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Addictive Behaviors

# Characteristics associated with smoking in a Hispanic sample

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ABSTRACT

Although general smoking prevalence has declined, similar declines have not been observed in some underserved populations. For example, groups such as ethnic minorities, individuals with psychiatric diagnoses, those with a history of substance use, and weight concerned smokers have not shown comparable reductions. The goal of this study is to create a profile of Hispanic smokers in the El Paso/Juárez area and identify predictors of smoking. In this cross-sectional study, these variables were assessed in 160 English-speaking Hispanic volunteers. Participants completed measures of tobacco use, nicotine dependence, weekly alcohol consumption, acculturation, depressive symptomatology, weight concern, and drug use. Expired carbon monoxide and body composition were also assessed. Participants were light smokers with low levels of nicotine dependence and expired carbon monoxide, a significant number of past quit attempts, and limited use of cessation aids. Significant characteristics associated with smoking included male gender, use of mental health services, increasing number of drinks per week, and lifetime use of illicit drugs. These findings suggest substance use and psychiatric comorbidity are associated with smoking in this population and may be barriers to quitting. These factors should be considered in developing culturally-sensitive tobacco cessation interventions for Hispanic smokers, particularly those residing on the U.S./México border.

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## 1. Introduction

Although smoking rates have declined in recent years (Centers for Disease Control and Prevention (CDC), 2001), underserved and persistent smokers still exist. For example, 23% of Hispanics smoke (Carmona et al., 2004), though few smoking cessation interventions currently exist for this group (Lawrence, Graber, Mills, Meissner, & Warnecke, 2003). Increasingly, the development and testing of culturally-sensitive cessation programs is warranted and urged (Caraballo & Lee, 2004; Fiore et al., 2008; Piper, Fox, Welsch, Fiore, & Baker, 2001), principally those that asses the intersection of smoking behavior, barriers to quitting, weight change, and ethnicity (Hill, Roe, Taren, Muramoto, & Leischow, 2000). Despite the success and endorsement of such programs, these are rare (Woodruff, Talavera, & Elder, 2002), particularly among Hispanics (Lawrence et al., 2003).

Determining the characteristics of a population to be served is necessary prior to creating and implementing a culturally relevant cessation program. For example, the proportion of Hispanics who smoke is slightly less than that of non-Hispanic Whites and African Americans (Carmona et al., 2004), though Hispanics tend to be lighter, occasional smokers (Levinson, Pérez-Stable, Espinoza, Flores, & Byers, 2004; Wortley, Husten, Trosclair, Chrismon, & Pederson, 2003) with lower average serum cotinine levels and less addiction to nicotine (Pérez-Stable, Marín, & Posner, 1998). Additionally, Hispanic smokers are more likely to try to quit than are non-Hispanic White smokers (Ward et al., 2002), despite being less likely to receive physician advice to quit (Denny, Serdula, Holtzman, & Nelson, 2003) and choosing not to use cessation aids when quit attempts are made (Levinson et al., 2004).

### 1.1. Smoking characteristics

The goal of this study is to create a profile of Hispanic smokers in the El Paso/Juárez area. In addition, the following potential predictors of smoking were assessed: substance and alcohol use; use of mental health services; depressive symptomatology; general weight concern, cessation-related weight concern, and acculturation. Two theoretical perspectives were utilized: the Acculturative Stress Model (Berry, Kim, Minde, & Mok, 1987) and the Health Belief Model (Becker et al., 1978). According to the Acculturative Stress Model, as an individual undergoes acculturation, health status is reduced in psychological, somatic and social domains (Berry et al., 1987). The Health Belief Model hypothesizes an individual engaging in an unhealthy behavior will alter his or her readiness to change based on six constructs that assess the costs and benefits of behavior change (Becker et al., 1978). In accordance with this model, factors such as psychiatric diagnoses,

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substance abuse, and concerns with weight may be barriers to smoking cessation. These factors may need to be addressed in order to increase the likelihood of successful cessation.

Smoking rate differences among Hispanic populations have often been attributed to acculturation discrepancies (Marín & Marín, 1991), as it has been observed that certain health risk behaviors of Hispanics increase with greater acculturation, while others decrease (Lara, Gamboa, Kahramanian, Morales, & Hayes-Bautista, 2005; Parker, Sussman, Crippens, Elder, & Scholl, 1998). More specifically, greater acculturation is often associated with greater risk of engaging in smoking (Lara et al., 2005).

