2000; Hassmiller, Warner, Mendez, Levy, & Romano, 2003; Wortley, Husten, Trosclair, Chrismon, & Pederson, 2001), reasons for smoking (e.g., Berlin et al., 2003; Ikard et al., 1969), admission of the smoking behavior (e.g., Levinson et al., 2007), and the time of day and situation in which smoking occurs (e.g., Shiffman, Kircher, Ferguson, & Sharf, 2009). These classifications are just some of the smoker types that exist, but there are many more researchers who argue for different types of classifications. These examples as well as other examples can also be seen in Table 1.

Table 1*Different Categorizations of Smoking Patterns*

Authors	Year	Categorizations
Ikard, Green, & Horn	1969	Habitual smoker, addictive smoker, negative affect reduction smoker, pleasurable relaxation smoker, and stimulation smokers.
McKenna	1970	Nervous irritation smoker, relaxation smoker, smoking alone, activity accompaniment smoker, and social confidence smoker.
Russell, Peto, & Patel	1974	Stimulation smoker, indulgent smoker, psychosocial smoker, sensorimotor smoker, addictive smoker and automatic smoker.
Husten, McCarty, Giovino, Chrisman, & Zhu	1998	Every day smoker and never-daily smokers.
Moskal, Dziuban, & West	1999	Tried cigarettes, smoked regularly, and tried to quit smoking.
Chassin, Presson, & Sherman	2000	Abstainers, triers, ex-regular smoker, monthly smoker, weekly smoker, and daily smoker.
Wortley, Husten, Troscclair, Chrismon, & Pederson	2001	Nondaily smoker and daily smoker.
White Pandina, & Chen	2002	Nonsmokers, experimental smoker, occasional smoker, mature smoker, heavy smoker, and regular smoker.
Hassmiller Warner, Mendez, Levy, & Romono	2003	Someday smoker and every day smoker.
Berlin et al.	2003	Nervous irritation smoker, relaxation smoker, smoking alone, activity accompaniment smoker, food substitution smoker, social smoker, and social confidence smoker.
Ling & Glantz	2004	Light smoker, casual smoker, part-time smoker, and social smoker.
Wetter et al.	2004	Nonsmoker, occasional smoker, and daily smoker.
Harrison, Desai, & McKee	2008	Nondaily smoker, intermittent smoker, occasional smoker, and social smoker.
Shiffman, Kirchner, Ferguson, & Scharf	2009	Early smoker, late smoker, chipper, and social smoker.
Gilpin, White, & Pierce	2010	Nondaily smoker, daily smoker, former established smoker, and current experimenter.

As is apparent, the categorization of smokers and smoking patterns has varied throughout the literature in psychology as well as in the fields of epidemiology, anthropology, and public health. This may be contributing to different observed or reported rates of dependence and potential negative health outcomes. Unfortunately, these problems might stem from the fact that many of these categories were not empirically defined (Mayhem, Flay, & Mott, 2000). Although these smoker types are somewhat inconsistent, almost all of these studies agree on what the pattern of nonsmoking and daily smoking look like. The issue of classification tends to be occurring when defining other types of smoking patterns such as nondaily smoking. To make matters worse, there is also no agreement on what terminology to use when addressing nondaily smoking. Terms such as nondaily smoker, intermittent smoker, occasional smoker, and social smoker have been used interchangeably even though the patterns associated with these types of smokers may vary (Harrison, Desai, & Mckee, 2008). For these reasons, research in this area has been somewhat mixed and inconclusive.

Nondaily smokers. The idea of nondaily smokers has only recently begun to receive attention since only 1 out of 5 smokers do not smoke daily (Evans et al., 1992). Usually, nondaily smokers have been defined as individuals who are between the ages of 15 and 24, who smoke less than 30 days out of the month, and who are more likely than daily smokers to attempt to quit (Wortley et al., 2003). Even when age is not used as a criterion for defining nondaily smokers, individuals who identify themselves as nondaily smokers tend to be much younger than individuals who identify themselves as daily smokers (Hassmiller et al., 2003). Clearly, there can be multiple types of smokers who smoke on fewer than 30 days. Some individuals may smoke once a week while others may smoke 25 days out of the month. Therefore, it is possible that there are different classes of nondaily smokers with different smoking patterns (Hassmiller et al., 2003). For example, nondaily smoking could be a transitional stage in the progression of smoking (i.e., individuals trying to quit or picking up smoking, Hassmiller et al., 2003), or it could be a regular smoking pattern for some individuals (Wortley et al., 2003).

Occasional smokers. Occasional smokers, sometimes also referred to as light and intermittent smokers (LITS), can be best defined as individuals who smoke less than 100 cigarettes and less than 25 days in a month (Evans et al., 1992). Researchers have documented that this type of smoking is on the rise due to individuals desiring to avoid health concerns related to daily smoking or negative social consequences (e.g., stigma) associated with being a regular smoker (Gilpin et al., 1997; McKennel & Thomas, 1967). The question is whether nondaily smoker could be an umbrella term in which occasional smoker could be a potential subtype (Schane, Glantz, & Ling, 2009). Compared to daily smokers, some researchers have found that occasional smoking usually occurs more with individuals who initiated use in early adulthood (Gilpin, Cavin, & Pierce, 1997). Occasional smokers have also been described as individuals who have a transitional and irregular smoking pattern which could include individuals who are starting to smoke and others who are attempting to quit (Gilpin et al., 1997; McKennel & Thomas, 1967).

There has been a recent attempt at further dividing occasional smokers into more meaningful smoker categories. One study divided occasional smokers into two categories: *uptake smokers*, who are currently experimenting with cigarettes and *non-uptake smokers*, who have maintained this smoking pattern for a long period of time or who are currently trying to stop smoking (Evans et al., 1992). These two groups have been found to be different since uptake smokers smoke less than non-uptake smokers (Evans et al., 1992). *Non-uptake smokers* may be at an intermediate stage before initiation of daily smoking or termination of current smoking which would explain the differences in smoking amount. Alternatively, Wetter and colleagues (2004) found that occasional smokers could be divided into three equal sized groups by amount of use: those who smoke every few days, those who smoke every few weeks, and those who smoke every few months, while Schane and colleagues (2009) suggested that this group could include light smokers, casual smokers, and youth smokers. As these examples indicate, thus far there is little consensus about the groupings of occasional smokers. Yet another typology of occasional smokers specifically related to college students was uncovered by Stormberg, Nichter, & Nichter, (2007).

They found two types of occasional smokers in college which include those who smoke during the week due to stress or boredom and those who smoke at parties and outside the resident halls with friends. The latter group could potentially be categorized as social smokers.

Social Smokers

Researchers have only started to investigate patterns associated with social smokers. This term first appeared in the tobacco industry to refer to individuals who smoked in social situations, who did not think they were addicted, and who cared whether smoking was socially acceptable (Moran, Wechsler, & Rigotti, 2004). In academic research, social smokers have been defined by some researchers as individuals who: (a) engage in nondaily smoking in social or public areas such as bars and restaurants (Philpot, Ryan, & Torre, 1999); (b) smoke only at parties or socializing areas (Waters, Harris, Hall, Nazir, & Waigandt, 2006); (c) smoke due to social situations or as a part of their social activities rather than on a regular basis due to dependence (Moran et al., 2004); and (d) smoke only with other smokers (Gilpin, White, & Pierce, 2005).

Thus, from the literature it seems that social smokers are individuals who identify themselves as nonsmokers and smoke at most only a few times a week in social situations (public or private) with other smokers (not by themselves), usually with alcohol, and do not attribute their behavior to dependence. Although this is the conclusion that can be drawn from the literature, there is little consensus on how social smoking should be operationalized. This has led to inconsistent findings across studies. Since the definitions have varied by study, it is important to further investigate what social smoking looks like in the college population and how college students describe social smoking.

It is important to note that there are some agreements throughout the literature about this construct. For example, there is an agreement that this type of smoker is influenced by social forces more so than other types of smokers (Thompson et al., 2007). Most importantly, there is some agreement that this smoking type is present on college campuses. Some go as far to argue that the prevalence of social smokers tends to be higher in college populations than in other populations (Moran et al., 2004). Furthermore, social nondaily smokers tend to be more common in the college population than

daily smokers (Gilpin White, & Pierce, 2001; Harrison et al., 2008; Wechsler et al., 1998). Consequently, understanding social smoking may be key to understanding college student smoking.

Previous studies have suggested different rates of social smoking in the college population, but the inconsistencies in the definition used (e.g. intermittent, nondaily, occasional, or social smokers) may be responsible for these discrepancies. For example, one study found that 41.3% of college smokers are occasional smokers (Oksuz, Mutlu, & Malhan, 2007) compared with other studies finding that social smokers make up from 51% to 70% of all college smokers (Levinson et al., 2007; Moran et al., 2004; Waters et al., 2006).). Although definitions have varied, these studies show that up to half of college students who smoke could potentially be considered social smokers. It is also possible that the pattern of social smoking is accounting for much of the nondaily use on campus; therefore, it is important to identify how common this pattern may be and how it fits into the progression of smoking.

Characteristics of Social Smoking Pattern

Initiation. There are limited studies that examine when social smoking is initiated. It is possible that social smokers begin smoking in their freshman or sophomore year of college (Wechsler, Lee, & Rigotti, 2001). It may also be the case that social smokers are an extension of the experimental stage in adolescence. This would mean that individuals' smoking habits may change from high school to better fit the cultural atmosphere of college life. Obviously, more research is needed to address when this smoking pattern begins.

Rates of dependency. According to the Addiction Model, once smoking behaviors occur, physical and psychological dependence is also likely to occur (Chassin et al., 1996). Therefore, it is important to look at the rates of dependence with social smokers. Previous studies have found that social smokers have lower rates of both physical and psychological dependence (Moran et al., 2004; Waters et al., 2006). According to Fagerstrom (1978), physical dependence is based on history of smoking and concentration of nicotine exposure. Since these individuals smoke less than other types of smokers, it is possible their limited exposure is protecting them from dependence. However, it is important to note that one study did find that light smoking may be enough to cause dependence (DiFranza, Rigotti, & McNeill,

2000) so it may be incorrect to assume that social smokers are not dependent on cigarettes. Moreover, low use of cigarettes may not be linked to current addiction but it may be linked to addiction in later adulthood, so it is important to prevent this continuation of smoking before dependency occurs.

Since physical dependency is not very common with social smokers, other factors may be contributing to this type of smoking behavior such as psychological dependence. A cognitive/affective perspective could be used to explain possible psychological dependence. It could be that there are memory encoded associations that contribute to this behavior (e.g., smoking and drinking, Brandon & Baker, 1991). Once one behavior occurs (e.g., drinking alcohol) the other behavior may likely follow (e.g., smoking). The psychological dependence could also stem from the need to smoke cigarettes to be able to socialize or to regulate emotions and/or stress (Baker, Morse, & Sherman, 1987). Individuals may feel that they cannot accomplish these things without smoking. For these reasons, it is important to include both a physical and psychological measure of dependence.

Smoking cessation. Interestingly, individuals in college tend to have the highest willingness to quit compared to other smoker populations (Moran et al., 2004). One study found that college students often plan on quitting before graduation and are more likely to make quit attempts than those not in college (Hines, Nollen, & Fretz, 1996). Wetter and colleagues (2004) found that approximately half of the individuals in their study had quit smoking altogether before the end of college. Unfortunately this means that half continued to smoke.

In addition, researchers have shown that social smokers are more likely to believe they can quit at any time (Schane et al., 2009; Thompson et al., 2007) and have greater confidence in their ability to quit. However, they may also be less motivated to quit since they feel like they are in control of their own smoking behavior (Waters et al., 2006). Due to these attitudes, social smokers have a lower likelihood of attempting to quit than other types of occasional smokers and regular smokers (Moran et al., 2004). This may also be because social smokers do not categorize themselves as smokers but as nonsmokers (Ling & Glantz, 2004; Schane et al., 2009). These individuals tend to not perceive themselves as smokers because they do not see themselves as being like other smokers in regard to dependency and health (Thompson et

al., 2007; Waters et al., 2006). For example, social smokers tend to not acknowledge the health risks associated with their smoking (Schane et al., 2009) since they do not smoke as much as established smokers. For these reasons, even though social smokers may not be dependent on nicotine, this group may benefit the most from intervention programs.

Amount smoked. The most commonly used method of identifying social smokers is by measuring how much the individual smokes at a specific period of time (usually in 30 days). Unfortunately, this is a flawed method of gauging social smoking since the amount may vary based on many different environmental components (e.g., how often the individual is in a social situation). This method is also flawed since different researchers have used different criteria leading to different conclusions. Social smokers have been described as not smoking every day (Waters et al., 2006), smoking less than 10 cigarettes a day (Shane et al, 2009), and smoking fewer days (Waters et al, 2006) and fewer cigarettes during the month (23 vs. 55; Gilpin et al., 2001) than regular smokers. These studies suggest that social smokers smoke fewer days, but might smoke a higher concentration of cigarettes in social settings in one sitting. Shiffman and colleagues (2009) found that to be the case since social smoking only occurs around two days per week (weekend smoking) and smoking is concentrated in a specific bracket of time. This is a good first step in looking at social smoking, but the social scene is very rarely just restricted to the weekend on a college campus.

Reasons for smoking. Within many models of smoking onset and progression, (e.g., social learning perspective, Bandura, 1977), smoking behavior is attributed to the influence of peers or family (Petraitis, Flay, & Miller, 1995) as well as the social atmosphere. Multiple studies have found that current smoking patterns in college were highly correlated to the percentage of friends who smoked (Hines et al., 1996; Levinson et al., 2007; Morell, Cohen, Bacchi, & West, 2005; Staten et al., 2007). Around 78% of those who initiated smoking in college reported having a friend or multiple friends who smoked cigarettes which was much higher than individuals who never smoked (Staten et al., 2007).

Around 64% of smokers reported that most of their friends were smokers which indicates the influence their friends may have on initiation, increase in use, and cessation (Thompson et al., 2007). It is obvious from these patterns that smoking is influenced by associating with smokers.

In regard to social smoking specifically, one of the most important components is that this pattern of smoking is socially driven and occurs primarily in social contexts (Schane et al., 2009; Shiffman et al., 2009; Stormberg et al., 2007). Consequently, friends may play a large role in this behavior. Some researchers even describe this pattern as a form of play for college students since it may be used to structure the social environment (Stormberg et al., 2007). It is also possible that social smoking is part of the college atmosphere. For example, one study found that being part of social organizations on campus such as sororities and fraternities predicted social smoking patterns, possibly because smoking is seen as part of their activities (Waters et al., 2006). More generally, the atmosphere or lifestyle on college campuses has been found to greatly influence this new pattern of smoking (Rigotti et al., 2000; Thompson et al., 2007). Specifically, the social nature of college (rather than its academic or athletic aspect) as well as the visibility of use on campuses appears to be the factors that contribute to that atmosphere (Rigotti et al., 2000). Other researchers have argued that it is due to college being a time of more freedom with fewer rules than in high school and that students are still attempting to establish their identities and make new friends (Stormberg et al., 2007).

Additionally, social smokers do not just smoke when they are around friends or acquaintances; social smoking has also been reported to occur amongst strangers. Some social smokers report that smoking helps with socialization at parties or events with strangers (McKee, Hinson, Rounsaville, & Petrelli, 2004). In one study, smokers reported that smoking helps with anxiety in different social situations (Lantz, 2003). Smoking also gives individuals an opportunity to strike up a conversation with others (Hines et al., 1996).

Drinking and smoking. According to the Problem Behavior Model, smoking should be associated with other negative behaviors (Jessor, 1991) and this does seem to be the case with social smokers. In general, research has shown that both alcohol use and tobacco use peak during young

adulthood, specifically during the college years (SAMHSA, 2005; Falk, Yi, & Sturmhofel, 2006). In addition, there is a current reported trend that the amount of binge drinking and smoking frequency seems to be increasing together (Lantz, 2003).

Many studies have shown that smoking is correlated with drinking behavior (Bien & Burge, 1990; Dierker et al., 2006; Harrison et al., 2008; Schane et al., 2009; Shiffman et al., 2009; Werner, Walker, & Greene, 1996). Drinkers are more likely to smoke (up to 59% of current drinkers in college report being smokers; Weitzman & Chen, 2005) and smokers are more likely to drink (young adult daily and nondaily smokers are up to four times more likely to drink heavily or binge than nonsmokers, Harrison et al., 2008; Wetter et al., 2004). In addition, smokers tend to drink more heavily than nonsmokers (Dawson, 2000; Harrison et al., 2008; Schane et al, 2009; Werner et al., 1996). Although there is a clear relationship between smoking and drinking alcohol, patterns of smoking and drinking vary based on individual and contextual factors. For example, in comparison to nonsmokers, young adults who start smoking in college are more likely to smoke and drink together (Staten et al., 2007). This difference is not only between those who smoke and those who do not; variation can also be seen with individuals who smoke at different rates. The link between smoking and drinking behaviors was found to be higher depending on the number of cigarettes smoked (i.e., stronger association for heavier smokers, Dierker et al., 2006). Other researchers have found similar results indicating that the relationship between smoking and drinking increases as either behavior increases (Bien & Burge, 1990).

Similarly, nondaily smokers are more likely to smoke heavily only on days that they are drinking (Harrison et al., 2008) and are most likely to smoke the highest concentration of cigarettes in drinking situations (Dierker et al., 2006). This is suggestive of a pattern of social smoking confirmed by Shiffman et al. (2009) who found that social smokers smoke most of their cigarettes (86%) during a drinking episode. Also, some researchers go so far as to suggest that the current increase in social smoking is due to the drinking scene in colleges (Hines et al., 1996).

Although there is overwhelming evidence for a link between alcohol consumption and cigarette use, it is not as clear why this relationship exists. Possible explanations include the sensitivity of the

substances to each other and conditioning of the behaviors to each other (Dierker et al., 2006). It is possible each substance enhances the effects of the other (Harrison et al., 2008). Tobacco has been said to help enhance the buzz that can be attained by drinking alcohol (Stromberg, Nichter, & Nichter, 2007) as well as prevent the sedative side effects of drinking (Rose et al., 2004). Also, researchers have reported that smoking makes the drinking experience more pleasurable (McKee et al., 2004). Similarly, drinking has been found to enhance satisfaction, liking, and the calming effects of cigarette smoking (Rose et al., 2004).

