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Smoking Abstinence-related Expectancies among American Indians, African Americans, and
Women: Potential Mechanisms of Tobacco-related Disparities

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Abstract

Research has documented tobacco-related health disparities by race and gender. Prior research, however, has not examined expectancies about the smoking cessation process (i.e., abstinence-related expectancies) as potential contributors to tobacco-related disparities in special populations. This cross-sectional study compared abstinence-related expectancies between American Indian ($n = 87$), African American ($n = 151$), and White ($n = 185$) smokers, and between women ($n = 231$) and men ($n = 270$) smokers. Abstinence-related expectancies also were examined as mediators between race and gender, and motivation to quit and abstinence self-efficacy. Results indicated that American Indians and African Americans were less likely than Whites to expect withdrawal effects, and more likely to expect that quitting would be unproblematic. African Americans also were less likely than Whites to expect smoking cessation interventions to be effective. Compared to men, women were more likely to expect withdrawal effects and weight gain. These expectancy differences mediated relationships between race and gender, and motivation to quit and abstinence self-efficacy. Findings emphasize potential mechanisms underlying tobacco-related health disparities among American Indians, African Americans, and women, and suggest a number of specific approaches for targeting tobacco dependence interventions to these populations.

Keywords: Abstinence, Expectancies, Smoking Cessation, American Indians, African Americans, Gender, Disparities

Smoking Abstinence-related Expectancies among American Indians, African Americans, and Women: Potential Mechanisms of Tobacco-related Disparities

Racial minorities and women are less likely to quit smoking and may have a heightened risk of smoking-related disease relative to Whites and men, respectively (e.g., Fagan, Moolchan, Lawrence, Fernander, & Ponder, 2007; Gohdes et al., 2002; Piper et al., 2010; Trinidad, Pérez-Stable, White, Emery, & Messer, 2011). There is some evidence that these special populations are likely to benefit from smoking cessation treatments targeted to their unique characteristics (Borrelli, 2010; Cox, Okuyemi, Choi, & Ahluwalia, 2011; Fiore et al., 2008). Because the mechanisms driving tobacco-related health disparities are poorly understood, however, there are scant data to inform such targeting. In the current study, we used expectancy theory as a model for conceptualizing mechanisms that underlie tobacco-related disparities. According to expectancy theory, the accumulated lifetime of learning experiences molds expectancies about the consequences of one's actions, which in turn guide future motivation and behavior (Goldman, Darkes, Reich, & Brandon, 2010; Hendricks, Reich, & Westmaas, 2009). In models of health disparities (cf. Warnecke et al., 2008) special populations' differing experiences at the environmental/contextual level (e.g., discrimination), sociocultural level (e.g., mistrust of medical institutions), social/interpersonal level (e.g., social integration/isolation), and biological level (e.g., metabolism of nicotine) contribute to disparate health outcomes. We propose that differences in these experiences across race and gender shape expectancies about the smoking cessation process, which in turn influence motivation to quit and abstinence self-efficacy (see Hendricks, Wood, Baker, Delucchi, & Hall, 2011).

To date, explanations for racial and gender disparities in smoking-related behaviors and illness include differences in menthol cigarette use (e.g., Trinidad, Pérez-Stable, Messer, White,

& Pierce, 2010) and utilization of effective cessation treatments (Centers for Disease Control and Prevention, 2011). In our model, abstinence-related expectancies, which are the outcomes that smokers anticipate from the process of smoking cessation (Hendricks et al., 2011), represent antecedent factors that also contribute to tobacco-related health disparities. For example, if the majority of individuals from a population expect largely negative outcomes from a cessation attempt, they may lack the motivation and self-efficacy necessary for attempting and/or achieving abstinence. Conversely, if many individuals from a population expect chiefly positive consequences from cessation, they may become demoralized when abstinence brings more hardships than anticipated. Abstinence-related expectancies among special populations, however, have yet to be evaluated. Moreover, while motivation to quit and abstinence self-efficacy are important predictors of cessation (Baker et al., 2011; Hendricks, Delucchi, & Hall, 2010), whether abstinence-related expectancies mediate the relationship between race or gender and motivation to quit or abstinence self-efficacy has not yet been tested. The main objectives of the present study were to compare American Indian with White smokers, African American with White smokers, and women with men smokers on a comprehensive set of abstinence-related expectancies. We also wanted to test whether differences in these expectancies accounted for associations between race and gender, and motivation to quit and abstinence self-efficacy.

Although research has not previously examined associations between abstinence-related expectancies and race or gender, the literature is suggestive of potential racial and gender differences across some abstinence-related expectancy domains. For American Indians, relevant data is scarce. This is unfortunate given that American Indians have the highest smoking prevalence of any racial group in the United States (Barnes, Adams, & Powell-Griner, 2010; Centers for Disease Control and Prevention, 1998). Nevertheless, because American Indians

report less favorable attitudes about tobacco interventions than Whites (Burgess et al., 2007; Fu et al., 2007), they may be less likely to expect smoking cessation interventions to be effective.

The majority of research on smoking-related racial disparities has focused on differences between African Americans and Whites. Still, the data are far from conclusive concerning how these groups might diverge in their abstinence-related expectancies. Research indicates that African Americans may experience less severe withdrawal (Pérez-Stable, Herrera, Jacob III, & Benowitz, 1998; Riedel, Robinson, Klesges, & McLain-Allen, 2003) and may hold fewer smoking-specific weight concerns relative to Whites (Pomerleau & Kurth, 1996; Pulvers et al., 2004; Sanchez-Johnsen, Carpentier, & King, 2011; Thomas et al., 2008). Furthermore, as with American Indians, African Americans may hold less favorable attitudes about smoking cessation treatments than Whites (Fu et al., 2007; Ryan, Garrett-Mayer, Alberg, Cartmell, & Carpenter, 2011; Trinidad et al., 2011). These findings suggest that relative to Whites, African Americans may be less likely to anticipate withdrawal effects and weight gain upon quitting, and less likely to expect tobacco dependence treatments to be effective.

Although the racial disparity studies noted above provide a basis for predictions, there are notable gaps in this area of research. Studies often focused on only one race, which precludes group contrasts (e.g., Burgess et al., 2007; Pulvers et al., 2004; Thomas et al., 2008), and/or examined disparities among adolescents (e.g., Riedel et al., 2003), which limits generalizability. Consequently, the question of how abstinence-related expectancies vary across race among adult smokers is not clear.

With regard to gender, women may be more likely to smoke to manage negative affect and may experience greater smoking withdrawal effects than men (e.g., Etter, Prokhorov, &

Perneger, 2002; Leventhal et al., 2007; Xu et al., 2008). Furthermore, women may be more likely to smoke for weight control purposes, and postcessation weight gain may be a more prominent barrier to cessation among women (e.g., Clark et al., 2006; Pomerleau, Zucker, & Stewart, 2001). While these findings suggest that women may be more likely to anticipate withdrawal symptoms and weight gain upon quitting, it is unclear whether differences across other abstinence-related expectancy domains might exist.