Psychiatric diagnoses are also often associated with smoking behavior, dependence, and cessation (Serrano & Woodruff, 2003). Smoking has often been linked to depression, as smokers are more likely to be depressed, and those who are depressed are more likely to smoke (Murphy et al., 2003). Compared to smokers who have not been able to quit, those who achieved smoking abstinence have reported significantly fewer depressive symptoms than those who continue to smoke (Levine, Marcus, & Perkins, 2003). Additionally, individuals reporting more depressive symptoms can experience more craving and withdrawal while quitting (Pomerleau et al., 2005).

Substance use and abuse are associated with persistent smoking (Jackson, Sher, Cooper, & Wood, 2002; Lewinsohn, Rohde, & Brown, 1999). Among Hispanics, smokers have been shown to drink more than nonsmokers (Sanderson Cox, Feng, Cañar, McGlinchey Ford, & Tercyack, 2005), and heavy drinking has been found to co-occur with smoking (Kranzler et al., 2002). Patients undergoing treatment for substance use disorders have reported their use increases smoking or urges to smoke, particularly during episodes of heavy drinking; similarly, smoking was reported to increase substance use and urges to use (Rohsenow, Colby, Martin, & Monti, 2005).

Smokers typically weigh about 7–10 lb less than nonsmokers (Ward, Klesges, & VanderWeg, 2001). Quitting smoking is associated with weight gain among Hispanics, but the increase in weight is small (Burke, Hazuda, & Stern, 2000). Although, fear of weight gain prevents some smokers from quitting (Filozof, Fernández-Pinilla, & Fernández-Cruz, 2004), and weight gain is associated with relapse (Borrelli, Spring, Niaura, Hitsman, & Papandonatos, 2001), cessation-related weight concern has not been found to impede quit attempts in past studies of Hispanic smoking (Ortíz et al., 2003). Interestingly, weight concerns not specific to cessation have been shown to predict higher cessation rates in other groups (Cooper, Dundon, Hoffman, & Stoever, 2006), yet few studies have comprehensively addressed weight and weight concern issues in Hispanic smokers and nonsmokers, so further research is necessary.

It is hypothesized that Hispanic smokers will be light smokers, with low expired carbon monoxide (CO) levels, and low levels of psychological dependence on nicotine. Greater alcohol use, a history of drug use, past mental health service use, greater number of depressive symptoms, general weight concern, and greater acculturation are expected to be associated with smoking. These data will be used to inform future culturally-sensitive tobacco cessation interventions in similar populations.

## 2. Methods

### 2.1. Participants

Eighty-six smoking and 74 nonsmoking English-speaking Hispanic participants were assessed. Participants were between the ages of 18 and 78, and recruited from the community.

The sample size for this study was based on theory by Hosmer and Lemeshow (2000). At least 10 observations should be made for every independent variable in a logistic regression model. Because nine independent variables were used, 160 participants exceeded the required sample size threshold.

### 2.2. Measures

#### 2.2.1. Smoking status

Smoking status was measured by response to a categorical question assessing smoking. To be considered a smoker, a participant was required to report having smoked at least one cigarette in the past week; participants self-identifying as nonsmokers stating they had not smoked in the past week were considered nonsmokers. Within either smoker or nonsmoker categories, participants could be identified as weekly smokers, monthly smokers, experimenters, or quitters. Weekly smoking was indicated by smoking in the past week, but not daily; monthly smoking was indicated by smoking in the past month yet not the past week; experimental smoking was indicated by trying a cigarette yet not smoking in the past week or past month; quitting was indicated by at one time meeting smoking criteria and subsequently quitting smoking; and relevant to only nonsmokers, never smoking was indicated by not ever taking a puff of a cigarette.

#### 2.2.2. Measures assessing relevant smoking-related characteristics

A demographic questionnaire assessed typical background information.

In addition to assessing current smoking, a tobacco use and attitude survey assessed smoking initiation, past quit attempts, cessation aid use history, general weight concern, cessation-related weight concern, and cessation aid and program preferences. To test for general weight concern, participants were asked, “Are you in general concerned about your weight?” The cessation-related weight concern question asks how much weight gain would be tolerated after quitting smoking before abandoning a quit attempt. Participants are asked, “Would you start smoking again if you gained 18–20 lb?” The question is asked nine times in decreasing two pound intervals (i.e., 16–18 lb, 14–16 lb, etc.). Answering “yes” to any of these questions classified the participant as cessation-related weight concerned. This questionnaire has been used in past studies of post-cessation weight gain and concern (Cooper et al., 2006, 2005).

