Abstract

Perceived Ethnic Discrimination and Cigarette Smoking Cessation among a Sample of

People With HIV

Introduction

Despite the high prevalence rates of both cigarette smoking and perceived ethnic

discrimination (perceived ethnic discrimination) among people with HIV (PWH), limited

research has examined the role of perceived ethnic discrimination in relation to cigarette

smoking behaviors among PWH beyond smoking status (e.g., cigarette abstinence, nicotine

dependence, motivation to quit smoking, self-efficacy to quit smoking). Further, perceived

ethnic discrimination is most common among Black and Latino/Hispanic PWH. Moreover,

PWH commonly report high rates of depressive symptoms and stress. Yet, prior research has

not examined race/ethnicity, depressive symptoms, or perceived stress as mechanisms of the

relationship between perceived ethnic discrimination and cigarette smoking in samples of

PWH. The aim of this study was to examine the relationship between perceived ethnic

discrimination and cigarette smoking outcomes among PWH who smoke, and the potential

roles of race/ethnicity, perceived stress, and depressive symptoms on this relationship.

Methods

For this study, a secondary analysis was conducted using data from a randomized controlled

trial for Positively Smoke Free, an intensive group therapy intervention tailored to PWH who

are motivated to quit smoking cigarettes. PWH who smoke (N = 442; M_{age} = 50.6; 52.8%

male; 56.3% Black; 87.7% unemployed/disabled; 81.6% single) were recruited from HIV

clinics in the Bronx, New York and Washington, DC, and were randomly assigned into the

Positively Smoke Free condition or the control condition. Participants were asked questions

regarding demographic information, smoking behaviors (e.g., nicotine dependence, motivation to quit smoking, self-efficacy to quit smoking/smoking temptations), perceived ethnic discrimination, depressive symptoms, and perceived stress. Participants were followed up with 3- and 6-months after study completion and smoking abstinence was assessed at these time points using self-report and biochemical confirmation. Separate analyses were conducted using the full sample and the Positively Smoke Free sample.

Results

Greater perceived ethnic discrimination was related to lower nicotine dependence and lower self-efficacy to quit smoking among PWH. There was an indirect effect of depressive symptoms such that greater perceived ethnic discrimination at baseline was associated with greater depressive symptoms at 3-month follow-up, and greater depressive symptoms were related to greater nicotine dependence and lower self-efficacy to quit smoking at 6-month follow-up. Moreover, race/ethnicity interacted with time and perceived ethnic discrimination to predict nicotine dependence. Hispanic/Latino participants with greater perceived ethnic discrimination reported higher nicotine dependence over time compared to Black and Black/Hispanic participants with greater perceived ethnic discrimination. Perceived ethnic discrimination was not related to smoking abstinence or motivation to quit smoking, and perceived stress did not mediate the relationship between perceived ethnic discrimination and any of the smoking outcomes. When analyses were conducted in the Positively Smoke Free sample, the majority of findings remained the same. In contrast to the finding from the full sample, the relationship between perceived ethnic discrimination and self-efficacy in the Positively Smoke Free sample was moderated by race/ethnicity and time such that Black PWH with high perceived discrimination reported increased self-efficacy to quit smoking

over time while Hispanic/Latino PWH did not. Moreover, depressive symptoms mediated the relationship between perceived ethnic discrimination and smoking abstinence in the Positively Smoke Free sample such that high perceived ethnic discrimination was associated with greater depressive symptoms at baseline, which were in tern associated with reduced likelihood of abstinence at 3-month follow-up.

Conclusions

This study advanced research related to smoking cessation among PWH by examining the relationship of perceived ethnic discrimination and numerous smoking outcomes, as well as potential mechanisms of these relationships. Findings highlight the importance of tailoring smoking cessation interventions to PWH with high levels of perceived ethnic discrimination, enhancing self-efficacy to quit smoking, and increasing use of adaptive strategies to cope with perceived ethnic discrimination, smoking temptations, and depressive symptoms. Moreover, providers must consider the ways in which race, ethnicity, and culture shape experiences and perceptions of ethnic discrimination and influence self-efficacy to quit smoking among PWH in order to develop culturally responsive and inclusive smoking cessation interventions.

Perceived Ethnic Discrimination and Cigarette Smoking Cessation among a Sample of People With HIV

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Dedication

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Chapter I: Introduction

Overview of HIV/AIDS

Human Immunodeficiency Virus (HIV) is a major public health concern in the United States (US), with approximately 1.2 million people with HIV across the nation (CDC, 2019). While the incidence of HIV has declined by over two thirds since the 1980's, recent data from the Centers for Disease Control (CDC) suggest that progress has slowed as there were around 38,000 new infections each year from 2014 to 2017. HIV disproportionately impacts certain populations in the US, including Black and Hispanic/Latino individuals who accounted for 42% and 27% of new HIV diagnoses in 2018, respectively (CDC, 2019).

HIV is a virus that attacks the cells in the body that are primarily responsible for fighting infections (i.e., CD4 cells) (WHO, 2020). As a result, HIV has a compromising effect on the body's immune system and results in physical symptoms including fatigue, nausea, vomiting, diarrhea, and temperature fluctuations. If HIV is left untreated, it can eventually progress to Acquired Immunodeficiency Syndrome (AIDS) when the body's CD4 cell count drops below 200 cells/mm3. HIV can be transmitted through blood, semen, breast milk, and pre-seminal, rectal, and vaginal fluids. It is most commonly transmitted via unprotected sexual intercourse and needle-sharing. The health consequences associated with HIV are striking, as the virus increases one's chances of cancers and other opportunistic illnesses that take advantage of the weakened immune system (CDC, 2019).

There is no effective cure for HIV, but symptoms can be managed with antiretroviral therapy (ART), which, when taken as prescribed, lowers the amount of virus in one's blood

(viral load) and increases the number of CD4 cells in the body. This can make the viral load so low that it becomes undetectable and helps to prevent HIV transmission to others (CDC, 2020). As a result of increased effectiveness of ART, HIV-associated morbidity and mortality have dramatically reduced such that other variables (e.g., cigarette smoking) are now linked to serious health consequences in persons with HIV (PWH) (Bogart, Landrine, Galvan, Wagner, & Klein, 2013; Helleberg et al., 2013).

Cigarette Smoking Outcomes among PWH

Cigarette smoking among PWH. PWH smoke cigarettes at a disproportionately high prevalence compared to the general US population (Hile, Feldman, Alexy, & Irvine, 2016; Mdodo et al., 2015; Pacek, Harrell, & Martins, 2014). A largescale survey of tobacco use among PWH in the US found the prevalence of cigarette smoking to be 42% (Mdodo et al., 2015), which is about three times the overall prevalence of cigarette smoking in the US (CDC, 2018a). In addition, data from the 2016 National Health and Nutrition Examination Survey (NHANES) demonstrated that 47% of adults (20-59 years) with HIV reported current smoking compared to 25.5% of adults without HIV (Asfar et al., 2021). Similarly, a meta-analysis of studies from the US, Canada, Western Europe, and Australia reported an aggregate estimate of smoking prevalence among PWH to be 54% (Park, Hernandez-Ramirez, Silverberg, Crothers, & Dubrow, 2016).

As mentioned above, advances in ART have dramatically reduced HIV-related morbidity and mortality, resulting in the emergence of cigarette smoking as the leading cause of death among PWH (Helleberg et al., 2013). The health consequences of cigarette smoking among PWH are immense, and include increased risk of pneumonia (Feldman & Anderson, 2013), lung cancer (Park et al., 2016), chronic obstructive pulmonary disease (Madeddu et

al., 2013), oral candidiasis (Conley et al., 1996), and a range of other respiratory and cardiovascular conditions associated with cigarette smoking (Helleberg et al., 2013; Madeddu et al., 2013; Pacek & Crum, 2015). Although cigarette smoking is not directly associated with the accelerated progression of HIV or AIDS-related mortality (Conley et al., 1996; Feldman & Anderson, 2013; Kabali et al., 2011; Marshall, McCormack, & Kirk, 2009), it has been associated with all-cause mortality among PWH (Crothers et al., 2009; Feldman & Anderson, 2013; Helleberg et al., 2013; Pines, Koutsky, & Buskin, 2011). In addition to the many adverse health effects of cigarette smoking, PWH who smoke cigarettes report significantly lower quality of life compared to PWH who have never smoked (Crothers et al., 2009; Feldman & Anderson, 2013; Pacek & Crum, 2015).

Smoking cessation. The majority of PWH are interested in quitting smoking and have made a quit attempt in their lifetime (Pacek & Cioe, 2015). In a review of smoking cessation interventions for PWH from 2010 to 2015, Pacek and Cioe (2015) outlined mixed findings related to smoking abstinence, with abstinence prevalence rates ranging from 7.2% to 14.5% for non-pharmacological smoking cessation interventions and 15%- to 2% for pharmacological smoking cessation interventions. Of note, many of these studies were pilot or feasibility trials with variable sample sizes. The majority (70%) of studies with abstinence outcomes reported a 3-month follow-up period, while one study had a one-month follow-up, and another study had a 12-month follow-up.

PWH who smoke have faster nicotine metabolism compared to individuals who smoke in the general population (Ashare et al., 2019). In community samples, faster nicotine metabolism has been associated with greater nicotine cravings, nicotine reinforcement, and attention to smoking-related cues (Sofuoglu, Herman, Nadim, & Jatlow, 2012). In addition,

faster nicotine metabolism has been associated with difficulties quitting cigarettes in a community sample of treatment-seeking individuals who smoke (Kaufmann et al., 2015). Among PWH, faster nicotine metabolism has been associated with greater nicotine dependence and greater smoking quantity (i.e., cigarettes per day) (Schnoll et al., 2019), which might make smoking cessation particularly difficult for PWH. Thus, enhanced efforts to develop interventions that improve smoking cessation outcomes in this population are imperative. Notably, a recent clinical trial of intensive group-based tobacco treatment tailored to PWH who smoke demonstrated that individuals in the intervention condition exhibited greater smoking abstinence, lower nicotine dependence, and higher self-efficacy to resist smoking temptations after a 3-month follow-up (Stanton et al., 2020). However, differences in smoking abstinence were no longer present at a 6-month follow-up. Cigarette smoking is a critical problem among PWH and it is important to identify modifiable factors (e.g., discrimination, depressive symptoms) related to smoking outcomes (e.g., abstinence, nicotine dependence, self-efficacy, quit attempts, motivation to quit) in this population.

Nicotine dependence among PWH. Nicotine dependence was recognized as a diagnosis in the DSM-IV-TR (APA, 2000) as a "maladaptive pattern of nicotine use, leading to clinically significant impairment or distress" (pp. 264). Individuals who endorsed three or more diagnostic criteria (e.g., tolerance, withdrawal, progressively increased use, unsuccessful efforts to cut down) in the past 12 months were classified as having nicotine dependence. The DSM-5 has replaced nicotine dependence with tobacco use disorder, which is conceptually similar and involves several of the same diagnostic criteria (APA, 2013). For simplicity and consistency, the term nicotine dependence is used throughout this text. In a nationally representative US sample of PWH, Pacek, Harrell, and Martins (2014) found that

64% of PWH who smoke met criteria for nicotine dependence, which is similar to the rate of nicotine dependence in an earlier, lower income sample of PWH (Gritz, Vidrine, Lazev, Amick, & Arduino, 2004). High levels of nicotine dependence among PWH have also been found outside the US. In a sample of PWH in South Africa, 38% of participants who smoke reported moderate to high levels of nicotine dependence (Egbe et al., 2019). In a national study of PWH in Italy, more than half of the sample reported current cigarette smoking, with one third of people who smoke reporting high to very high nicotine dependence (De Socio et al., 2020).

High levels of nicotine dependence among PWH have been cited as a major barrier to both HIV treatment adherence (King et al., 2012) and smoking cessation (Cioe, Gordon, Guthrie, Freiberg, & Kahler, 2018). Moreover, higher nicotine dependence has been associated with lower levels of self-efficacy to quit smoking among PWH (Shuter, Moadel, Kim, Weinberger, & Stanton, 2014). Thus, research suggests that many PWH who smoke have high levels of nicotine dependence, which has been associated with greater difficulty quitting cigarettes.

Self-efficacy and cigarette smoking among PWH. Self-efficacy refers to one's confidence in their ability to perform a certain behavior (Bandura, 1977). In the context of cigarette smoking and treatment, self-efficacy is one's confidence in their ability to abstain from smoking in a variety of situations (Gwaltney, Metrik, Kahler, & Shiffman, 2009; Shuter et al., 2014) and has been shown to correlate with smoking cessation outcomes. For instance, a meta-analysis by Gwaltney and colleagues (2009) found that self-efficacy is consistently associated with future smoking such that greater self-efficacy is related to a lower likelihood of smoking following a quit attempt (i.e., smoking relapse). The strength of this relationship,

however, depended on whether self-efficacy was measured prior to a quit attempt versus following a quit attempt. There was a modest relationship between self-efficacy and smoking relapse when self-efficacy was measured before the quit attempt and a strong relationship when self-efficacy was measured after the quit attempt. In addition, the strength of the relationship depended on whether other smoking variables (e.g., smoking status, smoking rate) were controlled for at the time of self-efficacy assessment. Specifically, the strength of the relationship between self-efficacy and smoking relapse was significantly weaker when analyses controlled for other smoking variables compared to when they did not control for other smoking variables.

