

Hispanic/Latinx Ethnic Subgroup Differences in Sociodemographic, Sociocultural, and Smoking Characteristics in a Cessation Trial: An Exploratory Study

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Abstract

Introduction: Hispanic/Latinx smokers in the United States are often treated as a homogeneous group. However, population-based studies suggest that cigarette use differs among Hispanic/Latinx subgroups by sociodemographic or sociocultural characteristics. This secondary analysis aimed to advance the limited literature by examining differences in smoking-related variables.

Aims and Methods: We used baseline data from a randomized controlled trial testing a self-help Spanish-language smoking cessation intervention. Puerto Rican (PR), Mexican, and Cuban, the three largest Hispanic/Latinx subgroups in the sample ($N = 1028$), were first compared on sociodemographic and sociocultural variables (acculturation and familism). Primary analyses assessed subgroup differences in cigarette use variables (eg, cigarettes per day [CPD], nicotine dependence [Fagerström Test for Nicotine Dependence], and daily smoking) and smoking-related cognitive constructs (motivation to quit, smoking outcome expectancies, and abstinence self-efficacy) controlling for sociodemographic and sociocultural variables. Additional analyses explored differences between men and women within subgroups.

Results: Mexicans exhibited the lowest levels of daily smoking (90% vs. 95% Cubans and 96% PR; $p = .001$), CPD ($M = 13.5$, $SD = 9.5$ vs. $M = 20.1$, $SD = 9.9$ Cubans and $M = 16.7$, $SD = 10.1$ PR; $p = .016$), and nicotine dependence ($M = 4.2$, $SD = 2.3$ vs. $M = 6.0$, $SD = 2.1$ Cubans and $M = 5.7$, $SD = 2.2$ PR; $p < .001$), with no differences between PRs and Cubans. Within-subgroup comparisons between men and women showed the most differences among PRs (eg, men were more nicotine dependent [$M = 6.0$, $SD = 1.9$] than women [$M = 5.4$, $SD = 2.3$; $p = .041$]) and Cubans (eg, men smoked more CPD [$M = 22.2$, $SD = 12.2$] than women [$M = 19.3$, $SD = 12.0$; $p = .042$]), and the fewest among Mexicans.

Conclusions: Findings support heterogeneity within Hispanic/Latinx smokers and highlight the potential utility of examining sociodemographic, sociocultural, and smoking characteristics important for developing salient cessation interventions.

Implications: Findings demonstrate that treatment-seeking Hispanic/Latinx smokers in the United States differ in sociodemographic, sociocultural, and smoking-related variables (cigarette use and smoking-related cognitive constructs) by subgroup (ie, PR, Mexican, and Cuban) and within subgroups by sex. These differences suggest that heterogeneity among subgroups should be considered when developing cessation interventions for Hispanics/Latinxs. Future research should examine how differences in sociodemographic and smoking-related variables impact intervention outcomes and explore the role of sociocultural factors (eg, acculturation and familism) as determinants of cessation.

Introduction

The Hispanic/Latinx (hereafter referred to as Hispanic) demographic is the largest ethnic minority group in the United States, comprising 19% of the population.¹ The communal use of the Spanish language among immigrants from the Americas, the Caribbean, and Spain has facilitated the amalgamation of Hispanic individuals into one pan-ethnic group. However, Hispanics emigrate from numerous home countries comprising multiple ethnorracial backgrounds with differing cultures and sociopolitical environments.² Differences between Hispanics are now being examined more closely, especially with respect to disparities in behavioral risk factors

and negative health outcomes that tend to disproportionately affect ethnorracial minority populations.^{3–8}

Overall, Hispanics have a significantly lower smoking prevalence than non-Hispanic Whites; the current rates are 9% vs. 16%, respectively, according to the 2019 National Health Interview Survey.⁹ Furthermore, Hispanics smoke fewer cigarettes per day (CPD), are less likely to be daily smokers, and have been smoking for fewer years.^{10,11} However, studies examining smoking behavior by Hispanic national origin groups (hereafter referred to as subgroups) have observed much variability, with some subgroups having significantly higher smoking rates than others.^{3,12,13} Puerto Ricans (PRs),

Mexicans, and Cubans make up the largest single-origin subgroups in the United States, representing 75% of the 60.5 million Hispanics.¹ Using data from the Hispanic Community Health Study/Study of Latinos, the most recent population-based survey of Hispanics, Kaplan and colleagues³ compared subgroups and found the highest smoking prevalence rates (35% men; 33% women) and proportion of daily smokers among PRs, followed by Cubans (31% men; 22% women), who also report the highest CPD. Mexicans had the lowest smoking prevalence (23% men; 10% women) and the highest proportion of intermittent smoking among these three groups.³