Debates in the Field

In addition to the issue of operationalizing social smoking which has been previously mentioned, other concerns regarding this construct have arisen. One example is whether the category of social smoker is even needed. Some researchers argue that social smokers could be a specific type of nondaily smoker such as light smoker, casual smoker, youth smoker, or occasional smoker (Schane et al., 2009). Instead of using social smoker, some researchers refer to it as occasional smoker (Levinson et al., 2007) or as light smoker (Sun, Unger, & Sussman, 2005). The question that arises from this debate is whether social smoking behaves differently than other occasional or intermittent patterns of smoking.

Although many disagree with the characteristics surrounding this smoking pattern, there is evidence that social smokers' motivations for smoking differ from other types of occasional smokers. For example, occasional smokers report smoking for other reasons such as to relieve stress or boredom that are not as likely to be reported by social smokers (Levinson et al., 2007). Interestingly, some occasional smokers tend to report smoking at low levels to try to bypass addiction and health problems of regular smokers, more so than social smokers (Levinson et al., 2007). In addition, social smokers are more likely than other occasional smokers to report smoking at low levels since they perceive it to be a socially acceptable amount (Moran et al., 2004), to have a stronger connection with drinking (Schane et al., 2009), and to smoke with friends for no specific reason (Levinson et al., 2007). Therefore, there is some evidence that social smokers are unique, but more research is needed to support this claim.

To address whether social smokers should be considered a distinct type of occasional smoker, the categories tobacco companies use may provide an important perspective. Unlike some researchers, many tobacco companies categorize occasional smoking patterns as light smokers (smoke .5 of pack or less a day), part time smokers (2-4 cigs a week), and social smokers (Ling & Glantz, 2004). Many tobacco companies acknowledge that social smoking is a unique pattern of smoking and directly target individuals who are prone to this type of smoking (Rigotti, Moran, & Wechsler, 2005). Tobacco companies continue to sponsor social events on campuses and at nightclubs/bars (Rigotti et al., 2005) which may develop an atmosphere conducive to this type of smoking (as well as drinking). It is unclear whether the market is influencing the college culture or the college culture is pushing the market, either way, this new pattern of smoking needs to be explored further. If the industry acknowledges social smokers as a category, it is important that researchers do as well. If tobacco companies use advertisements and events to target individuals based on these categories but prevention is not addressing this category, adverse public health outcomes are likely to occur.

Lastly, it is important to acknowledge that the term social smoker is used throughout many college campuses (Harrison et al., 2008). Some researchers have even documented that college social smokers identify themselves as such and see themselves as different from other types of smokers (Waters et al., 2006). This indicates that there is a possibility that this type of smoking is distinct for this population and cannot be ignored. Further research is needed to investigate the prevalence of social smokers on college campuses and how this pattern of smoking is different from other nondaily patterns of smoking.

Issues with Measurement

Due to the various perspectives as well as various definitions of social smoking, measures aimed at identifying social smokers have not been consistent. Some researchers rely on participant self-identification as a specific type of smoker (Schane et al., 2009). It is important to ask participants this type of question to gauge their perceptions about their own smoking habits, but due to social desirability and the negative stigma associated with smoking (Stuber, Galea, & Link, 2009) participants may not

accurately indicate where they are on the continuum. Also, asking this type of question leaves a researcher open to the problem that many individuals may be smokers but not identify as smokers. Researchers must also ask for participants' frequency of use to get a more accurate picture (Koontz et al., 2004).

Other researchers have measured social smoking by the amount smoked in a particular period of time (Gilpin et al., 1997; Hassmiller et al., 2003; Wortley et al., 2002). Usually, those who have smoked fewer than 100 cigarettes and fewer than 30 days in a month were considered nondaily smokers (Wortley et al., 2002). Others have asked how often individuals smoked in one day or in one sitting (Colder et al., 2008; Hassmiller et al., 2003; Schane et al., 2009). Usually social smokers were identified as those who smoked fewer than 10 cigarettes a day (Schane et al., 2009). Researchers have also attempted to include other types of questions such as context specific smoking habits (Colder et al., 2008; Oksuz et al., 2007; Waters et al., 2006) and with whom the individual typically smokes (Gilpin, et al., 2001; Oksuz et al., 2007). All these questions are important to ask when trying to measure social smoking but very rarely do researchers use all of them. Questions are never the same for studies on social smokers which means that many facets of this pattern are not being measured consistently. In addition to the issue of lack of consistency in the questions being asked, not all researchers ask these questions to look specifically at social smokers, but more broadly at occasional, light, nondaily, or intermittent smokers. As stated before, this may be a problem since these patterns may differ from each other.

There have been more specific and more recent attempts to identify social smokers. For example, Berlin et al. (2003) used the Modified Reasons for Smoking Scale which may be useful in asking why individuals smoke when used in conjunction with other social smoking related scales. A useful questionnaire developed by Moran et al. (2004) asked about cigarette use in the past 30 days along with dependence questions. Recently, new measures have emerged; for example, Kenford et al. (2005) developed a Smoking and Drinking Dynamics Scale to assess smoking acceptance and pervasiveness, but the scale was created for a specific study and no analysis on the validity of the scale was performed.

Others like Waters et al. (2006) asked about specific activities that were being performed while smoking, frequency and rate of smoking in the past 30 days, dependency, and motivation to quit smoking. This approach moved the field a step closer but it does not include all the components that are necessary to effectively measure social smoking (e.g., with whom they smoke, what day of week they tend to smoke more on). More recently, Gilpin and colleagues (2001) asked if the participants only smoked with others, if they bought their own cigarettes, if they smoked on mostly weekends, and if they thought they could quit anytime. These questions are also a step closer at capturing social smoking and identifying social smokers since the questions address social smoking attitudes. It is apparent that progress has been made with the measurement of this construct, but the measures are not used consistently and more work needs to be done to develop a measurement strategy that could fruitfully be applied to a wide range of studies.

Although there is a lack of consensus or standardized measures in the field, the existing definitions and measures may still serve as a springboard for looking at social smoking patterns on college campuses. Despite the inconsistent measurement, these studies have shown that it is important to include questions on smoking norms and attitudes, smoking social networks, smoking initiation, frequency and amount of use, current smoking habits, days and times smoking occurs, reasons for smoking, smoking cessation, level of dependence, and questions on co-occurring alcohol and tobacco use. Doing so will allow us to gauge the multiple dimensions of the social smoking pattern and potentially identify social smokers in the college population.

Summary, Goals, and Hypothesis

It is obvious from previous research that college smoking patterns are different from adolescent or adult smoking. Little is known about the progression of college smoking (Thompson et al., 2007), but one trend that has been identified in this population is social smoking. Many college smokers identify themselves as social smokers (Moran et al., 2004), but categorizing social smokers has proven difficult. Researchers have called for more combined methodological studies that examine the nature of social smoking and how social smokers are different from other types of smokers (Moran et al., 2004; Patterson et al., 2004; Waters et al., 2006). More specifically, in order to develop a clear definition of social

smoking it may be necessary go beyond survey measures. Therefore, in the present study, exploratory focus groups were included to identify how college students conceptualize social smokers (as well as other types of smokers) and to identify what behaviors, attitudes, and norms are associated with these different smoking patterns. An additional goal of the focus group was to use the data to guide the quantitative analysis.

For the quantitative section of this study, our goals included: (1) to investigate self-identified types of smokers on campus, (2) to identify the different types of smokers (specifically social smokers) present, (3) to estimate the prevalence of these types, and (4) to find characteristics and measurement items that can help predict these various types of smokers. Although this study is exploratory in nature, we hypothesized that social smokers could be distinguished from other types of nondaily and daily smokers based on one if not all of the following constructs: patterns of use, reasons for smoking, quitting behavior, level of addiction, and pattern of drinking and smoking. Furthermore, it was plausible that distinct differences would emerge between social smokers and other types of nondaily smokers. For example, in comparison to other types of nondaily smokers, social smokers may be late-onset smokers who initiate smoking in college (Wechlser et al., 2001), social smokers may have lower rates of dependency and may be less likely to attempt to quit (Moran et al., 2004), they may smoke more on the weekends than on weekdays (Waters et al., 2006), and they may smoke more with friends or in social situations (Schane et al, 2009). There also may be a stronger connection between social smoking and drinking than with other types of occasional smokers (Schane et al, 2009; Shiffman et al., 2009). Ultimately, the goal of the present study was to use both our focus groups and tracking surveys to develop a better definition of social smoking as well as to identify other types of smokers on campus, to identify measurement items that distinguish between these different types of smokers, and to create a better description of what these smoking patterns look like so that we can develop a social smoker and nondaily smoker screening method for researchers, healthcare providers, and prevention/intervention programs.

General Methods

Participants

Participants for this study were 408 students ($M = 18.6$ years old, $SD = 1.15$; 64.5% female; 84.3 % White/Caucasian) who were enrolled in an Introduction to Psychology or Research Methods course and were participating in research as part of the requirements for the class. About 98.8% of participants had full-time status and 72.5% were in their first year of college. In regard to living arrangements, 73% lived in the dorms on campus or on a Greek floor, and 27% lived off campus.

Procedure

This study was advertised on the Psychology research pool web page, and students volunteered directly on the page. The description stated:

If you are between the ages of 18 and 21 (before September 13th), you may qualify for this study. We are looking for students who may, at any point in the Fall semester, smoke one or more cigarettes. You do not have to be a regular smoker to participate in this study. We are interested in including people with many different patterns of smoking (for example, people who have tried smoking in the past and are open to smoking in the future, people who have smoked regularly in the past and are trying to quit, people who only smoke occasionally, etc.). The aim of this study, which will be conducted by Juliana Rosa in the Applied Social Psychology program, is to track smoking patterns and attitudes towards smoking of CSU students during the Fall semester. You will be asked to complete one in-person survey. The survey should only take 30-45 minutes to complete. You will be awarded 1 class credit for the survey. After the survey is completed, you may be selected to participate in a focus group for an additional 1.5 credits. Signing up for the surveys does not obligate you to participate in the focus groups.

Participants were asked to come to an available classroom to participate in the study. Participants were tested in groups of up to 20 individuals at a time. The researcher described the study further during this session and distributed consent forms. Once written consent was obtained and a copy of the form was given to the participants, they were asked to fill out a sheet with contact information including name, email address, and cell phone number. It was explained that these would be used only to contact students about participating in future waves of the study. Students were asked to create an identification number based on a combination of their student identification number, their cell phone number, and their year of birth; all data was identified only with this number. After these tracking sheets were turned in, the

participants were given a survey packet, with one survey that included the demographic questions and one that included questions on smoking habits. The consent and survey packet took approximately 45 to 60 minutes to complete.

Based on their self-identification on the final completed survey, 50 participants were selected to take part in one of six focus group sessions (two each for regular smokers, occasional smokers and social smokers). Participants were selected based on their responses to three questions: 1) smoking in the past 12 months, the past 6 months, and the past 30 days (1 = *Not at all*, 2 = *Some days*, or 3 = *Everyday*), and 2) self-identification as a smoker (*yes* or *no*), and 3) type of smoker (*Nonsmoker*, *Former smokers*, *Very light smoker*, *Light smoker*, *Social smoker*, *Moderate smoker*, or *Heavy smoker*).

Individuals were assigned to the regular smoker focus group if they (a) self-identified as a moderate or heavy smoker and (b) smoked on a daily basis. Occasional smokers were selected if they (a) self-identified as very light or light smokers but not as social smokers and (b) did not smoke on a daily basis. Lastly, social smokers were selected if they (a) self-identified as social smokers and (b) did not smoke on a daily basis. Six to eight students were invited to participate in each group (as recommended by Krueger, 1994). Only participants who acknowledged an interest in participating in the groups and whose pattern of smoking matched regular, occasional, or social smoking were selected. E-mails were sent to the selected participants indicating that they had been chosen to participate in a 1.5 hour focus group session which stated:

You have been selected to participate in the next round of data collection based on your survey responses for the Smoking Patterns in Young Adults study. Please reply to this e-mail to let me know if you would be interested in being part of this study for an additional 1.5 class credits. For the last part of this study, focus groups will be held and you will be asked to participate in just one group. A focus group is a type of interview that is conducted with a group of 8 to 10 individuals. Once you have responded, I will send you a list of dates and times the focus groups will be held for you to pick from. I appreciate your help.

All focus groups were conducted within a three week span until saturation was reached and the number of different types of focus groups was somewhat equal.

Before the start of the interview, students were given guidelines for the focus group. In particular, participants were told *they must at all times show respect for fellow participants and that all participants*

are responsible for maintaining the confidentiality of the information shared in the focus group. Also at the beginning of the focus group, participants were asked to complete a brief demographic questionnaire containing questions identical to those given during survey collection. The focus groups were conducted by the author. Two trained research assistants were present to take notes on paper, take notes on the white board, and record the sessions with a voice recorder. All the files were digital and kept in a computer file locked and password-protected in the researchers' lab. The files were only available to the author, and four research assistants. To be able to run the analysis, the notes taken during the session were typed no more than 24 hours after the session, and the recordings were transcribed verbatim. Unfortunately, due to limited technology, we were unable to assess nonverbal cues and group interaction.

At the end of the semester, all the participants were sent, via e-mail, a debriefing form about the study with the researchers' contact information if they had any questions. The debriefing email read:

Thank you for your participation in the Smoking Patterns in Young Adults study. The purpose of this study was to look at different patterns of smoking on campus and especially to look at social smoking. Social smoking has recently been identified as an important trend in colleges where students only smoke when drinking, partying, or socializing. When researchers think about the social context for smoking, they often use Social Learning Theory (which is discussed on p. 92 of your PSY 100 textbook Exploring Psychology). Social Learning Theory helps us understand how social rewards and punishments influence behaviors such as smoking. If you are interested in learning more about smoking behaviors and nicotine, you can refer to p. 220 of your PSY 100 textbook. As you can read in your textbook, nicotine is very addictive, and it is very hard to quit due to nicotine withdrawal symptoms. As you probably already know, smoking can lead to many negative health consequences such as cancer and heart disease. To prevent these negative consequences, it is important for researchers and health practitioners to know about the patterns of smoking on campus so that progression into addiction can be prevented with appropriate programs. This is why this study is being conducted. If you are interested in reducing or quitting your smoking, you may get help from CSU's Health Promotions Cessation Program at <http://www.health.colostate.edu/HealthPromotions/TobaccoCessation/index.cfm> or call 907-491-7121. You can also contact the Colorado Quitline at <http://www.coquitline.org/>. If you have any questions or concerns about the study, please contact me at Colorado State University, 1876 Campus Delivery, Fort Collins, CO 80523-1876 or (970)491-5803 or jdrosa@rams.colostate.edu. If you have concerns about this study, you may also contact Janell Baker, Human Research Administrator at (970)-491-1655.

Qualitative Study

Method

Participants. Fifty of the 200 students who participated in the survey study were recruited to participate in the focus groups. Of the 50 students recruited, 41 (65.9% female; 80.5 % White, 9.8% Hispanic, 9.7% other) participated in the focus groups with 6 to 7 individuals present per session. The mean age of participants was 18.73 years ($SD=.867$) indicating that most were in their first year of college (75.6% first year, 10.5% second year, and 4.9% third year). All students were attending school full-time and most students lived in the residence halls (68.3%) or off-campus but not with parents (29.3%).

Measures. The questions for the focus groups were developed based on observed gaps in the literature on occasional and social smoking.

Icebreaker activity. As an icebreaker activity, participants were asked to state their name, their first experience with cigarette smoking, and why they believed they initiated. Participants were also asked when they started smoking more often if applicable.

Categories of smokers. Participants were first asked to list the different types of smoker categories on campus. Participants were also asked how common these types of smokers were on campus and why. Lastly, the participants were asked to describe in detail these different categories of smokers. After participants answered these questions generally, they were also prompted to answer the following questions for each category: when they smoke, where they smoke, with whom they smoke, how much they smoke, smoker vs. nonsmoker identity, level of addiction, and desire to quit.

Current smoking patterns. Participants were also asked about their own smoking patterns (i.e., when they smoke, where they smoke, with whom, how much they smoke, smoker identity- smoker vs. nonsmoker, level of addiction, and desire to quit). This section and the previous section were collapsed for analysis to thoroughly describe the different categories of smokers that are on campus.

Differences between occasional smokers. Participants were also asked if they believed there was a difference between the several types of occasional smokers and, if so, what the differences were. Additional questions such as “Why do you think some people smoke while drinking or only

smoke in social situations?” and “Do you think that people who only smoke in this context consider themselves a smoker?” were asked to see the differences between the types of occasional smokers.

Analysis. A social anthropological approach to data analysis was used for this study which allows researchers to describe a phenomenon and create a theory to better explain this phenomenon (Miles & Huberman, 1994). This approach was appropriate, as it allowed the researchers to describe smoking behavior on campus, identify patterns of smoking, and develop a better definition or theory of what occasional and social smoking is for college students. More specifically, a grounded theory approach developed by Glaser and Strauss (1967) was used. The most important aspect of this approach is that it is driven by the participants’ responses rather than by the researcher’s hypotheses (Charmaz, 1995). Although researchers have identified some acceptable typologies of smokers, one issue that arises for practitioners is that social smokers sometimes do not self-identify as smokers. Since they do not view themselves as smokers, they are unlikely to seek out assistance in quitting. Thus, the aim of this study was to better understand how the students categorize smoking patterns so that quantitative measures could be developed that map onto students’ perceptions.

Because the focus groups were semi-structured and questions were developed based on the gaps in the literature, an adjustment to this approach needed to be made. Specifically, a two-step systematic coding system (open coding and focused coding) suggested by Emerson, Fretz, and Shaw (1995) was used to analyze the data instead of the traditional grounded theory coding system. Open coding requires line-by-line highlighting of important key words or phrases as well as categorizing these words and phrases. The main goal was to come up with multiple raw themes that could then be consolidated, which sometimes required going over the transcripts multiple times. Four research assistants and the author coded the transcripts independently. When this phase was complete, a meeting with all the coders was held to discuss the themes and to develop more specific codes. During this step, the researchers brought in specific questions and themes that had been briefly addressed in previous literature. During focused coding, these specific themes were used when coding the transcripts again. The aim of this step was to refine the number of general codes to more specific codes and to help draw connections among the

themes that were emerging. Only themes and data points that were agreed upon by at least three out of the four coders were included in the results. Coding conducted by the primary researcher was only used to guide the meetings as well as to make sure that the coders were all on track and was not included in the results.

Results and Discussion

Initiation of smoking. The focus group data supported previous research indicating that the time period during middle school and high school is critical in regard to smoking initiation (Chassin et al., 1996; Riggs Chou, Chaoyang, & Pentz, 2007). For example, one participant stated, “My first experience smoking was probably freshman year [high school]. I was spending the night at a friend’s house and she like woke me up and was like, you want to try a cigarette?” More specifically, 82% of the participants indicated that smoking initiation occurred during their late middle school to early high school years.