It also is unclear whether abstinence-related expectancies might contribute to racial or gender differences in motivation to quit or abstinence self-efficacy. In fact, although the literature reports higher motivation to quit and abstinence self-efficacy among African American smokers relative to White smokers (e.g., Daza et al., 2006; Vander Martin, Cummings, & Coates, 1990) and lower motivation to quit and abstinence self-efficacy among women smokers relative to men smokers (e.g., Etter et al., 2002; Reid, Pipe, Riley, & Sorensen, 2009), the underpinnings of these relationships have not been tested. This is significant because those who are more motivated to quit and more confident in their ability to quit are more likely to attempt cessation, and those whose motivation and confidence perseveres over the course of a quit attempt are more likely to achieve long term abstinence (e.g., Baker et al., 2011; Hendricks et al., 2010). Although greater motivation to quit and abstinence self-efficacy among African American smokers is inconsistent with their lower quit rates, one possibility is that African Americans are only more likely to *attempt* to quit smoking as motivation to quit and abstinence self-efficacy must be sustained across the quit attempt to successfully cease cigarette use. This interpretation is borne out by the empirical evidence (e.g., Fiore et al., 1989; Piper et al., 2010) and suggests that African Americans' motivation to quit and abstinence self-efficacy may decrease soon after they attempt to quit smoking but return to their robust prequit levels upon relapse (perhaps as a result

of external, unstable, and specific causal attributions; see Gehlert, DiFrancesco, & Chang, 2000). If this is the case, then tobacco interventions for African Americans could benefit from a better understanding of what forms motivation to quit and abstinence self-efficacy. Indeed, tobacco interventions seeking to augment and sustain motivation to quit and abstinence self-efficacy among American Indians, African Americans, and women could benefit from an elucidation of those factors that contribute to racial and gender differences in these constructs. Considering that contemporary theory asserts that expectancies are fundamental to substance use motivation and behavior (Goldman et al., 2010; Hendricks et al., 2009), abstinence-related expectancies appear to be a rational starting point for investigating such factors.

We hypothesized that American Indian and African American smokers would be less likely to anticipate that tobacco dependence interventions would be effective compared with White smokers, and that African American smokers would be less likely to anticipate withdrawal symptoms and postcessation weight gain compared with White smokers. We also examined racial differences in other abstinence-related expectancies (i.e., enhanced social functioning, unfavorable outcomes, improved health and other touted benefits, barriers to care, abstinence-specific social support, the notion that quitting would be unproblematic, and alteration of one's experience with coffee) for their potential value in understanding racial disparities in smoking behavior, but offered no specific hypotheses. Moreover, we hypothesized that differences in abstinence-related expectancies would account for the greater levels of motivation to quit and abstinence self-efficacy observed among African Americans relative to Whites. Given the paucity of data on motivation to quit and abstinence self-efficacy among American Indians, mediation analyses among this racial group were exploratory.

With respect to gender, we hypothesized that women smokers would be more likely to expect withdrawal symptoms and weight gain upon quitting compared with men smokers. As with racial analyses, we investigated gender differences in other abstinence-related expectancies. Furthermore, we hypothesized that differences in abstinence-related expectancies between women and men would account for the lower levels of motivation to quit and abstinence self-efficacy observed among women in previous studies.

Method

Participants

The present research compared subsets of participants from a study designed to develop a measure of smokers' abstinence-related expectancies, the Smoking Abstinence Questionnaire (SAQ; Hendricks et al., 2011). Details concerning the development of the SAQ can be found in a previous publication (see Hendricks et al., 2011).

Participants were recruited from the San Francisco Bay Area through newspaper and internet advertisements, flyers, and outreach to community organizations. Given the racial composition of the San Francisco Bay Area (non-White racial groups comprise nearly 50% of the population; Metropolitan Transportation Commission & Association of Bay Area Governments, n.d.), we were well positioned to recruit a diverse sample. American Indian smokers were especially available for participation as California boasts the largest American Indian population of any U.S. State (U.S. Census Bureau, 2011), and the San Francisco Bay Area alone has an American Indian population of approximately 50,000 residents that eclipses that of 34 of the 50 U.S. states (see Metropolitan Transportation Commission & Association of Bay Area Governments, n.d. and U.S. Census Bureau, 2011). Recruiting a diverse sample was a

specific objective of the current study and to achieve this we advertised in community newspapers and other media that targeted minority populations. We also provided study information and flyers to minority community gatekeepers, including clergy, service providers, and other community leaders. In the total sample used to develop the SAQ ($N = 507$), American Indians ($n = 87$), African Americans ($n = 151$), Whites ($n = 185$), women ($n = 231$), and men ($n = 270$) were well represented. Despite our efforts to recruit a diverse sample, sample sizes of other racial groups were insufficient to warrant inclusion in the analyses (e.g., n of Asian Americans/Pacific Islanders = 22).

Participants were required to be at least 18 years old, fluent in English, have a breath carbon monoxide (CO) reading of at least 10 parts per million (ppm), and to smoke at least 10 cigarettes per day. A relatively low smoking rate criterion was chosen to increase the likelihood of participation among racial minority populations, who tend to smoke fewer cigarettes per day (Pérez-Stable et al., 1998).

Measures

Participants indicated race (American Indian/Alaskan Native, African American/Black, Caucasian/White) and gender (Female, Male, or Other), as well as age, Hispanic/Latino ethnicity, educational attainment, and income on a standard demographic form. Cigarettes smoked per day, years smoked regularly, number of quit attempts with abstinence of at least one week, and regular use of mentholated cigarettes were assessed with a standard smoking questionnaire. Physical tobacco dependence was measured with the Fagerström Test for Nicotine Dependence (FTND; Heatherton, Kozlowski, Frecker, & Fagerström, 1991), a widely used six-item measure with scores ranging from 0 to 10 and greater scores indicating greater dependence.

The primary measure of the current investigation was the SAQ (Hendricks et al., 2011). The SAQ is the first instrument to capture the full range of smokers' abstinence-related expectancies. Evidence of the SAQ scales' construct validity is provided by their strong relationships with tobacco dependence, motivation to quit, abstinence self-efficacy, withdrawal, and tobacco use expectancies (Hendricks et al., 2011). The SAQ instructs respondents to rate how likely or unlikely they believe 55 consequences (i.e., items) would be for them if they attempted to quit smoking (0 = "not likely at all" to 6 = "extremely likely") and assesses expectancies on 10 scales: (i) *Withdrawal*, which assesses expectancies for postcessation withdrawal effects (e.g., anxiety, craving, and irritability) and withdrawal-related processes (e.g., cue reactivity; $\alpha = .85$); (ii) *Social Improvement/Non-smoker Identity*, which measures expectations for gains in social functioning and a transition in identity from stigmatized "smoker" to "non-smoker" ($\alpha = .80$); (iii) *Adverse Outcomes*, which addresses expectancies that quitting would occasion a number of somewhat exaggerated negative consequences (e.g., feeling like a traitor to one's fellow smokers, increased use of illicit substances to compensate for abstinence from cigarettes; $\alpha = .75$); (iv) *Treatment Effectiveness*, which measures expectancies for the effectiveness of formal smoking cessation treatments (i.e., pharmacotherapy and professional interventions; $\alpha = .82$); (v) *Common Reasons*, which assesses expectancies for commonly offered reasons to quit (e.g., health benefits, improved appearance, feeling a sense of accomplishment; $\alpha = .72$); (vi) *Barriers to Treatment*, which measures expectations that smoking cessation treatment would be difficult to obtain ($\alpha = .75$); (vii) *Social Support*, which assesses expectancies for abstinence-specific social support during a quit attempt ($\alpha = .76$); (viii) *Optimistic Outcomes*, which addresses the prospect that quitting would be unproblematic, trouble-free, or easy (e.g., "My ability to deal with stress would not be affected," "It would be no

problem to find an alternative to smoking that helps reduce stress”; $\alpha = .62$); (ix) *Coffee Use*, which measures expectancies that one’s experience of coffee drinking would be altered by cessation ($\alpha = .72$); and (x) *Weight Gain*, which assesses expectancies for weight gain and appetite increase upon quitting ($\alpha = .74$).