PRs, Mexicans, and Cubans also exhibit differences in sociodemographic characteristics often associated with current smoking, difficulty quitting, and maintaining abstinence. For instance, socioeconomic status (eg, education level, income) is the highest for Cubans and the lowest for Mexicans, whereas PRs report the highest rates of unemployment and poverty.^{3,8,11,12,14,15}

Differences between men and women have also been observed among Hispanic smokers, with women overall reporting lower smoking frequency and intensity than men,^{16,17} but the size of the difference varies by subgroup. For example, Mexican men are more than twice as likely than Mexican women to be heavy daily smokers.^{3,4} The observed differences may be related to sociocultural variables. Prior research has indicated that for Hispanic women (especially Mexicans) the likelihood and intensity of smoking increase with greater acculturation (ie, adoption of values and norms of the host culture), whereas the findings for men have been mixed.^{14,17-19} Although the moderating role of acculturation in the relationship between sex/gender and smoking behavior has been documented, differences in acculturation by subgroups have not previously been examined. Moreover, research on the role of acculturation and smoking has been conducted with predominantly Mexican samples.¹⁸ Another important sociocultural variable is familism, a Hispanic value that emphasizes family solidarity and closeness, which gives priority to family needs over an individual's.²⁰ However, research on familism and Hispanics substance use behavior has been limited to adolescents and young adults.²¹

Hispanics largely continue to be treated as a homogenous group despite multiple observed differences across subgroups and between men and women in socioeconomic and sociocultural factors that influence smoking behavior and cessation.^{3,11,12,14,16-19} Consequently, there is a dearth of information regarding differences across subgroups and between men and women in smoking-related cognitive constructs such as readiness to quit, abstinence self-efficacy, and smoking expectancies. These variables may partially explain observed differences in smoking cessation outcomes, with women being less likely to quit and sustain cessation compared with men.²² Therefore, examining differences in sociodemographic, sociocultural, and smoking characteristics among Hispanic subpopulations can further our understanding of the relationship between culture and smoking, addressing the intersection between ethnicity and sex/gender.²³ For smoking cessation interventions, these differences may limit the generalizability of results when the sample does not properly, proportionately represent the population and may influence the effectiveness of the intervention because of cultural differences. This latter issue is of great interest given that interventions could be tailored to include culturally relevant content.

The objective of this exploratory, secondary analysis is to advance the limited literature by assessing differences across the three most prominent subgroups of Spanish-speakers in the United States in sociodemographic and smoking-related variables (that are known to be relevant to cessation success), as well as sociocultural factors. Differences in smoking-related variables between men and women within each of these three subgroups were also evaluated to provide information that may further guide the tailoring of interventions. Because of limited literature on the smoking behavior of Hispanics, we did not have a priori hypotheses for differences between groups. We used data from the baseline assessment of a randomized controlled trial (RCT) evaluating a Spanish-language smoking cessation intervention.²⁴

Methods

Data Source

Participants were recruited throughout the United States via social media, mass media, online advertisement, and community partnerships. All participants completed a baseline questionnaire, in Spanish, that collected sociodemographics, current smoking behavior, smoking-related cognitive constructs, smoking history, and sociocultural measures (ie, acculturation and familism). The parent RCT was approved by the Advarra Institutional Review Board. Detailed descriptions of the procedures, intervention arms, and recruitment methods have previously been reported.^{24,25}

Variables

Sociodemographic and Sociocultural Variables

Primary *sociodemographic variables* were age, sex (men/women), highest level of education completed, marital status, employment status, annual household income, and number of adults in the household. The Hispanic subgroup was assessed by "Which of the following sub-ethnicities do you self-identify with?" with response options of PR, Central American, Mexican/Mexican American, South American, Cuban, Dominican, and Other. Those marking only PR, Mexican/Mexican American, or Cuban were included in this study. Regarding *sociocultural variables*, acculturation was measured by the 12-item Short Acculturation Scale for Hispanics (SASH).²⁶ Greater adoption of the dominant US culture is reflected by higher SASH scores (range, 10-60). The Spanish-language version of the SASH has been found to be reliable among smokers and across Hispanic subgroups (Cronbach's $\alpha \geq .85$).¹² Familism was assessed using the Attitudinal Familism Scale.²⁷ This 18-item measure assesses family support, family interconnectedness, family honor, and subjugation of self. Respondents indicate the level of agreement or disagreement with each statement using a 9-point Likert scale, with higher scores reflecting greater familism (range, 18-162).

