ORIGINAL INVESTIGATION

Everyday Discrimination Is Associated With Nicotine Dependence Among African American, Latino, and White Smokers

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ABSTRACT

Introduction: Discrimination is a commonly perceived stressor among African Americans and Latinos, and previous research has linked stress with substance dependence. Although studies have shown a link between discrimination and smoking, little is known about the relationship between discrimination and nicotine dependence.

Methods: A total of 2,376 African American (33.4%; $n = 794$), Latino (33.1%; $n = 786$), and White (33.5%; $n = 796$) smokers completed an online survey. Everyday discrimination experiences were described in total and by race/ethnicity. Covariate-adjusted linear regression analyses were conducted to evaluate the associations between everyday discrimination and indicators of nicotine dependence.

Results: Most participants (79.1%), regardless of race/ethnicity, reported experiencing everyday discrimination. However, total scores on the discrimination measure were higher among Latinos and African Americans than among Whites ($p < .001$). Race/ethnicity/national origin was the most commonly perceived reason for everyday discrimination among African Americans and Latinos, whereas physical appearance was the most commonly perceived reason among Whites. Regression analyses indicated that everyday discrimination was positively associated with indicators of nicotine dependence, including the Heaviness of Smoking Index (HSI; $p < .001$) and the Brief Wisconsin Inventory of Smoking Dependence Motives (WISDM) scales (all $ps < .001$). There was a significant interaction between race/ethnicity and discrimination, such that discrimination was associated with the HSI only among Latinos. Similarly, discrimination was most strongly associated with the WISDM scales among Latinos.

Conclusions: Analyses indicated that discrimination is a common stressor associated with nicotine dependence. Findings suggest that greater nicotine dependence is a potential pathway through which discrimination may influence health.

INTRODUCTION

Tobacco use is the leading preventable cause of death in the United States (Mokdad, Marks, Stroup, & Gerberding, 2004), though smoking cessation at any age is associated with improved health and increased longevity (Jha et al., 2013). Unfortunately, those with greater dependence on nicotine are less likely to achieve cessation following a quit attempt (e.g., Borland, Yong, O'Connor, Hyland, & Thompson, 2010; Piper et al., 2008) and are more likely to develop tobacco-related diseases (Muscat, Ahn, Richie, & Stellman, 2011; Muscat, Liu, Livelsberger, Richie, & Stellman, 2012). Although the

definition of nicotine dependence remains the topic of much debate, dependence is often conceptualized as involving tolerance, difficulty controlling use, use despite adverse consequences, and withdrawal effects (e.g., Baker, Breslau, Covey, & Shiffman, 2012; Chen et al., 2012; DiFranza et al., 2010; Hendricks, Prochaska, Humfleet, & Hall, 2008). Gaining a greater understanding of the factors associated with nicotine dependence may broaden our understanding of dependence and facilitate the development of more effective cessation interventions.

Dependence and other smoking-related characteristics are known to differ by race/ethnicity, and these differences may

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contribute to tobacco-related health disparities (for a review, see Fagan, Moolchan, Lawrence, Fernander, & Ponder, 2007; Pérez-Stable, Herrera, Jacob, & Benowitz, 1998). For example, nicotine metabolism, the nicotine content of cigarettes smoked, and time to first cigarette in the morning have been shown to vary substantially by race/ethnicity (e.g., Pérez-Stable et al., 1998). Similarly, the rates of certain tobacco-related diseases vary by racial/ethnic group. For example, the rates of lung cancer are highest among African Americans relative to all other racial/ethnic groups (for a review, see Fagan et al., 2007). To better understand the factors that contribute to tobacco-related health disparities, it will be important to gain insight into how racial/ethnic differences in nicotine dependence may develop.