When asked about the situation in which initiation occurred, one major theme emerged: participants initiated in a social setting/social situation with friends or a family member. As one participant stated:

Participant (P1): My first experience with smoking was in high school freshman year, I think. I just got a drag off somebody else’s and felt a little buzz, thought it got me high.

Researcher (R): Who was the somebody else?

P1: Just a friend.

Another participant indicated that family was involved in his initiation: “My first experience smoking was a primetime; it was with my sister and her friends in college.” This finding is not surprising, as previous researchers have found that peers and siblings play a large role in smoking initiation (e.g., Aloise-Young, Graham, & Hansen, 1994; Slomkowski, Rende, Novak, Lloyd-Richardson, & Niaura, 2005).

Smoking progression. Three themes emerged in regard to when participants started to smoke more often. The first theme is referred to as sporadic smokers (Colder et al., 2008). These individuals have a fluid pattern of smoking with various increase and cessation periods. As one participant argued:

“I smoked for like a year and a half and I quit for a whole year and then started in the summer. And when I first started smoking again it was when I was drunk and now I lean towards smoking while I drink while before I quit, it didn’t matter when I smoked. My patterns changed.”

Similarly, another participant stated “I started a lot sophomore and junior year of high school then I quit all of senior year, got into college, and started drinking and started again.” This sporadic pattern of smoking was more common amongst the occasional and social smoker focus groups.

Another common theme that emerged in regard to smoking progression was that participants rarely smoked in early high school but rather they were more likely to increase smoking by late high school (e.g., “It started more at senior at parties”) or early college years (e.g., “I don’t smoke regularly either, but more often than when I first picked it up probably freshmen year). This pattern is very common with the college population (Colder et al., 2008). Both the smoking patterns of sporadic smokers and those “picking up” or increasing their smoking patterns could be seen as an extension from their smoking patterns from middle school or high school (Chassin et al., 2000).

Most participants fit under one of these two themes; however, there were also individuals who fell under the theme of rapid progression. Many of the regular smokers indicated that they increased their smoking patterns substantially between high school and college, which is a common trajectory for some individuals (Chassin et al., 1996; Chassin et al., 2000).

Interestingly, most of these participants indicated that they started smoking as a social or drunk smoker and then progressed to being what they considered a daily smoker (e.g., “I started out as a social smoker and then I just became more of a casual smoker”).

Unlike in other studies (e.g., Colder et al., 2008), a decreasing pattern of smoking was not observed with the focus group participants. The results hinted at the idea that many students set their cessation goals for after college and have no desire to reduce their smoking while in school. In addition, this study focused on early college years and cessation may occur later in college. Regardless, the first two themes and previous research (e.g., First Look, 2000) have shown that there are more individuals between 18 and 19 in the beginning stages of smoking than later stages, but the last theme indicates that it

is not uncommon for progression into daily smoking to occur quickly in college (Wetter et al., 2004). In addition, all three themes indicate that college may be a transition period for many smokers, where experimentation may still be occurring and smoking patterns are in flux (Choi et al., 2003; Chassin et al., 2000). Since these smoking patterns are very fluid, there is some evidence to support the idea that college smoking patterns are different from adolescent and young adult smoking patterns (Thompson et al., 2007). This fluidity may present unique opportunities and challenges to smoking cessation practitioners.

Categories of smokers and patterns. As expected, four themes repeatedly emerged from the participant responses as to the types of smoker categories on campus as well as how they would categorize themselves which included light, regular, heavy, and occasional smokers (which was also interchangeably referred to as nondaily smokers in the focus group). In addition to the two hypothesized sub-themes of occasional smokers (stress and social), a third sub-theme of drunk smokers emerged under the theme of occasional smokers. These findings support the notion that there are different types of nondaily smokers with distinct smoking patterns in the college population such as social and stress smokers (Hassmiller et al., 2003; Moran et al., 2004; Stromberg et al., 2007; Waters et al., 2006). However, research is limited on the new type of smoker, drunk smokers, which was uncovered and labeled by the focus group sessions.

Frequency of smoking patterns. When asked to categorize their own smoker identity, participants described themselves more frequently as drunk or social smokers across all the nondaily smoking groups. Also, when asked to rate how common different types of smokers were on campus, participants indicated that drunk and social smokers were most common. This is not surprising, as research has shown that almost half of college smokers are a type of occasional smoker (Oksuz et al., 2007).

Description of occasional smokers. Participants had a very difficult time describing the patterns of smoking associated with just occasional smokers. The only agreement for this category was that occasional smokers are nondaily smokers who typically smoke less than regular and heavy smokers and are less likely to smoke on a schedule like light smokers. Participants agreed that this category of smoker

was the hardest to categorize because there are other types of smokers that fall under this category (i.e., social smokers, drunk smokers, and stress smokers). The purpose of this section is to explain the difference between these types of occasional smokers which has only started to be addressed in the literature (e.g., Hassmiller et al., 2003)

Social smoker. The focus groups supported the assertion of previous research that social smokers typically smoke at night and on weekends and typically at social events like at parties, bars, or concerts (Waters et al., 2006). As one participant stated, smoking usually occurs in “any type of like social situation, like even if it’s like a small group of friends.” In addition, many participants indicated that specific social events are not necessary and smoking can also occur when “hanging out with friends, doing homework or like you know what I mean, just chilling.” Social smokers typically smoke with friends or acquaintances who smoke; as one participant stated, “When I was smoking it became almost a social thing for me too, because like a lot of my friends smoke so we’d all go smoke together.” It is less common, but social smokers may also smoke with stranger. Whether it is with friends or strangers, the focus group supported previous research indicating that social smokers smoke only around other people (Gilpin et al., 2005), therefore indicating that it is not necessarily due to the social setting but due to the social nature of the behavior.

According to the literature, there are three main reasons why social smokers smoke: (1) to help individuals fit in with other smokers (Hines et al., 1996), (2) to help with social interactions (McKee et al., 2004), and (3) to help relieve social anxiety (Lantz, 2003). Focus group participants’ responses were consistent with two of these three reasons. First, the theme of being social with others who smoke in order to “fit in” frequently emerged. For example, one participant said, “like everyone’s doing [it] and you go out and have a cigarette with them.” A second theme was to help start a social interaction with strangers. Participants stated that “if I’m at a party it works as a conversation starter. I can usually use it as a cheesy pickup line,” and “it is a way to meet people, I think.” Social anxiety was not mentioned at significant length in the focus groups. As is apparent, social smoking is greatly influenced by peers, and individuals who demonstrate this smoking pattern do not smoke outside of social situations.

Past research has also emphasized the relationship between social smoking and drinking (e.g., Harrison et al., 2008; Schane et al., 2009). However, the relationship is described in general terms, as cigarette use and alcohol use are highly correlated during the college period (e.g., Bien & Burge, 1990; Falk et al., 2006; Shiffman et al., 2009). The participants in the focus groups were more refined in their thoughts about the connection between social smoking and drinking. Participants indicated that alcohol does not need to be present for a social smoker to smoke and it does not drive their smoking patterns, even though smoking and drinking still co-occur for social smokers. For example, one individual stated that “you can hang out with people and not be drinking as a social smoker.”

Given the interpersonal nature of social smoking, it is not surprising that social smokers typically smoke more on the weekends or at night than they do during the day (this result was also reported by Shiffman et al., 2009). We also expected, based on the literature, that there would be substantial variability in the amount smoked per social occasion. Participants reported that it is dependent on the situation (e.g., “I think it could be like 1-3 per night, or like whatever the personal situation they’re at,” or “I guess it depends on the week or how I feel, like when I first moved up here in August it was a lot of partying so it would be around 5 or 6 in a month”). However, there was agreement regarding the idea that social smokers will buy as well as “bum” cigarettes from other smokers and that brand loyalty is not common. As was stated by one participant, “it’s whatever you have in possession.”

This casual view of smoking would suggest social smokers are unlikely to be addicted. Indeed, current research findings show that social smokers have lower rates of dependence and addiction than other smokers (Moran et al, 2004; Wetter et al., 2006). However, in the present study, when nonsocial smokers were asked if social smokers were addicted, the responses were almost always that social smokers were addicted. After further questioning, it became apparent that they were applying a broader definition of addiction which encompasses the idea that there may be certain triggers or habits that increase their chances of smoking, but that they still had control over their smoking patterns. For example, one participant stated that it is “through habit; they are addicted in certain situations, like social triggers.” When discussing addiction with only the social smoker focus groups, many individuals stated

that they were not addicted due to lack of symptoms and because they can quit at any time (e.g., “I could quit if I wanted to. I went down to Denver and didn’t smoke for like two weeks. So I mean I can just quit whenever I want. It’s not like I was dying” or “I’d say no. Because I’ve never really like craved one, or gone out of my way to find one,” or “I think it is because I just smoke like a general amount but I don’t feel like I’m addicted because I stop without any negative effects”). These findings show that social smokers may be less likely to say they are addicted because they lack withdrawal symptoms (Moran et al., 2004; Wetter et al., 2006), and they feel like they can quit at any time (Schane et al., 2009; Thompson et al., 2007); therefore, social smokers seem to be applying a more conventional yet narrow definition of addiction. However, many social smokers indicated that they worry about becoming addicted (e.g., “I think I could [become addicted], it could like slowly escalate to the point where it could become an addiction”).

Interestingly, social smokers present at the focus groups had mixed feelings about whether they had a desire to quit. Many acknowledged a desire to quit after college was over. For example, one participant stated, “Once I get out of college and try and start a life then maybe I’ll quit.” Many individuals did not see a problem with their smoking pattern, and therefore they were less likely to have cessation goals (e.g., “No. I’d say probably I’d completely stop if I had cancer or anything like that or especially if you were with someone and it like bothered them I think that would be like motivation” or “I mean I don’t really think it affects me in any way because it doesn’t affect me when I do it so I mean probably not quitting”). Research has also been mixed in this regard. Some studies say that college smokers are the most likely group to have a desire to quit (Moran et al., 2004) while others found that they are less motivated to quit since they do not perceive their behavior to be a problem (Waters et al., 2004).

Social smokers’ perception that they are not addicted and can quit anytime may also be tied into the idea that they are less likely to self-identify as smokers (e.g., Ling & Glantz, 2004; Schane et al., 2009; Waters et al., 2006). In the present study, social smokers and other smoker focus groups agreed that social smokers might not acknowledge that they are smokers. For example, one participant stated,

“Well if someone thinks of a smoker, they don’t think of someone who will do it when they’re drunk or with friends, they think of someone who smokes as at least a light smoker, so at least 1 a day.” Social smokers also indicated that they do not consider themselves smokers due to the limited amount of cigarettes they smoke and their sporadic pattern of smoking (e.g., “I wouldn’t say that, but I think that it’s just so rare that I smoke that I wouldn’t classify myself as a smoker”).

A new theme emerged during the focus groups that has not been typically discussed in the literature. Social smokers were more likely to also smoke tobacco using a water pipe (also referred to as a hookah) than were any other type of smoker. Interestingly, some participants smoke more using a hookah than they smoke cigarettes. This is consistent with the finding of a previous study that around 35% of people who smoke using water pipes never smoke cigarettes (Primack et al., 2008). As one individual stated, “I don’t smoke cigarettes that often, maybe like once a year. Hookah like three or four times a week” while another participant confirmed, “I think that most people who do it, like I know people who don’t smoke cigarettes but they like plan a date to go to a hookah bar every night and stuff.” This shift in smoking patterns for these smokers could be due to the growing unacceptability of smoking in public and laws that prohibit smoking in social areas such as bars and restaurants but not in hookah bars or cigarette stores. Individuals are more likely to see using a water pipe as more socially acceptable than smoking regular cigarettes (Primack et al., 2008), especially since there are social areas designated for use.

Typically, a hookah smoking period could last from one to four hours a sitting (e.g., “I don’t know, it’s cigarettes last what like five, ten minutes. When you’re at like the hookah bar you’re like there for like a couple hours. You stay there ‘til like one in the morning”). This is concerning, as a traditional cigarette produces 500 ml of smoke while an hour of smoking with a water pipe may produce 50,000 ml, increasing the chances of negative health effects (Djorjevic, Stellman, & Zang, 2000). Some participants acknowledged that they knew that smoking with a water pipe was equally if not more damaging to their health. For example,

(P1): I mean hookah’s worse for you than cigarettes.

(P2): Yeah, especially when you’re in there for like seven hours at a time.

However, participants smoke using a water pipe because they perceive it to be less addictive, which is consistent with other research findings (Primack et al., 2008). One participant argued that he “never heard anyone say, ‘OH man I’ve got to go smoke my hookah or its bad.’” Interestingly, one participant argued adamantly that “the hookah doesn’t have as much nicotine.” Many individuals also said that this risk is averted if they do not inhale (e.g., “Well, it’s like if I don’t inhale then it doesn’t count ‘cause I know I have a bunch of friends that look at it that way”), which is a potential indicator that this type of smoking pattern is influenced by social factors. Current research has supported this idea and warns that this type of smoking is increasing in college populations (Primack, 2008).

Stress smokers. There is limited research that addresses the category of stress smoker, which is also sometimes referred to as tension reduction/relaxation smoker (Berlin et al., 2003). This type of nondaily smoker is commonly overlooked, but some studies (e.g., Moran et al., 2004; Stromberg et al., 2007; Waters et al., 2006) have started to bring this category to light. Similar categories, such as emotional regulator, have emerged in the literature, but this was not sufficiently acknowledged by the participants during the focus groups.

Participants typically explained that stress smokers smoke on a schedule or at a specific period of time (e.g., “when studying for a test,” “during finals,” “smoking when around family,” or “smoking during holidays”), in other words, when they are under stress. This is in accordance with the research (e.g., Patterson, Lerman, Kaufmann, Neuner, & Audrain-McGovern, 2004; Oksuz et al., 2007). Stress smokers were described as typically smoking anywhere but “less out in the open,” and they mostly smoke alone or with others “who share the same stress.” Interestingly, although the concept of social anxiety was not prominent the focus groups’ perception of social smokers, it did emerge in their discussion of stress smokers. Stress smokers were described as possibly smoking in social situations but only if the social situation is stressful (e.g., “They may smoke at parties if it is a stressful situation”). Social anxiety is a supported reason for why some college students may smoke (Lantz, 2003). It is not surprising that this type of smoker is influenced by the college environment, as college was described to be very stressful for

some students, and research has shown that individuals who are stressed academically and unhappy with their college experience are more likely to smoke (Emmons, Wechsler, Dowdall, & Abraham, 1998; Patterson et al., 2004).

The participants also indicated that stress smokers typically smoke only cigarettes and smoke 1 to 3 cigarettes a day, or around a pack or two a month. Some participants stated that the pattern of smoking is very irregular, unlike for light smokers (e.g., “Sometimes none, sometimes half a pack. So probably a really irregular pattern” and, “It really depends on the person”). This is consistent with the research that states that stress smokers are likely to smoke in higher concentration during high anxiety academic periods (Patterson et al., 2004).

Participants agreed that stress smokers were not addicted to nicotine and that they smoked due to habit, but that it is possible that some may become addicted and not admit to it (e.g., “some stressed smokers may think they are not addicted”). Although it is commonly used to describe the relationship between alcohol and cigarette use, the cognitive/affective perspective may explain this pattern of potential addiction, since it could be that some events or activities (e.g., tests or family time) are memory encoded and when paired with cigarettes might cause the behavior to occur more often over time (Brandon & Baker, 1991).

Similar to social smokers, participants also acknowledged that stress smokers would consider themselves nonsmokers due to amount smoked (e.g., “Nonsmoker- I only smoke when I am stressed” or “nonsmoker, I only enjoy smoking”). Interestingly, some stress smokers present at the focus groups indicated that they do have a goal for quitting, which typically was before the end of college or shortly after college (e.g., “Yes- after college before I have children, whenever that is”). However, it is important to note that stress smokers were consisted of the least amount of participants since they were not directly recruited.

Drunk smoker. Drunk smokers, as labeled by the students, is a new category of smoker that has not been widely acknowledged in the literature. It is well known that alcohol and cigarettes are typically paired (e.g., Schane et al., 2009; Weitzman & Chen, 2005), but little is known about this pattern of

smoking. Participants agreed that drunk smokers typically smoke on somewhat of a schedule (e.g., “I usually smoke when drinking” or “depending on habit, but probably on the weekend”) and only when alcohol is present (e.g., “I smoke at parties only when there is alcohol involved”) with other drunk smokers who are readily available such as classmates, friends, or strangers. However, as with social smokers, many participants indicated that drunk smokers are strongly influenced by peers. Some participants stated that they smoke “just ‘cause most of my friends do it, and whenever we drink together we go outside,” “it became almost a social thing for me to do because like a lot of my friends smoke so we’d all go smoke together.” This may indicate that drunk smoking may be a subtype of social smoking which was debated during the focus groups. Some participants acknowledged that this pattern is just a social smoking pattern while other participants insisted that it was a separate pattern of smoking that was associated more with those who identify as nonsmokers. Consistent with previous research (Stromberg et al., 2007), it is not surprising that the connection between smoking and using other substances like alcohol was very strong for this type of smoker and that the college life is a huge influence on their smoking patterns. As one participant put it, “It’s the lifestyle, it’s the college environment” and another added, “It’s an expectation to the norm.”

When asked why drunk smokers smoke, most participants referred to the notion that together it is enjoyable and one substance enhances the effects of the other (Harrison et al., 2008; Nichter et al., 2010; Rose et al., 2004; Stromberg et al., 2007). Some participants argued that “it’s better together,” “[it] just makes you feel better,” “it’s a high,” “it numbs you up I guess,” or “smoking helps enhance the drinking.” Other participants argued that it was not necessarily a conscious decision. For example, one participant argued that “they don’t have better judgment.” One drunk smoker agreed with this premise and stated, “I can’t control myself when I am drunk.”