Smoking-Related Variables

The *cigarette use* variables were CPD in the past month, number of days smoked per week in the past month (7, 5-6, 3-4, 1-2, or <1), number of years as a regular smoker, quit attempts in the past year, and nicotine dependence. Our measure of *nicotine dependence* was the validated Spanish Fagerström Test for Nicotine Dependence (FTND),²⁸ which was slightly modified to indicate "the past month" as the

timeframe. Higher scores (range, 0–10) indicate greater tobacco dependence. The FTND has been used with Hispanic smokers in prior studies.²⁹

We assessed three *smoking-related cognitive constructs*: readiness to quit, smoking abstinence self-efficacy, and smoking outcome expectancies. The Contemplation Ladder was used to assess *readiness to quit* smoking.³⁰ The Contemplation Ladder has been administered to Hispanic smokers with different acculturation levels.²⁹ This measure was translated into Spanish for this study by a certified bilingual (English/Spanish) translator. *Smoking abstinence self-efficacy* (confidence) was measured with a modified 9-item version of the Smoking Situations Confidence Scale (SSC).³¹ Respondents were presented with situations likely to trigger smoking and were asked how confident they were that they would not smoke. The 5-point Likert scale produces higher scores indicating greater confidence (range, 9–45). The SSC has been administered to bicultural and less acculturated Hispanic smokers.²⁹ We translated this measure into Spanish for the RCT. *Smoking outcome expectancies* were assessed using 25 items of the Spanish version of the Smoking Consequences Questionnaire (SCQ).^{32,33} The SCQ-Spanish (SCQ-S) comprises eight scales: Negative Affect Reduction, Stimulation/State Enhancement, Health Risks, Taste/Sensorimotor, Social Facilitation, Weight Control, Craving/Addiction, and Boredom Reduction.³⁴ High internal consistency and predictive validity of the SCQ-S have been demonstrated among smokers in Spain and Spanish-speaking Hispanic smokers in the United States (Cronbach's α .74–0.96).^{34,35}

Study Sample

Participants were Hispanic smokers in the United States who enrolled in an RCT that evaluated the efficacy of a validated English-language self-help smoking cessation intervention that was transcreated (translated into Spanish and culturally adapted) for Hispanic smokers (clinicaltrials.gov: NCT02945787). The RCT enrolled 1417 treatment seekers recruited throughout much of the United States (mostly Florida, Texas, Puerto Rico, and California) using diverse recruitment strategies, including social media (ie, Facebook), mass media (eg, TV ads), digital/web-based ads, public transit signage, and community partnerships.²⁵ Of those, 1028 who self-identified as being solely of PR ($n = 235$), Mexican ($n = 477$), or Cuban ($n = 316$) descent were included in the current analyses. Eligible participants were 18 years old or older, smoked ≥ 5 cigarettes per week over the past year, were not enrolled in a face-to-face smoking cessation program, and preferred educational health materials in Spanish. Smokers were excluded from participating in the study if they were unable to provide a valid US mailing address or if a member of their household was already enrolled in the study.

Statistical Analysis

Initial analyses were descriptive statistics to review variable characteristics and evaluate the need for transformation (eg, log transformation and category reduction) prior to primary analyses. This review resulted in dichotomizing marital status into married versus other, employment status into employed full- or part-time versus other, annual household income into $\geq \$10\,000$ versus $< \$10\,000$, education into high school diploma or less versus beyond diploma, number of adults in the household into ≥ 3 versus < 3 , days per week smoking into

daily versus non-daily, and number of quit attempts in the past year to making at least one quit attempt versus none.

The first set of analyses evaluated subgroup differences (eg, PR vs. Mexican) on sociodemographic and sociocultural variables using χ^2 for categorical variables and t -tests for continuous measures. Those variables found to differ by subgroup ($p < .10$) were later included as covariates in the primary set of analyses focusing on subgroup differences in smoking-related variables to identify differences in these variables independent of the sociodemographic and sociocultural differences. These analyses employed linear or logistic regression, depending on the distribution of the dependent variable. For both sets of analyses, subgroups were evaluated in pairs (eg, PR vs. Mexican) and α was adjusted using the Holm-Bonferroni method³⁶ to account for the three tests per variable with familywise $\alpha = .05$. In the final set of analyses, the smoking-related variables were evaluated for differences between men and women within each subgroup using χ^2 for categorical variables and t -tests for continuous variables. We set α to .05 to identify significant subgroup differences. SAS v 9.4 was used for all analyses.

Results

Participant and Subgroup Characteristics

The sample was approximately half male, half married, and mostly between the ages of 35 and 65 years. Educational attainment (59% high school or less), employment (45% unemployed), and annual household income (38% below \$10 000) were generally low (Table 1). Acculturation scores were low overall ($M = 19.3$, $SD = 6.4$), and familism scores were generally high ($M = 147.9$, $SD = 25.8$) (Table 1).

Results from subgroup paired comparisons are also presented in Table 1. There were at least two statistically significant subgroup differences for every primary sociodemographic and sociocultural variable (top part of Table 1). Therefore, subsequent analyses of subgroup differences in smoking-related variables included all of these as covariates.