Stress is one factor that has been theoretically and empirically linked with substance dependence through physiological mechanisms (Uhart & Wand, 2009). Discrimination due to race/ethnicity or other characteristics is a commonly perceived stressor among African Americans and Latinos (Borrell et al., 2010; Lopez, Morin, & Taylor, 2010; Pérez, Fortuna, & Alegría, 2008), and a growing body of research indicates that discrimination is associated with smoking. Specifically, Purnell et al. (2012) reported that the prevalence of current smoking was significantly greater among individuals who perceived racial discrimination in healthcare and/or workplace settings versus those who did not. Numerous other studies have focused on the link between racial/ethnic discrimination and smoking among Black adults (Borrell et al., 2007, 2010; Corral & Landrine, 2012; Cuevas et al., 2014; Horton & Loukas, 2013; Landrine & Klonoff, 2000; Nguyen, Subramanian, Sorensen, Tsang, & Wright, 2012), and research suggests that racial/ethnic and other forms of discrimination are similarly linked with smoking prevalence among Latinos (Albert et al., 2008; Lorenzo-Blanco & Cortina, 2013; Todorova, Falcón, Lincoln, & Price, 2010).

There are several mechanisms that may help to explain the link between discrimination and smoking. Perceived discrimination has been hypothesized to lead to increased stress, negative emotional states, and poor health behavior (Ahmed, Mohammed, & Williams, 2007; Pascoe & Richman, 2009). Psychological distress has been found to mediate the relationship between discrimination and smoking (Purnell et al., 2012). Thus, it is possible that smoking serves as a means to cope with discrimination-related distress, though research has indicated that smoking is not an effective way of alleviating stress and may actually increase stress (Parrott, 1999).

Despite known links between discrimination and smoking, the relationship between discrimination and nicotine dependence has yet to be examined. The stress associated with experiences of discrimination may increase vulnerability to nicotine dependence among current smokers. Thus, the primary goals of the current study were to: (a) characterize the experiences of discrimination among Black, Latino, and White smokers, (b) evaluate potential associations between discrimination and indicators of nicotine dependence, and (c) determine whether the associations between discrimination and nicotine dependence may vary by race/ethnicity.

METHODS

Participants

Participants completed a cross-sectional survey administered through an online panel survey service, Survey Sampling

International (SSI), between July 5, 2012 and August 15, 2012. SSI maintains access to an online panel of 1.5 million people in the United States who have indicated that they are willing to participate in online surveys. Participants were eligible for the study if they self-identified as African American, White, or Latino (the three largest racial/ethnic groups in the United States), were at least 25 years of age, and spoke English. In addition, all participants had smoked in the past 30 days, had smoked at least 100 cigarettes in their lifetime, had smoked for at least 1 year, had smoked at their current rate (i.e., daily or nondaily) for at least 6 months, and had not participated in smoking cessation treatment within the past 30 days. Pregnant or breastfeeding women were excluded from the study. Non-daily and daily smokers were recruited, such that each made up half of the sample. Nondaily smokers smoked at least one cigarette on 4 to 24 days in the past 30 days. Daily smokers smoked 25 to 30 days in the past 30 days and were further stratified into light daily smokers (10 or fewer cigarettes per day) and moderate to heavy daily smokers (greater than 10 cigarettes per day). Individuals who smoked on fewer than 4 days within the past 30 days were ineligible to participate. The recruitment goal was to enroll approximately 1,200 non-daily smokers, 600 light daily smokers, and 600 moderate to heavy smokers, with equal proportions of African American, Latino, and White participants recruited within each smoking level (i.e., nondaily, light, and moderate/heavy smoking).

A total of 42,715 participants were screened for study eligibility, 13,775 did not meet the study criteria and were ineligible, 21,891 were ineligible because the appropriate study group was full (i.e., non-daily, light, moderate/heavy smokers), 4,125 discontinued before completing the screener, and 456 were eligible but did not complete the survey. Sixty duplicate responders were removed from the data set. Thus, the study sample included 2,408 participants (1,201 non-daily smokers and 1,207 daily smokers). Of the daily smokers, 604 were light daily smokers and 603 moderate to heavy daily smokers. Subsequent to study inclusion, 32 daily smokers (26 light smokers and 6 moderate/heavy smokers) responded inconsistently (i.e., reporting “no” on an item that asked if they had smoked daily for 6 months or more), and were excluded leaving a final sample size of 2,376 participants.

Procedures

All procedures were approved by the University of Minnesota Institutional Review Board, and informed consent was obtained from all participants. Eligible participants completed online survey questions. Participants who completed the survey were entered into a quarterly drawing for \$12,500 available to all SSI panelists as well as points that could be redeemed for cash.

Measures

Demographic Variables

Age, race/ethnicity (African American, Latino [of any race], or White), gender, and education (high school or less vs. greater than high school) were assessed.