The participants indicated that drunk smokers typically smoke both cigarettes and hookah during a drinking period. However, there was some disagreement about the amount smoked per drinking period, since it depends on the amount of alcohol consumed. One participant stated that “it seems, especially with drinking, that the more you drink the more you smoke,” which is consistently reported in various studies

(e.g., Bien & Burge, 1990; Dierker et al., 2006; Harrison et al., 2008). Some drunk smokers may smoke as little as a couple of cigarettes a month (e.g., “I smoke like once or twice a month”) while other drunk smokers may smoke up to as much as a heavy smoker smokes a month (e.g., “A cigarette per beer? Like chain smoker status,” “It is easy to smoke one pack when you are drinking”). Interestingly, participants indicated a sharing culture with cigarettes, where drunk smokers rarely buy their own cigarettes and only do so based on the situation. Drunk smokers in the group acknowledged that it is “kind of a split, I’ll buy a pack this night, a friend will get the next” or “they could buy their own cigarettes before they go drinking.” Obviously, brand loyalty is typically not common with drunk smokers. As one participant candidly stated, “When I get shit piss drunk, like to the point where I can’t see straight, I will smoke whatever [cigarettes]”.

There was no disagreement over the addiction and smoker identity of drunk smokers; drunk smokers are not addicted to nicotine and do not consider themselves smokers. Two themes emerged that justify why they categorize themselves as not addicted and nonsmokers. One theme was because smoking only occurs in a specific drinking situation. For example, some participants argued:

(P1) Well, when I only smoked when I drank it was like I only smoke when I drink, I’m not a smoker. It just felt like you don’t have to take responsibility for it. It was like you could just use it for an excuse.

(P2) Yeah it’s the same for me, like I’m not a smoker. Every once in a while I’ll have a cigarette but it’s just like I would never really smoke ‘cause I’m hammered drunk.”

(P3) Alright, I would not consider myself a smoker because like I mean I’m pretty much a drunk smoker whenever I drink, even if I’m not like really drunk, I’ll have a little drink just so I can smoke a cigarette.

The second theme on why drunk smokers were not addicted was that there were no addiction/withdrawal symptoms present (e.g., “No. Because I’ve never had an urge like oh my god I really need a cigarette right now. It’s just like oh there’s one that someone’s letting me have”). Interestingly, most drunk smokers present at the focus groups acknowledged a desire to quit after college was over (e.g., “Yeah, but not until after I’m done with college because the lifestyle and people,” or “It would be easier [after college], I think to be able to resist temptation and be able to go out but not always be drinking and smoking”).

Brief description of daily smokers. Overall, light smokers, regular smokers (also referred to as moderate smokers), and heavy smokers (also referred to as chain smokers) were described by participants in accordance with what previous research has suggested. Since the goal of this study was to look at the differences within the nondaily smoker group, the following sections are brief general descriptions of these patterns of smoking and are not as in depth as previous sections.

Overall, light smokers, regular smokers, and heavy smokers were described very similarly. One main theme emerged for these types of daily smokers; all three smokers smoked on a schedule or during specific times (e.g., “When I wake up, during work, 1-2 hours, during breaks at school,” “between classes, between meals – before and after, study breaks,” “I think they have a routine”). All these smokers were described as typically smoking anywhere since location does not matter (e.g., “At home or pretty much wherever I am”), although there are typically spots they choose to smoke in. All three types of smokers will smoke alone or by themselves. These smokers were described as possibly smoking in social situations, but that it is not what drives their smoking. It is not surprising then that a connection between smoking and using other substances like alcohol was described as present for these types of smokers since a connection between smoking and drinking has been repeatedly found to exist (Rose et al., 2004; Stromberg et al., 2007), but the connection was not as strong as for other smokers. These smokers typically smoke for the effects of the cigarette (e.g., “To get out of bed in the morning. It wakes you up,” “To relieve stress, it’s relaxing” “I like it and I don’t really think about the consequence,” or “I really like it”) which is in accordance with previous studies (e.g., Oksuz et al., 2007; Rose et al 2007). Therefore, the participants were less convinced that these types of smokers were influenced by the college environment. These types of daily smokers differed only in the amount smoked, level of addiction, and quitting behaviors.

Light smoker. The participants indicated that light smokers typically smoke only cigarettes and smoke 1 to 3 cigarettes a day, or around a pack or two a month, and smoke less than other heavier smokers (e.g., “There is less per day/week than a regular smoker”) which is supported by previous research (Businelle et al., 2009). There was some disagreement over whether light smokers were addicted

or not addicted to nicotine, but most participants agreed that the light smoker uses due to habit (e.g., “Maybe it’s just more of a habit, I don’t really think they’re like addicted to it but I’m guessing that light smokers could very well turn into regular or heavy smokers”) and that withdrawal symptoms may not be present (similar results in Fagan & Rigotti, 2009; Shiffman & Paty, 2006). Some light smokers present at the focus groups indicated that they do have the desire to quit (e.g., “Yes- I don’t want to become a regular smoker- I dunno if I have a goal”). Research has shown that most of light smokers do have a strong desire to quit and may be more likely to attempt it compared to heavier smokers (Rose et al., 2007).

Regular smoker. There was some disagreement about how much regular smokers use, and the groups were usually divided by two themes. Some participants indicated that regular smokers typically smoke 5 to 6 cigarettes a day, or around two packs a week, but smoke less than heavier smokers (as supported by Businelle et al., 2009). Other participants argued that regular smokers smoke around a pack a day. Both groups agreed that regular smokers typically smoke more on the weekends due to social situations (e.g., “2-3 cigarettes. On the weekend, it’s a little higher,” or “About 5 every day, but it goes up on the weekend”).

There was also some disagreement over whether regular smokers were addicted. Some participants agreed that they were addicted (e.g., “I don’t like to admit it but I am addicted,” or “I continue to [smoke] because of addiction”), while others only thought it was due to habit (e.g., “It’s just from habits”), but that addiction was more common than with light smokers (as supported by Businelle et al., 2009). When asking only the regular smoker focus group, all participants in that group acknowledged that they were addicted to nicotine (e.g., “Yes because I have cravings and I would probably go through withdrawals,” “Yes, because I couldn’t quit if I wanted to,” “I would say I’m addicted because I plan things in my life around smoking,” “When you unconsciously reach for a cigarette and I have to have it with me then yeah”). Two themes emerged regarding why regular smokers feel like they are addicted: psychological (addictive personality) or due to physiological changes (e.g., “Some have physical while others have psychological changes,” or “Whether or not they have an addictive personality”). This is not

surprising, since according to Fagerstroms's model of addiction (1978), rates of addiction occur based on the amount smoked. Interestingly, all regular smokers acknowledged that they had a desire to quit with a goal in mind (e.g., "Yeah, but probably not until after college. College is stressful enough. It helps me deal," or "Yeah, probably before the end of college. It's just so bad for you and so expensive") (as supported by Businelle et al., 2009; Harris, Schwartz, Thompson, 2008).

Heavy smokers. The participants had some difficulty with classifying how much heavy smokers smoke, as none of the participants considered themselves heavy smokers. Most participants indicated that heavy smokers typically smoke at least a pack a day (supported by Rose et al, 2007). There was no disagreement over whether heavy smokers were addicted (e.g., "Absolutely addicted" or "They like to smoke, but they might not and can't quit - addicted") and most participants acknowledged that heavy smokers did consider themselves to be smokers (also supported by Rose et al., 2007). No information on quitting intentions was given for this group, since many participants did not know.

Differences between smokers. One of the main themes that emerged to describe differences between the various types of smokers is the major triggers which might lead to smoking. For example, alcohol is a trigger for drunk smokers, friends and social events are triggers for social smokers, and stressful periods are triggers for stress smokers. Regardless of the trigger, most participants acknowledged that smoking may occur more heavily during the period in which the triggers are present.

Another major theme that emerged to explain the differences between the various smokers is their purpose or reason for smoking. For example, drunk smokers acknowledged that smoking helps or enhances the effects of alcohol (e.g., "It just makes you feel better") and not to just socialize. Social smokers acknowledged that smoking helps to meet new people, start a conversation, or be able to be around other friends who smoke, but alcohol does not need to be involved for smoking to occur although it is typically involved (e.g., "At some point you're a drunk smoker because you're there [at parties with alcohol] but social smoker when just in a social situation without drinking." Stress smokers obviously smoke to reduce their perceived stress levels, regardless of whether the stress is due to school-related

events or social events. As is apparent, these categories of smokers do overlap at times. In addition, some individuals in the social focus groups argued that social and drunk smoking are very closely tied due to the college environment but might be very different outside the college environment (e.g., “Social and drunk kinda go hand and hand in college– they are pretty much the same” or “Different settings- I think there’s a fine line between the two”).

Lastly, participants who regularly smoke acknowledged one theme that overlaps all three smoker typologies (i.e., light, regular, and heavy smokers): when they first started smoking, they self-identified as social, stress, or drunk smokers (e.g., “I started socially, just like other people were doing it so I started from there”). This is an important theme, since it is apparent that the occasional smokers may progress into more regular smokers. However, prevention or intervention programs may be less effective if the differences described by the participants are not acknowledged.

Quantitative Study

Method

Participants. As described earlier, participants were recruited through the Psychology department participant pool at Colorado State University. Because the primary focus of this study was on patterns of smoking, restrictions were placed on who could participate in the study. As a result, 70 students who signed up for the study and who indicated that they had never smoked or only experimented and had not smoked since high school were excluded from the analysis. This left 335 smokers ($M=18.58$ years, $SD=.887$; 63.9% Female; 85.7% White/Caucasian) for the final sample. The demographic characteristics of this group did not vary from the full sample. In addition, 16% of the restricted sample identified as moderate to heavy smokers, 33% identified as very light to light smokers, 27% identified as social smokers, and 24% identified as nonsmokers.

Measures. Participants filled out a consent form, a tracking form that asked for the participant’s name, email address, and cellphone number, and the survey packet. The first part of the survey packet included a demographics sheet with questions regarding age, gender, ethnicity, student status, level of education, income, living arrangements, and relationship status. The second part of the survey packet

included questions that were compiled based on a review of literature and adapted from the Colorado Collegiate Tobacco Preventative Initiative: Assessment Survey of Tobacco Cessation and Prevention Services Provided by Student Health and Counseling Centers and the Annual Campus Tobacco Use and Attitude Survey Health and Counseling Center Assessment or the Harvard Alcohol College Study. Given that the primary purpose of the present study was to develop a typology of college smokers and, concurrently, a method for measuring social smoking, a large number of items were administered to participants which resulted in 25 potential items or scales that could be used for the analysis.

We took a classical test theory approach and conducted several Exploratory Factor Analyses (EFA) using Principal Axis Factoring Analysis extraction with Promax Rotation to determine which potential items could be collapsed into a scale. To retain a factor, the following criteria had to be met: (1) an eigenvalue of 1.00 or higher (Kaiser-Guttman criterion); (2) over 50% variance explained (Streiner, 1994); and (3) at least three variables per factor (Anderson & Rubin, 1956; Comrey, 1988). Items in a factor were considered valuable when their factor loadings were .30 or higher (Floyd & Wildman, 1995). The initial and altered EFAs were all guided by recommendations and previous research.

Confirmatory Factor Analyses (CFA) were also conducted to validate the results from the EFAs. Model fit was assessed using the Chi-square statistic (χ^2 ; $p > .05$), the Comparative Fit Index (CFI $> .95$; Bentler, 1990), the Root Mean Square Error of Approximation (RMSEA $< .06$ to $.08$; Steiger & Lind, 1980) and Standardized Root Mean Square Residual (SRMR $< .08$; Hu & Bentler, 1999). Due to their popularity, χ^2 and RMSEA were reported, but it is important to note that χ^2 will typically be significant for large samples and RMSEA will also be higher for models with small degrees of freedom (Hu & Bentler, 1999). Since the data for this study may have these limitations, model fit will be assessed more heavily using the other indicated fit statistics. If the model fit for the CFA initial model was not acceptable, the last step before creating the scales was to improve the model fit based on the contribution of the items to the factor (R^2). Akaike Information Criteria (AIC) and Bayes Information Criteria (BIC) were also used for model comparison; lower values indicating a better model (Burnham & Anderson, 2004). Having

selected the scales, we proceeded with investigating the internal consistency of the scales using Cronbach's alpha. Results of the EFAs and CFAs for the scales are presented in Tables 2 through 8.

Subjective norms (Table 2). Participants were asked three questions that gauged perceptions of the percentage of CSU students who smoke occasionally, regularly, and socially. The EFA of the initial model revealed that the questions formed only one factor as indicated by the eigenvalue of 2.151, with 71.69% total variance explained. Moreover, the CFI revealed a good model fit and reliability was high for these items ($\alpha=.80$). However, this scale was used only in the initial exploratory analysis and was excluded from the final analysis due to limited sample size.

Table 2
EFA and CFA Model for Subjective Norms (n=335)

	Initial Model
Factor Loadings	
What percentage of CSU students smoke occasionally?	0.859
What percentage of CSU students smoke on a regular basis?	0.666
What percentage of CSU students smoke at parties or bars?	0.754
EFA Results	
Eigenvalues	2.151
% of Variance Explained	71.694
CFA Indices	
<i>df</i>	3
χ^2	331.082*
CFI	1.00
RMSEA	---
CI RMSEA	---
SRMR	.00

Note. Items with highest loading on each factor are in bold; χ^2 =Chi square test; *df*= degrees of freedom; CFI = Comparative Fit Index; RMSEA= root-mean-square error of approximation; CI RMSEA = 90% confidence interval for root-mean-square of approximation; * $p < .05$

Smoking preference (Table 3). Participants were asked four questions which were adapted from the Annual Campus Tobacco Use and Attitude Survey about preferences to be in smoking areas or with other friends, partners, or roommates who smoke (1=*Strongly Disagree* to 5=*Strongly Agree*). Participants were also asked three questions (similar to those used by Colder et al., 2008 and Kenford et al., 2005) about approval or disapproval of friends', partners', or roommates' smoking (1 = *Strongly disapprove* to 5=*Strongly approve*). The EFA of the first model indicated that the seven questions about preference for and approval of smoking formed two factors: preference for smokers in one's social network (eigenvalue of 2.98 and the total variance explained was 49.77%) and acceptance of others' smoking behavior (eigenvalue of 1.33 and the total variance explained was 71.94%). However, because the model fit was marginal, the question with the lowest R^2 value (.12), 'I would be friends with a nonsmoker,' was dropped for the modified model. The new model provided better fit statistics but continued to be marginal. The reliability for the modified preference scale ($\alpha = .83$) and acceptance scale ($\alpha = .75$) were high; therefore, these items were combined and retained for the final analysis. This scale was used in the initial exploratory analysis but was excluded from the final analysis due to limited sample size.

Table 3
EFA and CFA Models for Preference (n=335)

	Initial Model		Modified Model	
	Factor Loadings			
I would be friends with a nonsmoker	0.445	0.156	--	---
I prefer to live in a smoke-free living area	0.863	0.070	0.859	0.103
I prefer to go to public places that are smoke free	0.798	-0.021	0.816	0.023
I would rather date a nonsmoker	0.640	-0.222	0.694	-0.163
How much would you/ do you disapprove of your best friend smoking?	0.077	0.779	0.060	0.799
How much would you/ do you disapprove of your partner smoking?	-0.083	0.674	-0.147	0.628
How much would you/ do you disapprove of your roommate smoking?	0.119	0.738	0.057	0.702
	EFA Results			
Eigenvalues	3.067	1.483	2.986	1.330
% of Variance Explained	43.814	21.184	49.772	22.170
	CFA Indices			
<i>df</i>	13			8
χ^2	71.207*			58.868*
CFI	0.925			0.930
RMSEA	0.116			0.138
	.090 to			0.106
CI RMSEA	.143			to.172
SRMR	.060			.056
AIC	5839.710			4890.336
BIC	5923.621			4962.805

*Note. Items with highest loading on each factor are in bold; χ^2 =Chi square test; *df*= degrees of freedom; CFI = Comparative Fit Index; RMSEA= root-mean-square error of approximation; CI RMSEA = 90% confidence interval for root-mean-square of approximation; **p* <.05*

Smoking network (Table 4). Four questions were used to identify how many students in the participants' social network were smokers. The first question asked how many of their current friends smoke (*None, One or two, Two to five, or More than five*). The other questions asked how often their friends, partner, or roommates smoke (0= *Does not smoke to 5= Smokes multiple times a day*). These questions produced a one factor model. The eigenvalue for the initial model was 1.65 with 41.40% variance explained. The CFA revealed that this model was a good fit and no additional modifications were necessary. This scale was used in the initial exploratory analysis but was excluded from the final analysis due to limited sample size.

Table 4
EFA and CFA Model for Smoking Network (n=335)

	Initial Model
Factor Loadings	
How often does your best friend smoke?	.768
If you are in a relationship, how often does your partner smoke?	.334
If you have a roommate, how often does he or she smoke?	.324
How many of your current friends smoke?	.461
EFA Results	
Eigenvalues	1.656
% of Variance Explained	41.410
CFA Indices	
<i>df</i>	2
χ^2	5.012
CFI	.081
RMSEA	.067
CI RMSEA	.00 to .143
SRMR	.028

*Note. Items with highest loading on each factor are in bold; χ^2 =Chi square test; *df*= degrees of freedom; CFI = Comparative Fit Index; RMSEA= root-mean-square error of approximation; CI RMSEA = 90% confidence interval for root-mean-square of approximation; **p* <.05*

Initiation. One question was used to identify whether the participant had ever smoked (*yes or no*); another question was used to gauge at what age initiation occurred. Since only 83% of participants indicated ‘yes’ to the question ‘have you ever smoked a cigarette?’ this question was only used to restrict the sample for further analysis. The additional question asked at what age initiation occurred (e.g., *Before college or In college*) which was used in the final analysis.

Current smoking. Participants were asked to indicate how many cigarettes on average they have smoked in a week, and a month, and how much they spend on cigarettes (similar to questions used by Colder et al., 2008). These items were left as standalone items since they are a common way of differentiating between different types of smokers in the literature. Only weekly use was used for the final analysis since monthly use and money spent did effectively differentiate between smokers.

Smoker Identity. Participants were asked what type of smoker they consider themselves (*Nonsmoker, Former smoker, Very light smoker, Light smoker, Social Smoker, Moderate smoker, or Heavy smoker*). Item responses were collapsed to *nonsmoker/former smoker, light smoker, social smoker, and moderate/heavy smoker*.

Smoking contexts (Table 5). Participants were asked 14 questions about the people with whom and the locations where they typically smoke both during the week and on the weekend (1=*Never* to 5=*Very often*) which is similar to the measure used by Colder et al. (2008) and Gilpin et al. (2005). The initial EFA model was conducted on 10 items which examined with whom and where participants typically smoke. Four of the questions were dropped and not included in the analysis because they did not directly focus on smoking patterns. The EFA conducted revealed that the remaining 6 questions formed two potential factors: daily smoking patterns (an eigenvalue of 1.11 and 74.07% variance explained) and nondaily smoking (an eigenvalue of 6.289 and 11.18% variance explained). The model had a marginal fit for RMSEA and a good fit for CFI; therefore, the items were collapsed into two scales. Both the nondaily smoking scale ($\alpha=.92$) and the daily smoking scale ($\alpha=.91$) had good reliability. However, this scale was only used in the initial exploratory analysis and was excluded from the final analysis due to limited sample size.