The Fagerström Test of Nicotine Dependence (FTND) assessed nicotine dependence (Heatherton, Kozlowski, Frecker, & Fagerström, 1991). The FTND is a valid measure of heaviness of smoking when compared to biochemical indices and has acceptable levels of internal consistency (Heatherton et al., 1991). Internal reliability for this study was .68. Scores on the FTND are derived by summing individual item scores; FTND sum scores range from 0 to 10 with higher scores indicating greater dependence on nicotine.

The Daily Drinking Questionnaire (DDQ) measured drinking rate and time spent drinking (Collins, Parks, & Marlatt, 1985). Internal reliability of this scale ranges between .73 and .78 (Geisner, Larimer, & Neighbors, 2004; Lewis & Neighbors, 2004), and internal reliability was .74 for this study. The numbers of drinks reported for each day of the week were summed to yield a total number of drinks per week. Outliers (higher than three standard deviations from the mean) were winsorized for subsequent analyses (Kirk, 1982); those scoring higher than three standard deviations above the mean were given that value in order to retain outliers in analyses ($n = 4$).

The Short Acculturation Scale for Hispanics (SASH) assessed level of acculturation to U.S. culture (Marín, Sabogal, VanOss, Otero-Sabogal, & Pérez-Stable, 1987). This instrument has been found to have high internal reliability ($\alpha = .92$; Marín et al., 1987), and internal reliability was also found to be high for this study ($\alpha = .89$). Mean item scores are used for purposes of analyses and can range from one (indicating less acculturation) to five (indicating greater acculturation).

The Primary Care Evaluation of Mental Disorders (PRIME-MD) assessed depressive symptomatology (Spitzer et al., 1994). This measure has been found to be consistent with diagnoses made independently by mental health professionals ($\kappa = .71$; Spitzer et al., 1994). Internal reliability for this study was good ($\alpha = .90$). Items are rated on a four-point Likert-type scale, and scores are obtained by

**Table 1**
Participant characteristics and univariate differences between smokers and nonsmokers.

| Characteristics | All participants ($N=160$) | Smoking participants ($n=86$) | Nonsmoking participants ($n=74$) | $p$-value |
|---|---|---|---|---|
| | Statistic | Statistic | Statistic | |
| Age (years) | $M=34.7$ | $M=30.8$ | $M=39.2$ | <.001 |
| | $SD=14.92$ | $SD=11.59$ | $SD=17.01$ | |
| Gender | | | | ns |
| % Female | 36.9 | 26.7 | 48.6 | |
| % Male | 63.1 | 73.3 | 51.4 | |
| Marital status | | | | ns |
| % Single | 51.9 | 60.5 | 41.9 | |
| % Living with someone | 5.6 | 7.0 | 4.1 | |
| % Married | 24.4 | 17.4 | 32.4 | |
| % Divorced | 11.9 | 9.3 | 14.9 | |
| % Separated | 4.4 | 4.7 | 4.1 | |
| % Widowed | 1.9 | 1.2 | 2.7 | |
| Educational status | | | | <.001 |
| % Less than high school | 6.3 | 11.6 | 0 | |
| % High school or equivalent | 32.5 | 41.9 | 21.6 | |
| % Some college | 32.5 | 24.4 | 41.9 | |
| % Vocational school/associate's degree | 11.3 | 15.1 | 6.8 | |
| % College graduate | 14.4 | 4.7 | 25.7 | |
| % Some post graduate training | 3.1 | 2.3 | 4.1 | |
| Age of tobacco initiation | | | | |
| In years | $M=15.5$ | $M=14.4$ | $M=17.5$ | <.001 |
| | $SD=4.32$ | $SD=2.89$ | $SD=5.81$ | |
| Smoking status | | | | <.001 |
| % Daily smoker | 35.3 | 66.7 | 0 | |
| %Weekly smoker | 13.1 | 24.7 | 0 | |
| % Monthly smoker | 3.9 | 3.7 | 4.2 | |
| % Experimental smoker | 17.0 | 0 | 36.1 | |
| % Quitter | 8.5 | 3.7 | 13.9 | |
| % Never smoked | 222.2 | 1.2 | 45.8 | |
| Carbon monoxide | | | | |
| Exhaled CO (ppm) | N/A | $M=8.03$ | $M=2.27$ | <.001 |
| | | $SD=8.40$ | $SD=2.89$ | |
| Fagerström Test of Nicotine Dependence | | | | |
| Total score | N/A | $M=3.36$ | $M=1.50$ | ns |
| | | $SD=2.52$ | $SD=1.76$ | |
| SASH | $M=3.3$ | $M=3.2$ | $M=3.35$ | ns |
| | $SD=.62$ | $SD=.65$ | $SD=.57$ | |
| Mental health | | | | |
| % Have used MH services | 20.6 | 27.4 | 13.5 | ns |
| PRIME-MD | $M=6.9$ | $M=7.99$ | $M=5.72$ | ns |
| | $SD=6.21$ | $SD=6.60$ | $SD=5.50$ | |
| Drinks per week | $M=14.5$ | $M=22.9$ | $M=6.14$ | <.001 |
| | $SD=19.47$ | $SD=26.33$ | $SD=9.90$ | |
| Ever used drugs | | | | |
| % Have used drugs | 58.8 | 69.8 | 45.9 | ns |
| Drug use (lifetime) | | | | |
| % Marijuana | 51.8 | 68.8 | 40 | <.001 |
| % Cocaine | 25.6 | 39.2 | 14.1 | <.001 |
| % Crack | 10.6 | 19.5 | 1.4 | ns |
| % Speed | 15.6 | 20.2 | 11.1 | ns |
| % Barbiturates | 18.1 | 21.7 | 15.5 | ns |
| % Inhalants | 11.2 | 17.1 | 5.6 | ns |
| % Opiates | 12.4 | 15.7 | 9.9 | ns |
| % Other | 1.8 | 1.2 | 2.8 | ns |
| Weight concern | | | | |
| % Have weight concerns | 63.8 | 64.7 | 68.1 | |
| % Have cessation-related weight concern | N/A | 48.8 | N/A | |
| Weight | $M=179.7$ | $M=178.6$ | $M=180.9$ | ns |
| | $SD=42.38$ | $SD=43.16$ | $SD=41.72$ | |
| BMI | $M=29.0$ | $M=28.6$ | $M=29.4$ | ns |
| | $SD=6.40$ | $SD=6.45$ | $SD=3.67$ | |
| Fat percentage | $M=29.2$ | $M=26.2$ | $M=32.7$ | ns |
| | $SD=12.01$ | $SD=11.58$ | $SD=11.62$ | |