Self-efficacy has also been found to predict smoking abstinence among PWH in several smoking cessation trials (Ingersoll, Cropsey, & Heckman, 2009; Moadel et al., 2012; Shuter et al., 2014; Stanton, Lloyd-Richardson, Papandonatos, de Dios, & Niaura, 2009; Vidrine, Arduino, & Gritz, 2006). In an effort to better understand smoking self-efficacy among PWH, Shuter and colleagues (2014) merged and analyzed data from two randomized controlled trials of smoking cessation treatment for PWH in the US. Findings demonstrated several important affective and behavioral correlates of self-efficacy, including recent alcohol use, nicotine dependence, and higher depression. Importantly, self-efficacy is a modifiable factor related to cigarette smoking and cessation among PWH. A recent multicenter randomized controlled trial of intensive group tobacco treatment for PWH demonstrated that the group treatment intervention increased participants' smoking self-efficacy at both 3-month and 6-month follow-up periods (Stanton et al., 2020).

Thus, specific smoking-related variables (i.e., high nicotine dependence, low self-efficacy, lower motivation to quit smoking) can pose challenges to individuals attempting to

reduce or abstain from cigarette smoking. One way to work towards reducing these challenges, and ultimately improving smoking-related outcomes among PWH, is to identify key variables related to smoking behavior among PWH (e.g., perceived ethnic discrimination) that can be targeted to improve cessation outcomes.

Perceived Ethnic Discrimination

Perceived ethnic discrimination refers to the perception of unfair treatment on the basis of one's ethnicity or race (Brondolo et al., 2005). Perceived ethnic discrimination is multifaceted, and can manifest as exclusion or rejection, stigmatization, discrimination (e.g., at work or school), threats, and aggression. Perceived ethnic discrimination is typically assessed through self-report measures including the full and brief versions of the Perceived Ethnic Discrimination Questionnaire (Brondolo et al., 2005), variations of the Everyday Discrimination Scale (Williams, Yan, Jackson, & Anderson, 1997), the Major Experiences of Discrimination Scale (Williams et al., 2008), the General Ethnic Discrimination Scale (Landrine, Klonoff, Corral, Fernandez, & Roesch, 2006), the Day-to-Day Unfair Treatment Scale (Krieger, Smith, Naishadham, Hartman, & Barbeau, 2005), the Detroit Area Study Discrimination Scale (Taylor, Kamarck, & Shiffman, 2004), and the Jackson Heart Study Discrimination Instrument (Sims, Wyatt, Gutierrez, Taylor, & Williams, 2009).

Disproportionately high rates of perceived ethnic discrimination have been found among Black (Brondolo et al., 2009; Carlisle, 2015; Colen, Ramey, Cooksey, & Williams, 2018; Cuevas, Ho, et al., 2019; Dailey, Kasl, Holford, Lewis, & Jones, 2010; Gonzales, Jung, Lee, & Wang, 2018; Mays, Jones, Delany-Brumsey, Coles, & Cochran, 2017) and Hispanic/Latino (Arellano-Morales et al., 2015; Colen et al., 2018; Hwang & Goto, 2008; Mays et al., 2017; Molina et al., 2019; Unger, Soto, & Baezconde-Garbanati, 2016; Williams

& Mohammed, 2009) individuals, US-born minority individuals (Brondolo et al., 2011; Brondolo et al., 2005; Broudy et al., 2007), and minority individuals living in areas with a predominately White population (Assari, Gibbons, & Simons, 2018). In addition, research has found that the association between socioeconomic status (SES) and discrimination varies across race whereby, for White individuals, gains in income are associated with reduced perceived ethnic discrimination over time, whereas among Black and Hispanic/Latino individuals, gains in income are associated with increased perceived ethnic discrimination over time (Colen et al., 2018).

Consequences of perceived ethnic discrimination. Perceived ethnic discrimination undeniably contributes to the racial and ethnic disparities seen in physical and mental health (Brondolo et al., 2005; Colen et al., 2018; Pascoe & Smart Richman, 2009; Williams & Mohammed, 2009). Perceived ethnic discrimination has been associated with numerous negative physical health outcomes, particularly among Black and Hispanic/Latino individuals (Colen et al., 2018). A meta-analysis of 134 samples by Pascoe and Richman (2009) found that perceived ethnic discrimination was associated with poor physiological health outcomes in 83% of studies. A large body of research has documented associations of greater perceived ethnic discrimination with poorer self-reported health (Brondolo et al., 2011; Hackett, Ronaldson, Bhui, Steptoe, & Jackson, 2020; Rask et al., 2018), lower health-related quality of life (Anderson et al., 2019; Coley et al., 2017; Molina et al., 2019), and underutilization of health care (Burgess, Ding, Hargreaves, van Ryn, & Phelan, 2008). Perceived ethnic discrimination has also been related to greater risk of hypertension (Dolezsar, McGrath, Herzig, & Miller, 2014), dietary fat (Sims et al., 2016), obesity (Siddiqi, Shahidi, Ramraj, & Williams, 2017; Vasquez, Udo, Corsino, & Shaw, 2018), cardiovascular conditions (Cuevas,

Ho, et al., 2019; Stewart, Kathawalla, Wolfe, & Everson-Rose, 2018), allostatic load (Cuevas, Wang, et al., 2019), inflammation (Ong & Williams, 2019), chronic pain (Arnold, Polenick, & Blow, 2020; Carlisle, 2015; Terry, Booker, Roach, Cobb, & Robinson-Lane, 2020), and impaired sleep quality (Bethea et al., 2020; Ong & Williams, 2019; Sims et al., 2016). In addition, a nationally representative Canadian survey (Siddiqi et al., 2017) found that greater perceived ethnic discrimination was related to the presence of asthma, back problems, migraine headaches, chronic obstructive pulmonary disease, diabetes, heart disease, cancer, intestinal or stomach ulcer, stroke, urinary incontinence, bowel disorder, scoliosis, and Alzheimer's disease.

Of note, research has also highlighted an important link between perceived ethnic discrimination and substance-related behaviors including cigarette smoking (Corral & Landrine, 2012; Plascak, Hohl, Barrington, & Beresford, 2018; Siddiqi et al., 2017; Sims et al., 2016; Unger et al., 2016; Webb Hooper et al., 2020), nicotine dependence (Kendzor, Businelle, Reitzel, Rios, et al., 2014; Osman, Daoud, Thrasher, Bell, & Walsemann, 2018) alcohol use (Desalu, Goodhines, & Park, 2019; Gilbert & Zemore, 2016; Glass, Williams, & Oh, 2020), and cannabis use (Assari, Mistry, Lee, Caldwell, & Zimmerman, 2019; Borrell et al., 2007), which may precipitate and/or exacerbate many of the negative health consequences associated with perceived ethnic discrimination.

Moreover, perceived ethnic discrimination has been associated with several negative psychological outcomes (Schmitt, Branscombe, Postmes, & Garcia, 2014; Williams et al., 2012). Most notably, extant literature has demonstrated a strong relationship between perceived ethnic discrimination and depressive symptoms (Arnold et al., 2020; Assari, Preiser, Lankarani, & Caldwell, 2018; Benner et al., 2018; Brondolo et al., 2008; Gonzales et

al., 2018; Hwang & Goto, 2008; Lee & Bierman, 2018; Nadimpalli, James, Yu, Cothran, & Barnes, 2015; Pascoe & Smart Richman, 2009; Polanco-Roman, Anglin, Miranda, & Jeglic, 2019; Qin, Nguyen, Mouzon, Hamler, & Wang, 2020; Ward et al., 2019; White, Bell, Huang, & Williams, 2020). In addition to depressive symptoms, perceived ethnic discrimination has been associated with anxiety (Arnold et al., 2020; Assari, Moazen-Zadeh, Caldwell, & Zimmerman, 2017; Brondolo et al., 2005; Hwang & Goto, 2008; Soto, Dawson-Andoh, & BeLue, 2011), psychological distress (Benner et al., 2018; Hackett et al., 2020; Hwang & Goto, 2008; Pascoe & Smart Richman, 2009; Sims et al., 2016), hostility (Brondolo et al., 2005), cynicism (Brondolo et al., 2005), loneliness (Lee & Bierman, 2018), and suicidal ideation (Arnold et al., 2020; Hwang & Goto, 2008; Polanco-Roman et al., 2019).

Some of these psychological outcomes may interact with perceived ethnic discrimination to influence health. For instance, depressive symptoms have been shown to influence the relationship between perceived ethnic discrimination and substance use among Black young adults (Clark, 2014) as well as the relationship between perceived ethnic discrimination and health-related quality of life among Hispanic/Latino adults (Molina et al., 2019). Similarly, stress and depressive symptoms may influence the relationship between perceived ethnic discrimination and self-rated health among Black adults (Cuevas et al., 2013). Thus, it is important to consider how psychological outcomes (e.g., depressive symptoms) may be linked to health-related behaviors (e.g., cigarette smoking) in the context of perceived ethnic discrimination.

Depression and HIV. Depression is the most common psychiatric condition among PWH, and is estimated to be two to four times as common among PLHW compared to individuals without HIV (Nanni, Caruso, Mitchell, Meggiolaro, & Grassi, 2015). In a large,

longitudinal sample of PWH in French Guiana, severe immunodeficiency was associated

with increased risk of depression compared to less severe immunodeficiency (Nacher et al.,

2010). In addition, in a large, representative sample of PWH in the US (N = 2,864), 36% of

the sample was diagnosed with depression (Bing et al., 2001). Similarly, in a sample of PWH

from a medical center in the US (N = 152), 21% were diagnosed with a mood disorder (i.e.,

major depressive disorder, depressive disorder not otherwise specified, substance-induced

mood disorder, "other" mood disorder) in the past month, and 32% in the past year (Gaynes,

Pence, Eron, & Miller, 2008). The risk of depression may be greater among certain

populations of PWH, including those with high levels of perceived ethnic discrimination

versus low levels of perceived ethnic discrimination (Bird, Bogart, & Delahanty, 2004;

Bogart et al., 2011; Logie, James, Tharao, & Loutfy, 2013; Sun et al., 2016; Williamson,

Mahmood, Kuhn, & Thames, 2017) as well as PWH who smoke cigarettes (Lasser et al.,

2018; Lorenz, Misra, & Gabuzda, 2019).

In addition, depressive symptoms are related to many negative clinical outcomes

among PWH, including greater HIV risk behaviors (Meade & Sikkema, 2005), poorer

adherence and virological response to ART (Sumari-de Boer, Sprangers, Prins, &

Nieuwkerk, 2012), greater risk of medical comorbidities (Sabin et al., 2013), and greater HIV

symptom severity (Leserman, 2008). In a recent study comparing cigarette smoking among

demographically matched individuals with HIV (n = 11, 235) and without HIV (n = 227,

320) in the US (Lam et al., 2020), smoking prevalence was highest among PWH diagnosed

with depression compared to PWH without depression and individuals without HIV.

Perceived ethnic discrimination, stress, and coping. The mechanisms by which

perceived ethnic discrimination can affect psychological and health outcomes among PWH

remain unclear. One potential explanation is informed by a stress and coping framework defined in the transactional model of stress and coping (Berjot & Gillet, 2011; Lazarus & Folkman, 1984) whereby an individual evaluates a situation as stressful and determines whether they have the resources to cope with that stress. Lazarus and Folkman (1984) found that individuals tend to either cope by regulating their emotions (i.e., emotion-focused coping) or managing the problem itself (i.e., problem-focused coping).

With regard to discrimination and smoking, perceived ethnic discrimination may lead to negative emotional states (e.g., stress, depression) that individuals, including PWH, attempt to alleviate through adaptive or maladapting coping strategies. In this context, cigarette smoking can be conceptualized as a maladaptive, emotion-focused coping response to stress and depressive symptoms caused by perceived ethnic discrimination.

Meta-analytic findings from 134 samples (Pascoe & Smart Richman, 2009) suggest that perceived discrimination is related to poorer physical health, negative psychological stress responses, and increased participation in unhealthy behaviors (e.g., cigarette smoking, alcohol use, other substance use), but potential mediators (e.g., stress, depression, anxiety) of these relationships were not examined. Individual studies have, however, supported the idea that negative emotions can mediate the relationship between discrimination and health in community samples (Bastos, Celeste, Silva, Priest, & Paradies, 2015; Cuevas et al., 2013; Pascoe & Smart Richman, 2009). For example, in a cohort of students in Brazil (N = 1,023), it was found that depression and anxiety symptoms mediated the relationship between greater discrimination and poorer self-reported health (Bastos et al., 2015). Similarly, in a sample of 1,406 Black adults in the US, both stress and depressive symptoms mediated the relationship between discrimination and self-rated health (Cuevas et al., 2013).