Motivation to quit and abstinence self-efficacy were measured by one item each on the four-item Thoughts about Abstinence Questionnaire (TAA; Hall, Havassy, & Wasserman, 1990). Participants indicated their desire to quit smoking (1 = “no desire to quit smoking” to 10 = “full desire to quit”) and how successful they expected to be in quitting smoking (1 = “lowest expectation of success” to 10 = “highest expectation of success”) on a 10-point scale. The TAA has been used with success in a number of studies, including a recent investigation documenting mechanisms of change in extended cognitive behavioral treatment for tobacco dependence (Hendricks et al., 2010).

Procedure

Those individuals who met inclusion criteria were scheduled for group appointments of approximately two hours, the majority of which were held in meeting rooms at the University of California, San Francisco. After informed consent was obtained, participants provided a CO sample. Those with a CO of at least 10 ppm then completed a packet of measures that included the standard demographic and smoking questionnaires, the FTND, the SAQ, and the TAA. Upon completing the packet of measures, participants were provided \$35 for their participation.

Data Analysis

Differences between American Indians and Whites, African American and Whites, and women and men on demographic and smoking characteristics were examined with analyses of

variance (ANOVAs) and chi-square tests. Characteristics that differed between groups and that did not reflect known population differences were interpreted as evidence of potential sampling error and included as covariates in all subsequent analyses (see Miller & Chapman, 2001). Given potential differences between Hispanic/Latino and non-Hispanic/Latino smokers (e.g., Borrelli, Hayes, Gregor, Lee, & McQuaid, 2011; Fagan et al., 2007), we tested the impact of controlling for those 37 participants across the three racial groups who reported membership in the heterogeneous Hispanic/Latino ethnic category. Doing so had no demonstrable effect on the results and thus we did not control for Hispanic/Latino ethnicity.

To determine if responses on the 10 SAQ scales differed between American Indians and Whites, and between African Americans and Whites, one-way ANOVAs were conducted with each of the 10 scales of the SAQ. For analyses comparing American Indians with Whites, a critical p-value of .05 was selected to establish significance on the one scale for which an a priori hypothesis was submitted (Treatment Effectiveness), whereas a Bonferroni-adjusted critical p-value of .0056 (.05/9) demarcated significance on the other nine scales. For analyses comparing African Americans and Whites, a critical p-value of .05 was selected to evaluate significance on the three scales for which a priori hypotheses were provided (Withdrawal, Treatment Effectiveness, and Weight Gain), whereas a Bonferroni-adjusted critical p-value of .0071 (.05/7) was used to determine significant differences on the remaining seven scales. Omega squared (ω^2) was used as an effect-size measure with values in the vicinity of .01, .06, and .14 representing small, medium, and large effects, respectively (see Kirk, 1996; Olejnik & Algina, 2003).

Those SAQ scales that differed significantly between American Indians and Whites were evaluated as mediators of the relationship between race (American Indian vs. White) and both motivation to quit and abstinence self-efficacy in two multiple mediator models (one in which

motivation to quit was the dependent variable and one in which abstinence self-efficacy was the dependent variable) by means of a bootstrap approach (Preacher & Hayes, 2008). Those SAQ scales that differed between African Americans and Whites were likewise tested as mediators of the relationship between race (African American vs. White) and both motivation to quit and abstinence self-efficacy. Per recent guidelines (MacKinnon, Cheong, & Pirlott, 2012), because mediation can exist despite a non-significant relationship between the independent and dependent variable (e.g., McCarthy et al., 2010), mediation analyses were conducted whether or not there were significant relationships between race and motivation to quit or abstinence self-efficacy.

The same strategy was employed in analyses involving gender. To examine gender differences in abstinence-related expectancies, one-way ANOVAs were conducted with each of the 10 scales of the SAQ. A critical p-value of .05 was used to determine significance on the two scales for which a priori hypotheses were offered (Withdrawal and Weight Gain), whereas a Bonferroni-adjusted critical p-value of .0063 (.05/8) was used to evaluate significance on the remaining eight scales for which there were no hypotheses. Abstinence-related expectancies that differed by gender were then tested as mediators of the relationship between gender and both motivation to quit and abstinence self-efficacy in two multiple mediator models via a bootstrap approach.

Results

Participant Characteristics

Demographic and smoking characteristics of American Indian, African American, and White participants are shown in Table 1, and demographic and smoking characteristics of women and men are presented in Table 2. American Indians were younger, more likely to

identify as Hispanic/Latino, and reported lower educational attainment and income than Whites. Each of these findings is consistent with the United States Census and other data (Barnes et al., 2010; Centers for Disease Control and Prevention, 1998; Humes, Jones, & Ramirez, 2011; Kao & Thompson, 2003). American Indian participants also smoked fewer cigarettes per day, smoked regularly for fewer years, and had lower FTND (i.e., tobacco dependence) scores than White participants. Although there is some indication that American Indians smoke fewer cigarettes per day than Whites (e.g., Welty et al., 1995), it is unknown if these differences reflect actual population differences given the lack of literature contrasting American Indian and White smokers. Therefore, cigarettes smoked per day, years smoked regularly, and FTND scores were entered as covariates in analyses comparing American Indians with Whites.

African Americans reported lower educational attainment than Whites and greater use of mentholated cigarettes, and women reported lower annual income and smoked fewer cigarettes per day compared with men. As each of these differences is consistent with the research literature (e.g., DeNavas-Walt, Proctor, & Smith, 2011; Etter et al., 2002; Kao & Thompson, 2003), no variables were entered as covariates in analyses comparing African Americans with Whites or women with men (see Miller & Chapman, 2001).

Tables 1 and 2 also list a number of variables that did *not* differ between American Indians and Whites (e.g., number of quit attempts), African Americans and Whites (e.g., number of quit attempts, FTND scores), and women and men (e.g., number of quit attempts, FTND scores). Accordingly, these variables were not controlled for in the analyses.

American Indians vs. Whites

SAQ scale scores of American Indians and Whites adjusted for cigarettes smoked per day, years smoked regularly, and FTND scores are presented in Table 3. As seen in the table,

American Indians reported significantly weaker expectancies for withdrawal effects and significantly stronger expectancies for optimistic outcomes compared to Whites.