Smoking-Related Variables

Table 2 presents descriptive statistics for all smoking-related variables. Participants were predominantly daily smokers, smoked an average of 17 CPD ($SD = 14$), had been smoking regularly for about 28 years ($SD = 13$), and half had attempted to quit in the past year. Participants reported a mean score of about 7 ($SD = 3$) on the Contemplation Ladder, just below “starting to think about changing my smoking patterns.” Participants had moderate nicotine dependence based on the FTND ($M = 5.1$, $SD = 2.4$).

Results from subgroup paired comparisons of smoking-related variables, controlling for all sociodemographic and sociocultural variables, are also presented in Table 2. At least one statistically significant subgroup difference was observed for 9 of the 15 smoking-related variables (eg, daily smoking, CPD, nicotine dependence, and years as a regular smoker). All significant paired comparisons involved the Mexican subgroup. There were no statistically significant differences between PRs and Cubans on any smoking-related variable. Mexicans differed from both of the other subgroups in the following characteristics: lower percentage of daily smokers ($p \leq .001$), lower average CPD ($p \leq .016$), and lower average nicotine dependence ($p < .001$). Mexicans also differed from PRs with lower average stimulation/state enhancement expectancies ($p = .001$) and higher health risk expectancies

Table 1. Descriptive and Test Statistics for Sociodemographic and Sociocultural Variables by Subgroup

	All (N = 1028)	PR (N = 235)	MX (N = 477)	CB (N = 316)	PR vs. MX test statistic	<i>p</i>	CB vs. MX test statistic	<i>p</i>	CB vs. PR test statistic	<i>p</i>
Age, years: M (SD)	49.5 (11.4)	47.9 (11.2)	49.2 (11.1)	51.3 (11.9)	$t(710) = -1.48$	.138	$t(791) = 2.59$	.010	$t(549) = 3.48$	<.001
Women, N (%)	495 (48%)	139 (59%)	198 (42%)	158 (50%)	$\chi^2(1) = 19.7$	<.001	$\chi^2(1) = 5.54$	.019	$\chi^2(1) = 4.54$	.033
Married, N (%)	489 (48%)	96 (41%)	276 (58%)	117 (37%)	$\chi^2(1) = 18.6$	<.001	$\chi^2(1) = 33.2$	<.001	$\chi^2(1) = 0.80$	.371
High school diploma or less, N (%)	610 (59%)	120 (53%)	364 (79%)	126 (41%)	$\chi^2(1) = 48.7$	<.001	$\chi^2(1) = 113.8$	<.001	$\chi^2(1) = 7.43$	.006
Employed full- or part-time, N (%)	570 (55%)	103 (45%)	289 (63%)	178 (57%)	$\chi^2(1) = 18.8$	<.001	$\chi^2(1) = 2.05$	.153	$\chi^2(1) = 7.90$	.005
Annual household income under \$10 000, N (%)	395 (38%)	115 (52%)	154 (34%)	126 (43%)	$\chi^2(1) = 18.1$	<.001	$\chi^2(1) = 5.16$	.023	$\chi^2(1) = 4.00$	.045
Three or more adults in household, N (%)	270 (26%)	47 (20%)	150 (31%)	73 (23%)	$\chi^2(1) = 10.1$	.001	$\chi^2(1) = 5.34$	.021	$\chi^2(1) = 1.07$	.301
Familism (18-180), M (SD)	147.9 (25.8)	141.7 (26.6)	143.7 (25.9)	158.8 (21.1)	$t(697) = -0.96$	.336	$t(778) = 8.57$	<.001	$t(543) = -8.36$	<.001
Acculturation (12-60), M (SD)	19.3 (6.4)	21.2 (7.7)	19.1 (6.1)	18.1 (5.4)	$t(698) = 3.94$	<.001	$t(773) = -2.18$	.030	$t(537) = -5.39$	<.001
Current residence, N (%)					$\chi^2(3) = 482.6$	<.001	$\chi^2(3) = 530.1$	<.001	$\chi^2(3) = 172.2$	<.001
Puerto Rico	60 (6%)	60 (26%)	0 (0%)	0 (0%)						
Florida	375 (36%)	101 (43%)	14 (3%)	260 (82%)						
Other state east of Missis- sippi River (eg, NY and IL)	94 (9%)	55 (23%)	32 (7%)	7 (2%)						
State west of Mississippi River (eg, TX and CA)	499 (49%)	19 (8%)	431 (90%)	49 (16%)						
Recruitment method, N (%)					$\chi^2(2) = 17.7$	<.001	$\chi^2(2) = 101.1$	<.001	$\chi^2(2) = 33.9$	<.001
Facebook	755 (73%)	170 (72%)	323 (68%)	262 (83%)						
TV/radio advertising	226 (22%)	54 (23%)	151 (32%)	21 (7%)						
Other	47 (5%)	11 (5%)	3 (1%)	33 (10%)						

PR = Puerto Rican subgroup, MX = Mexican subgroup, CB = Cuban subgroup, NY = New York, IL = Illinois, TX = Texas, CA = California. Test statistics and *p*-values in bold are statistically significant following the Holm adjustment for multiple comparisons (α 's are .0167, .025, and .05). The number (percentage) of responses missing ranged from 0 (0%) for age, sex, and adults in household to 63 (6.1%) for income.