Table 5
EFA and CFA Model for People and Places(n=335)

	Initial Model	
Factor Loadings		
On the weekdays, how often do you smoke?	.800	.158
How often do you smoke at home? (not in the dorms)	.777	.036
How often do you smoke at work?	.831	-.096
How often do you smoke on campus?	.700	.193
How often do you smoke with family members?	.525	-.100
How often do you smoke by yourself?	.837	.024
How often do you smoke at social gatherings?	.083	.790
How often do you smoke with friends?	.020	.854
How often do you smoke when you are drinking alcohol?	-.201	.952
On the weekends, how often do you smoke?	.197	.777
EFA Results		
Eigenvalues	6.289	1.119
% of Variance Explained	62.892	11.186
CFA Indices		
<i>df</i>	34	
χ^2	140.892*	
CFI	.960	
RMSEA	.097	
CI RMSEA	.081 to .114	
SRMR	.039	

*Note. Items with highest loading on each factor are in bold; χ^2 =Chi square test; *df*= degrees of freedom; CFI = Comparative Fit Index; RMSEA= root-mean-square error of approximation; CI RMSEA = 90% confidence interval for root-mean-square of approximation; **p* <.05*

Reasons for smoking (Table 6). Participants were asked 24 questions that addressed reasons for smoking (e.g., social, stress reliever, addiction, or boredom). These items were previously used by the Annual Campus Tobacco Use and Attitude Survey (1=*Strongly disagree* to 5=*Strongly agree*) which was adapted for college students based on the Modified Reasons for Smoking Scale (Berlin et al., 2003). These questions were also used to identify different smokers for the focus groups. For this analysis, these questions were converted to categorical responses (endorsed or did not endorse/neutral).

Table 6
Reasons for Smoking Scale Used

Items
1. Because it is pleasurable
2. Because my friends smoke
3. Because my parents don't know I am smoking*
4. Because if I don't smoke, I shake*
5. Out of habit
6. As a reward
7. To take a break
8. To relieve boredom
9. Because I like the taste
10. To socialize
11. To relieve stress
12. To help relax
13. To help control my weight*
14. Because I have tried to quit before but was unsuccessful
15. Because I am addicted
16. To help me fit in
17. To help me meet people
18. To help me stay awake
19. When I am angry
20. In response to craving
21. To suppress my appetite*
22. When I am upset
23. Because my parents are not here to tell me I can't*
24. Because other people smoke

Note: *not included in final analysis

Smoking cessation. Participants were asked two questions on quitting behavior. One question addressed if the participant believed he or she could quit anytime (*Disagree, Agree, or Neutral*). The second question addressed when the participants would like to quit (*in 6 months, before graduation, after graduation, or not at all*). These items are similar to the ones used by Hassmiller et al. (2003) and Gilpin et al. (2005). EFAs and CFAs could not be conducted due to the limited number of questions, however reliability revealed that these items did not work well together ($\alpha=.22$). Since there was more variability with responses in the 'could quit anytime' item, this question was kept for the analysis.

Dependence (Table 7). Participants were asked one question on whether they believed that they were addicted to nicotine (*yes* or *no*). The six item Severity of Dependence Scale (SDS) (Gossop et al., 1995) was also given to the participants to discover any psychological or physical symptoms they might be experiencing due to dependence (e.g., anxiety). One factor emerged in the initial EFA model for the remaining addiction questions with an eigenvalue of 3.08 and 61.74% variance explained. This model was a good fit with good reliability ($\alpha=.84$), therefore the items were combined into a scale. This scale was used in the initial exploratory analysis but was excluded from the final analysis since the Reasons for Smoking scale already addressed dependence.

Table 7
EFA and CFA Model for Dependence (n=313)

	Initial Model
Factor Loadings	
Do you think your smoking of cigarettes is out of control?	0.688
Does the prospect of missing a smoke make you anxious or worried?	0.707
Do you worry about your use of cigarettes?	0.811
Do you wish you could stop?	0.626
How difficult did you find it to stop or go without cigarettes?	0.777
EFA Results	
Eigenvalues	3.087
% of Variance Explained	61.748
CFA Indices	
<i>df</i>	5
χ^2	7.673
CFI	.974
RMSEA	.041
CI RMSEA	.000 to .096
SRMR	.031

*Note. Items with highest loading on each factor are in bold; χ^2 =Chi square test; *df*= degrees of freedom; CFI = Comparative Fit Index; RMSEA= root-mean-square error of approximation; CI RMSEA = 90% confidence interval for root-mean-square of approximation; **p* <.05*

Alcohol use (Table 8). Participants were asked eight questions about their daily, weekly, and monthly drinking behavior, as well as episodes of heavy drinking. These questions were adapted from the Harvard College Alcohol Study. The initial EFA model indicated that this is a one factor model with an

eigenvalue of 3.87 and 55.33% of the variance explained. The CFA indicated that this model did not have good model fit; therefore, the items with the lowest R^2 were removed from the model ('How would you best describe yourself in terms of your current use of alcohol?' and 'Think back over the past 30 days. How many times have you had four or more drinks in a row?'). The final CFA provided a good model fit and the reliability for this scale was acceptable ($\alpha=.78$).

Table 8
EFA and CFA Model for Alcohol Use (n=324)

	Initial Model	Modified Model	Final Model
Factor Loadings			
On how many occasions have you had a drink of alcohol in the past 30 days?	.807	.774	.776
In the past 30 days, on those occasions when you drank alcohol, how many drinks did you usually have?	.610	.642	.638
In the past 30 days, how often did you drink enough to get drunk? (By drunk, we mean unsteady, dizzy, or sick to your stomach.)	.717	.730	.736
Think back over the past 30 days. How many times have you had four or more drinks in a row?	.868	.870	---
The last time you had four or more drinks in a row, how many drinks did you actually have?	.564	.553	.551
How would you best describe yourself in terms of your current use of alcohol?	.687	---	---
When did you last have a drink (that is more than a few sips)?	.590	.578	.574
EFA Results			
Eigenvalues	3.874	3.408	2.722
% of Variance Explained	55.339	56.799	54.438
CFA Indices			
<i>df</i>	14	9	5
χ^2	62.583*	47.590*	17.565*
CFI	.849	.863	.943
RMSEA	.103	.115	.088
	.078 to	.084 to	.046 to
CI RMSEA	.130	.148	.135
SRMR	.055	.054	.035

*Note. Items with highest loading on each factor are in bold; χ^2 =Chi square test; *df*= degrees of freedom; CFI = Comparative Fit Index; RMSEA= root-mean-square error of approximation; CI RMSEA = 90% confidence interval for root-mean-square of approximation; * $p < .05$*

Marijuana use (Table 9). Participants were also asked four questions about their monthly and weekly marijuana use patterns adapted from the Harvard College Alcohol Study. One factor emerged from the four questions for the initial EFA model. The EFA produced an eigenvalue of 3.39 with 84.84% variance explained. The model provided a good fit for the data and had excellent reliability ($\alpha=.94$), therefore the items were used to create a scale. This scale was used in the initial exploratory analysis but was excluded from the final analysis due to limited sample size.

Table 9
EFA and CFA Model for Marijuana Use (n=323)

		Initial Model
Factor Loadings		
How would you best describe yourself in terms of your current use of marijuana?		.926
When did you last smoke marijuana?		.823
On how many occasions have you smoked marijuana in past 30 days?		.972
How often during a typical week do you smoke marijuana?		.852
EFA Results		
Eigenvalues		3.394
% of Variance Explained		84.849
CFA Indices		
<i>df</i>		2
χ^2		16.814*
CFI		.964
RMSEA		.090
CI RMSEA		.090 to .222
SRMR		.034

*Note. Items with highest loading on each factor are in bold; χ^2 =Chi square test; *df*= degrees of freedom; CFI = Comparative Fit Index; RMSEA= root-mean-square error of approximation; CI RMSEA = 90% confidence interval for root-mean-square of approximation; **p* <.05*

Results

Latent Class Analysis. Latent Class Analysis (LCA) using MPLUS (version 6.11) was conducted to identify the different groups of smokers present and to estimate the prevalence of these groups. LCA is a type of mixture model and cluster analytical technique that looks for group clusters (Feldman, Masyn, & Conger, 2009) and assumes that individuals in a population can be divided into a certain number of qualitatively different groups (McCutchen, 1987). In the present study, the population of college students was assumed to have a latent variable that splits the population into different clusters referred to as classes. Each class is assumed to produce similar response probabilities within class but vary on response probabilities across classes.

The number of classes was decided upon using model fit statistics. In particular, Bayes Information Criterion (BIC) was used along with Akaike Information Criterion (AIC) statistics to look at model fit compared to other models with smaller values indicating a better fit (McCutchen, 1987; Rose et al., 2007). Lastly, Vuong-Lo-Mendell-Rubin Likelihood Ratio Test (VLMR-LRT) and Lo-Mendell-Rubin Adjusted LRT Test were used to investigate whether the model with one fewer class was significantly better than the model specified (Lo, Mendell, & Rubin, 2001). A significant value ($p < .05$) for these analyses indicates that the model fit the data better than a model with one fewer class. As recommended by Nylund, Asparouhov, and Muthen (2007), a stronger emphasis was placed on BIC and VLMR-LRT when deciding the number of classes. Model usefulness was assessed based on a substantive interpretation, examination of classification quality by using the classification tables (number and percentage of individuals per class), and examination of entropy. Entropy is an indication of how well the items fit into different classes and classification error (values closer to 1 indicate less chance of classification error).

The focus group results revealed that one of the ways to distinguish between different types of smokers was based on their reasons for smoking. To test whether reasons for smoking could produce different classes of smokers in the college population, an LCA was conducted using the 24-item reasons for smoking scale ($n=327$). According to the focus groups (see results above), five classes were plausible

in the college population (i.e., light, regular, heavy, stress, and social/drunken smokers); therefore a two class model to a five class model was tested. Table 10 and Figure 1 show the fit statistics of the models; Figures 2 through 5 depict the probability of endorsing each item. Due to the large number of items in the models, χ^2 could not be estimated. To address this problem, seven items that were not endorsed or had low endorsement by all the possible classes were eliminated from the analysis (see Table 6 above). The elimination of the items did not qualitatively change the class results.

Table 10

Latent Class Analysis Fit Statistics for Original Reason Items (n=327)

Fit Indices	2 Class Model	3 Class Model	4 Class Model	5 Class Model
Parameters	49	74	99	124
Loglikelihood	-3085.745	-2945.449	-2879.450	-2822.299
AIC	6269.489	6038.898	5956.900	5892.599
BIC	6455.197	6319.355	6332.106	6362.554
Adjusted BIC	6299.771	6084.630	6018.083	5969.231
VLMR LRT	-3625.872*	-3085.745*	-2945.449	-2879.450*
LMR LRT	1072.536*	278.500*	131.092	113.518*
Entropy	.915	.920	.888	.904

Note. BIC=Bayesian information criteria; AIC= Akaike information criterion; VLMR LRT= Voung-Lo-Mendell-Rubin Likelihood Ratio Test; LMR LRT= Lo-Mendell-Rubin Adjusted Likelihood Ratio Test; *p<.05

Figure 1

Latent Class Analysis Fit Statistics for Original Reason Items (n=327)

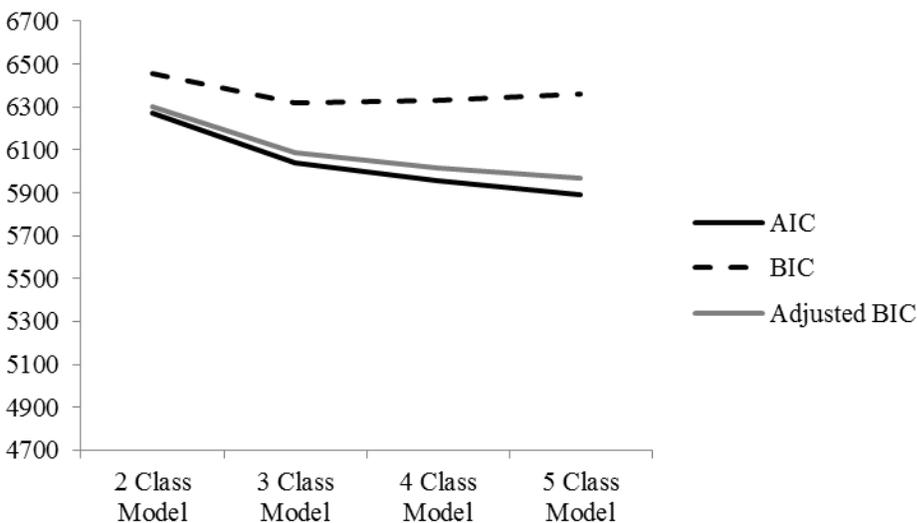


Figure 2

Item Response Probability from a Two Latent Class Model of Original Reasons for Smoking Items

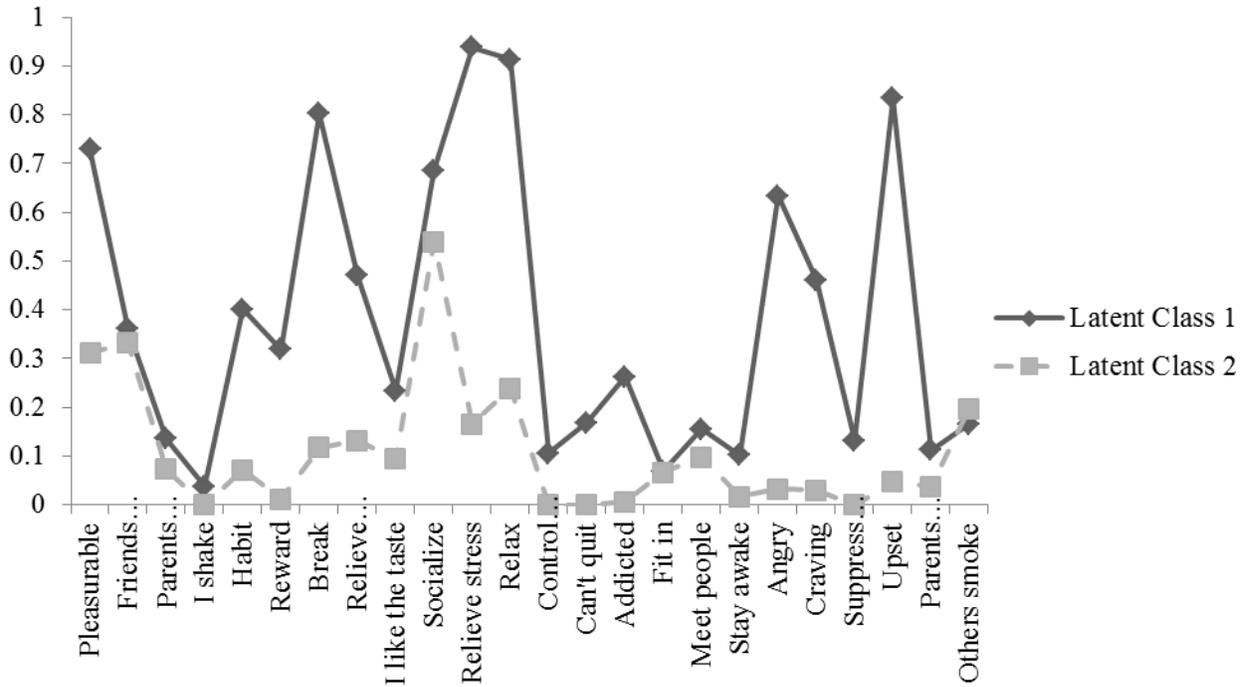


Figure 3

Item Response Probability from a Three Latent Class Model of Original Reasons for Smoking Items

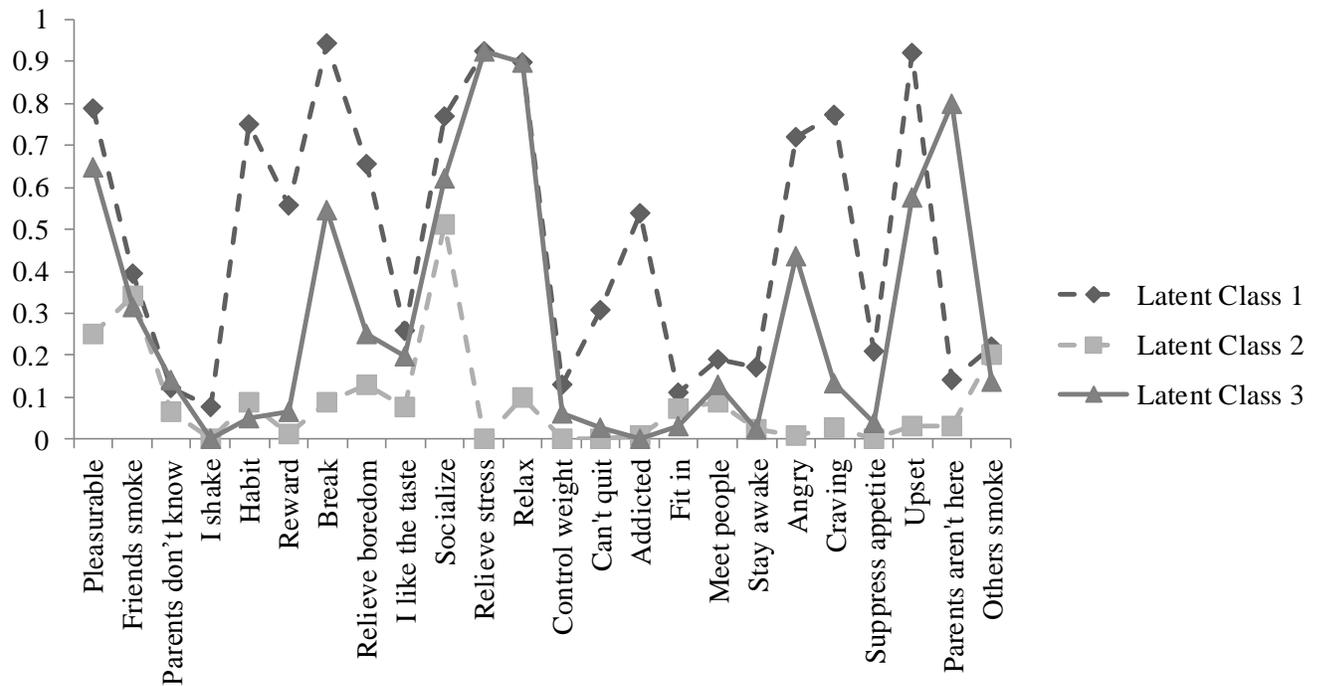


Figure 4

Item Response Probability from a Four Latent Class Model of Original Reasons for Smoking Items