Results of mediation analyses with American Indians and Whites are presented in Figures 1a and 1b. Although American Indians' motivation to quit ($M = 6.60$, $SEM = .31$) did not differ significantly from that of Whites ($M = 6.11$, $SEM = .21$; $p = .19$, $\omega^2 = .002$, 90% CI [0, .03]), expectancies for withdrawal effects nevertheless mediated the relationship between American Indian vs. White race and motivation to quit ($B = .25$, 95% CI [.06, .53]). Indeed, American Indians' weaker expectancies for withdrawal effects contributed to increased motivation to quit. Expectancies for optimistic outcomes, however, were not significant mediators of the association between American Indian vs. White race and motivation to quit ($B = .14$, 95% CI [-.08, .49]).

American Indians reported greater abstinence self-efficacy ($M = 5.68$, $SEM = .29$) than Whites ($M = 4.66$, $SEM = .20$; $p = .005$, $\omega^2 = .02$, 90% CI [.004, .06]). Mediation analyses indicated that American Indians' greater abstinence self-efficacy was accounted for by their weaker expectancies for withdrawal effects ($B = .26$, 95% CI [.07, .57]) and their stronger expectancies for optimistic outcomes ($B = .31$, 95% CI [.08, .66]).

African Americans vs. Whites

SAQ scale scores of African Americans and Whites are compared in Table 4. As shown in the table, African Americans reported significantly weaker expectancies for withdrawal effects and for the effectiveness of smoking cessation treatments, and significantly stronger expectancies for optimistic outcomes.

Results of mediation analyses with African Americans and Whites are presented in Figures 2a and 2b. African Americans reported greater motivation to quit ($M = 6.73$, $SD = 2.47$)

compared with Whites ($M = 6.14$, $SD = 2.83$; $p = .04$, $\omega^2 = .009$, 90% CI [.0002, .03]). Analyses revealed that expectancies for withdrawal effects and treatment effectiveness mediated the relationship between race and motivation to quit. One of the mediated effects, however, was in a different direction from that of the other mediated effect (see MacKinnon et al., 2012).

Specifically, whereas African Americans' weaker expectancies for withdrawal were associated with greater motivation to quit ($B = .59$, 95% CI [.35, .93]), their weaker expectancies for treatment effectiveness were associated with lower motivation to quit ($B = -.18$, 95% CI [-.38, -.03]). Expectancies for optimistic outcomes did not mediate the relationship between African American vs. White race and motivation to quit ($B = .05$, 95% CI [-.15, .31]).

African Americans also reported greater abstinence self-efficacy ($M = 5.89$, $SD = 2.38$) compared with Whites ($M = 4.64$, $SD = 2.56$; $p < .001$, $\omega^2 = .05$, 90% CI [.02, .10]). Here too mediation analyses revealed opposing mediation effects; whereas African Americans' weaker expectancies for withdrawal effects ($B = .56$, 95% CI [.33, .87]) and stronger expectancies for optimistic outcomes ($B = .22$, 95% CI [.007, .48]) were related to greater abstinence self-efficacy, their weaker expectancies for treatment effectiveness were related to lower abstinence self-efficacy ($B = -.11$, 95% CI [-.25, -.01]).

Women vs. Men

Table 5 shows SAQ scale scores between women and men. As indicated in the table, women reported significantly stronger expectancies for withdrawal and for weight gain than men. No other gender differences in expectancies were significant.

Results of mediation analyses with women and men are presented in Figures 3a and 3b. Women reported lower motivation to quit ($M = 5.93$, $SD = 2.62$) than men ($M = 6.74$, $SD = 2.7$;

$p < .001$, $\omega^2 = .02$, 90% CI [.006, .04]) and women's stronger expectancies for withdrawal symptoms accounted for their lower motivation to quit ($B = -.15$, 95% CI [-.32, -.02]).

Expectancies for weight gain, however, did not mediate the relationship between gender and motivation to quit ($B = .03$, 95% CI [-.01, .13].)

Women also reported lower abstinence self-efficacy ($M = 5.03$, $SD = 2.65$) than men ($M = 5.50$, $SD = 2.63$), though this difference fell just short of statistical significance ($p = .05$, $\omega^2 = .005$, 90% CI [0, .02]). Women's stronger expectancies for withdrawal effects accounted for their lower abstinence self-efficacy ($B = -.19$, 95% CI [-.41, -.03]). Weight gain expectancies did not mediate the relationship between gender and abstinence self-efficacy ($B = -.004$, 95% CI [-.08, .06]).

Discussion

No previous study has examined race or gender differences in smokers' abstinence-related expectancies and whether these differences could account for disparities in predictors of cessation success such as motivation to quit and abstinence self-efficacy. With regard to race, analyses revealed several notable findings. American Indians held somewhat weaker expectancies for postcessation withdrawal effects and were much more likely to expect cessation to be trouble-free than Whites. These results were unanticipated. Furthermore, expectancies mediated the effects of American Indian race (vs. White race) on motivation to quit and abstinence self-efficacy. Specifically, American Indians' weaker expectancies for withdrawal effects accounted for their greater motivation to quit and greater abstinence self-efficacy, and their stronger expectancies that cessation would be trouble-free accounted for their greater abstinence self-efficacy. These findings suggest that American Indians may be less likely to quit smoking than Whites to some degree because they underestimate the difficulty associated with

cessation while attempting to quit. Realizing that achieving abstinence is more challenging than projected may occasion discouragement and undermine motivation to quit and abstinence self-efficacy; reduced motivation to quit and abstinence self-efficacy increase the likelihood of relapse. American Indians' expectancies for a trouble-free quitting experience, and their associated motivation to quit and abstinence self-efficacy, might return to prequit levels upon relapse as a result of external, unstable, and specific causal attributions (i.e., a positive explanatory style; see Seligman & Schulman, 1986); this would explain why, for instance, American Indians and Whites differ with regard to their optimistic abstinence-related expectancies despite a similar number of prior quit attempts. Of course, the current study cannot speak to these series of events and additional research is needed to unravel the prospective relations between abstinence-related expectancies, motivation to quit and abstinence self-efficacy, cigarette use, and explanatory style. However, as American Indians are poorly represented in the tobacco research literature, this marks an important insight into this underserved population for which little data are available and provides a springboard for future investigations.