Smoking Characteristics/Nicotine Dependence

Participants reported the number of days they smoked in the past month, the average number of cigarettes they smoked per day on the days smoked during the past 7 days, and the number of years that they had been smoking cigarettes. Using an item from

the *Cigarette Dependence Scale*, participants were asked to rate their level of addiction to cigarettes on a scale from 0 = “I am not addicted to cigarettes at all” to 100 = “I am extremely addicted to cigarettes” (Etter, Le Houezec, & Perneger, 2003). The *Heaviness of Smoking Index* (HSI) was calculated based upon daily smoking rate and time to first cigarette in the morning (Borland et al., 2010). HSI scores may range from zero to six, with higher scores indicating greater nicotine dependence. The *Brief Wisconsin Inventory of Smoking Dependence Motives* (WISDM) is a 37-item self-report questionnaire that yields an overall dependence score as well as subscale scores for 13 dimensions of dependence (Smith et al., 2010). Items are rated on a scale from one to seven, with higher scores indicating greater dependence. The subscales include Affiliative Attachment, Automaticity, Loss of Control, Cognitive Enhancement, Craving, Cue Exposure/Associative Processes, Social/Environmental Goads (i.e., social stimuli/contexts that invite or model smoking), Taste, Tolerance, Weight Control, and Affective Enhancement (for detailed description of the subscales, see Piper et al., 2004). The subscales may be combined to create two additional scales: Primary Dependence Motives (PDM; Automaticity, Loss of Control, Craving, Tolerance) and Secondary Dependence Motives (SDM; Affiliative Attachment, Cognitive Enhancement, Cue Exposure/Associative Processes, Affective Enhancement, Social/Environmental Goads, Taste, and Weight Control).

Discrimination

The Everyday Discrimination Scale (Short Version) is a six-item self-report measure of day-to-day experiences of discrimination (Sternthal, Slopen, & Williams, 2011). The internal consistency of the measure has previously been demonstrated (Cronbach's $\alpha = .77$; Sternthal et al., 2011). Participants were asked “In your day-to-day life, how often have any of the following things happened to you? (a) You are treated with less courtesy or respect than other people, (b) You receive poorer service than other people at restaurants or stores, (c) People act as if they think you are not smart, (d) People act as if they are afraid of you, and (e) You are threatened or harassed.” Participants rated how often they had experienced each of the five discriminatory situations on a 6-point scale (0 = never, 1 = less than once a year, 2 = a few times a year, 3 = a few times a month, 4 = at least once a week, 5 = almost everyday). Total scores reflect the sum of the five items, and scores may range from 0 to 25. One additional item assessed the perceived reason for the discrimination, “What do you think is the main reason for these experiences?” and participants indicated one primary perceived reason for the discrimination (e.g., race, gender, age).

Analyses

IBM SPSS statistics software (version 20) was used to complete all analyses. Descriptive statistics were generated for participant characteristics, total everyday discrimination experiences, and experiences of discrimination by race/ethnicity. Chi-square analyses (for categorical variables) and Analyses of Variance (ANOVAs; for continuous variables) were used to evaluate differences between racial/ethnic groups. When significant racial/ethnic differences were found for a continuous variable, Fisher's Least Significant Difference (LSD) tests were conducted to identify which racial/ethnic groups differed from each other. When significant racial/ethnic differences were found for a categorical variable, follow up chi-square analyses

were conducted in which two racial/ethnic groups were compared at a time to identify specific racial/ethnic differences.

A series of linear regression analyses were conducted to determine whether self-reported discrimination was associated with several indicators of nicotine dependence including cigarettes smoked per day, years of smoking, the HSI, self-rated addiction, and WISDM (total and subscale scores). Other variables in the models included age, education, gender, and race/ethnicity. Race/ethnicity was dummy coded into two variables (i.e., African American and Latino), with Whites as the reference group. Interactions between race/ethnicity and discrimination on cigarettes per day, years of smoking, HSI scores, self-rated addiction, and WISDM (total, PDM, SDM) scores were also examined. Interaction terms for each dummy variable (i.e., African American $\times$ discrimination; Latino $\times$ discrimination) were created and included in the model along with all other covariates.