Previous literature has highlighted how substance use and cigarette smoking may be used to cope with general stress (Robles et al., 2016; Rod, Gronbaek, Schnohr, Prescott, & Kristensen, 2009), and discrimination-related stress (Gerrard et al., 2012) in community samples. A longitudinal study using data from the Copenhagen City Heart Study (N = 7,066) (Rod et al., 2009) found that respondents who endorsed higher levels of stress were less likely to quit smoking compared to those who endorsed low levels of stress. Similarly, in a sample of 332 adults seeking smoking cessation treatment (Robles et al., 2016), it was found that perceived stress was indirectly related to difficulty quitting smoking through greater negative reinforcement of outcome smoking expectancies. Further research by Gerrard and colleagues (2012) demonstrated that racial discrimination was associated with greater substance use among Black adolescents (N = 889) who endorsed substance use as a coping mechanism.

Some research has examined negative emotions (e.g., stress, depressive symptoms) as possible mechanisms in the relationship between discrimination and cigarette smoking (Lorenzo-Blanco & Unger, 2015; Todorova, Falcon, Lincoln, & Price, 2010; Wang, Chen, Gong, & Yan, 2016). Lorenzo-Blanco and Unger (2015) found that, among Hispanic/Latino youth (N = 1,919), greater baseline ethnic discrimination was associated with higher perceived stress one year later and increased depressive symptoms and cigarette smoking the following year. This finding highlights the potential role of stress as a mediator in the relationships among discrimination, depressive symptoms, and cigarette smoking. Relatedly, Wang and colleagues (2016) examined negative emotions as potential mechanisms in the relationship between stress and smoking intensity (i.e., nicotine dependence, cigarettes per day), and found that both anxiety and depression mediated the relationship between stress

and smoking intensity. Further, in a sample of older adults in Puerto Rico (N = 1,122), it was found that depressive symptoms, but not perceived stress, mediated the relationship between perceived discrimination and lifetime smoking (Todorova et al., 2010).

Limited research has examined negative emotions as potential mechanisms of the relationship between discrimination and cigarette smoking in samples of PWH. This being said, in focus groups with HIV-positive men (N = 13) (Reynolds, Neidig, & Wewers, 2004), cigarette smoking was described as a tool to provide "comfort, relief, and distraction from unpleasant emotional and physical sensations" (pp. 40). In other words, some respondents smoked cigarettes to cope with negative emotions. Similarly, in a recent qualitative study examining the values and preferences around cigarette smoking among PWH in Australia (N = 54), cigarette smoking was used for stress management by respondents (Edwards et al., 2021). Further, in a sample of 358 PWH in the US, depressive symptoms partially mediated the association between HIV-related enacted stigma (i.e., discrimination) and substance use severity (i.e., number of substances used and number of substances used at moderate to high risk, including tobacco) (Earnshaw et al., 2020).

Thus, cigarette smoking may be a maladaptive coping response to perceived ethnic discrimination-related stress; a coping response that contributes to negative health outcomes among PWH. The strategies an individual uses to cope with perceived ethnic discrimination may be amenable to intervention by channeling one's negative feelings into a more adaptive response, ultimately increasing the reliance on adaptive coping strategies (e.g., exercise, mindfulness, seeking social support) and reducing the likelihood of maladaptive coping (e.g., cigarette use).

Perceived ethnic discrimination among PWH. A recent nationally representative US survey (Williams, Joo, Lipira, & Glass, 2017) found that PWH were more likely than individuals without HIV to report experiences of discrimination related their race and ethnicity, making it especially important to consider perceived ethnic discrimination in samples of PWH from racially and ethnically diverse backgrounds. Moreover, perceived ethnic discrimination among PWH has been associated with greater depressive symptoms (Bird et al., 2004; Bogart et al., 2011; Logie et al., 2013; Sun et al., 2016; Williamson et al., 2017), stress (Williams et al., 2017) and symptoms of post-traumatic stress disorder (PTSD) (Bird et al., 2004; Wagner, Bogart, Galvan, Banks, & Klein, 2012).

Research suggests that racial discrimination may interact with other forms of discrimination to impact physical and mental health (Sun et al., 2016; Logie et al., 2013; Bogart et al., 2011; Bogart et al., 2013). For instance, in a sample of Hispanic/Latino sexual minority men and Hispanic/Latina transgender women in the US (Sun et al., 2016), 74% reported perceived ethnic discrimination, and 54% reported perceived sexual discrimination, each of which were associated with greater depression. In a Canadian sample of Black women with HIV (Logie et al., 2013), racial discrimination was associated with greater HIV-related stigma, gender discrimination, and depressive symptoms. Moreover, Bogart and colleagues (2011) found that, among Black and Hispanic/Latino men who have sex with men (MSM), the interaction among racial discrimination, HIV discrimination, and sexual orientation discrimination was related to greater depressive symptoms compared to any single form of discrimination. In later work with Black and Hispanic/Latino MSM, Bogart and colleagues (2013) found that racial discrimination had the strongest association with health outcomes (e.g., lower CD4 cell count, higher HIV viral load, emergency room visits)

compared to HIV discrimination or sexual orientation discrimination, while the interaction between the three forms of discrimination was related to greater AIDS symptom severity and medication side effects.

Experiences and perceptions of racial discrimination among PWH can have negative consequences for HIV-related treatment adherence, particularly if discrimination is perceived during interactions with treatment providers (Bird et al., 2004; Sohler, Li, & Cunningham, 2007). In a study of HIV-positive Hispanic/Latino men, individuals with higher perceived ethnic discrimination had more mistrust towards the medical system and providers (Galvan, Bogart, Klein, Wagner, & Chen, 2017). In addition, medical mistrust mediated the association between perceived ethnic discrimination and ART adherence, such that individuals with greater perceived ethnic discrimination and medical mistrust reported poorer ART adherence. In a pilot study of 57 PWH, Bogart and colleagues (2008) found that perceived racial discrimination was related to lower HIV treatment adherence, while sexual orientation discrimination and HIV-related discrimination were not related to adherence. Similarly, a longitudinal study of Black, HIV-positive MSM demonstrated that, although each form of perceived discrimination (i.e., HIV status, race, and sexual orientation) was associated with poor ART adherence, only racial discrimination was significantly related to adherence in multivariate analyses (Bogart, Wagner, Galvan, & Klein, 2010). In contrast, in a sample of Black men with HIV (Wagner et al., 2012), discrimination due to race, HIV-status, and sexual orientation were each associated with poor HIV treatment adherence. In light of this research, it is possible that the association between racial discrimination and HIV treatment adherence among PWH may extend to other health outcomes specific to PWH who smoke, including adherence to smoking cessation treatment.

Perceived Ethnic Discrimination and Cigarette Smoking among PWH

  Perceived ethnic discrimination and cigarette smoking. Despite the high prevalence of both cigarette smoking and perceived ethnic discrimination reported by PWH, little is known about the relationship between perceived ethnic discrimination and smoking abstinence among PWH, or potential moderators and mediators of this relationship. This being said, some research has shown that perceived ethnic discrimination is related to reduced likelihood of smoking abstinence among Hispanic/Latino (Kendzor, Businelle, Reitzel, Castro, et al., 2014) and Black (Alexander, Hebert, Businelle, & Kendzor, 2019) individuals without HIV. For example, in a longitudinal smoking cessation study of Spanish-speaking participants of Mexican heritage in Texas, US (N = 199), individuals with greater lifetime exposure to discrimination were less likely to achieve smoking abstinence compared to those with less lifetime exposure to discrimination (Kendzor et al., 2014).

  Perceived ethnic discrimination, cigarette smoking, and HIV. There is limited research on the relationship between cigarette smoking and perceived ethnic discrimination among PWH. However, one study examined whether avoidance coping mediated the relationship between multiple forms of discrimination (i.e., based on race, HIV, and sexual orientation) and tobacco use among PWH (Crockett, Rice, & Turan, 2018). This study found that race-based discrimination was not significantly related to tobacco use. In addition, the authors found that avoidance coping did not mediate the relationship between race-based discrimination and tobacco use. In a randomized controlled trial for a smoking cessation intervention comparing PWH with poly-tobacco use (i.e., use of multiple tobacco products) and cigarette-only use, Tamí-Maury and colleagues (2013) found that PWH with poly-tobacco use reported higher levels of perceived racial discrimination, stress, anxiety, and

depression compared to PWH with cigarette-only use. In addition, PWH with poly-tobacco use reported lower levels of self-efficacy to quit smoking and lower levels of social support compared to PWH with cigarette-only use. The authors concluded that unemployment and high levels of perceived discrimination were the most important risk factors for poly-tobacco use among PWH who smoke. Moreover, a recent qualitative study of HIV-positive Black MSM (Del Pino, Dacus, Harawa, & McWells, 2021) found that many PWH smoked cigarettes to cope with stressors related to race, sexual orientation, and HIV status, including race-related discrimination. To date, no study has directly examined the relationship of perceived ethnic discrimination to cigarette smoking abstinence among PWH, or the relationship of and depression and perceived stress to perceived ethnic discrimination and smoking abstinence.

Summary, Significance, and Innovation

Summary. Cigarette smoking among people with HIV is a prevalent (Park et al., 2016), urgent, and potentially fatal public health concern (Helleberg et al., 2013). Thus, it is important to identify factors (e.g., discrimination) related to continued smoking and difficulty quitting smoking in this population. Experiences of perceived discrimination are common among PWH (Molero, Recio, García-Ael, Fuster, & Sanjuán, 2012) and can result in significant adverse physical (Cuevas, Ho, et al., 2019; Pascoe & Smart Richman, 2009) and psychological (Assari et al., 2017; Brondolo et al., 2008; Ward et al., 2019) effects. The impact of perceived discrimination is magnified among individuals living with multiple, co-occurring marginalized identities including HIV status, smoking status, and racial or ethnic minority status (Logie et al., 2013). In particular, perceived ethnic discrimination is common

among Hispanic/Latino and Black PWH and may be associated with poor mental health (e.g., depression) outcomes (Herskovits, Knackmuhs, Stanton, & Shuter, 2011).

This study aimed to contribute to the understanding of perceived ethnic discrimination and smoking outcomes among PWH who smoke cigarettes and are attempting to quit in a clinical trial for an intensive group-based smoking cessation intervention. Specifically, this study investigated the relationship between perceived ethnic discrimination and cigarette smoking-related outcomes (i.e., smoking abstinence, nicotine dependence, self-efficacy, motivation to quit) among PWH, assessed whether race and ethnicity moderated the relationship between perceived ethnic discrimination and cigarette smoking, and assessed whether depressive symptoms and perceived stress mediated the relationship between perceived ethnic discrimination and cigarette smoking in this sample of PWH who smoke (see below for detailed description of the aims).

Significance. Key findings from this work can inform patient care and identify important directions for future research. Specifically, findings will advance our understanding of the role of perceived ethnic discrimination in cigarette smoking-related outcomes among PWH, a population with high prevalence of smoking, compounded experiences of stigma and discrimination, and health consequences related to HIV (e.g., medication nonadherence), cigarette smoking, and discrimination. It is critical to target and address discrimination (e.g., by increasing adaptive coping and decreasing maladaptive coping) to improve smoking cessation outcomes and reduce smoking-related morbidity and mortality among PWH. Moreover, interventions that prevent and combat discrimination may have the potential to improve psychological wellbeing, medication adherence, and health outcomes, which may help to achieve and maintain smoking cessation gains overall.

Innovation. This was the first study, to the author's knowledge, to directly examine the relationship between perceived ethnic discrimination and cigarette smoking abstinence in a sample of PWH. Two known studies, including the parent study (Stanton et al., 2020), measured perceived ethnic discrimination in a sample of PWH in a smoking cessation trial, but did not examine perceived ethnic discrimination in the analysis of smoking outcomes (Moadel et al., 2012; Stanton et al., 2020). In addition, one existing study has looked at perceived race-based discrimination in relation to poly-tobacco use (Tami-Maury et al., 2013), but not smoking abstinence, nicotine dependence, self-efficacy, or motivation to quit smoking. This study found that greater perceived discrimination was related to greater poly-tobacco use after adjusting for demographic and psychosocial variables.

The current study was the first to look at each of these smoking outcomes (i.e., abstinence, nicotine dependence, motivation to quit smoking, self-efficacy to quit smoking) in relation to perceived ethnic discrimination among PWH who smoke. Moreover, it was the first to explore potential moderators (i.e., race, ethnicity) and mediators (i.e., depressive symptoms, perceived stress) in the relationship between perceived ethnic discrimination and these smoking outcomes among PWH.

Although some longitudinal research on smoking outcomes among PWH exists, most are limited to a follow-up period of 3 months or less (e.g., (Moadel et al., 2012; Tami-Maury et al., 2013)). This study assessed treatment outcomes at 3- and 6-month follow-up periods and examined variables related to longer term abstinence.