($p = .004$). Mexicans differed from Cubans with lower average years as a regular smoker ($p = .003$) and lower average expectancies for boredom reduction ($p = .006$), taste/sensorimotor ($p = .001$), and weight control ($p = .012$).

Differences Between Men and Women Within a Subgroup

Table 3 presents descriptive statistics for men and women within subgroups, as well as the results from the subgroup paired comparisons. Among PRs, men had higher averages for nicotine dependence ($p = .041$), as well as boredom reduction ($p = .021$), social facilitation ($p = .009$), and craving/addiction expectancies ($p = .002$). Among Mexicans, women had a higher average in boredom reduction expectancies ($p = .042$). Among Cubans, men had a higher average CPD in the past month ($p = .042$), whereas women had a higher average negative affect reduction ($p = .040$), state enhancement ($p = .019$), and weight control expectancies ($p = .002$).

Discussion

To our knowledge, this is the first study to explore Hispanic subgroup differences in cessation-related factors such as nicotine dependence, abstinence self-efficacy, readiness to quit, and smoking outcome expectancies. Data were provided by a large, geographically diverse sample of Spanish-speaking smokers seeking treatment. We evaluated selected characteristics among the three largest single-origin Hispanic subgroups in the United States. We also evaluated how men and women within each subgroup differed on cessation-related factors.

Importantly, we found subgroup differences in sociodemographic and sociocultural variables that have been shown to be related to smoking cessation outcomes among Hispanics.^{7,12,15} For instance, PRs in our study reported lower income and higher unemployment and acculturation. Previous research has shown that higher levels of acculturation and lower income and employment were associated with smoking cessation failure among Hispanics.^{7,12,15} Furthermore, Mexicans reported higher income and were more likely to be married, which are two factors associated with increased likelihood of being a former smoker among Hispanics.¹² Differences in socioeconomic and sociocultural characteristics suggest vulnerability among PRs in our study. These variables could be used to target interventions to groups that might be at risk of failed cessation. The observed heterogeneity among subgroups in sociodemographic and sociocultural variables indicates a need for future studies to recruit sufficient sample sizes and with subgroup variability to allow for assessing socioeconomic and sociocultural effects on outcomes.

Notably, we found subgroup differences in smoking-related variables, even when controlling for sociodemographic and sociocultural variables, which also varied by subgroup. First, consistent with prior research, Mexicans reported lower smoking intensity and frequency compared with Cubans and PRs.³ More importantly, we observed subgroup differences across a range of cessation-related factors such as years as a regular smoker, and smoking outcome expectancies, which extends prior research among Hispanics.^{3,35,37} We also observed subgroup differences in nicotine dependence, which

Table 2. Descriptive and Test Statistics for Smoking-Related Variables by Subgroup