RESULTS

Participant Characteristics

Participants ($N = 2,376$) were 33.4% African American ($n = 794$), 33.1% Latino ($n = 786$), and 33.5% White ($n = 796$; participant characteristics are presented in Table 1). More than half of participants were female, and most had achieved a greater than high school education. Participants differed by race/ethnicity on a variety of characteristics including age, gender, years of smoking, menthol cigarette use, average cigarettes smoked per day, time to first cigarette in the morning, HSI, and WISDM (total, PDM, SDM) scores. Notably, Whites reported more years of smoking and smoked more cigarettes per day than African Americans and Latinos. However, African Americans were more likely than Whites and Latinos to smoke within 5 min of waking, and they reported the highest HSI scores. Latinos reported the highest scores on the WISDM (including the PDM and SDM scales) compared with African Americans and Whites.

Discrimination

A total of 79.1% ($n = 1,880$) of participants reported experiencing everyday discrimination, and Latinos and African Americans reported significantly more discrimination than Whites (see Table 1). In all racial/ethnic groups, participants most frequently endorsed being treated with less courtesy or respect than other people ($M = 1.6$), and 32.5% reported having this experience three or more times per month (see Table 2). The most commonly perceived reasons for discrimination were race/ancestry/national origin, physical appearance (other than height/weight), and age, though this varied slightly by race/ethnicity (see Table 3). Discrimination was inversely associated with age, $r = -.223$, $p < .001$, and males reported significantly more discrimination than females ($M = 8.3$ vs. 6.3, $p < .001$). Discrimination did not vary by education level.

Discrimination and Nicotine Dependence

After controlling for age, education, gender, and race/ethnicity, linear regression analyses indicated that discrimination was positively associated with cigarettes per day ($p = .002$), the HSI ($p < .001$), and self-rated addiction ($p = .025$). Discrimination

Discrimination associated with nicotine dependence

Table 1. Characteristics of African American, Latino, and White Participants in Total ($N = 2,376$) and by Race/Ethnicity

	All participants ($N = 2,376$)	African Americans ($N = 794$)	Latinos ($N = 786$)	Whites ($N = 796$)	p value
	Mean (SD) or % (n)	Mean (SD) or % (n)	Mean (SD) or % (n)	Mean (SD) or % (n)	
Age, years	43.0 (12.4)	43.8 (11.9)	39.2 (10.8)	45.9 (13.6)	<.001 ^{a-c}
Gender, % female	58.2 (1,382)	59.3 (471)	53.7 (422)	61.4 (489)	.006 ^{a,c}
Education, % $\leq$ high school	26.6 (631)	27.5 (218)	24.7 (194)	27.5 (219)	.347
Years of smoking	19.4 (13.2)	18.6 (12.0)	16.2 (12.3)	23.4 (14.0)	<.001 ^{a-c}
Smoke menthol cigarettes, %	57.2 (1,360)	85.3 (677)	53.8 (423)	32.7 (260)	<.001 ^{a,b,c}
Discrimination	7.1 (6.3)	7.4 (6.1)	7.8 (6.9)	6.1 (5.9)	<.001 ^{b,c}
Average cigarettes per day	9.7 (8.6)	9.4 (7.9)	9.4 (9.0)	10.4 (8.9)	.027 ^{b,c}
Time to first cigarette, % ≤ 5 min	15.9 (378)	20.5 (163)	13.5 (106)	13.7 (109)	<.001 ^{a,b}
Heaviness of smoking index	1.8 (1.4)	1.9 (1.4)	1.7 (1.4)	1.7 (1.5)	.003 ^{a,b}
Brief Wisconsin Inventory of Smoking Dependence Motives	3.9 (1.5)	3.8 (1.5)	4.2 (1.6)	3.8 (1.4)	<.001 ^{a,c}
Primary dependence motives	3.9 (1.8)	3.9 (1.7)	4.1 (1.8)	3.7 (1.8)	<.001 ^{a-c}
Secondary dependence motives	3.9 (1.5)	3.7 (1.5)	4.2 (1.6)	3.8 (1.3)	<.001 ^{a,c}

Note. ^aSignificant difference between African Americans and Latinos ($p < .05$).

^bSignificant difference between African Americans and Whites ($p < .05$).

^cSignificant difference between Latinos and Whites ($p < .05$).