The current research also revealed significant differences between African Americans and Whites in abstinence-related expectancies. Relative to Whites, African Americans held considerably weaker expectancies for withdrawal effects, and somewhat weaker expectancies for the effectiveness of formal smoking cessation interventions. These findings corroborate prior research implying that African Americans may experience milder withdrawal (e.g., Pérez-Stable et al., 1998), and may hold less favorable attitudes toward tobacco dependence interventions (e.g., Ryan et al., 2011) than Whites. It is possible that African Americans expect smoking cessation treatments to be less effective because they believe that these treatments do not

appropriately account for African American culture. However, culturally-specific smoking cessation interventions for African Americans are superior in the short- but not the long-term (Webb, 2008) and only a slight majority of African Americans (55%) believe that culturally-specific interventions are more effective than standard treatment (Webb, Francis, Hines, & Quarles, 2007). African Americans were also much more likely to expect cessation to be trouble-free. This result was unexpected and yielded the largest effect size of all differences between African Americans and Whites. Findings further indicated mediation effects such that African Americans' weaker expectancies for withdrawal were related to their greater motivation to quit, though African Americans' weaker expectancies for the effectiveness of smoking cessation treatments were related to a reduction in their motivation to quit. Expectancies also mediated the relationship between African American race (vs. White race) and abstinence self-efficacy. African Americans' weaker expectancies for withdrawal and stronger expectancies that cessation would be trouble-free were related to their greater abstinence self-efficacy, although African Americans' weaker expectancies for the effectiveness of smoking cessation treatments were associated with a reduction in their abstinence self-efficacy. In total, these findings suggest that, similar to American Indians, African Americans might be less likely to cease cigarette use than Whites in part because they misjudge the difficulty associated with quitting while undervaluing the benefits of formal smoking cessation treatments, an expectancy profile that may lead to demoralization during a quit attempt, diminished postquit motivation and abstinence self-efficacy, and ultimate relapse. This interpretation is consistent with the findings that African Americans underestimate the health risks associated with smoking (Vander Martin et al., 1990) and whereas African Americans are more likely to attempt cessation, they are less likely to succeed in doing so (e.g., Piper et al., 2010). While it is intriguing that both American Indians

and African Americans appear to hold relatively more auspicious expectations about the quitting process, we know of no theoretical models that might explain this commonality among these historically marginalized groups.

With respect to gender, women were more likely to anticipate withdrawal and weight gain upon quitting compared with men. These distinctions align with previous findings suggesting that women may experience greater withdrawal discomfort and may be more likely to use smoking as a weight control strategy (e.g., Clark et al., 2006; Xu et al., 2008). Mediation effects obtained also indicated that women's stronger expectancies for withdrawal effects accounted for their weaker motivation to quit and weaker abstinence self-efficacy. In sum, the current results suggest that women may be less likely to quit smoking than men to some extent because they anticipate greater postcessation withdrawal distress; this expectancy may contribute to halfhearted quit attempts, a defeatist approach to cessation, more severe withdrawal symptoms (Goldman et al., 2010; Hendricks et al., 2009), and so on. Future research should examine prospectively whether women's greater expectancies for withdrawal distress predict success in quitting. Although our results indicated that weight gain expectancies were less important than other expectancy domains in understanding motivation to quit and abstinence self-efficacy, expectations of postcessation weight gain may nevertheless play an important role in smoking-related gender disparities.

It should be noted that, consistent with the gender similarities hypothesis (Hyde, 2005), gender differences were modest in size. However, gender differences in quit rates are also typically small. For instance, Piper et al. (2010) recently reported odds ratios of .77 and .62 characterizing the effect of female gender on six-month quit rates in two smoking cessation trials. Furthermore, small differences can have meaningful impacts at the population level and

should not be interpreted as trivial (Fritz, Morris, & Richler, 2012). Considering the nearly 47 million women and men who smoke in the United States, it is possible that even subtle gender differences in abstinence-related expectancies could translate into thousands fewer women who quit smoking. The same holds true for differences in abstinence-related expectancies across race.

The present investigation suggests several ways in which interventions might be targeted to American Indians, African Americans, and women. Treatments for both American Indians and African Americans might be improved by addressing what appears to be an unrealistic appraisal of the cessation process, in particular a minimization of the challenges presented by a quit attempt. Although expectations of less intense withdrawal effects may be partially grounded in reality (e.g., Pérez-Stable et al., 1998), the notion of an uncomplicated quitting process could be balanced by an understanding that smoking is among the most addictive of all behaviors and therefore cessation should be approached with utmost caution and preparedness. Interventions for African Americans also might emphasize the efficacy of smoking cessation treatments for this group (Webb, 2008) in order to increase treatment-seeking behavior and engagement with treatment.

Women might benefit from communication delineating the brief time course of pharmacologic withdrawal symptoms (e.g., Shiffman et al., 2006) and the ability of pharmacotherapy to reduce the impact of these symptoms. Considering that those with stronger abstinence-related withdrawal expectancies likely experience more severe withdrawal symptoms when they attempt to quit (see Hendricks et al., 2011), treatments for women might be enhanced by the inclusion of components designed to mollify withdrawal distress, such as behavioral withdrawal regulation strategies (see Baker, Japuntich, Hogle, McCarthy, & Curtin, 2006), bupropion (see Scharf & Shiffman, 2004), and combination pharmacotherapy (see Piper et al.,

2010). Given the mixed effectiveness of weight control interventions (see Farley, Hajek, Lycett, & Aveyard, 2012; Spring et al., 2009) and results from the current study that downplay the importance of expectancies for postcessation weight gain, the issue of weight gain may be best dealt with by a straightforward presentation of the typically limited nature of postcessation weight gain and the risks of continued smoking.

The current findings should be interpreted in view of certain limitations. The degree to which results from this research can be generalized to adolescent smokers, light and intermittent smokers, non-English speaking smokers, or more affluent smokers is unknown (Hendricks et al., 2011). It is well documented, however, that cigarette use is becoming increasingly concentrated among individuals from lower socioeconomic strata (Hiscock, Bauld, Amos, Fidler, & Munafo, 2012; Kandel, Griesler, & Schaffran, 2009; Laaksonen, Rahkonen, Karvonen, & Lahelma, 2005), which characterized smokers in the present sample. Furthermore, subgroup sample sizes were insufficient to evaluate gender by race interactions. However, it is possible that categories of identity interact in a number of ways, and indeed it has been advocated that research attend to the intersection of gender and race, in addition to other variables (e.g., Cole, 2009). For instance, whereas expectancies for postcessation weight gain may not differ between African American men and White men, they may differ between African American women and White women. Finally, because the mediator and dependent variables were measured cross-sectionally, the results of mediation analyses should be interpreted cautiously. However, our hypotheses were consistent with theory that differences in expectancies would be responsible for differences in motivation to quit and abstinence self-efficacy (Goldman et al., 2010; Hendricks et al., 2009), and mediation analyses were utilized to test these potential mechanisms. More systematic

longitudinal studies would be beneficial to confirm the causal mechanisms that were indicated in the current study.

In addition to examining the prospective impact of abstinence-related expectancies on the smoking cessation process, future research should aim to compare abstinence-related expectancies among other racial and ethnic populations (e.g., Asian Americans/Pacific Islanders and Hispanic/Latino Americans), and special populations (e.g., individuals with mental illness and HIV/AIDS), and evaluate the efficacy of treatments targeted to abstinence-related expectancies. Determining why certain populations differ in their abstinence-related expectancies represents a complex task that is unlikely to reveal a simple set of determinants. Nevertheless, investigating mechanisms that drive differences in abstinence-related expectancies, and their potential for understanding disparities in smoking cessation and prevalence, could be valuable in reducing disparities.