	All (N = 1028)	PR (N = 235)	MX (N = 477)	CB (N = 316)	PR vs. MX test statistic	<i>p</i>	CB vs. MX test statistic	<i>p</i>	CB vs. PR test statistic	<i>p</i>
Smoking daily in the past month, N (%)	963 (94%)	226 (96%)	429 (90%)	308 (95%)	$\chi^2(1) = 10.9$	.001	$\chi^2(1) = 13.0$	<.001	$\chi^2(1) = 0.00$	.973
Cigarettes per day in past month, M (SD)	17.4 (13.8)	16.7 (10.1)	13.5 (9.5)	20.1 (9.9)	$F(1,563) = 5.85$	.016	$F(1,614) = 30.3$	<.001	$F(1,424) = 1.91$	.168
FTND (0–10): M (SD)	5.1 (2.4)	5.7 (2.2)	4.2 (2.3)	6.0 (2.1)	$F(1,587) = 55.8$	<.001	$F(1,638) = 95.8$	<.001	$F(1,444) = 1.99$	.159
Years as a regular smoker, M (SD)	27.8 (12.7)	26.7 (10.1)	26.9 (12.7)	30.1 (13.0)	$F(1,584) = 4.42$	.036	$F(1,638) = 8.91$	.003	$F(1,439) = 2.43$	.120
Attempted to quit smoking in past year, N (%)	514 (50%)	130 (55%)	246 (52%)	138 (44%)	$\chi^2(1) = 0.58$	.771	$\chi^2(1) = 5.32$	.021	$\chi^2(1) = 1.76$	.185
Contemplation Ladder (0–10), M (SD)	6.9 (2.8)	6.8 (2.9)	6.9 (2.8)	6.9 (2.8)	$F(1,563) = 1.61$	.205	$F(1,620) = 0.36$	.551	$F(1,422) = 0.18$	.668
Self-efficacy (9–45), M (SD)	18.7 (9.1)	18.1 (8.9)	19.7 (9.2)	17.7 (9.0)	$F(1,573) = 1.52$	.219	$F(1,621) = 3.58$	.059	$F(1,431) = 0.21$	.643
Smoking expectancies, M (SD)										
Boredom reduction	6.0 (2.4)	6.0 (2.2)	5.7 (2.4)	6.6 (2.3)	$F(1,580) = 1.33$	.250	$F(1,633) = 7.51$	.006	$F(1,440) = 0.72$	.397
Negative affect reduction	6.7 (2.4)	6.9 (2.2)	6.4 (2.4)	7.0 (2.4)	$F(1,580) = 5.09$	.025	$F(1,633) = 1.29$	.257	$F(1,440) = 1.14$	.286
Stimulation/State enhancement	4.4 (2.7)	4.6 (2.5)	3.9 (2.7)	4.8 (2.8)	$F(1,580) = 10.3$	.001	$F(1,633) = 4.33$	.038	$F(1,440) = 0.95$	.331
Health risks	8.3 (1.6)	8.1 (1.9)	8.5 (1.3)	8.4 (1.6)	$F(1,580) = 8.31$	.004	$F(1,633) = 4.02$	.045	$F(1,440) = 0.19$	.660
Taste/sensorimotor	5.4 (2.9)	5.1 (2.8)	5.0 (3.0)	6.3 (2.8)	$F(1,580) = 1.16$	.282	$F(1,633) = 10.4$	.001	$F(1,440) = 3.43$	.065
Social facilitation	5.1 (2.7)	4.7 (2.6)	5.0 (2.7)	5.7 (2.6)	$F(1,580) = 0.33$	.566	$F(1,633) = 1.28$	.258	$F(1,440) = 1.95$	.163
Weight control	4.7 (3.0)	4.7 (2.9)	4.3 (3.0)	5.2 (3.1)	$F(1,580) = 1.11$	.293	$F(1,633) = 6.30$	.012	$F(1,440) = 0.51$	.475
Craving/addiction	6.9 (2.2)	6.8 (2.2)	6.8 (2.3)	7.1 (2.1)	$F(1,580) = 0.00$	.986	$F(1,633) = 0.01$	.924	$F(1,440) = 0.35$	.554

PR = Puerto Rican subgroup, MX = Mexican subgroup, CB = Cuban subgroup, FTND = Fagerström Test for Nicotine Dependence.

Test statistics and *p*-values in bold are statistically significant following the Holm–Bonferroni adjustment for multiple comparisons (α 's are .0167, .025, and .05). Models included age, sex, marital status, education, employment status, income, number of adults, familism, and acculturation as covariates because of the subgroup differences (see Table 1). The number (percentage) of responses missing ranged from 3 (<.01%) for FTND to 49 (4.8%) for cigarettes per day in the past month.

has not been previously examined. Relative to Mexicans, Cubans and PRs reported more positive and less negative smoking expectancies (eg, “Smoking makes me feel more energetic” vs. “smoking is bad for my health”). This is consistent with the observed differences in smoking frequency, intensity, and nicotine dependence.^{34,38}

Another key finding was the lack of significant differences between PRs and Cubans across all smoking-related variables. Notably, these two subgroups, both Caribbean cultures with a pre-colonial tradition of tobacco use and a long history of its commercialization,³⁹ differed from Mexicans, but not from each other, which has important implications for treatment. Given that the few existing evidence-based cessation interventions for Hispanics have been tested with predominantly Mexican samples,⁴⁰ it is possible that they may be less effective for PR or Cuban smokers. The multiple differences in these characteristics suggest a public health opportunity to consider heterogeneity in Hispanic subgroups to improve the efficacy and generalizability of smoking cessation interventions. Future studies would benefit from oversampling of subgroups that are historically underrepresented in cessation trials (eg, PRs and Cubans) to advance research assessing outcome differences among subgroups.⁴⁰ This is of particular importance given that much of the data to date on smoking cessation outcomes among Hispanics have been driven by the experience of Mexican smokers.