Table 2. Percent of Participants Who Endorsed Everyday Discrimination at a Frequency of $\geq$ a Few Times Per Month

	All participants ($N = 2,376$)	African Americans ($N = 794$)	Latinos ($N = 786$)	Whites ($N = 796$)	p value
	% (n)	% (n)	% (n)	% (n)	
Treated with less courtesy or respect than other people	32.5 (773)	30.7 (244)	34.5 (271)	32.4 (258)	.281
Receive poorer services than other people at restaurants or stores	20.3 (482)	20.3 (161)	24.7 (194)	16.0 (127)	<.001 ^{a-c}
People act as if they think you are not smart	26.9 (640)	28.6 (227)	30.3 (238)	22.0 (175)	<.001 ^{b,c}
People act as if they are afraid of you	23.9 (569)	26.7 (212)	29.3 (230)	16.0 (127)	<.001 ^{b,c}
Threatened or harassed	15.2 (361)	12.6 (100)	19.7 (155)	13.3 (106)	<.001 ^{a,c}

Note. Items in the table are included in the 5-item version of the Everyday Discrimination Scale. Participants were asked to rate how often they had experienced each situation on a 6-point scale (0 = never, 1 = less than once a year, 2 = a few times a year, 3 = a few times a month, 4 = at least once a week, 5 = almost everyday).

^aSignificant difference between African Americans and Latinos ($p < .05$).

^bSignificant difference between African Americans and Whites ($p < .05$).

^cSignificant difference between Latinos and Whites ($p < .05$).

was inversely associated with years of smoking ($p < .001$; see Table 4). Further, discrimination was positively associated with the total score and all subscales of the WISDM after controlling for relevant covariates (all $ps < .001$; see Table 4).

Discrimination and Nicotine Dependence by Race/Ethnicity

After controlling for covariates, the interaction term of race/ethnicity and discrimination predicted HSI scores (Latinos vs. Whites, $p = .011$), years of smoking (African Americans vs. Whites, $p = .004$), WISDM total scores (Latinos vs. Whites, $p = .001$), PDM scores (Latinos vs. Whites, $p = .004$), and SDM scores (Latinos vs. Whites, $p = .002$). Specifically, discrimination was positively associated with HSI scores among

Latinos ($p < .001$), but not among African Americans or Whites. Discrimination was inversely associated with years of smoking among Latinos ($p < .001$) and Whites ($p = .002$), but not among African Americans. Finally, although discrimination was positively associated with WISDM total scores as well as PDM and SDM scores in each racial/ethnic group (all $ps \leq .05$), these relationships were strongest among Latinos. Discrimination did not interact with race/ethnicity to predict cigarettes smoked per day or self-rated addiction.

DISCUSSION

The primary finding of this study was that everyday discrimination was positively associated with several measures of

Table 3. Percent of Participants Who Endorsed Each Perceived Reason for Discrimination on the Everyday Discrimination Scale

	All participants (<i>N</i> = 2,376)	African American (<i>N</i> = 794)	Latino (<i>N</i> = 786)	White (<i>N</i> = 796)	<i>p</i> value
	% (<i>n</i>)	% (<i>n</i>)	% (<i>n</i>)	% (<i>n</i>)	
Race/ancestry/national origin	21.3 (507)	38.4 (305)	21.4 (168)	4.3 (34)	<.001 ^{a-c}
Physical appearance (other than height/weight)	8.3 (198)	4.9 (39)	8.5 (67)	11.6 (92)	<.001 ^{a,b,c}
Age	6.8 (162)	4.4 (35)	7.5 (59)	8.5 (68)	.003 ^{a,b}
Gender	6.1 (146)	4.0 (32)	7.0 (55)	7.4 (59)	.009 ^{a,b}
Weight	6.1 (144)	3.5 (28)	7.3 (57)	7.4 (59)	.001 ^{a,b}
Education/income level	4.1 (97)	3.8 (30)	2.7 (21)	5.8 (46)	.007 ^c
Height	2.1 (50)	1.3 (10)	2.8 (22)	2.3 (18)	.096
Sexual orientation	1.7 (40)	0.9 (7)	2.3 (18)	1.9 (15)	.081
Religion	1.3 (32)	0.6 (5)	1.3 (10)	2.1 (17)	.033 ^b
Other/missing	21.2 (504)	20.4 (162)	18.6 (146)	24.6 (196)	.010 ^{b,c}
No discrimination reported	20.9 (496)	17.8 (141)	20.7 (163)	24.1 (192)	.008 ^b

Note. ^aSignificant difference between African Americans and Latinos ($p < .05$).