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Table 1

Demographic and Smoking Characteristics of American Indians, African Americans, and Whites

Characteristic	AI (n = 87)	AA (n = 151)	W (n = 185)	AI vs. W p-value	AA vs. W p-value
Gender (%)				.42	.77
Male	50.6	56.3	55.7		
Female	49.4	41.7	43.2		
Transgender	0	2.0	1.1		
Mean Age (SD)	35.70 (10.63)	44.55 (10.10)	41.34 (13.74)	.001	.18
Hispanic/Latino Ethnicity (%)	21.8	3.9	6.5	<.001	.27
Education Level (%)				<.001	.003
No High School Degree	20.7	11.9	4.3		
High School Degree	58.6	62.9	57.8		
Associate's/Vocational Degree	17.2	15.3	15.7		
Bachelor's Degree or Above	3.5	9.9	22.2		
Income (%)				.01	.37
Less than \$10,000	67.8	47.7	45.4		
\$11,000 - \$20,000	12.6	28.5	27.0		
\$21,000 - \$30,000	2.3	11.3	8.1		
\$31,000 - \$40,000	5.8	6.6	6.5		
\$41,000 - \$50,000	4.6	2.6	7.0		
Over \$51,000	6.9	3.3	6.0		
Mean Cigarettes Smoked per Day (SD)	15.63 (7.01)	17.81 (7.94)	19.32 (8.02)	<.001	.08
Mean Years Smoked Regularly (SD)	15.36 (10.66)	23.30 (11.08)	22.77 (13.52)	<.001	.69
Mean Quit Attempts of at least 1 Week (SD)	7.31 (16.20)	7.82 (19.58)	6.62 (21.29)	.78	.59
Mean FTND Score (SD)	4.36 (2.06)	5.21 (2.06)	5.16 (2.20)	.005	.81
Mentholated Cigarette Use (%)	10.6	68.5	9.4	.75	<.001

Note. AI = American Indians, AA = African Americans, W = Whites, FTND = Fagerström Test

for Nicotine Dependence.

Table 2

Demographic and Smoking Characteristics of Women and Men

Characteristic	Women (n = 231)	Men (n = 270)	p-value
Race (%)			.22
American Indian	18.6	16.3	
African American	27.3	31.5	
White	34.6	38.1	
Other race	19.5	14.1	
Mean Age (SD)	40.03 (12.61)	41.57 (12.30)	.16
Hispanic/Latino Ethnicity (%)	15.6	11.0	.20
Education Level (%)			.45
No High School Degree	12.1	8.5	
High School Degree	55.0	61.1	
Associate's/Vocational Degree	16.0	14.8	
Bachelor's Degree or Above	16.9	15.6	
Income (%)			.01
Less than \$10,000	57.2	44.8	
\$11,000 - \$20,000	23.8	23.0	
\$21,000 - \$30,000	6.9	8.9	
\$31,000 - \$40,000	5.6	10.0	
\$41,000 - \$50,000	3.9	5.2	
Over \$51,000	2.6	8.1	
Mean Cigarettes Smoked per Day (SD)	16.88 (6.80)	18.61 (8.27)	.01
Mean Years Smoked Regularly (SD)	20.76 (13.17)	21.41 (12.23)	.57
Mean Quit Attempts of at least 1 Week (SD)	8.35 (30.71)	7.53 (20.64)	.72
Mean FTND Score (SD)	4.84 (2.08)	5.00 (2.19)	.40
Mentholated Cigarette Use (%)	30.7	26.5	.46

Note. FTND = Fagerström Test for Nicotine Dependence.

Table 3

Comparisons of Smoking Abstinence Questionnaire (SAQ) Scale Scores between American Indians and Whites

	<u>AI</u>	<u>W</u>			
SAQ Scale	<i>M (SEM)</i>	<i>M (SEM)</i>	<i>p</i>	ω^2	90% CI
Withdrawal	3.73 (.13)	4.17 (.08)	.005	.02	[.004, .06]
Social Improvement/Non-smoker Identity	3.67 (.14)	3.30 (.09)	.04	.01	[.0003, .04]
Adverse Outcomes	1.50 (.12)	1.43 (.08)	.63	.002	[0, .01]
Treatment Effectiveness	3.23 (.17)	3.46 (.11)	.27	.0007	[0, .02]
Common Reasons	5.14 (.09)	4.94 (.06)	.08	.007	[0, .04]
Barriers to Treatment	3.60 (.17)	3.55 (.11)	.82	.003	[0, .009]
Social Support	4.55 (.14)	4.73 (.09)	.29	.0004	[0, .02]
Optimistic Outcomes	2.80 (.12)	2.06 (.08)	<.001	.08	[.03, .13]
Coffee Use	2.76 (.16)	3.15 (.10)	.052	.009	[0, .04]
Weight Gain	3.60 (.16)	4.00 (.11)	.048	.01	[0, .04]

Note. AI = American Indians, W = Whites. Significant findings are presented in bold. Means are adjusted for cigarettes smoked per day, years smoked regularly, and Fagerström Test for Nicotine Dependence. Higher scores represent stronger expectancies. ω^2 = omega squared; values in the vicinity of .01, .06, and .14 represent small, medium, and large effects, respectively.

Table 4

Comparisons of Smoking Abstinence Questionnaire (SAQ) Scale Scores between African Americans and Whites

	<u>AA</u>	<u>W</u>			
SAQ Scale	<i>M (SD)</i>	<i>M (SD)</i>	<i>p</i>	ω^2	90% CI
Withdrawal	3.22 (1.38)	4.18 (1.13)	<.001	.12	 [.07, .18]
Social Improvement/Non-smoker Identity	3.65 (1.17)	3.31 (1.24)	.01	.01	[.002, .04]
Adverse Outcomes	1.44 (1.17)	1.41 (1.06)	.80	.002	[0, .008]
Treatment Effectiveness	3.15 (1.37)	3.52 (1.58)	.02	.01	 [.001, .04]
Common Reasons	4.86 (.91)	4.92 (.89)	.51	.001	[0, .01]
Barriers to Treatment	3.45 (1.47)	3.54 (1.59)	.59	.002	[0, .01]
Social Support	4.61 (1.37)	4.74 (1.25)	.36	.0005	[0, .02]
Optimistic Outcomes	2.91 (1.11)	2.06 (1.03)	<.001	.13	 [.08, .19]
Coffee Use	3.00 (1.53)	3.20 (1.47)	.21	.001	[0, .02]
Weight Gain	3.78 (1.50)	4.02 (1.50)	.15	.003	[0, .02]

Note. AA = African Americans, W = Whites. Significant findings are presented in bold. Higher scores represent stronger expectancies. ω^2 = omega squared; values in the vicinity of .01, .06, and .14 represent small, medium, and large effects, respectively.