Study Aims and Hypotheses

The **primary aim** of this study was to examine whether perceived ethnic discrimination at baseline was related to smoking abstinence at 3-month follow-up (Aim 1a)

and at 6-month follow-up (Aim 1b). It was hypothesized that higher levels of perceived ethnic discrimination at baseline would relate to lower likelihood of abstinence at 3-month follow-up (Hypothesis 1a) and 6-month follow-up (Hypothesis 1b) compared to PWH with lower perceived ethnic discrimination.

The **secondary aim** of this study was to examine whether perceived ethnic discrimination at baseline is related to nicotine dependence at 3-month follow-up (Aim 2a) and 6-month follow-up (Aim 2b), motivation to quit smoking at 3-month follow-up (Aim 2c) and 6-month follow-up (Aim 2d), and self-efficacy to quit smoking at 3-month follow-up (Aim 2e) and 6-month follow-up (Aim 2f). It was hypothesized that higher levels of perceived ethnic discrimination at baseline would relate to higher nicotine dependence at 3-month follow-up (Hypothesis 2a) and 6-month follow-up (Hypothesis 2b), lower motivation to quit smoking at 3-month follow-up (Hypothesis 2c) and 6-month follow-up (Hypothesis 2d), and lower self-efficacy to quit smoking at 3-month follow-up (Hypothesis 2e) and 6-month follow-up (Hypothesis 2f) compared to PWH with lower perceived ethnic discrimination.

The **exploratory aims** were to examine race and ethnicity as potential moderators in the relationship between perceived ethnic discrimination at baseline and abstinence at 3-month follow-up (Exploratory Aim 1a) and 6-month follow-up (Exploratory Aim 1b), nicotine dependence at 3-month follow-up (Exploratory Aim 1c) and 6-month follow-up (Exploratory Aim 1d), motivation to quit smoking at 3-month follow-up (Exploratory Aim 1e) and 6-month follow-up (Exploratory Aim 1f), and self-efficacy to quit smoking at 3-month follow-up (Exploratory Aim 1g) and 6-month follow-up (Exploratory Aim 1h).

In addition, potential mediators related to mental health (i.e., depressive symptoms, perceived stress) were explored in the relationship between perceived ethnic discrimination at baseline and abstinence at 3-month follow-up (Exploratory Aim 2a) and 6-month follow-up (Exploratory Aim 2b), nicotine dependence at 3-month follow-up (Exploratory Aim 2c) and 6-month follow-up (Exploratory Aim 2d), motivation to quit smoking at 3-month follow-up (Exploratory Aim 2e) and 6-month follow-up (Exploratory Aim 2f), and self-efficacy to quit smoking at 3-month follow-up (Exploratory Aim 2g) and 6-month follow-up (Exploratory Aim 2h).

Chapter II: Research Methods and Design

Overview of Research Methods and Design

This study was a secondary analysis of data from a prospective, randomized controlled clinical trial for a group-based smoking cessation treatment across three sites: Montefiore Medical Center's Center for Positive Living (CPL) in the northwest Bronx, NY, Montefiore Medical Center's Comprehensive Health Care Center in the south Bronx, NY, and MedStar Georgetown University Hospital HIV Clinical Program in Washington, DC (see Stanton et al., 2020 for more details). The clinical trial was reviewed and approved by the institutional review boards of Montefiore Medical Center and MedStar Georgetown University Hospital.

Participants

Between August 2014 and July 2017, 537 candidates were screened, and of these, 450 treatment-seeking PWH were enrolled in the study. Participants were excluded from the study due to no current tobacco smoking (n = 63), not having HIV infection (n = 13), having a contraindication to transdermal nicotine patch (n = 7), pregnancy (n = 2), and other reasons (n =2). Of the 450 participants who were enrolled, eight were removed from the study due to randomization contamination (n = 3), withdrawal from study prior to randomization (n = 3), accidental loss of study data (n = 1), and enrollment in the study at a different site (n = 1). Reasons for exclusions from the study and analyses are illustrated in the consort diagram (see Figure 1). In total, 442 participants completed the study (M_{age} = 50.6; 52.8% male; 56.3% Black; 87.7% unemployed/disabled; 81.6% single); with 216 randomly assigned to the

Positively Smoke Free Condition and 226 randomly assigned to the control condition (Stanton et al., 2020). In total, 176 participants from the Positively Smoke Free condition and 196 participants from the control condition completed the study (i.e., completed the 6-month follow-up visit).

Procedures

Recruitment procedure. Across all three sites in the clinical trial, participants were recruited through primary care referrals, self-referral, and by direct invitation in clinic waiting rooms. Individuals who were interested in participating in the study were screened for HIV status, current tobacco use, motivation to quit smoking, and any contraindications to transdermal nicotine patch. Participants were considered eligible to participate in the clinical trial if they met the following inclusion criteria: 1) lab-documented HIV positive status, 2) 18+ years of age, 3) English fluency, 4) current tobacco smoking (i.e., "any product containing nicotine including cigarettes, pipes, or cigars"), 5) motivation to quit smoking, as defined by a score of 4 to 9 of the Abrams-Biener Readiness to Quit Ladder (1991), and 6) willingness to commit to eight 90-minute group sessions over seven weeks if assigned to the group therapy condition. Individuals were considered ineligible to participate in the clinical trial if they: 1) were pregnant, 2) previously participated in the study, 3) had a contraindication to transdermal nicotine patch, and 4) did not meet one or more of the inclusion criteria.

Consent procedure. A research assistant explained the purpose and the procedures of the study in a private room and obtained written informed consent from eligible participants. Participants were made aware that they did not need to consent to participate immediately and were encouraged to ask questions to the research staff and/or discuss with family or

friends before they made the decision to participate. Participants were informed that they could decline participation or withdraw from the study at any time once participation had begun. In addition, participants were told that a decision not to participate would in no way affect the care they receive at the facility. A copy of the consent form was provided to participants for their own records.

      Study procedure. Candidates who met all inclusion criteria, remained interested, and provided consent were randomized in a 1:1 ratio to the group therapy (i.e., intervention) condition or the standard of care (i.e., control) condition using a concealed computer-programmed randomization algorithm. Randomization was stratified by study site, motivation to quit (contemplation phase vs. preparation/action phase), and race (Black vs. non-Black).

      The intervention condition, titled Positively Smoke Free (Moadel et al., 2012; Stanton et al., 2020), is briefly summarized below. Additional details for the clinical trial can be found in a recent publication (Stanton et al., 2020). Positively Smoke Free consists of a 42-day, eight-session group therapy-based intensive behavioral tobacco treatment led by cofacilitators consisting of a peer (i.e., a PWH with former smoking status) and a professional (i.e., a person with master's level or doctoral level training in psychology or social work) who each completed tobacco treatment training and certification.

      Positively Smoke Free is based on Social Cognitive Theory principles (Bandura, 2004) and interventions described in the Tobacco Dependence Treatment Handbook (Abrams, Niaura, Brown, Emmons, & Monti, 2003). Positively Smoke Free integrates topics that are particularly relevant to PWH who smoke, including specific smoking-related risks for PWH, comorbid mental health and substance use concerns, social isolation, and stress

reduction, which were identified in preliminary work (Shuter, Bernstein, & Moadel, 2012) and refined through numerous pilot studies.

Each Positively Smoke Free group contained approximately six to eight participants and group therapy sessions were conducted in private conference rooms at each site. To accommodate participants' schedules, evening and weekend groups were offered in addition to weekday and daytime groups. All sessions were recorded to assess fidelity.

In the standard care control conditions, participants were provided with a self-help smoking cessation brochure targeting PWH who smoke and brief (~5 minutes) advice to quit smoking based on the Tobacco Dependence Treatment Handbook.

All participants, regardless of condition, were offered a prescription for a 12-week supply of transdermal nicotine patches and encouraged to use the nicotine patches in their quit attempts. Transdermal nicotine patches were often covered by participants health insurance and, if not, it was provided free of charge.

Participants in both conditions were asked to complete interviews at baseline and during study visits at four time points (see Figure 2): baseline, day 28 (i.e., quit date), day 120 (i.e., 3 months post quit date), and day 210 (i.e., 6 months post quit date). Participants' quit dates were scheduled for 28 days following the initial group session. Interviews were conducted using audio computer-assisted self-interview (ACASI, QDSTM software) and included measures of sociodemographic, smoking, clinical, substance use, and behavioral characteristics. Only measures included in the secondary analyses are summarized below.

Measures

Demographic measures and perceived ethnic discrimination were only assessed during the baseline study visit. All other variables listed below were assessed during each of the four study visits.

Demographics and HIV-related information. Demographic information was self-reported for age, gender (i.e., male, female, transgender), ethnicity (i.e., Hispanic/Latino, Not Hispanic/Latino), race (i.e., American Indian or Alaska Native, Asian, Black or African American, Native Hawaiian or Other Pacific Islander, White), income, employment status (i.e., full-time, part-time, unemployed/disabled), education (i.e., elementary or less, some high school, high school diploma, some college, college diploma), housing status (i.e., stable, transitional, homeless), and marital status (i.e., married or living with partner, single). Participants were asked to report the year of their HIV diagnosis, HIV infection route (e.g., sexual contact, injection drug use, transfusion), and whether they had been diagnosed with AIDS.

National Institutes of Health (NIH) guidelines were used for measuring racial and ethnic categories. With regard to race and ethnicity, data for individuals who selected "other" to race and ethnicity items were categorized according to the information specified. Specifically, those whose responses contained the following words were categorized as Hispanic/Latino ethnicity: Puerto Rican, Latino, Latina, Hispanic, Latin, Spanish. Race was categorized using the NIH guidelines above: those who identified as Black or African American were classified as "Black" and those who identified as any other race, (i.e., American Indian or Alaska Native, Asian, Native Hawaiian or Other Pacific Islander, White) were classified as "other" race. In addition, one individual specified their race as "Jamaican"

and was coded as Black race. Finally, individuals had the option to select "none or multiple" races, and those who did not identify a race were coded as "none". For analyses, one race/ethnicity variable was created with the following, exclusive categories: White (with non-Hispanic/Latino ethnicity), Hispanic/Latino ethnicity (with White, Black, or none/multiple/other race), Black (with non-Hispanic/Latino ethnicity), and none/multiple/other race (with non-Hispanic/Latino ethnicity).

        Perceived ethnic discrimination. Perceived ethnic/racial discrimination was assessed with the Brief, 17-item community-version of the Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B) (Brondolo et al., 2005). The scale asked respondents, "Because of your ethnicity/race, how often…", and measured 4 types of perceived ethnic discrimination including exclusion/rejection (4 items; e.g., "Have others ignored you or not paid attention to you?"), stigmatization/devaluation (4 items; e.g., "Have others hinted that you are dishonest or can't be trusted?"), discrimination at work/school (4 items; e.g., "Have you been treated unfairly by teachers, principals, or other staff at school?"), and threat/aggression (4 items; e.g., "Have others threatened to hurt you?"). One additional item measured unfair treatment from police (i.e., "Have policemen or security officers been unfair to you?"). Responses for each item were scored on a Likert scale of 1 ("never") to 5 ("very often"). Total PEDQ-CV-B scores and each of the four subscale scores were based on the average of each response and range from 1 to 5, with higher scores indicating higher perceived ethnic discrimination. The PEDQ-CV-B ($\alpha = .87$) and its subscales ($\alpha = .67$-$.80$) have demonstrated adequate internal consistency in a community sample of adults (Brondolo et al., 2005). Moreover, the PEDQ-CV-B has demonstrated convergent and discriminant validity as well as measurement invariance across five racial and ethnic groups, including

Black and Hispanic/Latino groups (Blair et al., 2021). In addition, the total PEDQ-CV-B

scale had good internal consistency in the current sample, α = .922.

Cigarette smoking. The primary outcome variable in this study was dichotomous

(abstinent vs. not abstinent) and the 7-day point prevalence smoking abstinence was

biochemically confirmed based on an exhaled carbon monoxide (ECO) level of ≤10 parts per

million (ppm) (Benowitz et al., 2002). However, more recent data suggests that an ECO level

of ≤6 ppm may be a more appropriate threshold for clinical trials (Benowitz et al., 2020),

thus separate analyses were conducted using each of the two ECO levels to define

abstinence.

Nicotine dependence was assessed using the Modified Fagerström Tolerance

Questionnaire (MFTQ) (Fagerstrom & Schneider, 1989), which is a 7-item scale with total

scores ranging from 0-9 with higher scores indicating greater nicotine dependence. A

systematic review of the psychometric properties of the MFTQ, which included samples of

Black and Hispanic/Latino individuals, reported that its internal consistency reliability ranges

from α = .56 (poor) to α = .75 (acceptable) (Prokhorov et al., 2017). The MFTQ's test-retest

reliability was excellent in a community sample of Argentinian adults ($r = 0.88$) (DiFranza,

Morello, & Gershenson, 2011).

Motivation to quit smoking was measured by the Abrams-Biener Readiness to Quit

Ladder (Biener & Abrams, 1991), which ranges from 0 ("no thought of quitting") to 10

("taking action to quit"), with greater scores indicating greater motivation to quit smoking.