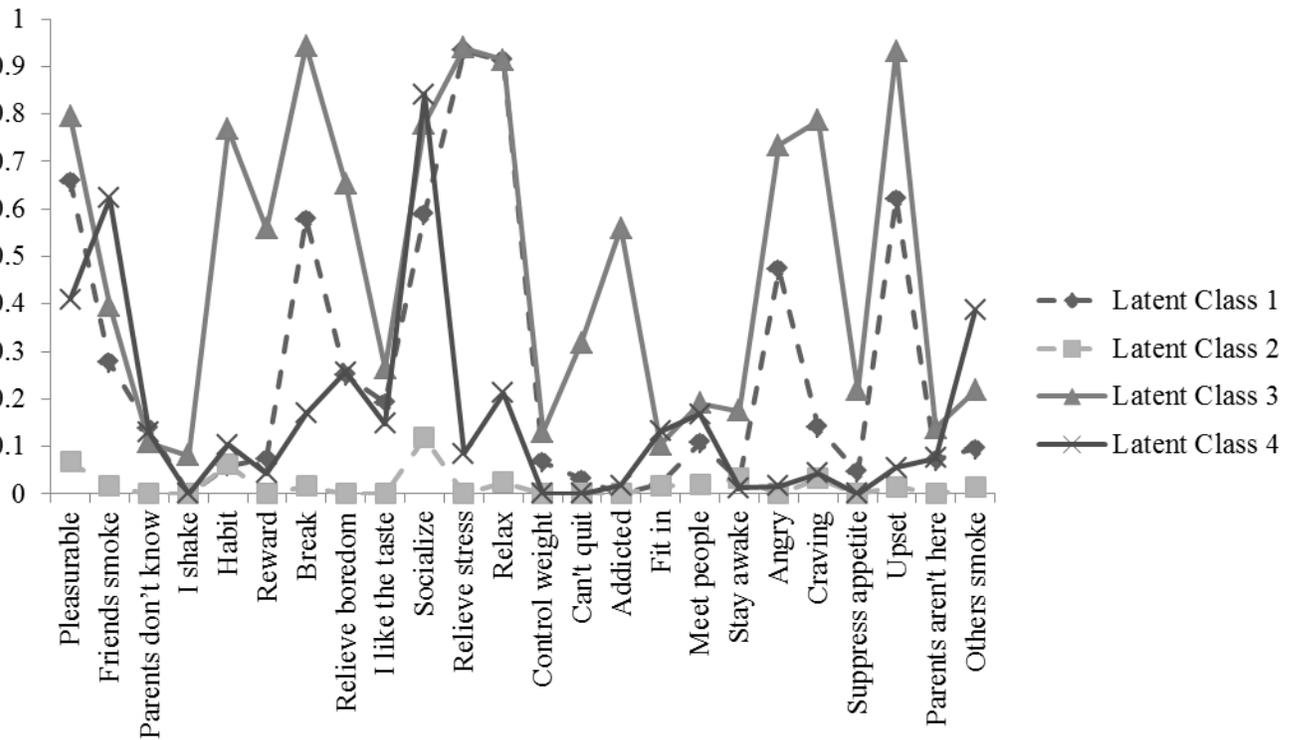
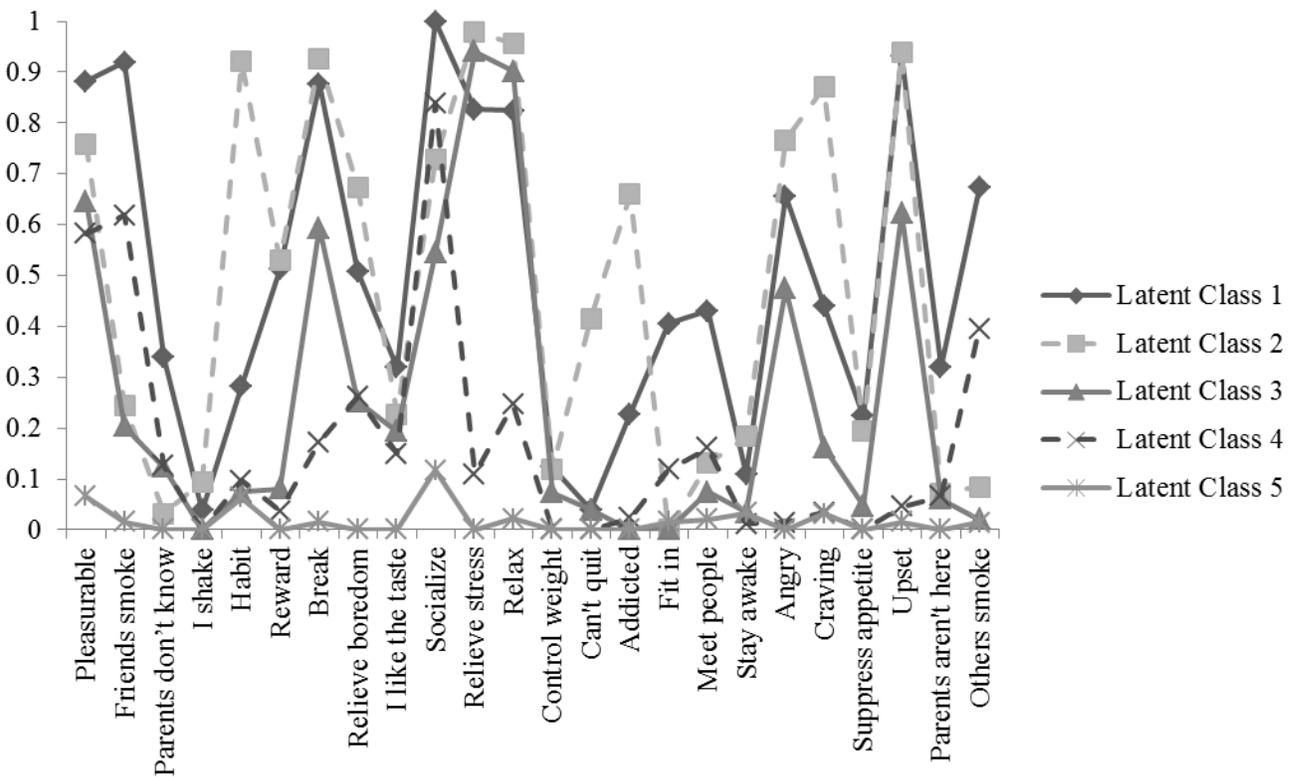


Figure 5

Item Response Probability from a Five Latent Class Model of Original Reasons for Smoking Items



A final LCA with the reduced items was conducted from a two class model to six class model ($n = 327$). The results revealed that a three class model (BIC = 5137.786, entropy = .912), a four class model (BIC = 5136.275, entropy = .883) and a five class model (BIC = 5142.598, entropy = .889) were plausible (See Table 11 and Figure 6). The probability of endorsing each item by number of classes can be seen in Figures 7 through 10. Since the results for the classes were very similar in nature, the decision to retain a class was based on the lowest BIC, significant VLMR-LRT, highest entropy, and substantive in nature (based on the literature as well as the focus groups). The four class model fit these criteria well. In addition, the VLMR-LRT results revealed that a four class model fit significantly better than the three class model ($p < .05$) but the five class model did not fit significantly better than the four class model ($p > .05$).

Table 11

Latent Class Analysis Fit Statistics for Final Reason Items (n=327)

Fit Indices	2 Class Model	3 Class Model	4 Class Model	5 Class Model	6 Class Model
<i>df</i>	130,970	130,970	130,951	130,942	130,927
χ^2	3844.164	3171.999	2768.271	2925.562	2759.953
Parameters	35	53	71	89	107
Loglikelihood	-2538.944	-2415.459	-2362.594	-2313.646	-2275.648
AIC	5147.887	4936.918	4867.188	4805.292	4765.296
BIC	5280.536	5137.786	5136.275	5142.598	5170.822
Adjusted BIC	5169.517	4690.673	4911.066	4860.598	4831.423
VLMR LRT	-3039.145*	-2538.944*	-2415.459*	-2362.594*	-2313.646
LMR LRT	990.895*	244.621*	104.726*	96.966*	75.273
Entropy	.913	.912	.883	.899	.890

Note. BIC=Bayesian information criteria; AIC= Akaike information criterion; VLMR LRT= Voung-Lo-Mendell-Rubin Likelihood Ratio Test; LMR LRT= Lo-Mendell-Rubin Adjusted Likelihood Ratio Test; * $p < .05$

Figure 6

Latent Class Analysis Fit Statistics for Modified Reason Items (n=327)

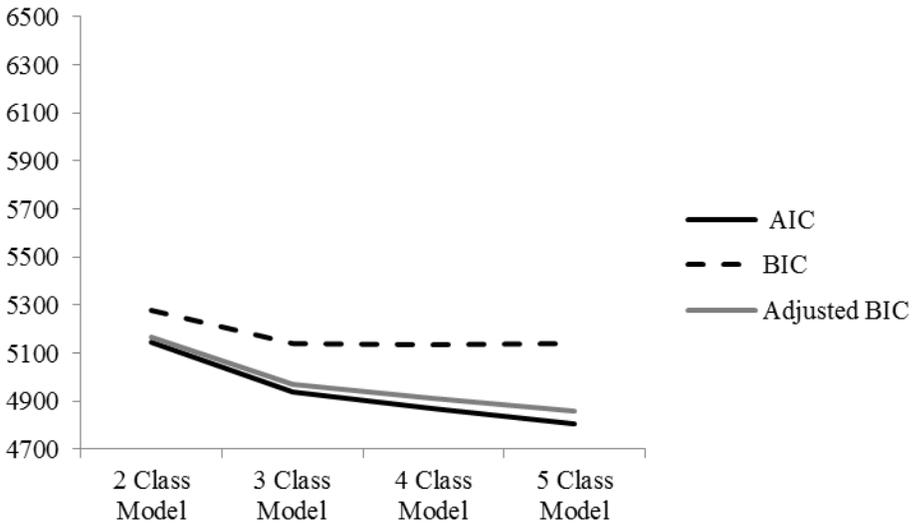


Figure 7

Item Response Probability from a Two Latent Class Model of Final Reasons for Smoking Items

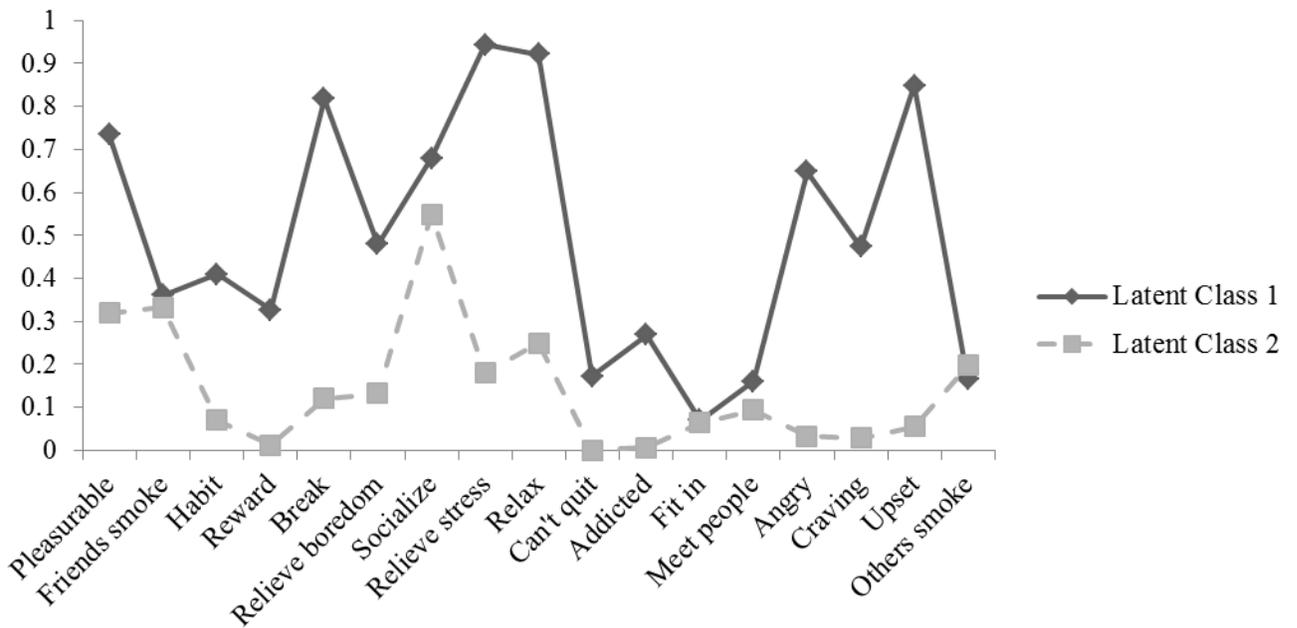


Figure 8

Item Response Probability from a Three Latent Class Model of Final Reasons for Smoking Items

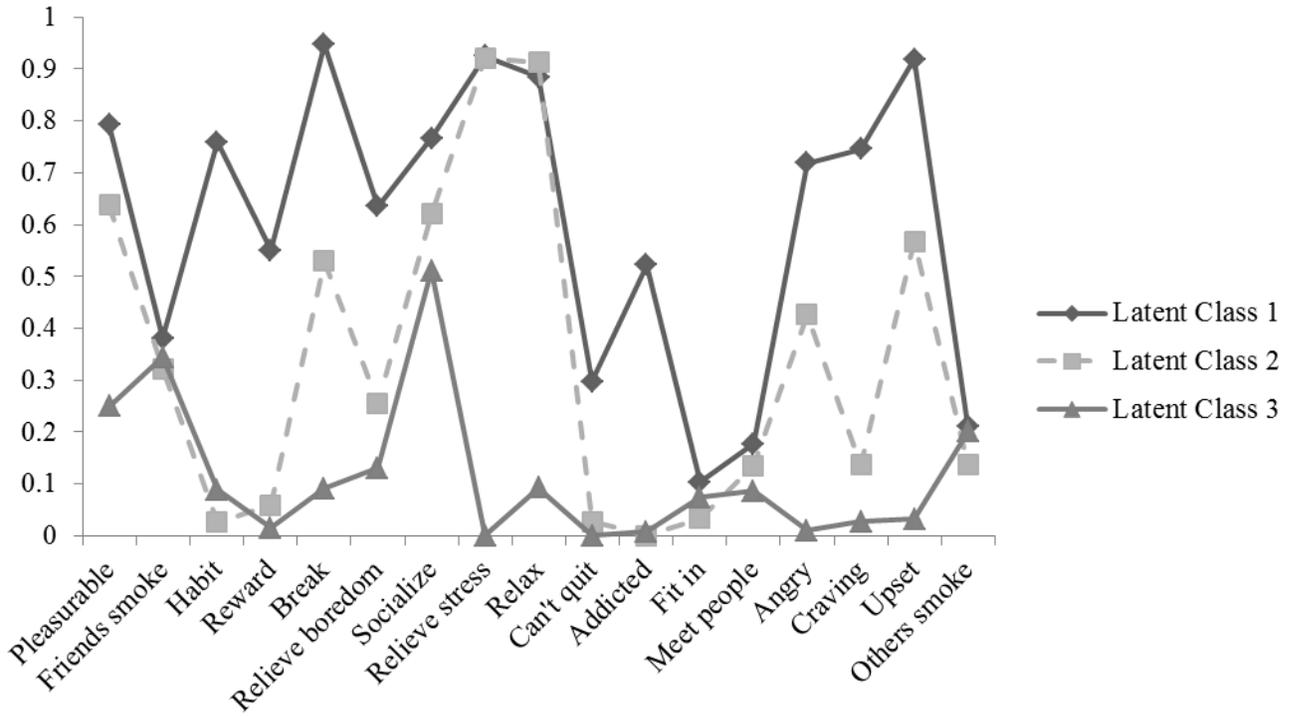


Figure 9

Item Response Probability from a Four Latent Class Model of Final Reasons for Smoking Items