summing item scores. Scores range from 0 to 27, with higher scores indicating more depressive symptoms. In addition to assessing depression, participants were asked to indicate whether they had sought mental health services for a variety of mood, anxiety, and psychotic disorders. Participants reporting past mental health service utilization were coded as such for analyses.

A drug use frequency questionnaire assessed use of several drugs utilizing numeric response options from the Adolescent Problem Severity Index (Metzger, Kushner, & McLellan, 1991). Drugs assessed are marijuana, cocaine, crack, speed, barbiturates/sedatives, inhalants, hallucinogens, and opiates. Good reliability was found for this study ($\alpha=.89$). For this study, frequencies for each drug were calculated, and participants were dichotomized to specify whether or not they had ever tried illicit drugs.

A Bedfont Smokerlyzer assessed expired CO with a precision of more than 99.8% (Hald, Overgaard, & Grau, 2003).

A Tanita-TBF 215 scale measured height, weight, BMI, body fat percentage, and body fat mass. This scale provides reliable estimates of body composition and correlates highly with dual energy X-ray absorptiometry (DEXA; Nuñez, Gallagher, Russell-Aulet, & Heymsfield, 1997a,b).

### 2.3. Procedure

This study was a cross-sectional assessment of characteristics associated with smoking (versus nonsmoking). Participants were recruited through newspaper, radio, and flyer advertising which informed potential participants they were eligible to receive a $10 cash incentive for completing a survey if they were Hispanic and over the age of 18. A phone number was provided to schedule an appointment. Efforts were made to recruit equal numbers of smokers and nonsmokers.

Individuals who called the phone number were screened for inclusion (i.e., Hispanic and to qualify as a smoking participant, at least 1 cigarette in the past week). As participants were not consented at the time of screening, data is limited as to characteristics of those who indicated study interest yet did not complete the study as opposed to those who completed the study.

Upon arriving for an appointment, informed consent was obtained by undergraduate and/or graduate research staff. Questionnaires were then distributed to the participants. Upon completion, measures of expired CO and body composition were taken. The entire procedure lasted under an hour. All participants received a $10 cash incentive.

Data were number coded for confidentiality. Names were not associated with records in order to ensure participant privacy. Consent forms and surveys were filed separately. University IRB approval was obtained.