Only participants with motivation scores of 4 ("I sometimes think about quitting, but I have

no plans to quit") to 9 ("I have quit smoking, but I still worry about slipping back, so I need

to keep working at living smoke free") were included in this study. The Readiness to Quit

Ladder has demonstrated satisfactory convergent validity and predictive validity in samples of individuals who smoke (Biener & Abrams, 1991; McDermut & Haaga, 1998) and use substances (Hogue, Dauber, & Morgenstern, 2010).

Smoking cessation self-efficacy was measured using the Self-Efficacy/Temptation Scale – Long Form (Velicer, Diclemente, Rossi, & Prochaska, 1990), which is a 20-item scale asking respondents how tempted they would be to smoke in a range of situations (e.g., "when I am craving a cigarette", "when I see someone smoking and enjoying it", "when I am extremely depressed"). Responses were assessed on a Likert scale from 1 ("not at all tempted") to 5 ("extremely tempted") with total scores summed and ranging from 20 to 100. In addition, items corresponded to subscales for positive affect/social situations, negative affect situations, and habitual/craving situations. The Self-Efficacy/Temptations scale has not been previously validated in a sample of PWH, however, it has demonstrated good internal consistency in a sample of treatment seeking PWH who smoke in the US (Shuter et al., 2014). In the current sample, the Self-Efficacy/Temptation Scale – Long Form had good internal consistency, $\alpha = .927$.

Perceived stress. Perceived stress was assessed with the Short Form Perceived Stress Scale (PSS-4) (Herrero & Meneses, 2006), which is a four-item scale that asks respondents to rate how often they experienced stressful situations in the previous month. Response options ranged from 0 ("never") to 4 ("very often") and total scores ranged from 0 to 16, with higher scores indicating greater perceived stress. A review of the Perceived Stress Scale found the PSS-4 to have "marginally acceptable" internal consistency with Cronbach's alpha ranging from .60-.82 across 6 study samples from Greece, Brazil, China, Jordan, and the US (Lee, 2012). The PSS-4 scale had poor internal consistency in the current sample, $\alpha = .454$.

Depressive symptoms. Depressive symptoms were assessed with the Center for Epidemiologic Studies Depression Scale (CES-D) (Radloff, 1977), which is a 20-item scale that asks participants how often they experienced symptoms associated with depression in the past week. Response options ranged from 0 ("rarely") to 3 ("most or almost all the time") and total scores ranged from 0 to 60, with higher scores indicating greater depressive symptoms. A systematic review of the psychometric properties of common mental health screening tools demonstrated that the CES-D has high internal consistency ($\alpha = .89$-$.93$) and criterion validity ($\alpha = .84$-$.90$) (van Ballegooijen, Riper, Cuijpers, van Oppen, & Smit, 2016). The CES-D has also demonstrated high internal consistency ($\alpha = .84$) in a sample of primary care patients with HIV or Tuberculosis in Zambia (Chishinga et al., 2011) and high internal consistency ($\alpha = .92$) in a sample of PWH in Colombia (Mueses-Marin, Montano, Galindo, Alvarado-Llano, & Martinez-Cajas, 2019). Of note, the CES-D has been found to over-estimate the prevalence of depression in epidemiologic studies (Dang, Dong, & Mezuk, 2020). Moreover, there is limited research regarding the scale's discriminability of symptoms related to depression and anxiety among Hispanic/Latino populations (Gonzalez-Rivera, Pagan-Torres, & Perez-Torres, 2020). In the current sample, the CES-D scale had good internal consistency, $\alpha = .874$.

Data Analysis

Power analysis. Based on a pilot trial of Positively Smoke Free group therapy with a three-month follow-up period (Moadel et al., 2012) and projecting for a 2-3% smoking relapse rate between the 3-month and 6-month follow-up periods, the authors of the parent study (Stanton et al., 2020) estimated that 16.2% of the participants in the Positively Smoke Free group condition and 6.7% of those in the control condition would achieve the primary

study endpoint at 6 months. Based on this, the authors planned to enroll 225 participants into each condition, generating a power of 89% to detect differences between groups.

Power estimates for the proposed analyses were based on the hypotheses for primary, secondary, and exploratory aims. Approximations for power were calculated using the statistical software G*Power 3.1 as PASS software was unavailable. Therefore, power analyses for all aims were based on repeated measures analysis of variance (ANOVA) rather than linear mixed models (LMM). An alpha level of .05 was used for each calculation. Studies with similar aims and analyses were not available to base effect sizes on, so small (0.2) effect sizes were examined for each power calculation.

For the current study's primary aim, a post-hoc test for logistic regression estimated that a sample size of 378 results in a power of 0.93 to detect an odds ratio of 1.5. For the secondary aim, a post-hoc test for a repeated measures, between factors ANOVA with two groups (i.e., intervention vs. control) and three measurements (i.e., baseline, 3-month follow-up and 6-month follow-up) estimated that a sample size of 378 results in a power of 0.99 to detect a small effect. Finally, for the exploratory aims, a post-hoc test for repeated measures, between factors ANOVA with four groups based on race/ethnicity and treatment condition (i.e., Black, intervention; Black, control; Hispanic/Latino intervention; Hispanic/Latino control) and two measurements (i.e., 3-month follow-up and 6-month follow-up) estimated that a sample size of 326 (i.e., the number of participants who identify as Black or Hispanic/Latino) results in a power of 0.99.

Preliminary analyses. All statistical analyses were conducted using IBM's Statistical Package for the Social Sciences (SPSS) Version 27. The intent to treat sample, excluding participants who identified as White, non-Hispanic/Latino (n = 28), was used for analyses

examining perceived ethnic discrimination (N = 378). The rationale for excluding White-only participants from all analyses is that perceived racial and ethnic discrimination is predominantly experienced by individuals from racial and ethnic minority backgrounds (Plascak et al., 2018). For analyses that also included the race/ethnicity variable, participants who identified as non-Hispanic/Latino and White (n = 28) or none/multiple/other races (n = 52) were excluded due to difficulties with interpretation. This resulted in a sample size of 326 Black and Hispanic/Latino participants in analyses including race/ethnicity.

Prior to analysis, the distributions (e.g., frequencies, normality) of all study variables were inspected and the data were corrected for errors. Missing data for the primary study outcome variable (i.e., dichotomous abstinence status) were manually imputed such that individuals who were lost to follow-up at 3 months and 6 months were coded as non-responders (i.e., not abstinent). In addition, separate dichotomous abstinence variables were created based on ECO levels of <10 and levels of <6 parts per million (ppm).

A missing value analysis was conducted to evaluate the extent of missing data for all continuous study variables examined: perceived ethnic discrimination, nicotine dependence, motivation to quit smoking, self-efficacy to quit smoking, perceived stress, and depressive symptoms, using the missing value pattern option in SPSS. In addition, Little's MCAR tests were used to test whether missing data was completely random. Data that were missing at random were manually computed using study variable means. Variables with imputed data were used for all analyses except linear mixed effect modelling as these analyses automatically handle missing data using maximum likelihood estimation. In addition, to determine whether all study variables were normally distributed, the data were visually inspected, normality statistics (i.e., skewness, kurtosis) were performed, and graphs (i.e.,

histogram, Q-Q plot) were examined. Outliers were assessed for nicotine dependence, self-efficacy to quit smoking, motivation to quit smoking, perceived stress, and depressive symptoms, using perceived ethnic discrimination as the predictor. Standardized residuals with absolute values larger than 3 were considered to be outliers and were winsorized.

In addition to the preliminary analyses described above, assumptions for logistic regression were assessed before conducting analyses for Aim 1 (a & b) and Exploratory Aim 1 (a & b). Box-Tidwell tests were used to examine the linear relationship between perceived ethnic discrimination and the logit of each dichotomous abstinence variable. Residuals were examined and Cook's distance was checked to test for extreme outliers. Assumptions for mixed effects models (i.e., normality, linearity, heteroscedasticity) were tested before performing analyses for the Secondary Aim (2a – 2f) and Exploratory Aim 1 (c – h). Standardized residuals of perceived ethnic discrimination were plotted against predicted values of each continuous outcome variable (i.e., nicotine dependence, self-efficacy, motivation to quit smoking). Finally, Variance Inflation Factors (VIF) were examined for perceived ethnic discrimination and continuous mediator variables (i.e., depressive symptoms, perceived stress) to check for multicollinearity in parallel mediation analyses used in Exploratory Aims 2a – 2h.

Descriptive statistics (i.e., means, standard deviations, frequencies, percentages) for all demographic and study variables (i.e., age, gender, ethnicity, race, income, employment status, education, housing status, marital status, perceived ethnic discrimination, abstinence, nicotine dependence, self-efficacy, motivation to quit smoking, perceived stress, depressive symptoms) were calculated and presented for the total intent to treat sample, each treatment group (i.e., intervention, control), and race/ethnicity (i.e., Black, Hispanic/Latino). These

statistics are presented in Tables 1-3. To assess for candidate covariates, associations between baseline characteristics (i.e., age, gender, ethnicity, race, income, employment status, education, housing status, marital status, treatment site, treatment group) and each study outcome (i.e., abstinence, nicotine dependence, self-efficacy, motivation to quit) were calculated and presented in Table 4. Further, associations between the primary study predictor (i.e., perceived ethnic discrimination) and these baseline characteristics were calculated and are presented in Table 5. Treatment group and demographic variables related to both perceived ethnic discrimination and abstinence (i.e., housing status) were entered as covariates in all adjusted analyses. Pearson correlations and Spearman rank correlations were used to examine the relationships between continuous variables. A correlation matrix for all continuous study variables is presented in Table 6. Dichotomous variables were analyzed using X^2 and Fisher exact tests, while ANOVA, independent sample t-tests, and Mann–Whitney U tests were used to compare means. Bonferroni adjusted p-values were calculated to account for use of multiple comparisons across primary and secondary study aims. Findings from exploratory analyses were considered statistically significant at $\alpha = .05$.

Principal components analysis with Horns parallel analysis was used to determine whether the PEDQ-CV-B subscales (i.e., exclusion/rejection, stigmatization/devaluation, discrimination at work/school, threat/aggression) were appropriate to analyze with this dataset. The internal consistency reliability for the total PEDQ-CV-B scale was calculated using Cronbach's alpha.

Primary analyses. The relationship between baseline perceived ethnic discrimination and the dichotomous abstinence outcome at 3-month and 6-month follow-up periods was analyzed using binary logistic regression with abstinence as the dichotomous criterion

variable and baseline perceived ethnic discrimination as the predictor. Separate analyses were performed for the 3-month and 6-month follow-up visits, using a Bonferroni adjusted p-value of .025 (.05/2), with and without adjusting for housing status (i.e., stable, unstable) and treatment group (i.e., intervention, control). In addition, separate analyses were performed for abstinence outcomes using ECO levels of <6ppm and <10ppm. Odds ratios [ORs] with 95% confidence intervals [CIs] are presented. The same logistic regression analyses were performed separately in the sample of participants who received the Positively Smoke Free intervention (i.e., the intervention-only sample; N = 216) to examine the relationship between baseline perceived discrimination and abstinence among PWH who were in the intervention condition, adjusting for housing status.

An ANOVA was conducted to determine whether perceived ethnic discrimination differs among the four abstinence outcome groups: 1) those who were abstinent at both follow-up periods, 2) those who were not abstinent at either follow-up period 3) those who were abstinent at the 3-month follow-up period and relapse, 4) those who were not abstinent at the 3-month follow-up but are abstinent at the 6-month follow-up. Further, an ANCOVA was conducted to control for housing status and treatment group in this relationship.

In addition, parallel mediation using model 4 of Hayes' PROCESS macro was performed to assess whether perceived ethnic discrimination mediates the relationship between race/ethnicity and cigarette smoking abstinence. Race/ethnicity (i.e., Hispanic-Latino ethnicity; Black race) was entered as the independent variable and perceived ethnic discrimination was entered the mediator. Separate mediation analyses were performed for abstinence at 3- and 6-month follow-ups, based on ECO levels of <6ppm and <10ppm, with and without adjusting for housing status and treatment group. Again, separate mediation

analyses were performed for PWH who received the Positively Smoke Free intervention (i.e., the intervention-only sample), adjusting for housing status.

Secondary analyses. Linear mixed effect modelling (LMM) for repeated measures was used to estimate missing values and to examine the relationship between perceived ethnic discrimination and continuous smoking-related outcome variables (i.e., nicotine dependence, self-efficacy, motivation to quit) at each timepoint. Intercept, time (i.e., baseline, 3-month follow-up, 6-month follow-up), and baseline perceived ethnic discrimination were included as fixed effects, as well as all two-way and three-way interactions. Intercept, participant ID and covariance structure were included as random effects, while time, participant ID, and covariance structure were included as repeated effects. Non-significant interactions were removed from the final models. Nicotine dependence, self-efficacy, and motivation to quit smoking were entered as continuous dependent variables and separate analyses were performed for each outcome, with and without adjusting for housing status and treatment group (i.e., additional analyses were conducted with housing status and treatment group included as fixed effects). The baseline visit was coded as the reference category for time and the same covariance structure was used for each analysis. A Bonferroni adjusted p-value of .017 (.05/3) was used to determine statistical significance in analyses. In addition, these analyses were performed separately among PWH in the Positively Smoke Free intervention condition (i.e., the intervention-only sample), adjusting for housing status.