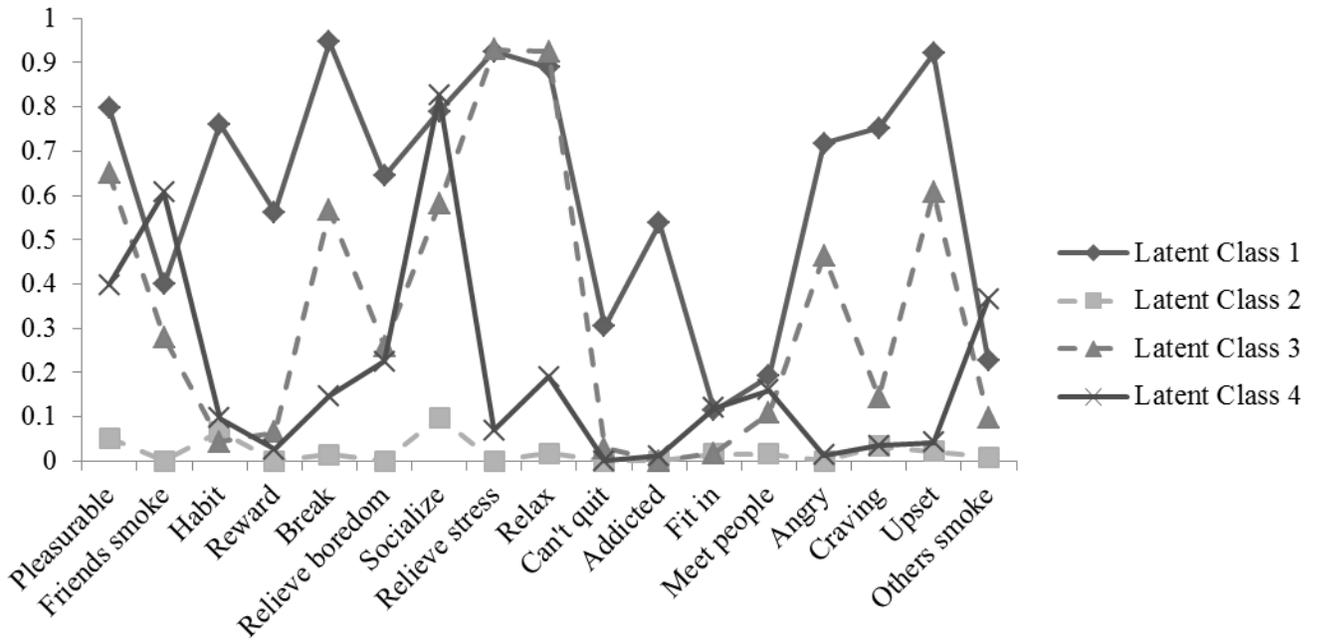
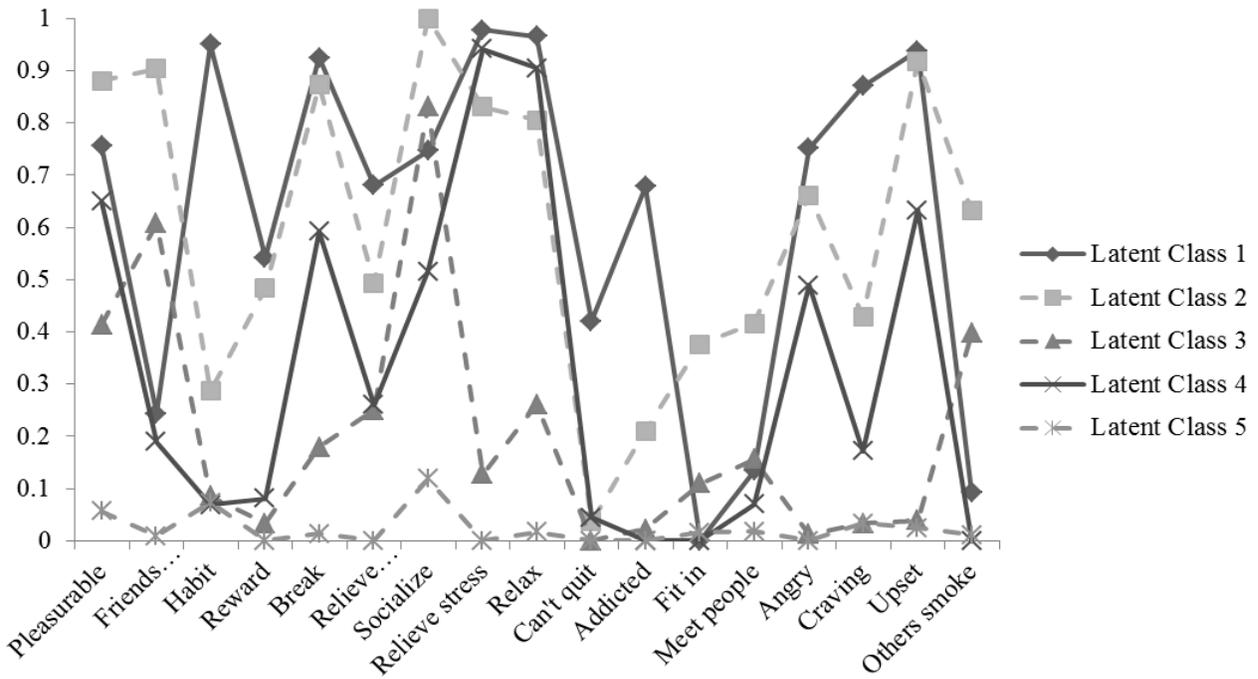


Figure 10

Item Response Probability from a Five Latent Class Model of Final Reasons for Smoking Items



Participants in Latent Class 1 (addicted smokers) consisted of 23.55% of the sample and were more likely to endorse smoking for pleasure, to take breaks, to relieve stress, to socialize, and due to habit/addiction. Participants in Latent Class 2 (non-endorsing smokers) consisted of 18.04% of the sample and included individuals who had a low endorsement for all the items. Participants in Latent Class 3 (stress smokers) consisted of 33.03% of the sample and were more likely to endorse stress related reasons for smoking such as to relax, to reduce levels of stress, and to help when upset. Participants in Latent Class 4 (social smokers) consisted of 25.38% of the sample and were more likely to only endorse smoking because friends smoke and for social reasons. The probability of endorsing each item for a four class model can be seen specifically in Figure 9 (as shown above) and Table 12. Additional demographic information about each class can be seen in Table 13.

Table 12*Item Response Probability for Final Model of Revised Reasons for Smoking Items (n=327)*

	Non-Endorsing Smokers	Stress Smokers	Social Smokers	Addiction Smokers
Pleasurable				
Agree	0.95	0.35	0.60	0.20
Disagree/Neutral	0.05	0.65	0.40	0.80
Friends smoke				
Agree	1.00	0.72	0.39	0.60
Disagree/Neutral	0.00	0.28	0.61	0.40
Habit				
Agree	0.93	0.96	0.90	0.24
Disagree/Neutral	0.07	0.04	0.10	0.76
Reward				
Agree	1.00	0.94	0.97	0.44
Disagree/Neutral	0.00	0.07	0.03	0.56
Break				
Agree	0.99	0.43	0.85	0.05
Disagree/Neutral	0.02	0.57	0.15	0.95
Relieve boredom				
Agree	1.00	0.74	0.78	0.36
Disagree/Neutral	0.00	0.26	0.23	0.64
Socialize				
Agree	0.90	0.42	0.17	0.21
Disagree/Neutral	0.10	0.58	0.83	0.79
Relieve stress				
Agree	1.00	0.07	0.93	0.08
Disagree/Neutral	0.00	0.93	0.07	0.93
Relax				
Agree	0.98	0.08	0.81	0.11
Disagree/Neutral	0.02	0.93	0.19	0.89
Can't quit				
Agree	1.00	0.97	1.00	0.70
Disagree/Neutral	0.00	0.03	0.00	0.31
Addicted				
Agree	1.00	1.00	0.99	0.46
Disagree/Neutral	0.00	0.00	0.01	0.54
Fit in				
Agree	0.98	0.98	0.88	0.89
Disagree/Neutral	0.02	0.02	0.12	0.11
Meet people				
Agree	0.98	0.89	0.84	0.81
Disagree/Neutral	0.02	0.11	0.16	0.19
Angry				
Agree	1.00	0.54	0.99	0.28
Disagree/Neutral	0.00	0.46	0.01	0.72
Craving				
Agree	0.97	0.86	0.97	0.25
Disagree/Neutral	0.03	0.14	0.04	0.75
Upset				
Agree	0.98	0.39	0.96	0.08
Disagree/Neutral	0.02	0.61	0.04	0.92
Others smoke				
Agree	0.99	0.90	0.63	0.77
Disagree/Neutral	0.01	0.10	0.37	0.23

Table 13*Demographic Characteristics of Latent Classes not Included in Model*

	Latent Classes			
	Non-Endorsing Smokers (n=59)	Stress Smokers (n=108)	Social Smokers (n=83)	Addicted Smokers (n=77)
Gender				
Female	66.10%	64.80%	57.80%	33.80%
Male	33.90%	35.20%	42.20%	66.20%
Ethnicity				
White	82.80%	81.50%	90.40%	93.50%
Other	17.20%	17.60%	9.60%	6.50%
Student Status				
Full Time	100%	99.10%	100%	96.10%
Part Time		0.90%		3.90%
Education Level				
Freshman	69.50%	77.80%	68.70%	67.50%
Sophomore	8.50%	12.00%	19.30%	11.70%
Junior	20.30%	6.50%	9.60%	15.60%
Senior	1.70%	2.80%	2.40%	5.20%
Living Arrangement				
On Campus Housing	64.40%	78.70%	75.90%	62.30%
Other	35.60%	21.30%	22.90%	37.70%

Note: Mean (SD) presented for the continuous variables and percentages presented for categorical variables.

Predictors of classes. A Conditional LCA with covariates was used to examine whether these classes differed on specific characteristics addressed in the literature ($n = 303$). LCA with covariates is estimated using a multinomial logistic regression framework because the outcome variables (the four classes) are categorical in nature and unordered. There were 24 different predictors that could have been used in the models; however, due to the small sample size of this study, only six essential predictors were selected based on previous studies: current age, age of initiation, smoker identity, smoking cessation, current weekly cigarette use, and alcohol use (see Table 14 for means and frequencies and Table 15 for correlations). Rates of dependency were omitted from the analysis because items addressing addiction

were included in the reasons for smoking scale. The categorical variables in this analysis included age (18 or younger vs. 19 or older), initiation age (before college vs. during college), and smoking cessation (high likelihood to quit vs. low likelihood to quit). It is important to note that a Natural Log was applied to the weekly cigarette use item.

Table 14
Latent Class differences on Covariates

	Latent Classes			
	Non-endorsing Smokers (<i>n</i> =59)	Stress Smokers (<i>n</i> =108)	Social Smokers (<i>n</i> =83)	Addicted Smokers (<i>n</i> =77)
Age				
18 and younger	62.70%	63.90%	57.80%	57.10%
19 and older	37.30%	35.20%	42.20%	42.90%
Age of Initiation				
Before College	83.10%	88.00%	84.30%	89.60%
College	16.90%	12.00%	14.50%	10.40%
Smoking Cessation				
Likely	94.90%	100%	96.40%	72.70%
Unlikely	5.10%		3.60%	27.30%
Smoker Identity	1.62 (.81)	2.26 (.78)	2.23 (.86)	3.26 (.96)
Nonsmoker	58.60%	14.00%	25.30%	3.90%
Light	20.70%	52.30%	28.90%	23.70%
Social	20.70%	27.10%	43.40%	14.50%
Moderate		6.50%	2.40%	57.90%
Weekly Use	0.401 (.21)	4.33 (1.46)	1.61 (.59)	25.01 (2.79)
Alcohol Use	2.134 (1.50)	2.30 (0.11)	2.42 (.12)	2.36 (0.12)

Note: Mean (SD) presented for the continuous variables and percentages presented for categorical variables.

Table 15*Correlations Between Predictors (N=335)*

	Age	Age of Initiation	Smoker Identity	Cessation	Weekly Use	Alcohol Use
Age	1					
Age of Initiation	0.016	1				
Smoker Identity	0.011	-0.018	1			
Cessation	-0.012	0.157*	0.008	1		
Weekly Use	-0.008	0.001	0.005	-0.005	1	
Alcohol Use	-0.016	-0.029	-0.003	-0.039	-0.019	1

*Note: *p<.05*

Although it was not the main focus of the study, the first step of this analysis was to run the model with each covariate separately to evaluate the unique contribution of each covariate. Because the primary aim of this study was to differentiate social smokers from other types of nondaily smokers, the social smoker class was used as the reference group to be compared to all other classes. Odds ratios were also used to interpret the likelihood of being in a specific class based on the 6 predictors. Current age ($n = 325$), age of initiation ($n = 327$), and alcohol use ($n = 316$) did not individually predict membership in any classes ($p > .05$). However, the results did reveal that smoker identity ($n = 324$) significantly predicted class membership in the non-endorsing smoker class and the addicted smoker class. Compared to the social smoker class, the non-endorsing smoker class was more likely to self-identify lower on the scale (e.g., nonsmoker or light smoker) whereas the addicted smoker class was more likely to self-identify higher on that scale (e.g., moderate or heavy smoker). Smoking cessation ($n = 320$) and weekly use ($n = 325$) each individually significantly predicted class membership in the addicted smoker class in relation to the social smoker class. More specifically, the addicted smoker class was more likely to indicate that they were unable to quit and that their weekly smoking rate was higher than for social smokers. More detailed results which include the estimates for the intercepts (β_0), regression coefficients (β_1), and odds ratios can be seen on Table 16.

Table 16
Covariates as Individual Predictors of Membership in Latent Classes

	Latent Classes			
	Non-Endorsing Smokers	Stress Smokers	Social Smokers	Addicted Smokers
Age				
β_0	0.071	0.674	ref	-0.137
Odds	1.074	1.9621	ref	0.872
β_1	-0.387	-0.353	ref	0.001
Odds Ratio	0.679	0.703	ref	1.001
Age of Initiation				
β_0	-0.274	1.046	ref	0.827
Odds	0.7603	2.846	ref	2.286
β_1	-0.126	-0.724	ref	-0.812
Odds Ratio	0.882	0.485	ref	0.444
Smoker Identity				
β_0	2.207*	0.358	ref	-7.749*
Odds	9.088*	1.430	ref	0.001*
β_1	-1.682*	-0.064	ref	2.403*
Odds Ratio	0.186*	0.938	ref	11.056*
Smoking Cessation				
β_0	-0.911	-0.877	ref	-7.326*
Odds	0.402	0.416	ref	0.001*
β_1	0.492	1.106	ref	4.744*
Odds Ratio	1.636	3.022	ref	114.893*
Weekly Use				
β_0	-.096	-0.032	ref	-4.734*
Odds	.908	.968	ref	.008
β_1	-4.056*	.365	ref	2.540*
Odds Ratio	.017	1.441	ref	12.679
Alcohol Use				
β_0	-0.121	0.474	ref	0.145
Odds	0.886	1.606	ref	1.156
β_1	-0.089	-0.081	ref	-0.051
Odds Ratio	0.915	0.922	ref	0.950

*Note: *p <.05; Natural log was applied to Weekly Use*

All six predictors were included in the second step of the analysis, as the literature indicates that these are important predictors to investigate and that relationships could emerge while controlling for other predictors. The social smoker class was once again used as the reference group, and odds ratios were also used to interpret the likelihood of being in a specific class. Overall, the results revealed that age

and alcohol use were not good predictors of classes even after controlling for the additional predictors. All additional variables contributed to predicting class membership, and Table 17 shows the estimates for the intercepts (β_0), regression coefficients (β_1), and odds ratios for all predictors. Lastly, Table 18 compares the original LCA model with no covariates to the model with individual covariates and the final model with combined covariates.

Table 17
Combined Covariates as Predictors of Membership in Latent Classes (n=303)

	Latent Classes			
	Non-Endorsing Smokers	Stress Smokers	Social Smokers	Addicted Smokers
Overall Model				
β_0	1.649	2.300	ref	-11.990*
Odds	5.202	9.974	ref	0.001*
Age				
β_1	-1.058	-0.141	ref	2.220
Odds Ratio	0.347	0.868	ref	9.207
Age of Initiation				
β_1	0.317	-1.107	ref	-3.878*
Odds Ratio	1.373	0.331	ref	0.021*
Smoker Identity				
β_1	-1.744*	-0.375	ref	-0.688
Odds Ratio	0.175*	0.687	ref	0.503
Smoking Cessation				
β_1	1.531	0.448	ref	4.734*
Odds Ratio	4.623	1.565	ref	113.750*
Weekly Use				
β_1	-3.923*	0.657*	ref	3.924*
Odds Ratio	0.019*	1.928*	ref	50.602*
Alcohol Use				
β_1	0.214	-0.349	ref	-0.23
Odds Ratio	1.239	0.705	ref	0.795

Note: * $p < .05$; Natural log was applied to Weekly Use

Table 18*Latent Class Analysis Fit Statistics for models with Covariates*

	Loglikelihood	AIC	BIC	Adjusted BIC
Model without Covariates	-2362.59	4867.18	5136.27	4911.06
Age as Covariate	-2345.22	4838.45	5118.45	4883.73
Initiation Age as Covariate	-2360.33	4868.67	5149.13	4914.40
Smoker Identity as Covariate	-2263.76	4675.52	4955.29	4720.57
Weekly Use as Covariate	-2246.36	4640.73	4920.74	4686.01
Cessation as Covariate	-2246.95	4641.91	4920.77	4686.05
Alcohol Use as Covariate	-2269.39	4686.79	4964.71	4630.00
Model with All Covariates	-2059.42	4296.84	4627.37	4345.11

Note. BIC=Bayesian information criteria; AIC= Akaike information criterion.

Non-endorsing smokers. The results revealed that smoker identity and amount of weekly use significantly predicted class membership in the non-endorsing smoker class in relation to the social smoker class. For smoker identity, the regression coefficient was negative indicating that for each unit increase in the smoker identity scale, the odds of belonging to the non-endorsing class compared to social smoker class decrease by 82.5%. For the Natural Log weekly cigarette use, the regression coefficient was also negative, indicating that for every 1% increase in amount smoked during the week, the odds of belonging to the non-endorsing class compared to the social smoker class decrease by 3.82%.

Stress smokers. Interestingly, weekly use was the only variable that significantly predicted membership in the stress smoker class in relation to the social smoker class. The regression coefficient was positive, indicating that for every 1% increase in amount smoked during the week, the odds of belonging to the stress smoker class compared to the social smoker class increased by .655%.

Addicted smokers. Finally, the results revealed that age of initiation, smoking cessation, and weekly cigarette use significantly predicted class membership in the addicted smoker class compared to the social smoker class. In regard to age of initiation, the regression coefficient was negative indicating individuals who started smoking in college had lower odds of being in the addicted smoker class compared to the social smoker class (specifically, the odds of individuals who initiated in college being in the addicted smoker class decreased by 97.9%). Regarding smoking cessation, the regression

coefficient was positive, indicating that individuals who believe they cannot quit at any time had high odds of being in the addicted smoker class compared to the social smoker class. More specifically, the odds of individuals who believe they cannot quit of being in the addicted smoker class were approximately 113.75 times higher compared to the social smoker class. Lastly, the regression coefficient was positive for weekly cigarette use, indicating that for every 1% increase in cigarettes smoked during the week, the odds of belonging to the addicted smoker class compared to the social smoker class increased by 3.98%.

Discussion

Previous research has indicated that a large proportion of college smokers are nondaily smokers; in addition, college smoking patterns are not declining like in other populations (Rigotti, Lee, & Wechsler, 2000; Foldes et al., 2010; Nichter et al., 2010). Recently, there has been an attempt in the fields of epidemiology, anthropology, and public health to divide occasional smokers into more specific typologies. There has also been an effort to investigate whether or not these typologies could be useful in describing college smoking, to predict smoking and quitting behaviors, and to help create different interventions (e.g., Levinson et al., 2007; Moran et al., 2004; Schane et al., 2009; Waters et al., 2006). In line with these attempts, the three main goals of this study were to identify the different typologies of smokers present on campus, to estimate the prevalence of these groups on campus, and to find characteristics (i.e., age, age of initiation, smoker identity, weekly use, smoking cessation, and alcohol use) that can help predict membership in these groups. Several different methods were used to reach these goals.