^bSignificant difference between African Americans and Whites ($p < .05$).

^cSignificant difference between Latinos and Whites ($p < .05$).

Table 4. Associations Between Everyday Discrimination and Smoking Characteristics Among African American, Latino, and White Smokers

	<i>B</i> (Unstandardized)	95% CI	Standard Error	<i>B</i> (Standardized)	<i>p</i> value	<i>r</i> ²
Cigarettes per day	0.087	0.031, 0.143	0.029	0.064	.002	.029
Years of smoking	-0.156	-0.216, -0.065	0.031	-0.075	<.001	.521
Heaviness of smoking	0.025	0.015, 0.034	0.005	0.108	<.001	.040
Self-rated addiction	0.249	0.032, 0.466	0.111	0.048	.025	.010
Wisconsin Inventory of Dependence Motives (WISDM)						
Total score	0.052	0.042, 0.062	0.005	0.216	<.001	.071
Primary dependence motives	0.053	0.041, 0.064	0.006	0.189	<.001	.050
Secondary dependence motives	0.051	0.042, 0.061	0.005	0.219	<.001	.083

Note. CI = confidence interval.

The total score on the Everyday Discrimination Scale was entered as the independent variable in all regression analyses, and analyses were adjusted for age, education, gender, and race/ethnicity. Please also note that everyday discrimination was significantly and positively associated with the WISDM Affiliative Attachment, Automaticity, Loss of Control, Cognitive Enhancement, Craving, Cue Exposure, Social/Environmental Goals, Taste, Tolerance, Weight Control, and Affective Enhancement subscales (all $ps \leq .001$; detailed results available upon request).

nicotine dependence in a tri-ethnic sample of smokers, and this link was strongest among Latinos. Nearly 80% of study participants reported experiencing some everyday discrimination, and discrimination was common in each racial/ethnic group. African Americans and Latinos had significantly higher scores on the discrimination measure than Whites. Race/ancestry/national origin, physical appearance, and age were the most commonly perceived reasons for discrimination among African Americans and Latinos, whereas Whites most commonly perceived physical appearance, age, gender, and weight as reasons for discrimination. Overall, findings suggest that discrimination is a common stressor that is associated with greater nicotine dependence. Thus, increased dependence may be a potential pathway through which discrimination influences health and contributes to tobacco-related health disparities.

Most notably, findings indicated that perceived everyday discrimination was associated with all indicators of nicotine dependence measured in the current study, including the HSI and all scales of the multi-dimensional WISDM. Previous research has shown links between discrimination and current

smoking (Albert et al., 2008; Borrell et al., 2007, 2010; Corral & Landrine, 2012; Horton & Loukas, 2013; Landrine & Klonoff, 2000; Lorenzo-Blanco & Cortina, 2013; Nguyen et al., 2012; Purnell et al., 2012; Todorova et al., 2010), and most recently between discrimination and smoking cessation among individuals making a quit attempt (Kendzor et al., unpublished observations). However, no studies have previously examined the link between discrimination and nicotine dependence among smokers. Studies have shown that stress is associated with increased desire to smoke as well as increased cigarette smoking (Ng & Jeffery, 2003; Perkins & Grobe, 1992; Rose, Ananda, & Jarvik, 1983; Todd, 2004). Thus, it is plausible that the stress associated with discrimination may increase vulnerability to nicotine dependence perhaps because smoking is used as a means to cope with stress and negative affect.

Interestingly, analyses of the interactions between race/ethnicity and discrimination suggest that discrimination may have the strongest relationship with dependence (as measured by the HSI and the WISDM) among Latinos. It is not clear why Latinos who experience discrimination might be more

vulnerable to nicotine dependence. Donovan et al. (2013) showed that the relation between perceived discrimination and depressive symptoms may be stronger among Latinos (immigrant or non-immigrant) than non-immigrant African Americans. Thus, it is plausible that Latino smokers experience more discrimination-related distress, and may therefore be more likely to rely on smoking as a coping mechanism. In addition, there is recent evidence that the relations between negative affect and smoking may vary by race/ethnicity, though findings have not been consistent (Bares & Andrade, 2012; Kiviniemi, Orom, & Giovino, 2011).