Exploratory analyses. To assess whether race/ethnicity moderated the relationship between perceived ethnic discrimination and cigarette smoking abstinence (Exploratory Aim 1a and 1b), binary logistic regressions were performed with 3- and 6-month abstinence (using

ECO levels of <6ppm and <10ppm) as the dichotomous criterion variables. Baseline perceived ethnic discrimination, race/ethnicity (i.e., Hispanic-Latino ethnicity; Black race), and the interaction between perceived ethnic discrimination and race/ethnicity were entered as the predictors. Odds ratios [ORs] with 95% confidence intervals [CIs] are presented. Analyses were performed with and without adjusting for housing status and treatment group. Moreover, separate analyses were performed among PWH in the Positively Smoke Free intervention condition (i.e., the intervention-only sample), adjusting for housing status.

In addition, LMM was used to examine whether race and ethnicity moderated the relationship between perceived ethnic discrimination and continuous smoking-related outcome variables (i.e., nicotine dependence, self-efficacy, motivation to quit) at each timepoint (Exploratory Aims 1c – 1f). Intercept, time (i.e., baseline, 3-month follow-up, 6-month follow-up), race/ethnicity (i.e., Hispanic-Latino ethnicity; Black race), and baseline perceived ethnic discrimination were included as fixed effects, as well as all two-way and three-way interactions. Intercept, participant ID, and covariance structure were included as random effects, while time, participant ID, and covariance structure were included as repeated effects. Non-significant interactions were removed from the final models. Nicotine dependence, self-efficacy, and motivation to quit smoking were entered as continuous dependent variables and separate analyses were performed for each outcome, with and without adjusting for housing status and treatment group. The baseline visit was coded as the reference timepoint. The above analyses were also conducted separately among PWH in the Positively Smoke Free intervention condition (i.e., the intervention-only sample), adjusting for housing status.

Finally, parallel mediation analyses using model 4 of Hayes' PROCESS macro were performed to assess potential mediators in the relationship between perceived ethnic discrimination and abstinence (using ECO levels of <6ppm and <10ppm) at 3- and 6-month follow-ups (Exploratory Aims 2a & 2b), as well as nicotine dependence, self-efficacy, and motivation to quit smoking at 3- and 6-month follow-ups (Exploratory Aims 2c-2h). Each mediation analysis was conducted with and without adjusting for housing status and treatment group. Baseline perceived ethnic discrimination was entered as the independent variable, while perceived stress and depressive symptoms were entered as mediators. Perceived stress and depressive symptom scores measured at baseline were used in analyses with 3-month follow-up outcomes while scores measured at 3-month follow-up were used in analyses with 6-month follow-up outcomes. Again, these analyses were conducted separately among PWH in the Positively Smoke Free intervention condition (i.e., the intervention-only sample), adjusting for housing status.

Chapter III: Results

Preliminary Results

Abstinence data were missing for 22.4% of participants ($n = 99$) at 3-month follow-up and 15.8% of participants ($n = 70$) at 6-month follow-up and were manually imputed as "not abstinent". Individuals in the intervention condition, compared to the control condition, accounted for more of the missing data at 3-month follow-up (63.6% versus 36.4%) and at 6-month follow-up (57.1% versus 42.9%). Little's MCAR test was run on participants' exhaled carbon monoxide (ECO) values and indicated that these data were missing at random, $X^2 = 1.88$, $p = .389$. Missing data for each continuous study variable ranged from 6.6% to 7.5%. Since the amount of missing data for each measure was less than 10% (Bennett, 2001), it was considered non-problematic. In addition, Little's MCAR test was run on these variables and results showed that the data were missing at random, $X^2 = 12.12$, $p = .205$. Because these data were missing at random, average scores for each continuous variable were manually imputed.

Examination of standardized residuals indicated that there were no extreme outliers for the measures of nicotine dependence or depressive symptoms. Self-efficacy had two outliers (1.00, 1.01) which were winsorized to 1.65 (0.5% winsorization). Motivation to quit smoking had four outliers (1, 1, 2, 2), which were winsorized to 4 (0.9% winsorization). Finally perceived stress had one outlier (16), which was winsorized to 14 (0.2% winsorization). Skewness and Kurtosis statistics indicated that data were normally distributed for perceived ethnic discrimination (skewness = 1.17, kurtosis = 2.15), nicotine dependence

(skewness = -.14, kurtosis = -.1), self-efficacy to quit smoking (skewness = -.19, kurtosis =.01), motivation to quit smoking (skewness = -.57, kurtosis = .21), perceived stress (skewness = -.38, kurtosis = -.07), and depressive symptoms (skewness = .7, kurtosis = .02).

Box-Tidwell tests indicated that the logistic regression assumption of linearity between 6-month abstinence and the log transformation of perceived ethnic discrimination was violated for ECO levels of <6ppm (β = 1.57, p = .035) and <10ppm (β = 1.41, p = .049). To account for this, perceived ethnic discrimination was median-split and dummy coded. This assumption was not violated for 3-month abstinence and the log transformation of perceived ethnic discrimination; however, the dummy coded variable was used in all logistic regression analyses to simplify comparisons of findings across analyses. An examination of Cook's distance values for perceived ethnic discrimination and each abstinence outcome variable indicated that there were no extreme outliers. Multicollinearity was not assessed as there was only one independent variable (i.e., perceived ethnic discrimination) in each logistic regression. Plots of standardized residuals and predicted perceived ethnic discrimination values indicated that assumptions of normality, linearity, and heteroscedasticity were not violated for any of the continuous smoking outcomes (i.e., nicotine dependence, self-efficacy to quit smoking, motivation to quit smoking) used in the linear mixed effect models. Finally, no variance inflation factors (VIF) exceeded 1 for perceived ethnic discrimination and both continuous mediators (i.e., perceived stress, depressive symptoms) indicating an absence of multicollinearity.

The total PEDQ-CV-B scale had good internal consistency, α = .922. Horns parallel analysis revealed that the original four PEDQ-CV-B subscales (i.e., exclusion/rejection, stigmatization/devaluation, discrimination at work/school, threat/aggression) were not

appropriate to analyze in this sample. An eigenvalue of 1.5, 50th and 95th percentile

thresholds, and an examination of the scree plot revealed that a two-component structure

would be more appropriate. The sampling adequacy of this data was excellent, KMO = .91

and Bartlett's test of sphericity indicated that the variables are not orthogonal, $X^2 = 4010.9$, p

< .001. Due to the lack of fit of the original subscales, only the total PEDQ-CV-B scale was

included in analyses.

Sample Characteristics

The intent to treat sample (N = 442) was used for analyses. Demographic

characteristics were calculated for the full sample and were broken down by treatment group

(see Table 1) and race/ethnicity (see Table 2). Similarly, treatment and clinical characteristics

are presented for the full sample and broken down by treatment group (see Table 3) and

race/ethnicity (see Table 4). The sample was middle aged on average ($M = 50.6$, SD = 9.1),

with a similar proportion of men (52.8%) and women (44.6%). In addition, the majority of

the sample was non-Hispanic Black (56.3%), unemployed (87.7%), single (81.6%),

graduated from high school (66.8%), and had stable housing (80.4%).

The intervention and control condition were similar in terms of most baseline

characteristics. However, there were twice as many participants with none, multiple, or other

race in the intervention condition (26.4%) compared to the control condition (13.7%), $X^2 =$

29.3, Cramer's $V = .168$, $p = .013$. This is likely due to race data being unavailable for

participants who were lost to follow-up between randomization and the baseline study visit,

the majority of whom were assigned to the intervention condition.

With regard to differences related to race and ethnicity in this sample, Black (non-

Hispanic/Latino) and Hispanic/Latino individuals differed in highest level of education.

More Black participants reported some college (32.9%) compared to Hispanic/Latino individuals (16.9%), X2 = 15.1, Cramer's V = .22, p = .004. Moreover, there were some differences in race/ethnicity across treatment sites, with more Hispanic/Latino participants recruited from the Montefiore CPL (75.3%) compared to the Montefiore CHCC (22.1%) or Georgetown University Hospital (2.6%), X2 = 24.3, Cramer's V = .27, p <.001.

Associations among baseline characteristics and perceived ethnic discrimination are presented in Table 5, and associations among baseline characteristics and abstinence outcomes are presented in Table 6. Housing status was related to perceived ethnic discrimination, such that individuals with transitional housing or homelessness reported greater perceived ethnic discrimination (M = 2.08, SD = .08) compared to those with stable housing (M = 1.78, SD = .69), t(411) = 3.43, p < .001. No other baseline characteristics were associated with perceived ethnic discrimination. In addition, perceived ethnic discrimination was not related to abstinence at 3-month (t = -.65, p = .522) or 6-month (t = -.57, p = .569) follow-up. Both treatment condition and housing status were related to abstinence at 3-month follow-up. Specifically, more participants in the intervention condition (11.1%) were abstinent at 3-month follow-up compared to those in the control condition (5.3%), X^2 = 4.22, Phi = .1, p =.036. There were, however, no differences in 6-month abstinence between treatment groups, X^2 = .19, Phi = -.03, p = .65. In addition, more participants with stable housing (10.5%) were abstinent at 3-month follow-up compared to those without stable housing (0%), X^2 = 8.02, Phi = .15, p <.001. No other baseline characteristics were related to abstinence. Based on these preliminary findings, all models were adjusted for housing status and treatment condition.

Bivariate correlations among main study variables are presented in Table 7. Pearson correlations among study variables indicated that greater perceived ethnic discrimination was associated with lower self-efficacy to quit smoking ($r = .21$, $p < .001$), greater perceived stress ($r = .34$, $p < .001$), and greater depressive symptoms ($r = .43$, $p < .001$). In addition, greater perceived stress was associated with greater nicotine dependence ($r = .13$, $p = .005$) and lower self-efficacy to quit smoking ($r = .21$, $p < .001$). Similarly, greater depressive symptoms were associated with greater nicotine dependence ($r = .21$, $p < .001$) and lower self-efficacy to quit smoking ($r = .34$, $p < .001$).

Perceived ethnic discrimination and Smoking Abstinence (Primary Aims 1a, 1b)

Binary logistic regression analyses demonstrated that perceived ethnic discrimination was not associated with participants' odds of abstinence at 3-month follow-up (95% CI = 0.47, 2.08) or 6-month follow-up (95% CI = 0.4, 1.47), regardless of ECO level (i.e., <6ppm vs. <10ppm), housing status, or treatment condition (see Tables 8-11). In addition, ANOVA results indicated that perceived ethnic discrimination did not differ by abstinence group (i.e., abstinent at both follow-ups, neither follow-up, 3-month only, 6-month only) using ECO levels less than 6ppm, $F(3, 410) = 0.1$, $p = .958$, or less than 10ppm, $F(3, 410) = 0.25$, $p = .86$. Adjusted analyses demonstrated that only the housing status covariate was significantly related to abstinence group at both ECO levels, $F(1, 379) = 11.9$, $p = .001$, $\eta^2 = .03$ (see Tables 12-13). In the intervention-only sample (N = 205), findings were similar and perceived ethnic discrimination was not related to participants' odds of abstinence at 3-month follow-up (95% CI = 0.40, 2.49) or 6-month follow-up (95% CI = 0.38, 2.56), regardless of ECO level (i.e., <6ppm vs. <10ppm) or housing status (see Supplemental Tables 1-4).

Mediation analyses showed that race/ethnicity was not related to abstinence and perceived ethnic discrimination did not mediate the relationship between race/ethnicity and abstinence, regardless of ECO level, housing status, or treatment condition (see Figures 3-10). For each adjusted mediation model, housing status was related to perceived ethnic discrimination, β = -0.30, 95% CI [-0.50, -0.10], *p* = .003. Housing status was also related to 3-month abstinence using ECO values of <10ppm, β = 2.24, 95% CI [0.21, 4.26], *p* = .031. In addition, treatment group was related to 3-month abstinence using ECO values of <6ppm, β = 0.85, 95% CI [0.04, 1.66], *p* = .041, and <10ppm, β = 0.80, 95% CI [0.07, 1.53], *p* = .032.

These findings remained the same when the mediation analyses were run in the intervention-only sample, indicating that race/ethnicity were not related to abstinence directly, or indirectly through perceived ethnic discrimination (see Supplemental Figures 1-8). Housing status was related to perceived ethnic discrimination for each of the adjusted mediation models, β = -0.58, 95% CI [-0.92, -0.24], *p* = .001.