### 2.4. Approach to analyses

Descriptive analyses were used to create a profile of Hispanic smoking behaviors and attitudes. Univariate analyses were used to compare smoking and nonsmoking participants, and error control was employed. For $t$ tests, the $\alpha$ level was set to .005 (.05/10). For $\chi^2$ tests, the $\alpha$ level was set to .003 (.05/15).

Given the dearth of research on smoking predictors in Hispanics and the goal of assessing potential characteristics as comprehensively as possible, a backward elimination logistic regression model using smoking status (1 = smoker, 0 = nonsmoker) as the dependent variable was used to build a model of characteristics of smoking using the following independent variables: age; gender; history of mental health service use; acculturation scores; PRIME-MD scores; history of illicit drug use; general weight concern; weekly alcohol use; weight; BMI; and body fat percentage. Collinearity diagnostics were used to assess multicollinearity, and predictors with a Variance Inflation Factor greater than 2.5 were removed (Allison, 1999). Subsequently, weight and body fat percentage were removed.

## 3. Results

Most smoking participants were male with an average age of 31 years. Most reported daily smoking, and one quarter reported smoking at least one cigarette per week. Daily smokers reported smoking half of a pack per day. Average expired CO was low. Average FTND scores indicated low psychological dependence on nicotine. More than half of smokers expressed general weight concern, and half expressed cessation weight concern.

Statistically significant univariate tests indicated that relative to nonsmokers, smoking participants were younger, reported less education, tried smoking earlier, had higher exhaled CO, drank more alcohol per week, and reported more frequent past use of marijuana and cocaine. Participant characteristics and the significance values of univariate tests are illustrated in Table 1.

The final multivariate model was statistically significant, $\chi^2$ (5) = 47.25, $p$<.001, Nagelkerke $R^2$ = .40, and appears in Table 2. Four significant characteristics were associated with smoking: male gender, use of mental health services, increasing number of drinks per week, and ever use of illicit drugs. Younger age was a marginally significant predictor of smoking status.

## 4. Discussion

Results suggest Hispanic smokers in this population are light smokers, which is consistent with studies that have found Hispanic smokers consume fewer cigarettes than non-Hispanic White smokers (Kandel & Chen, 2000; Levinson et al., 2004; Wortley et al., 2003). For example, Levinson and colleagues (2004) found Latino current smokers to more likely be light, rather than heavy, smokers. Wortley and colleagues (2003) found that Hispanics made up the greatest part of nondaily smokers in the United States as compared to other ethnic/racial groups. Pérez-Stable et al. (1998) also found Hispanic smokers consumed half as many cigarettes per day when compared to non-Hispanic white smokers. Likewise, rates of dependence on nicotine were low, which is consistent with research conducted with Hispanic (Pérez-Stable et al., 1998) as well as light smokers (Okuyemi et al., 2007). Pérez-Stable et al. (1998) compared nicotine dependence between Hispanics and non-Hispanic Whites and found dependence to be significantly lower among Hispanics. Okuyemi and colleagues (2007) found FTND scores to be less than 3 in a sample of African American light smokers who smoked between 1 and 10 cigarettes per day. This is encouraging as smokers with lower levels of nicotine dependence may be more amenable to intervention (Sargent, Mott, & Stevens, 1998; Wellman, DiFranza, & Wood, 2006).

Although depressive symptomatology was not predictive of smoking status, prior use of mental health services was. The focus on depression may have been too narrow, as smoking is associated with many psychological diagnoses, including other mood (Waxmonsky et al., 2005), anxiety (McCabe et al., 2004; Zvolenksy, Schmidt, & McCreary, 2003), and psychotic disorders (Campo-Arias et al., 2006). Research suggests a stronger link between smoking and psychotic diagnoses rather than mood disorder diagnoses (Campo-

**Table 2**
Final backward elimination logistic regression model — predicting the odds of smoking.

| Variables | $B$ | Odds ratio | 95% Confidence intervals | | $p$ |
|---|---|---|---|---|---|
| | | | Lower | Upper | |
| Age | −.031 | .970 | .940 | 1.001 | .055 |
| Gender | .891 | 2.438 | 1.035 | 5.740 | .041 |
| Past use of mental health services | 1.117 | 3.055 | 1.115 | 8.369 | .030 |
| Number of drinks per week | .053 | 1.055 | 1.022 | 1.089 | .001 |
| Ever use of illicit drugs in the lifetime | .887 | 2.428 | 1.013 | 5.816 | .047 |
| Constant | .826 | | | | ns |

Note: overall model was significant, $\chi^2$ (5) = 47.25, $p$<.001, Nagelkerke $R^2$ = .40.