Although it is difficult to compare the rates of perceived discrimination across studies due to differences in measurement strategies, the rates of everyday discrimination in the current study appear to be high relative to other studies (e.g., Pérez et al., 2008; Sims et al., 2012). For example, Pérez et al. (2008) reported that 30% of Latinos reported moderate/high levels of perceived everyday discrimination. Using the same categorization, 67.3% of current study participants (and 67.8% of Latino participants) experienced moderate/high levels of discrimination. One possible explanation is that smokers may experience more discrimination than non-smoking or mixed samples. Future studies that assess discrimination should consider adding smoking as a perceived cause of discrimination.

The findings of the current study broaden our understanding of the factors associated with nicotine dependence, and suggest a potential pathway through which discrimination may lead to tobacco-related health disparities. Specifically, those who report experiencing more discrimination (i.e., African American and Latinos in the current study) and greater dependence may have greater difficulty quitting smoking and may be more likely to develop tobacco-related disease. As a result, those who have experienced discrimination may require more intensive and tailored cessation interventions. However, more research is needed to evaluate hypothesized links between discrimination, nicotine dependence, and cessation before conclusions can be drawn.

The most notable strength of the current study is that it is the first to examine the link between discrimination and nicotine dependence, providing evidence that nicotine dependence may be a pathway through which discrimination negatively impacts health. Findings are further strengthened because the relationship between discrimination and nicotine dependence was shown to be consistent across multiple measures of dependence, including the multi-dimensional WISDM and its subscales. This is among the first studies to examine discrimination both by race/ethnicity and type of discrimination. Other important strengths of the study include the large sample size, and the equal proportions of African Americans, Latinos, and Whites.

On the other hand, the cross-sectional design limits conclusions about causality. Although it seems plausible that experiences of discrimination might increase vulnerability to nicotine dependence, reverse causality is also possible. For example, those who are more nicotine dependent may experience discrimination because of their smoking status. There was also a high rate of missing/other responses (21.2%) to the item that inquired about the main reason for the discrimination. Thus, it seems possible that some participants experienced discrimination for reasons that were not included as response options, such as smoking or Spanish language use. In addition, participants were only allowed to indicate one primary perceived reason for discrimination and it is certainly possible that participants experienced discrimination for multiple reasons. Another important

limitation is that the study sample is not likely to represent the general population of smokers for a variety of reasons, especially the inclusion of equal proportions of three racial/ethnic groups, the overrepresentation of light and non-daily smokers, the voluntarily enrollment strategy (rather than random sampling), and the computerized format of the survey. It is also notable that the survey was not offered in Spanish; therefore some Latinos may not have participated in the study for this reason. Finally, there is always the possibility of unmeasured confounding variables that may help to explain cross-sectional relationships (e.g., smoking-related discrimination).

Future studies are needed to determine whether discrimination prospectively influences nicotine dependence. Plausibly, individuals may increase their smoking rate as a means to cope with discrimination-related distress, and this could lead to greater nicotine dependence over time. The specific mechanisms that link discrimination and nicotine dependence must be determined in prospective research. Current conceptual models describing the links between racism and health suggest that racism may lead to increased stress and psychological distress which in turn leads to unhealthy behavior, stress-related physiological sequelae, and disease (see Ahmed et al., 2007; Clark, Anderson, Clark, & Williams, 1999). Research is needed to apply and evaluate previously hypothesized theoretical links between discrimination and nicotine dependence.

In conclusion, the current study generated three key findings. Although African Americans and Latinos experienced more everyday discrimination than Whites, discrimination was commonly reported among smokers of any race/ethnicity though often for different reasons (e.g., African Americans more frequently perceived race/ancestry/national origin as the reason for discrimination compared to Latinos and Whites). Discrimination was positively associated with several measures of nicotine dependence, and this relationship was strongest among Latinos on some measures of dependence. Overall, findings highlight another potential pathway through which tobacco-related health disparities may develop. Future research should focus on characterizing the mechanisms that link discrimination with dependence.

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DECLARATION OF INTERESTS

None declared.

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