Perceived ethnic discrimination and other Smoking Outcomes (Primary Aims 2a – 2f)

First Order Ante-Dependence (AIC = 5159.8) was selected as the covariance structure for all linear mixed effect models (see Table 14). The omnibus test for fixed effects of perceived ethnic discrimination and time (i.e., baseline, 3-month, 6-month) on nicotine dependence showed that time, $F(2, 364) = 52.1$, $p < .001$, and the interaction between time and perceived ethnic discrimination, $F(2, 378) = 6.9$, $p = .001$, were significantly related to nicotine dependence while perceived ethnic discrimination alone was not, $F(1, 407) = .003$, $p = .956$. Participants' expected nicotine dependence rose by 3.2 points (95% CI = 2.39, 3.97) from baseline to 3-month follow-up and rose by 3.1 points (95% CI = 2.46, 3.81) from baseline to 6-month follow-up (see Table 15, Figure 11). In addition, perceived ethnic

discrimination was not related to nicotine dependence from baseline to 3-month follow-up, however, at 6-month follow-up, expected nicotine dependence was 0.6 points lower among individuals with higher perceived ethnic discrimination compared to those with lower perceived ethnic discrimination (95% CI = -0.93, -0.24). The fixed effects of time ($p<.001$) remained significant after adjusting for housing status and treatment condition, however the interaction between time and perceived ethnic discrimination ($p = .027$) was no longer significant using the predetermined Bonferroni adjusted p-value of .017. In addition, the adjusted model revealed a significant three-way interaction among time, treatment, and perceived ethnic discrimination, $F(2, 376) = 4.3$, $p =.015$, and a significant four-way interaction among time, perceived ethnic discrimination, treatment, and housing status, $F(2, 376) = 4.1$, $p = .017$ (see Figure 12). In the treatment condition, those with unstable housing and greater perceived ethnic discrimination had higher levels of nicotine dependence from baseline to three-month follow-up compared to individuals with stable housing and lower perceived ethnic discrimination in both treatment conditions. However, individuals had similar levels of nicotine dependence at 6-month follow-up regardless of housing status, perceived ethnic discrimination level, or treatment condition.

When the above analyses were run in the intervention sample only (N = 148), findings remained the same (see Supplemental Table 5), demonstrating significant fixed effects for time, $F(2, 171) = 40.0$, $p <.001$, and the interaction between time and perceived ethnic discrimination, $F(2, 177) = 7.2$, $p <.001$, but not perceived ethnic discrimination alone, $F(1, 191) = 0.35$, $p = .556$. These findings again remained significant after adjusting for housing status. In addition, there was a two-way interaction between time and housing status, $F(2, 177) = 3.99$, $p = .02$, and a three-way interaction between time, housing status, and

perceived ethnic discrimination, $F(2, 175) = 4.05$, $p = .019$, however, neither of these interactions remained significant at the predetermined Bonferroni adjusted p-value of .017.

The omnibus test for fixed effects of perceived ethnic discrimination and time on motivation to quit smoking were not significant (see Table 16, Figure 13). Moreover, none of the variables or interaction terms included in the adjusted linear mixed effect model were significantly related to motivation to quit smoking. This remained the same when analyses were run in the intervention-only sample (N = 148; see Supplemental Table 6).

Finally, the omnibus test for fixed effects of time and perceived ethnic discrimination on self-efficacy to quit smoking (i.e., smoking temptations) demonstrated significant effects of time, $F(2, 442) = 4.4$, $p = .013$ and perceived ethnic discrimination, $F(1, 436) = 7.4$, $p = .007$, but not their interaction, $F(2, 446) = 2.7$, $p = .071$. Participants' expected smoking temptations decreased by 0.3 points at 3-month follow-up (95% CI = -0.51, -0.003) and by 0.4 points at 6-month follow-up (95% CI = -0.63, -0.13), suggesting an increase in self-efficacy to quit smoking over time (see Table 17, Figure 14). In addition, at each time point, expected smoking temptations were 0.2 points higher among individuals with higher perceived ethnic discrimination compared to those with lower perceived ethnic discrimination (95% CI = 0.13, 0.29). After adjusting for treatment condition and housing status, neither perceived ethnic discrimination ($p = .032$) nor time ($p = .577$), remained significant in predicting self-efficacy, using a Bonferroni adjusted p-value of .017.

In contrast to findings from the full sample, when these analyses were performed in the intervention-only sample (N = 148), the omnibus test for fixed effects demonstrated a significant interaction between perceived ethnic discrimination and time, $F(2, 164) = 4.86$, $p = .009$, but not time, $F(2, 162) = 0.48$, $p = .622$, or perceived ethnic discrimination alone,

$F(1, 191) = 1.37$, $p = .243$. Individuals in the intervention condition who reported greater perceived ethnic discrimination demonstrated a 0.29 point increase in self-efficacy to quit smoking at 3-month follow-up and a 0.25 increase in self-efficacy to quit smoking at 6-month follow-up (see Supplemental Table 7). Although individuals with greater perceived ethnic discrimination had lower self-efficacy to quit smoking at baseline compared to individuals with lower perceived ethnic discrimination, self-efficacy was similar between groups at 3- and 6-month follow-ups (see Supplemental Figure 9).

Race/Ethnicity Moderation (Exploratory Aims 1a – 1h)

Race/ethnicity (i.e., Black, Hispanic/Latino) did not moderate the relationship between perceived ethnic discrimination and abstinence at 3- or 6-month follow-up, regardless of ECO level, with and without adjusting for housing status and treatment condition (see Tables 18-21). Similar results were found when analyses were performed in the intervention-only condition (N = 216) (see Supplemental Tables 8-11).

When examining race/ethnicity as a moderator in the relationship between perceived ethnic discrimination and nicotine dependence over time, however, there was a three-way interaction among race/ethnicity, time, and perceived ethnic discrimination, $F(2, 278) = 4.71$, $p = .01$ (see Table 22; see Figure 15), however, this three-way interaction was no longer significant after adjusting for housing status and treatment condition. Race/ethnicity did not moderate the relationship between perceived ethnic discrimination and motivation to quit smoking or self-efficacy to quit smoking, with or without adjusting for covariates (see Tables 23-24).

In addition, race/ethnicity did not moderate the relationship between perceived ethnic discrimination and nicotine dependence or motivation to quit smoking (see Supplemental

Tables 12 and 13) in the intervention-only sample (N = 148). However, race/ethnicity did moderate the relationship between perceived ethnic discrimination and self-efficacy to quit smoking in the intervention-only condition (see Supplemental Table 14, see Supplemental Figure 10) such that high perceived ethnic discrimination was associated with lower self-efficacy to quit smoking (i.e., greater smoking temptations) among Hispanic/Latino PWH but not Black PWH. Moreover, there was a three-way interaction between perceived ethnic discrimination, race/ethnicity, and time, such that Black PWH with high perceived ethnic discrimination had increased self-efficacy to quit smoking over time, while self-efficacy to quit smoking did not change over time among Hispanic/Latino PWH with high perceived ethnic discrimination (see Supplemental Figure 11).

Stress and Depression Mediation (Exploratory Aims 2a – 2h)

Parallel mediation analyses demonstrated that depressive symptoms and perceived stress did not mediate the relationship between perceived ethnic discrimination and 3- or 6-month abstinence, regardless of ECO level, housing status, or treatment condition (see Figures 16-23). Greater perceived stress, β = 1.35, 95% CI [0.99, 1.7], $p < .001$, and depressive symptoms, β = 7.37, 95% CI [5.93, 8.8], $p < .001$, were related to greater perceived ethnic discrimination at baseline, with and without adjusting for housing status and treatment condition, however, neither were related to abstinence at 3-month or 6-month follow-up.

When conducting these analyses in the intervention-only condition, adjusting for housing status, perceived stress did not mediate the relationship between perceived ethnic discrimination and 3-or 6-month abstinence, regardless of ECO level (see Supplemental Figures 12-15). In contrast, depressive symptoms mediated the relationship between

perceived ethnic discrimination and 3-month abstinence (indirect effect = -0.41, 95% CI = -1.12, -0.001), but not 6-month abstinence. Greater perceived ethnic discrimination at baseline was associated with greater depressive symptoms at baseline (β = 6.81, SE = 0.90, p < .001), which were associated with reduced likelihood of abstinence at 3-month follow-up (β = -0.06, SE = 0.03, p = .045).

 Perceived stress and depressive symptoms did not mediate the relationship between perceived ethnic discrimination and nicotine dependence at 3-month follow-up (see Figure 24). However, there was a direct effect of baseline perceived ethnic discrimination on nicotine dependence at 6-month follow-up, where greater perceived ethnic discrimination was associated with lower nicotine dependence (β = -0.52, SE = 0.19, p = .006). In addition, depressive symptoms at 3-month follow-up mediated the relationship between perceived ethnic discrimination and nicotine dependence at 6-month follow-up (indirect effect = 0.07, 95% CI = 0.004, 0.16). Higher perceived ethnic discrimination was associated with higher depressive symptoms at 3-month follow-up (β = 2.34, SE = 0.64, p < .001) and higher depressive symptoms were associated with higher nicotine dependence at 6-month follow-up (β = 0.03, SE = 0.02, p = .05) (see Figure 25). After adjusting for housing status and treatment condition, the main effect of perceived ethnic discrimination on nicotine dependence at 6-month follow-up remained significant, but the indirect effect did not (see Figure 26 and Figure 27). When these analyses were conducted in the intervention-only sample, adjusting for housing status, neither depressive symptoms nor perceived stress mediated the relationship between perceived ethnic discrimination and nicotine dependence (see Supplemental Figures 16-17).

Neither perceived stress, nor depressive symptoms mediated the relationship between perceived ethnic discrimination and motivation to quit smoking at 3- or 6-month follow-ups, with or without adjusting for covariates (see Figures 28-31). In addition, perceived stress did not mediate the relationship between perceived ethnic discrimination and self-efficacy to quit smoking. When these analyses were conducted in the intervention-only sample, adjusting for housing status, neither depressive symptoms nor perceived stress mediated the relationship between perceived ethnic discrimination and motivation to quit smoking (see Supplemental Figures 18-19).

Depressive symptoms, did, however, mediate the relationship between perceived ethnic discrimination and self-efficacy to quit smoking at both 3- and 6-month follow-ups, with and without adjusting for covariates, in the full sample (see Figures 32-35). Specifically, greater perceived ethnic discrimination was associated with greater depressive symptoms at baseline ($\beta = 7.37$, SE $= 0.73$, $p < .001$), and greater baseline depressive symptoms were associated with more cigarette smoking temptations (i.e., less self-efficacy to quit smoking) at 3-month follow-up ($\beta = 0.01$, SE $= 0.004$, $p = .001$). This resulted in a significant indirect effect of perceived ethnic discrimination on self-efficacy, through depressive symptoms (indirect effect $= 0.1$, 95% CI $= 0.04$, 0.17). Similarly, greater baseline perceived ethnic discrimination was related to greater depressive symptoms at 3-month follow-up ($\beta = 2.34$, SE $= 0.64$, $p < .001$) and higher depressive symptoms were associated with more smoking temptations (i.e., lower self-efficacy to quit) at 6-month follow-up ($\beta = 0.02$, SE $= 0.01$, $p < .001$). When these analyses were conducted in the intervention-only sample, adjusting for housing status, neither depressive symptoms nor perceived stress mediated the relationship

between perceived ethnic discrimination and self-efficacy to quit smoking (see Supplemental

Figures 20-21).

Chapter IV: Discussion

This study examined the relationship between perceived ethnic discrimination and cigarette smoking-related outcomes, including abstinence, nicotine dependence, motivation to quit smoking, and self-efficacy to quit smoking in a multisite sample of people with HIV (PWH) enrolled in a randomized controlled trial for an intensive outpatient smoking cessation group in the Bronx, NY and Washington, DC. Further, this study explored potential moderators (i.e., race/ethnicity) and mediators (i.e., depressive symptoms, perceived stress) of these relationships. Overall, perceived ethnic discrimination was not associated with cigarette smoking abstinence or motivation to quit smoking. Perceived ethnic discrimination was associated with reduced nicotine dependence at 6-month follow-up and lower self-efficacy to quit smoking at 3- and 6-month follow-ups. Race and ethnicity did not moderate the relationship between perceived ethnic discrimination and any of the cigarette smoking outcomes. In addition, depressive symptoms and perceived stress did not mediate the relationship between perceived ethnic discrimination and cigarette smoking abstinence. While depressive symptoms mediated the relationship between perceived ethnic discrimination and nicotine dependence and the relationship between perceived ethnic discrimination and self-efficacy to quit smoking, perceived stress did not.

All analyses were performed with and without adjusting for housing status and treatment condition as they were related to the primary outcome and predictor variables. In addition, analyses that examined abstinence were performed twice using different ECO levels to define abstinence (<6ppm and <10ppm) and results did not differ between the two ECO

levels. Those with unstable housing and those assigned to the control condition were less likely to be abstinent at 3-month follow-up, and individuals with unstable housing reported greater perceived ethnic discrimination.

The primary aim of the study was to examine the relationship between perceived ethnic discrimination and cigarette smoking abstinence among PWH, at 3- and 6-month follow-up periods. It was hypothesized that PWH with higher levels of perceived ethnic discrimination at baseline would be less likely to be abstinent at both follow-up periods compared to PWH with lower levels of perceived ethnic discrimination. This hypothesis was not supported as perceived ethnic discrimination was not related to participants' odds of abstinence at either follow-up period. Nonetheless, this finding expands literature related to PWH who smoke cigarettes as no prior studies have examined the relationship between perceived ethnic discrimination and cigarette smoking abstinence among PWH.