Table 5

Comparisons of Smoking Abstinence Questionnaire (SAQ) Scale Scores between Women and Men

	<u>Women</u>	<u>Men</u>			
SAQ Scale	<i>M (SD)</i>	<i>M (SD)</i>	<i>p</i>	ω^2	90% CI
Withdrawal	3.93 (1.26)	3.66 (1.37)	.02	.008	 [.0007, .03]
Social Improvement/Non-smoker					
Identity	3.32 (1.24)	3.53 (1.29)	.06	.004	[0, .02]
Adverse Outcomes	1.48 (1.06)	1.42 (1.15)	.55	.001	[0, .009]
Treatment Effectiveness	3.19 (1.51)	3.42 (1.51)	.10	.003	[0, .02]
Common Reasons	4.91 (.89)	4.97 (.87)	.45	.0009	[0, .01]
Barriers to Treatment	3.62 (1.46)	3.46 (1.56)	.26	.0006	[0, .01]
Social Support	4.81 (1.16)	4.49 (1.42)	.008	.01	[.002, .03]
Optimistic Outcomes	2.43 (1.22)	2.46 (1.11)	.75	.001	[0, .006]
Coffee Use	3.14 (1.56)	2.93 (1.52)	.14	.002	[0, .02]
Weight Gain	4.07 (.10)	3.68 (1.52)	.004	.01	 [.002, .03]

Note. Significant findings are presented in bold. Higher scores represent stronger expectancies.

ω^2 = omega squared; values in the vicinity of .01, .06, and .14 represent small, medium, and large effects, respectively.

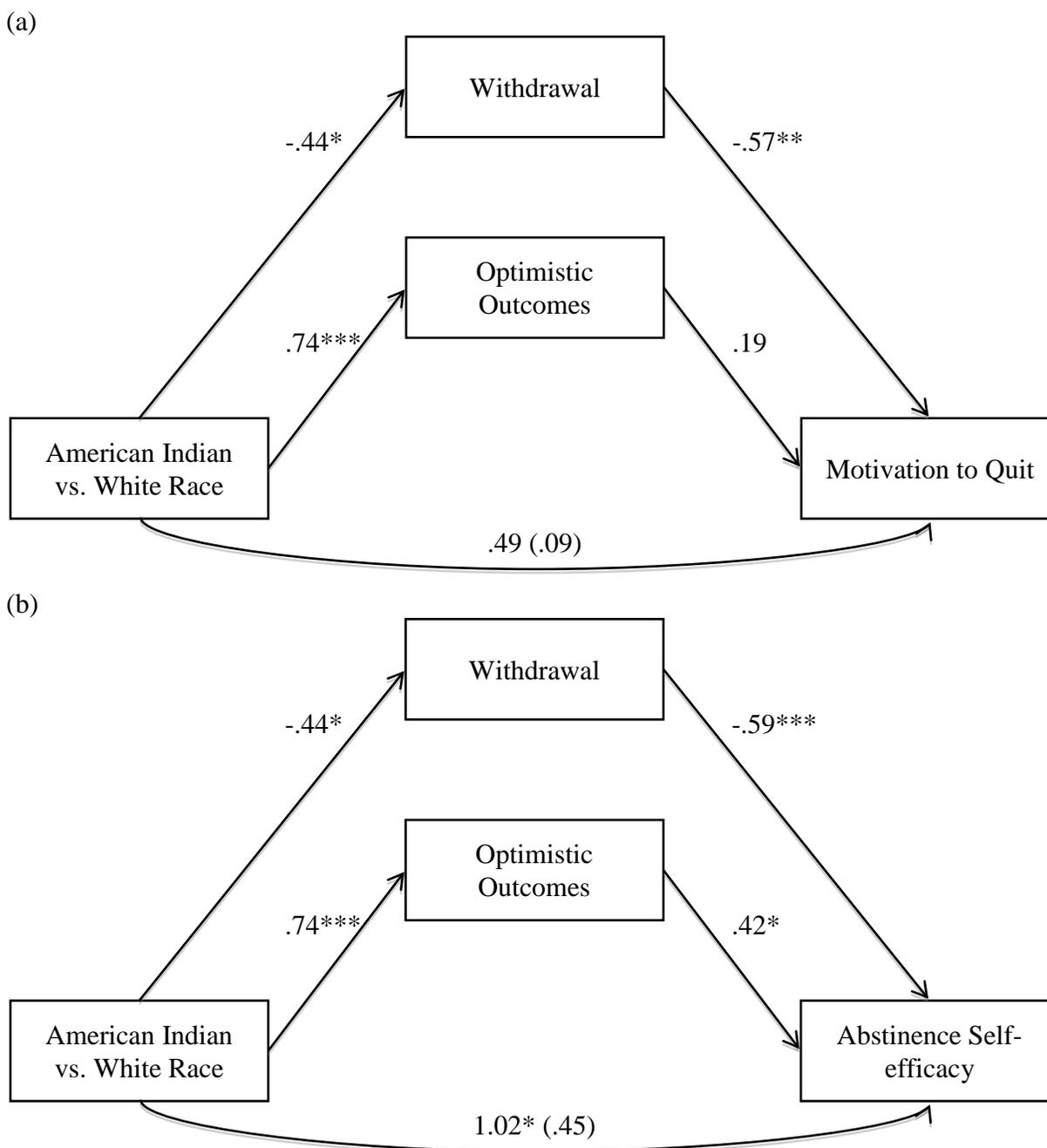


Figure 1. Mediation path models of the relations between race (American Indian vs. White race; White race is the reference group), abstinence-related expectancies (Withdrawal and Optimistic Outcomes scales of the Smoking Abstinence Questionnaire), and (a) motivation to quit and (b) abstinence self-efficacy. Paths are adjusted for cigarettes smoked per day, years smoked regularly, and Fagerström Test for Nicotine Dependence. Reported statistics are regression coefficients. The values in parentheses are the direct effects of race. * $p < .01$, ** $p < .001$, *** $p < .0001$.