In previous literature, a person's reasons for smoking have been used to distinguish between smokers (e.g., Berlin et al., 2003; Ikard et al., 1969); however, reasons for smoking has not be used to investigate college smokers patterns which have been found to be different than in other populations. By focusing only on reasons for smoking, the present study showed that there were four different groups of smokers present: social smokers, non-endorsing smokers, stress smokers, and addicted smokers. These findings support the argument that there are multiple types of nondaily/occasional smokers on campus

(e.g., Moran et al., 2004; Patterson et al., 2004; Stormberg et al., 2007; Waters et al., 2006). In regard to prevalence, these four smoker typologies were almost equally represented in the sample. Stress smokers were the most common (33%), followed by social smokers (25%), indicating that occasional smokers made up over half of this sample. This is in line with previous research that has found that up to half of smokers in college could be considered occasional smokers (Oksuz et al., 2007). It is important to note that non-endorsing smokers could also be considered occasional smokers, and if included, over 75% of smokers in this sample would be occasional smokers. This is not surprising since most of the individuals in the study were in their first or second year in college, when heavy smoking patterns may not yet be established (Gilpin et al., 2001; Harrison et al., 2008; Thompson et al., 2007; Wechsler et al., 1998). These results support previous research that has indicated that there are high rates of different types of occasional smokers on campus and that social smokers are also present on campus as a distinct type of smoker typology (Levinson et al., 2007; Moran et al., 2004; Oksuz et al., 2007; Thompson et al., 2007; Waters et al., 2006).

Social smokers. As expected, a social smoker typology emerged in this study. In particular, the results fit into two out of four components associated with the definition of social smokers in the literature: 1) smoking due to friends or because others are smoking (Gilpin et al., 2005; Hines et al., 1996) and 2) to help social interactions (McKee et al., 2004; Moran et al., 2004). The only two components that were missing in the results were smoking to relieve social anxiety (Lantz, 2003) and smoking in social areas (Waters et al., 2006), but there were no specific items in the reasons scale to address these two components. It is important to note that almost all of the smoker groups, except for non-endorsing smokers, indicated smoking to socialize since the college environment might promote such behavior (Nichter et al., 2010). Unlike the other smoker groups, the social smokers did not endorse any other reasons for smoking than for social reasons; this may indicate that they are a unique type of smoker (as found in Thompson et al., 2007).

Interestingly, only 43% of the individuals in this class self-identified as social smokers, with the rest of the responses clustered around nonsmoker and light smoker. This may indicate that allowing

participants to report on what type of smoker they consider themselves may not capture the difference between occasional smokers that may be present in the population (Ling & Glantz, 2004; Schane et al., 2009). Reporting reasons for smoking, amount of use, or quitting intentions may provide a better picture, as social smokers smoked on average one to two cigarettes a week and around 96% of these smokers indicated that they could quit smoking at any time (as seen in Schane et al., 2009; Thompson et al., 2007). However, due to a small sample size, not all intended predictors made it into the model, and it is possible that other predictors may better differentiate between social smokers and other types of smokers.

Non-endorsing smokers. The non-endorsing smoker typology was not anticipated in this study and has not typically been discussed in the literature. This typology of smoker consists of individuals who do not acknowledge any of the reasons for smoking and who are less likely to identify as a smoker. Unfortunately, it is unclear how to classify this group of smokers solely based on the reasons for smoking questionnaire. However, there have been some limited studies on a similar smoker typology referred to as phantom smokers (e.g., Choi, Choi, & Rifon, 2010; Rifon et al., 2004). This group of smokers has been described as individuals who are potentially experimenting with smoking in college, are less likely to identify as smokers, and have a lighter smoking pattern compared to other smokers. This categorization is very similar to the results of this current study. Investigating demographic characteristics for this group indicated that non-endorsing smokers only smoke on average half a cigarette a week and are more likely to self-identify as nonsmokers or light smokers compared to other types of smokers. The reason this might be the case is that these smokers may experience a disconnect between their own self-identity and their own behavior which may be because these smokers tend to not endorse positive or negative smoker images and are more positive about the health outcomes associated with the smoking (Choi et al., 2010). It is important to note that the Choi et al (2010) study found that there was an important social component to this type of smoking especially to reduce negative affect related to social situations which was also a trend in this study; however, it was not a significant trend possibly due to limited sampling. It is important to note that this study uncovered evidence to support the idea that non-endorsing smokers do differ from social smokers. The results of this study revealed that non-endorsing smokers smoked less

during the week than social smokers, and they were also more likely to self-identify lower on the smoking identity scale. More research needs to be done to investigate this new smoker typology and to discover whether they can be considered phantom smokers as previous research has indicated.

Stress smokers. It is not surprising that the stress smoker class emerged in this study. Many researchers have been arguing for this type of smoker (also referred to as tension smokers or relaxation smokers) to be identified as a type of occasional smoker (e.g., Berlin et al., 2003; Stomberg et al., 2007). As would be expected, stress smokers were more likely to endorse that smoking happens as a result of being stressed, upset, or angry. This group also highly endorsed smoking as a way to reduce stress or to enhance relaxation, which supports previous research (Berlin et al., 2003; Stomberg et al., 2007).

In addition, the results of the present study indicated that stress smokers and social smokers are different types of occasional smokers. Interestingly, the only difference emerged in the amount smoked during a week. On average, stress motivated smokers smoke around four cigarettes a week, which is much more than what was acknowledged by the social smokers. Contrary to expectations, patterns of alcohol use did not differ for these groups (Schane et al., 2009). There are three possible explanations for this occurrence: 1) different types of smokers are drinking at the same rate (Harrison et al., 2008; Nichter et al., 2010; Wetter et al., 2004), 2) alcohol items did not capture what is truly occurring in the population (see Jackson, Colby, & Sher, 2010), or 3) these individuals drink for stress regulation (Rose et al., 2004).

Addicted smokers. As expected, a daily smoker class emerged in the study referred to as addicted smokers (also seen in Ikard et al, 1969). Previous research has shown that daily smokers typically endorse multiple reasons for smoking (e.g., Oksuz et al., 2007; Rose et al., 2007), which was also the case for addicted smokers. Most importantly, this class was the only smoker group to endorse smoking due to addiction or habit, which is also an important characteristic of daily smokers (Businelle et al., 2009).

Although it is not the focus of this study to examine smokers who may not be considered occasional smokers, it is still interesting to see the comparison between the different groups. As expected, more predictors differentiated between social smokers and addicted smokers compared to other types of

smokers. This is not surprising, as the comparison is now between nondaily smokers and daily smokers. In particular, the results revealed that addicted smokers smoke more than social smokers, and they do not believe that they can quit at any time (Waters et al., 2006).

One difference of particular interest was that addicted smokers were more likely to have initiated smoking before college than social smokers. This indicates the presence of late-onset smokers in the sample (Wechsler et al., 1998; Staten et al., 2007) and the possibility that occasional smokers may fall under this trajectory more so than daily smokers (Chassin et al., 2000). More research is needed to investigate whether this is occurring in this sample. In addition, one difference that did not emerge but has been supported in previous studies is the idea that addicted or daily smokers may be much older than nondaily smokers (Hassmiller et al., 2003). It is important to highlight that age was not a good predictor in any of the models due to the high proportion of first year college students in the sample.

Summary and Conclusions

The general purpose of this study was to investigate the typologies of smokers present on campus and to determine if it would be worthwhile and practical to divide these categories further (e.g., Levinson et al., 2007; Schane et al., 2009; Shiffman et al., 2009). One of the strengths of the current study is that both qualitative methods and quantitative methods were used to contribute to this debate. The quantitative methods allowed for a glimpse at the different types of smokers who are on campus, while the focus groups contributed more in-depth information about these possible groups. The results from the two portions of the study were often, but not always, consistent with each other and with the literature. The focus groups revealed that there were two or three types (due to some disagreements) of occasional smokers on campus: social smokers/drunk smokers, and stress smokers as well as three types of daily smokers: light, regular, and heavy smokers. Using the surveys, four different types of smokers cleanly emerged: non-endorsing smokers, social smokers, stress smokers, and addicted smokers. Although the results differ somewhat, it is no surprise that the presence of daily smokers and nondaily smokers is clear.

The results of both the qualitative and the quantitative studies revealed that nondaily smokers are more common on campus than daily smokers which lend support to previous research (Gilpin et al., 2001; Harrison et al., 2008).

The survey data revealed that using reasons for smoking items may be a good way to distinguish different types of smokers. In the focus groups, participants also indicated several reasons for smoking such as to relieve stress, to socialize, due to the college environment, to help fit in, to relieve social anxiety, when drinking, and due to addiction or habit. The results for both methods indicate that reasons for smoking may be a good way to distinguish smoking typologies in this population. However, based on the focus group responses, more work needs to be done with this scale to include additional relevant items that have been omitted (e.g., I smoke when I drink, I smoke due to the college environment, I only smoke at parties, I smoke to relieve social anxiety).

Implications

The question still remains as to whether it is necessary to divide the occasional smoking category further. It is important to note that there are several advantages to just using the nondaily and the daily smoker labels when addressing college students (Husten, McCarty, Giovino, Chrismon, & Zhu, 2009). For example, one advantage is that it allows for researchers and practitioners to be on the same page in regard to typologies of smokers and definitions of these typologies. This may help unify the field and allow for comparison between studies. Another advantage is that the two classes can be distinguished simply by a handful of questions, if not fewer. One can simply ask a smoker if he or she smokes on a daily basis (yes or no). Reducing and simplifying the measures also comes with the added benefit of having to use less complicated statistical methods, which may be particularly advantageous for practitioners in the field who need something practical and quick when deciding how to treat clients.

However, Kontz and colleagues (2004) found that when it comes to giving information or materials that could help clients quit, occasional smokers are typically missed by health care providers. If practitioners are only asking clients questions such as *Do you smoke cigarettes* and *How much (or how often) do you smoke*, many individuals who are in need of cessation services may be missed (Ridner,

Walker, Hart, & Myers, 2010). For example, similar to previous studies (e.g., Thompson et al., 2007, Waters et al., 2006), the current study revealed that many individuals who smoke do not identify themselves as smokers (e.g., non-endorsing smokers or drunk smokers); therefore it might be beneficial to include additional questions on different typologies of smokers or smoker identities (Ridner et al., 2010) and motivations for smoking. Both the focus groups and the surveys identified two distinct typologies of smokers that should not be ignored in the college population: social smokers and stress smokers. These two typologies could be included in adaptations of the traditional scale so that more smokers are identified early on by health care providers. Since this study also revealed some inconsistency between self-report and actual smoking behavior, asking clients about their personal reasons for smoking may also help tap into the different types of smoker typologies that are present on college.

In addition, this study revealed that asking patients how much they smoke on a weekly basis may be beneficial when trying to distinguish between nondaily and daily smokers. However, these types of questions may not adequately distinguish between different types of nondaily smokers. Especially in college population, information about differences between nondaily smokers may be essential for intervention purposes since not all nondaily smoking patterns look the same. For example, the focus group data revealed that the differences between social smokers and stress smokers include: 1) social smokers only smoke for social reasons and due to peer influence, which may lead to cessation when the environment changes; whereas stress smokers smoke to regulate stress and emotions, which is also environmental but may remain constant after students leave the college setting and may lead to more daily patterns of smoking, 2) social smokers may also have increased connections with and problems due to extensive alcohol use, which stress smokers may not experience, 3) social smokers may smoke using other methods, such as smoking with a water pipe or hookah, and see their use as less of a health threat, and 4) although stress smokers are considered occasional smokers, unlike social smokers, many endorse smoking on a daily basis. These differences may have a significant impact on smoking behavior as well as quitting behavior, which may need to be addressed when creating, targeting, and implementing cessation programs with college students. For example, when implementing a program for non-endorsing

smokers or drunk smokers, it might be essential to provide more general information about smoking since this group might include individuals who are experimenting with smoking (e.g., discuss health implication with limited use of cigarettes or discuss the rates and risk of addiction). In particular for drunk smokers, it would be important to address the connection between smoking and drinking, especially binge drinking patterns. On the opposite side of the spectrum, a program for stress smokers might have to be more specific. In particular, it would be essential to discuss alternative ways to reduce stress while in school which would not necessarily be relevant for other types of occasional smokers. In addition, since stress smokers reported smoking more cigarettes than drunk, social, or non-endorsing smokers, these smokers might require cessation aids like different medications or patches to help them quit. In conclusion, only asking about use during a short time period may not address the differences between occasional nondaily smokers, therefore not giving practitioners all the tools necessary to help their clients.

Limitations and Future Directions

Unfortunately, there were limitations that emerged while conducting this study. Some of the major limitations of this study were related to using a convenience sample. First, the sample size of the study was too small to address the 18 additional predictors that were proposed (e.g., smoking norms and attitudes, smoking social networks, frequency and amount of use, current smoking habits, days and times smoking occurs, and questions on co-occurring tobacco and additional substances used). This is unfortunate because these predictors could have explained additional important differences between occasional smokers in the sample and should be addressed in future research.

The second issue related to sampling was that this study relied on a sample from only one university; therefore, these results cannot necessarily generalize to other universities. For this type of research to have the most impact, it is important that multiple universities are included to rule out the possibility that there is a unique smoker population at one particular school. The sample was somewhat representative of the students under 21 years of age at the university in which data was collected (e.g., predominantly non-Hispanic white and majority female), which may be applicable to universities with the same demographics, but caution should still be taken when generalizing these results. For example, the

town and state in which this university is located are both smoke-free, but the campus itself is not. Such policies may have an impact on the pattern of smoking demonstrated by college students. Future studies may want to address these issues by sampling from several universities. This may also potentially help with increasing the number of participants and by specifically oversampling older students so that patterns of smoking are not just described for first or second year students.

In addition, this study attempted to include multiple measures that looked at constructs suggested by the general literature as essential when trying to describe social smokers. These included measures on initiation (e.g., Wechsler et al., 2001), current smoking (e.g., Shane et al., 2009), smoking status (e.g., Waters et al., 2006), reasons for smoking (e.g., Berlin et al., 2003), rates of dependency (e.g., Waters et al., 2006), smoking cessation (e.g., Schane et al., 2009), and smoking paired with drinking behaviors (e.g., Shiffman et al., 2009). However, another limitation of this study was that not all measures could be used for the analysis due to the limited sample size. Unfortunately, LCA handles multiple measures more effectively with larger samples (Feldman, Masyn, & Conger, 2009). In addition, many of the measures had to be simplified to one or two items for the analysis which was also necessary within the LCA framework for smaller samples. However, it is important to note that the measures used still provided a good glimpse at the possible differences between college smokers. Moreover, it is rare to find studies that include both survey and focus group data. One of the reasons for adding the focus group data was to possibly fill in the gaps that the quantitative measure could not capture. For future research, it could be advantageous to use full measures or different variations of the measures that tap into the same constructs with a larger national sample to confirm these different classes.

Another solution to this measurement limitation is bringing in health-related models and theories such as Social Cognitive Theory (Bandura, 1986), or the Health Belief Model (Rosenstock, 1974), which may be useful when describing these smoker typologies as well as predicting progression in smoking patterns or smoking cessation. In particular, the Prototype Willingness Model (PWM; Gibbons & Gerrard, 1995; Gibbons, Gerrard, Ouellette, & Burzette, 1998) may be an essential theory to investigate when looking at college smoking behaviors. This theory states that there are two specific pathways to

risk: the reasoned path and social reaction path. The reason path described smoking as a deliberate, intentional, or planned behavior which does not seem to be the case for the college population. The social reaction path includes the concept of smoker image, social norms, and attitudes toward the behavior which may lead to the willingness to participate in the behavior (Gibbons et al., 1998). Since the results of this study indicate that smoking patterns, especially for occasional smokers, are strongly influenced by social factors in a college population and that experimentation with smoking may still be occurring, the social reaction path may be a good predictor of smoking behavior. It is important to note that attitudes, social images, and social norms were not measured in this study, but future studies may want to investigate the underlying pathways that may lead to different occasional smoking patterns versus regular smoking patterns.

In addition, the PWM suggests that when engaging in the deviant behavior in public, individuals will be identified as members of the group and will be associated with the image of that group. Both the quantitative and qualitative results of this study indicated that this may be occurring for individuals who identify as smokers or a specific type of smoker (e.g., social smoker or stress smoker). This may be particularly relevant since smoker identity has been found to be very important for many individuals in this population (Ridner, 2010). In addition, this theory states that different identities are seen as consequences of participating in a behavior and individuals may be willing to deal with the consequences of the behavior to self-identify in a particular manner. Those who identify as smokers may accept the consequences of their smoking behavior; therefore, they were more likely to identify themselves as smokers during this study. However, during the focus groups, many occasional smokers stated that they identify as a certain type of smoker, but that they are not considered problem or regular smokers. As the participants state, they do not consider themselves as “that type of smoker” or a “real smoker” which indicates that they are not completely accepting the consequences of their behavior and are developing sub-identities to describe their own smoking behavior distancing themselves from an undesirable regular or problem smoker identity.

In addition, this theory may not be as helpful when describing individuals who smoke but identify as nonsmokers, even if they participate in the behavior publically. These smokers may identify themselves as nonsmokers since they do not wish to be associated with the social consequences of being a smoker. Therefore not surprisingly, these smokers tend to be ambivalent towards social smoking images that promote different identities (Choi et al., 2010). Since smoking behaviors are becoming increasingly seen as socially unacceptable (Stuber et al., 2009), future research should investigate the differences in the self-identity and social images of this different types of smokers.

In addition to just understanding smoking behavior, stage theories like the Stages of Change in the Transtheoretical Model (Prochaska & DiClemente, 1983), which has been adapted to smoking behavior (Pallonen et al., 1998), may be useful when investigating whether different smokers vary on their readiness to quit or reduce their smoking. Also, it is imperative to investigate the progression of smoking and quitting behaviors for these smoker typologies by also using longitudinal designs. There are several models that explain progression of smoking with an adolescent population (e.g., Gilpin et al., 2001; Pallonen et al., 1998; Pierce, Gilpin, & Farkas, 1998; Sun et al., 2005), but models that explain progression in the young adult population are lacking. Longitudinal studies should be conducted to investigate whether these existing models also describe progression in smoking in the young adult population or if additional models need to be created to best capture the changes in their smoking patterns and their desire to quit.

It is unclear which of these theories has the best predictive value for occasional smokers, but this is also an additional area of research that is necessary to progress the field and perhaps even introduce some consistency between studies. In conclusion, there is still much that needs to be done to fully understand the different types of young adult smokers and to determine whether going beyond the nondaily and daily labels is essential to better describe smoking patterns and progression in this population. There is also much to be done to investigate whether it has value in regard to interventions

and smoking cessation. However, this study has provided a small glimpse of study designs, measures, and statistical methods that are useful when considering different smoking typologies in the college population.

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