Within subgroups, differences between men and women in smoking-related factors were also observed, with the number and type of differences varying by subgroup, as presented in Table 3. Specifically, there were several differences in

endorsement of smoking outcome expectancies that may have important implications for more targeted gender-relevant intervention efforts. For instance, PR men endorsed more craving and addiction expectancies compared with their female counterparts. Previous research found that craving and addiction expectancies were significantly associated with smoking relapse in Spanish-speaking Hispanics.³⁵ In combination, these findings suggest that it may be particularly important that interventions for PR men consider the inclusion of pharmacotherapies to optimize cessation success.

Furthermore, consistent with previous studies comparing men and women,^{32,37,38} Cuban women in this study endorsed more weight control expectancies than their male counterparts. This is of importance given that positive expectancies, such as weight and appetite control, were found to predict smoking withdrawal severity over time^{35,41} and are positively associated with relapse.³³ Given these findings, targeted interventions for Cuban women could provide healthy weight management alternatives such as daily physical activity, improved nutrition, or counseling focused on positive body image and self-esteem. Moreover, Mexican women endorsed more boredom reduction expectancies than Mexican men, which is an important finding given that this is the only subscale of the SCQ that had been found to predict smoking relapse among Spanish-speaking Hispanics.³⁵ These findings suggest that interventions for Mexican women might increase quit success and sustained abstinence by providing coping skills to deal with loneliness, fatigue, and boredom (eg, problem-solving skills or behavioral activation strategies to increase engagement or activity levels). Future research is

Table 3. Descriptive Statistics for Smoking-Related Variables by Sex Within Each Subgroup

	PR-Men (N = 96)	PR-Women (N = 139)	Test statistic	<i>p</i>	MX-Men (N = 279)	MX-Women (N = 198)	Test statistic	<i>p</i>	CB-Men (N = 158)	CB-Women (N = 158)	Test statistic	<i>p</i>
Smoking daily in the past month, N (%)	95 (99%)	131 (94%)	3.43	.064	256 (92%)	173 (87%)	2.46	.117	155 (98%)	153 (97%)	0.51	.474
Cigarettes per day in past month, M (SD)	19.4 (9.0)	17.3 (17.1)	1.09	.277	15.8 (15.0)	13.4 (12.2)	1.78	.076	22.2 (12.2)	19.3 (12.0)	2.04	.042
FTND (0–10): M (SD)	6.0 (1.9)	5.4 (2.3)	2.05	.041	4.2 (2.3)	4.2 (2.3)	−0.27	.788	6.1 (2.0)	5.9 (2.2)	0.93	.352
Years as a regular smoker, M (SD)	26.4 (11.5)	26.9 (12.4)	−0.31	.759	27.8 (12.5)	25.7 (13.0)	1.77	.077	31.2 (13.0)	29.0 (13.0)	1.51	.132
Attempted to quit smoking in the past year, N (%)	52 (54%)	78 (56%)	0.09	.768	146 (52%)	100 (51%)	0.15	.694	75 (47%)	63 (40%)	1.85	.173
Contemplation Ladder (0–10), M (SD)	6.7 (2.8)	6.9 (2.9)	−0.44	.660	6.9 (2.8)	6.8 (3.0)	0.59	.553	6.9 (2.9)	6.8 (2.2)	−0.12	.906
Self-efficacy (9–45), M (SD)	17.7 (8.6)	18.4 (9.1)	−0.57	.569	20.1 (9.3)	19.3 (9.2)	0.90	.369	18.2 (9.6)	17.2 (8.3)	0.99	.325
Smoking expectancies, M (SD)												
Boredom reduction	6.4 (2.1)	5.7 (2.3)	2.33	.021	5.5 (2.5)	6.0 (2.3)	−2.04	.042	6.4 (2.4)	6.8 (2.2)	−1.55	.122
Negative affect reduction	7.0 (2.2)	6.8 (2.3)	0.48	.634	6.3 (2.4)	6.6 (2.5)	−1.35	.177	6.7 (2.6)	7.3 (2.2)	−2.06	.040
Stimulation/State enhancement	4.9 (2.3)	4.4 (2.5)	1.62	.106	3.9 (2.7)	4.0 (2.8)	−0.61	.540	4.4 (2.8)	5.2 (2.8)	−2.35	.019
Health risks	8.3 (1.6)	8.0 (2.1)	1.34	.182	8.4 (1.3)	8.5 (1.3)	−0.22	.824	8.3 (1.6)	8.4 (1.7)	−0.13	.895
Taste/sensorimotor	5.3 (2.8)	5.0 (2.8)	1.00	.319	5.3 (2.9)	4.7 (3.1)	1.86	.064	6.1 (3.0)	6.4 (2.7)	−0.86	.389
Social facilitation	5.2 (2.5)	4.3 (2.5)	2.62	.009	5.0 (2.7)	5.0 (2.8)	−0.16	.870	5.4 (2.6)	5.9 (2.6)	−1.78	.076
Weight control	4.4 (3.0)	4.9 (2.8)	−1.15	.251	4.1 (2.9)	4.6 (3.0)	−1.81	.072	4.6 (3.1)	5.7 (2.9)	−3.10	.002
Craving/addiction	7.3 (2.0)	6.5 (2.2)	3.06	.002	6.9 (2.2)	6.5 (2.4)	1.81	.071	7.1 (2.1)	7.1 (2.1)	−0.10	.921