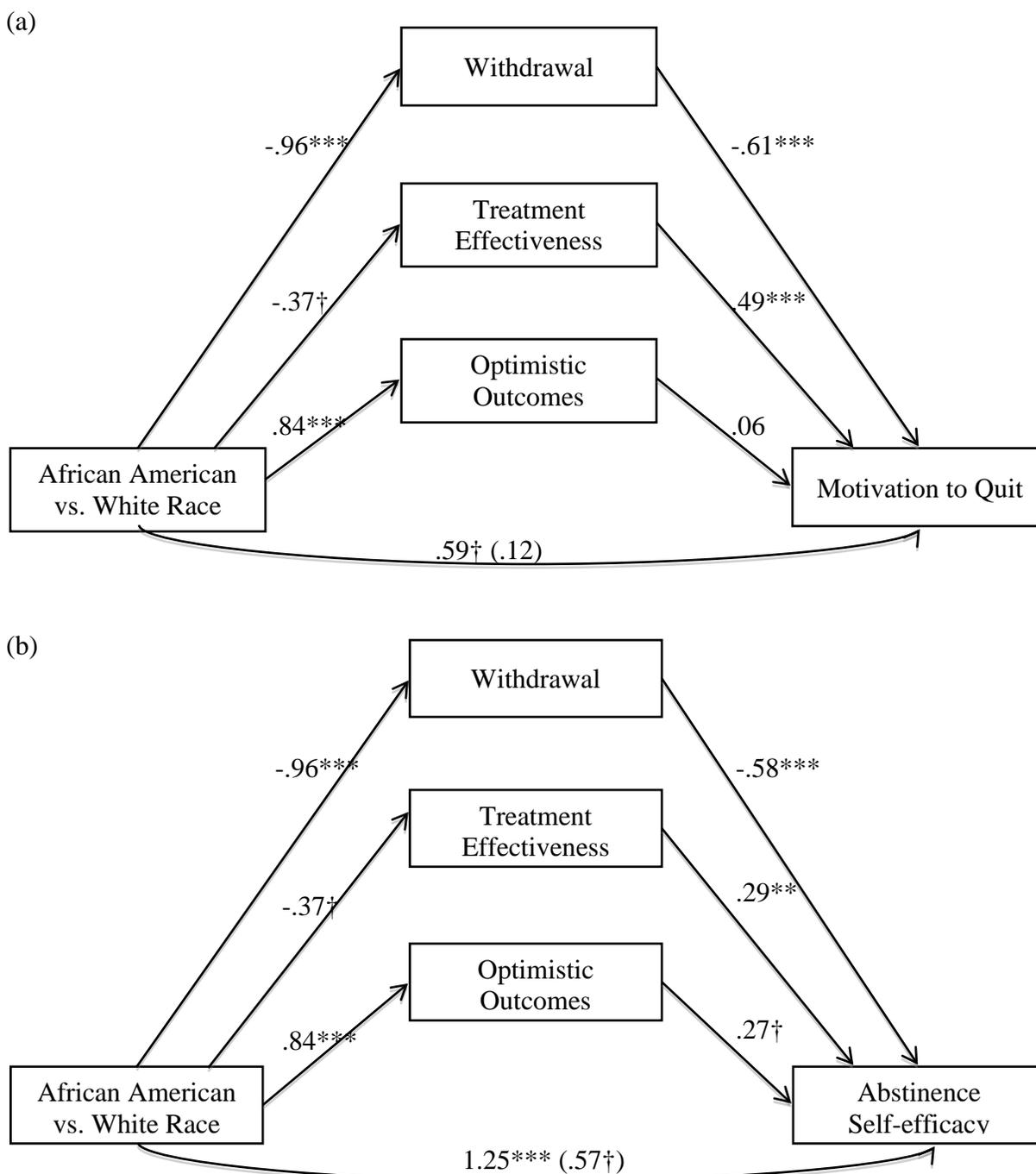


Figure 2. Mediation path models of the relations between race (African American vs. White race; White race is the reference group), abstinence-related expectancies (Withdrawal, Treatment Effectiveness, and Optimistic Outcomes scales of the Smoking Abstinence Questionnaire), and (a) motivation to quit and (b) abstinence self-efficacy. Reported statistics are regression coefficients. The values in parentheses are the direct effects of race. † $p < .05$, ** $p < .001$, *** $p < .0001$.

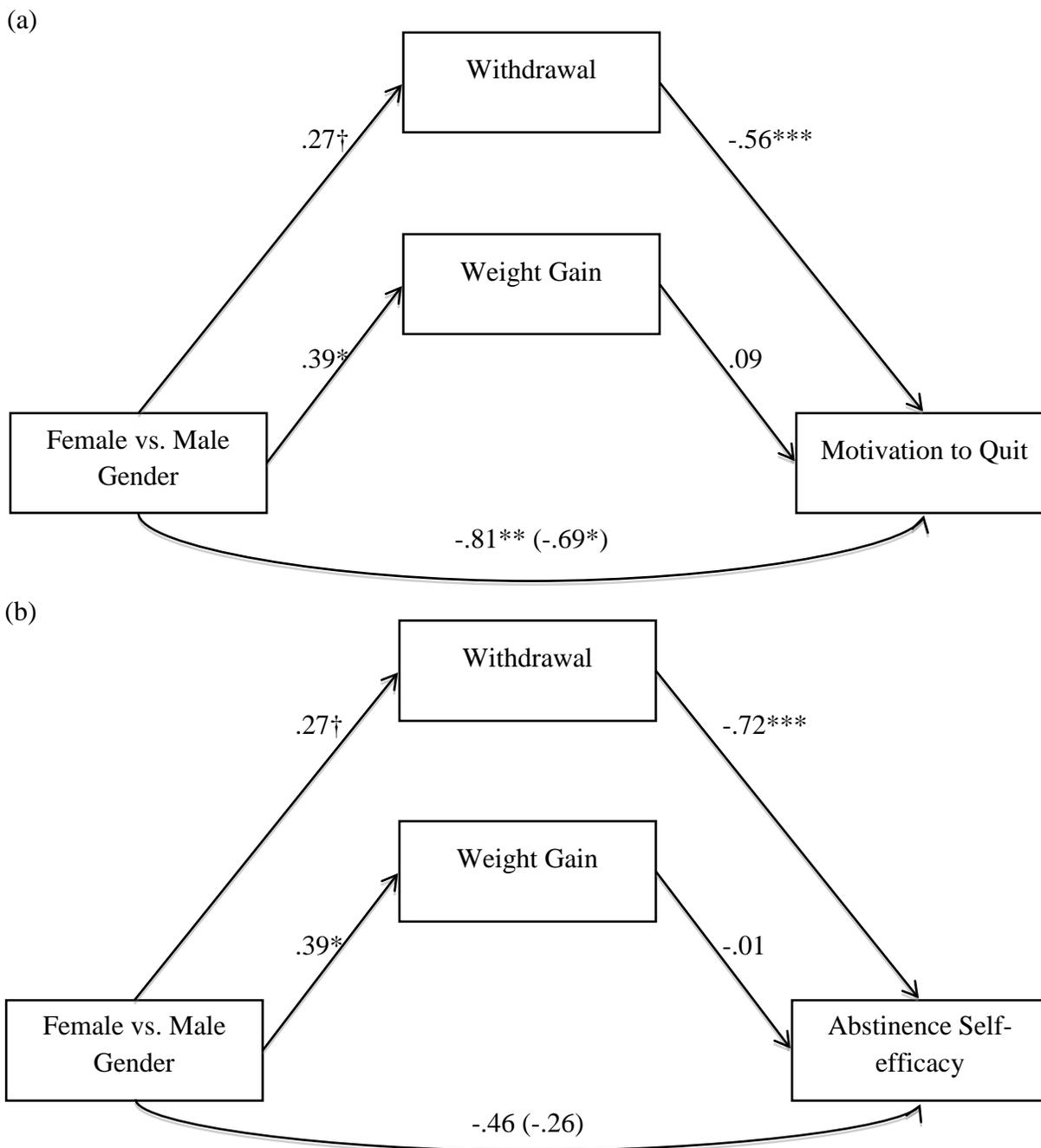


Figure 3. Mediation path models of the relations between gender (female vs. male gender; male gender is the reference group), abstinence-related expectancies (Withdrawal and Weight Gain scales of the Smoking Abstinence Questionnaire), and (a) motivation to quit and (b) abstinence self-efficacy. Reported statistics are regression coefficients. The values in parentheses are the direct effects of gender. $^\dagger p < .05$ $^* p < .01$, $^{**} p < .001$, $^{***} p < .0001$.