Arias et al., 2006). Addressing general mental health-related issues in a smoking cessation program may be beneficial.

Greater use of alcohol and ever use of illicit drugs were associated with smoking status. These findings are consistent with past research (Jackson et al., 2002; Lewinsohn et al., 1999; Sanderson-Cox et al., 2005). Since substance use can be associated with increased smoking and urges to smoke (Rohsenow et al., 2005) and polysubstance use has synergistic detrimental health effects (Hoffman, Welte, & Barnes, 2001; Rohsenow et al., 2005), a smoking cessation intervention for this population should include a strong polysubstance use component.

BMI was not a significant predictor of smoking status, which is inconsistent with prior research (Ward et al., 2001). Perhaps the anorectic effects of smoking are not discernible due to lower cigarette consumption. Most smokers in this study, however, expressed general weight concern, and half were concerned with post-cessation weight gain. This is consistent with studies of smoking and weight concern (Filozof et al., 2004). Because weight gain is associated with relapse (Borrelli et al., 2001), weight concern should be assessed in cessation programs. Such programs should include a component that reduces post-cessation weight gain or that contrasts the health consequences of weight gain and continued smoking (John et al., 2005; Ward et al., 2001). This component may reduce relapse after cessation. The high presence of general weight concerns may be encouraging, as weight concerns not specific to smoking can predict higher cessation rates (Cooper et al., 2006).

Gender was associated with smoking status, but given both the narrowing gap between male and female smoking rates (United States Department of Health and Human Services, 2001), as well as past (Cooper et al., 2006) and current findings suggesting weight concerns are not unique to females, gender tailoring is likely not warranted, although few studies have addressed this issue (Fiore et al., 2008).

Acculturation scores were not associated with smoking status. This runs contrary to prior research (Lara et al., 2005), and may be attributable to many factors. For example, as this was a sample of English-speaking Hispanics, there may have been little variability in acculturation scores. Also, acculturation measures have been criticized for not reliably assessing acculturation in different Hispanic populations (J. Lechuga, M.A. and J. Wiebe, Ph.D., unpublished data, 2005); however, other factors associated with acculturation may be more predictive of smoking status than acculturation alone. Specifically, acculturative stress, which was not assessed in this study, may have better predicted smoking status. An acculturative stress scale such as the Societal, Attitudinal, Familial and Environmental Acculturative Stress Scale (SAFE; Padilla, Wagatsuma, & Lindholm, 1985) may have been more informative.

Taken together, these findings can be used to develop a culturally-sensitive, tailored smoking cessation intervention for this Hispanic population which takes into account that many smokers in this population are light smokers who may not be physiologically dependent on nicotine. Despite light smoking and low dependence, many continue to smoke, and tailored cessation programs can be conceived and developed in light of the characteristics found in this study. For example, potential mental health issues and the temporal relation between psychiatric symptoms and smoking behavior should be further assessed. Substance use should also be addressed so that avenues of potential relapse can be reduced. General and cessation-related weight concerns should be addressed in a cessation program to potentially deter smokers from relapse if weight gain occurs after cessation and to encourage the emergence of other healthy behaviors in smokers who have quit (e.g., by reducing the amount of fat in the diet or by increasing the amount of physical activity).

The limitations of this study include the cross-sectional approach employed, which did not allow for temporal assessment of the characteristics of smoking. Moreover, participants in this study self-selected to take part and may not be representative of English-speaking Hispanic smokers and nonsmokers in this area. This may limit the generalizability of results. Specifically, because equal numbers of smokers and nonsmokers were intentionally recruited, estimates of regional smoking rates could not be made.

However, there were several strengths. This study focused on a Hispanic population, and given the dearth of research in this population, this study helps to further the understanding of smoking among Hispanics. Also, a reasonable sample size was employed, as was a theoretically and empirically derived set of potential characteristics to differentiate between smokers and nonsmokers.

Future directions include the prospective assessment of smoking-related predictors, such as mental health and substance use, in a Hispanic population to better understand temporal relationships between these factors. This may enable a more systematic development of intervention components. In addition, smoking cessation researchers need to develop and implement a culturally-sensitive tailored intervention, which includes not only components crucial to most cessation interventions (e.g., smoking cues, motivation; Fiore et al., 2008) but also techniques designed to address the characteristics of Hispanic smoking found in this study and future studies in border region and Hispanic smoking more generally. By doing so, quitting smoking may be facilitated among this population of Hispanic smokers situated on the U.S./México border.

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