PR = Puerto Rican subgroup, MX = Mexican subgroup, CB = Cuban subgroup, FTND = Fagerström Test for Nicotine Dependence. Test statistics are χ^2 for the two categorical variables ($df = 1$) and t for continuous variables (dfs range from 220 to 474). Sets of values in bold represent statistically significant differences, $\alpha = .05$. The number (percentage) of responses missing ranged from 3 (<.01%) for FTND to 49 (4.8%) for cigarettes per day in the past month.

needed to examine whether further targeting of intervention approaches and strategies based on subgroup differences by gender is indeed needed for superior intervention outcomes. Our findings also provide additional support for considering the influence of gender-ethnic minority intersectionality on smoking-related factors.³⁷

There are limitations of our study that are worth noting. First, this study was a secondary analysis of data from an RCT testing the efficacy of a smoking cessation intervention for Hispanics. Sample recruitment for the RCT was geographically broad, and multiple recruitment methods were used.²⁵ Importantly, because the study did not use population-based sampling, the final sample of treatment-seeking smokers should not be considered representative of Hispanic smokers in the United States. However, this sample was large and diverse, and the differences in sociodemographics observed here are consistent with population-based studies.²⁵ Second, as is the case with most secondary analyses, the study was dependent on data collected for other purposes. Even so, the baseline survey included variables considered relevant to the questions of interest, collected with valid and reliable measures previously used with Hispanics (eg, SASH and SCQ-S).^{12,34,35} Third, because of small sample sizes of some national origin groups, we only examined differences among the

largest single-origin Hispanic subgroups (ie, PR, Mexican, and Cuban). Nevertheless, our study is among the few to explore differences across the three largest Hispanic subgroups using a sample of smoking cessation treatment seekers. Given the diversity of the Hispanic population, future research should include other subgroups as well as individuals who identify with multiple Hispanic subgroups. Fourth, our analyses were exploratory in nature, and therefore no causal attributions should be made. However, our findings of group differences suggest the need to consider subpopulation differences in future empirical research, which could guide future intervention development. Last, although data were collected on gender and sexual orientation, for the purpose of these analyses, we used sex (self-identification of being either men or women) because of the high nonresponse rate on the gender identity and sexual orientation items in our baseline questionnaire. Nonresponse to the sexual orientation question is associated with ethnicity, and Hispanics have been found to be more likely than non-Hispanic Whites to decline to answer.⁴²

Despite the limitations, this study makes several contributions to the literature. First, we provide novel data on differences between and within subgroups in smoking-related cognitive constructs (ie, smoking outcome expectancies) and sociocultural (ie, acculturation and familism) factors. In the case of

acculturation and familism, research on the role of these culturally relevant variables on tobacco cessation in Hispanic adults is scant. Second, our findings highlight the importance of considering the intersection between sex/gender and ethnicity when identifying differences that may inform the development and delivery of tailored smoking cessation interventions. Last, by using a large, national sample that was not restricted by geographical location, our study provides relevant data that move the field forward toward effective interventions for Hispanic smoking cessation treatment seekers in the United States.

Conclusions

In summary, the current study demonstrated that Hispanic treatment seekers are not a homogenous group with respect to smoking-related variables, even after controlling for sociodemographic and sociocultural variables. Our findings indicate that there are differences in cognitive constructs and sociocultural factors across subgroups, which is a novel contribution to the limited literature examining heterogeneity between and within Hispanic subgroups. Broadly, our study provides support for the need to consider the intersectionality between sex/gender and ethnicity when identifying factors that may contribute not only to ethnoracial disparities in smoking cessation but also to disparities between men and women. Smoking cessation interventions can capitalize on addressing subgroup and sex/gender differences, thus improving saliency to specific populations. Consequently, future studies should investigate the effect of these differences on intervention outcomes in a more comprehensive way. In doing so, researchers will expand the limited literature on determinants of cessation among Hispanic smokers and create multiple opportunities to boost the effectiveness of public health tobacco interventions.

Supplementary Material

A Contributorship Form detailing each author's specific involvement with this content, as well as any supplementary data, are available online at <https://academic.oup.com/ntr>.

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Declaration of Interests

THB has received research support from Pfizer, Inc. and is on the advisory board of Hava Health, Inc. All other coauthors report no conflicts of interest.

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Data Availability

The data underlying this article will be shared upon reasonable request to the corresponding author.

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