One known study examined whether avoidance coping mediated the relationship between multiple forms of discrimination, including race-based discrimination, and tobacco use among PWH (Crockett et al., 2018). That study measured current tobacco use instead of abstinence and demonstrated that race-based discrimination was not related to current tobacco use. Interestingly, it also found that other forms of discrimination (i.e., HIV-related discrimination and sexual orientation-related discrimination) were not directly related to current tobacco use, but that HIV-related discrimination was indirectly related to tobacco use through avoidance coping. It is possible that the intersectionality of multiple forms of discrimination commonly experienced by PWH (e.g., discrimination related to race/ethnicity, HIV, sexual orientation) makes it difficult to disentangle the unique effects of one form of discrimination (e.g., perceived ethnic discrimination) on cigarette smoking and abstinence in

the context of other, overlapping experiences of discrimination. In addition, findings from

Crockett et al. (2018) suggest that the relationship between perceived ethnic discrimination

and abstinence could be complicated by other mechanisms (e.g., coping style) that were not

assessed for in the present study. Future research is needed to examine the relationships

among cigarette smoking abstinence and multiple forms of discrimination, as well as

potential mechanisms of these relationships.

Of note, findings from community samples in the US (Corral & Landrine, 2012;

Plascak, Hohl, Barrington, & Beresford, 2018; Sims et al., 2016; Unger et al., 2016) and

Canada (Siddiqi et al., 2017) suggest that greater perceived ethnic discrimination is related to

cigarette smoking, however, many of these studies measured cigarette smoking status and not

cigarette smoking abstinence. This being said, Kendzor et al. (2014) examined the

associations of everyday discrimination and lifetime discrimination on cigarette smoking

abstinence at 26 weeks post-quit attempt in a sample of 190 Hispanic/Latino individuals who

smoked cigarettes. In line with findings from the present study, everyday discrimination,

which was most commonly related to race/ethnicity, was not associated with abstinence.

However, the authors found that experiencing more lifetime discrimination events was

associated with a reduced likelihood of abstinence at 26-week follow-up. The PED-CV-B

scale used to measure perceived ethnic discrimination in the present study resembles the

structure of the Everyday Discrimination Scale (Williams et al., 1997) used by Kendzor and

colleagues (2014) in that it measures how often experiences of discrimination occur as

opposed to whether experiences of discrimination have occurred in one's lifetime. Thus, the

differences in everyday versus lifetime discrimination may partially explain why the present

study did not find a significant relationship between perceived ethnic discrimination and

cigarette smoking abstinence among PWH. Future research should examine both everyday and lifetime perceived ethnic discrimination among PWH who smoke to better understand the role of perceived ethnic discrimination on smoking cessation outcomes in this population.

Current cigarette smoking was an inclusion criterion for the present study, thus the relationship between perceived ethnic discrimination and current smoking status (smoking versus no smoking) could not be assessed. Despite this, studies that measure cigarette smoking status in community samples can shed light on important factors that may be related to the relationship between perceived ethnic discrimination and cigarette smoking abstinence among PWH. While the present study only measured perceived ethnic discrimination at baseline, Unger and colleagues (2016) looked at changes in perceived discrimination among Hispanic/Latino emerging adults (N = 2722) over time. The authors identified four groups of discrimination trajectories (i.e., low and stable, increasing, initially high but decreasing, high and stable) and examined how each trajectory was related to substance use, including past month cigarette smoking. They found that, compared to those with low and stable perceived discrimination, the only group that had higher odds of past month cigarette smoking were individuals with initially high but decreasing discrimination. This finding suggests that specific trajectories of perceived discrimination may influence cigarette smoking behaviors. It is possible that, while baseline perceived ethnic discrimination was not related to abstinence in the present study, the relationship between perceived ethnic discrimination and abstinence could differ depending on the extent of perceived discrimination over the course of one's life. More research is needed to examine how perceived ethnic discrimination changes over time among PWH, and whether this influences cigarette smoking cessation efforts.

In addition to the trajectory of discrimination, the burden of discrimination and gender may relate to cigarette smoking behaviors. Sims and colleagues (2015) examined associations of lifetime discrimination, everyday discrimination, and burden of discrimination to odds of cigarette smoking among Black respondents from the Jackson Heart Study (N = 4925). They found that everyday discrimination was associated with greater odds of smoking among men and women. However, lifetime discrimination and burden of discrimination were only associated with greater odds of cigarette smoking among women. The present study did not find any gender differences in baseline perceived ethnic discrimination or cigarette smoking abstinence and did not explore the role of gender in the relationship between perceived ethnic discrimination and abstinence. Further, the present study did not measure burden of perceived ethnic discrimination, though it is possible that higher burden of perceived ethnic discrimination could impede smoking cessation efforts. It would be beneficial for future research to examine relationships among gender, burden of perceived ethnic discrimination, and cigarette smoking abstinence in samples of PWH to better understand the potential impact perceived ethnic discrimination has on PWH and how this relates to smoking cessation outcomes.

Moreover, Plascak and colleagues (2018) investigated associations among perceived ethnic discrimination, neighborhood disorder (i.e., crime safety, traffic safety, aesthetics), and health behaviors including current cigarette smoking. The authors cited several past studies suggesting a relationship between perceived ethnic discrimination and neighborhood disorder and sought to examine their independent relationships to health behaviors (e.g., cigarette smoking). They found that greater perceived ethnic discrimination and neighborhood disorder were both related to greater odds of current cigarette smoking and

remained significant after adjusting for one another. They did not, however, assess whether neighborhood disorder moderated or mediated the relationship between perceived ethnic discrimination and cigarette smoking. This study alludes to neighborhood disorder as a potential mechanism of the relationship between perceived ethnic discrimination and cigarette smoking, which future research should explore. Neighborhood disorder may be particularly relevant to PWH in the Bronx (i.e., 77% of the current study's sample), given the high concentration of neighborhood disorder in this area (Quinn et al., 2016).

Overall, more research is needed to better understand the relationships among perceived ethnic discrimination and abstinence among PWH, particularly in the context of other forms of discrimination experienced by PWH who smoke (e.g., HIV-related stigma, smoking-related stigma), varying trajectories of perceived discrimination, the burden of discrimination, and potential mechanisms of the relationship between perceived ethnic discrimination and cigarette smoking (e.g., coping style, neighborhood disorder, gender). A more nuanced understanding of how these factors relate to perceived ethnic discrimination and cigarette smoking abstinence among PWH may provide some insight into why perceived ethnic discrimination was not related to cigarette smoking abstinence in the present study.

The secondary aim of this study was to examine whether perceived ethnic discrimination at baseline was related to nicotine dependence, motivation to quit smoking, and self-efficacy to quit smoking among PWH, at 3-month and 6-month follow-up periods. It was expected that PWH with greater baseline perceived ethnic discrimination would report higher nicotine dependence, lower motivation to quit smoking, and lower self-efficacy to quit smoking at both follow-ups, compared to PWH with lower baseline perceived ethnic discrimination. This hypothesis was partially supported as greater perceived ethnic

discrimination was related to lower self-efficacy to quit smoking, but not related to greater nicotine dependence or lower motivation to quit smoking.

In contrast to this hypothesis, PWH with higher baseline perceived ethnic discrimination had lower nicotine dependence at 6-month follow-up compared to PWH with lower perceived ethnic discrimination. However, this relationship was no longer significant after controlling for housing status and treatment condition. Examining this finding in the context of research on discrimination trajectories and cigarette smoking (Unger et al, 2016), perceived ethnic discrimination in the current study was only measured at one time point. It is possible that PWH who reported higher levels of perceived ethnic discrimination at baseline had discrimination trajectories (e.g., increasing, high and stable) that may not be related to increased odds of cigarette smoking. Moreover, the discrimination trajectory that has been associated with cigarette smoking (e.g., initially high but decreasing) may not have been captured in the group of PWH who reported higher baseline perceived ethnic discrimination. However, because Unger and colleagues (2016) measured current cigarette smoking in a community sample and did not assess nicotine dependence in a sample of PWH, it is unclear whether these findings would generalize to the present study. Nonetheless, it is important to consider that the relationship between perceived discrimination and nicotine dependence may vary depending on how and when discrimination is measured. Hence, it would be valuable for future research to investigate how perceived ethnic discrimination trajectories relate to nicotine dependence among PWH. Moreover, future research is needed to examine how other forms of discrimination, beyond perceived ethnic discrimination, relate to nicotine dependence in samples of PWH who smoke.

One study has examined the relationship between everyday discrimination and nicotine dependence using an online survey of 2,376 adult respondents in the general population with current cigarette smoking (Kendzor, Businelle, Reitzel, Rios, et al., 2014). Contrary to the present study, the authors found that greater everyday discrimination was associated with greater nicotine dependence (measured by the Heaviness of Smoking Index; HSI) and self-reported cigarette addiction. However, this varied by race/ethnicity and was not significant among Black respondents, which made up the majority of the present study's sample and could partially explain why greater perceived ethnic discrimination was not related to greater nicotine dependence in the overall sample of PWH. This finding also suggests that race and ethnicity may moderate the relationship between perceived ethnic discrimination and nicotine dependence, which was explored in the present study's exploratory aims and is discussed below. The cross-sectional design and online sample used in Kendzor and colleagues' (2014) study may limit the generalizability of these findings to the current study's sample, however it nonetheless provides valuable information on the relationship between discrimination and nicotine dependence in general.

Research by Osman et al. (2017) found that racial/ethnic discrimination was not associated with nicotine dependence among Arab men living in Israel (N = 954). However, they found that social support moderated the relationship between discrimination and nicotine dependence. Among participants with higher social support, greater discrimination was associated with lower nicotine dependence compared to participants with lower social support. Thus, the authors argue that social support may provide a buffer against the harmful effects of discrimination on nicotine dependence. It is plausible that social support may have played a role in the present study's finding that greater perceived ethnic discrimination was

related to lower nicotine dependence. However, since social support was not measured in the parent study, this remains unclear. There is a need for future research to explore whether perceived social support modifies the relationship between perceived ethnic discrimination and nicotine dependence among PWH. Identifying factors that are related to lower nicotine dependence among PWH (e.g., helpful coping strategies, social support) are equally as beneficial as identifying risk factors (e.g., discrimination). To date, no prior research has examined the relationship between perceived ethnic discrimination and nicotine dependence among PWH who smoke, thus both buffering factors and risk factors in this relationship remain unexplored in this population.

The adjusted analyses of the present study allude that housing status may be potential moderator of the relationship between perceived ethnic discrimination and nicotine dependence. A four-way interaction demonstrated that, among PWH in the intervention condition, those with greater perceived ethnic discrimination and unstable housing had the highest nicotine dependence at baseline and 3-month follow-up compared to all other participants. A potential explanation for this finding could be that PWH with unstable housing have fewer tangible and social supports in place, making them more vulnerable to the negative impact of perceived ethnic discrimination. Similarly, they may have fewer resources available to cope with perceived ethnic discrimination and its associated consequences (e.g., stress, depression) constructively, instead relying on substances that provide an immediate sense of relief (e.g., cigarettes). Finally, unstable housing may make it difficult for individuals to consistently access or benefit from services (e.g., smoking cessation interventions) due to barriers and psychosocial stressors related to housing and financial insecurity (e.g., risk of losing unattended belongings, lack of transportation, safety

concerns). In other words, one's foundational needs (e.g., housing) may need to be addressed before smoking cessation treatment can have an impact. As mentioned previously, individuals with unstable housing were less likely to be abstinent at 3-month follow-up and reported greater perceived ethnic discrimination. Moreover, the relationship between perceived ethnic discrimination and nicotine dependence was no longer significant after adjusting for housing status. These findings suggest that housing status may play a bigger role in smoking cessation outcomes than perceived ethnic discrimination and may actually represent a proxy for enacted (i.e., experienced) discrimination. Thus, it would be valuable for future studies to further explore unstable housing status as a potential risk factor in the relationship between perceived ethnic discrimination and nicotine dependence and other smoking-related variables among PWH. Moreover, future research may conceptualize housing status as a possible explanatory variable for smoking outcomes rather than a covariate. Relatedly, it may be worthwhile for future studies to focus on variables related to more direct experiences of discrimination rather than perceived discrimination to better understand how ethnic discrimination impacts smoking outcomes among PWH.

Taken together, more research is needed to better understand the relationship between perceived ethnic discrimination and nicotine dependence among PWH. In particular, it would be interesting to see whether PWH with greater perceived ethnic discrimination report greater nicotine dependence in future studies, or if this finding is unique to the current sample. Moreover, although the present study examined a handful of potential mechanisms (e.g., race/ethnicity, perceived stress, depressive symptoms) of the relationship between perceived ethnic discrimination and nicotine dependence, additional mechanisms of this unexpected relationship should be explored, with particular attention to social support and helpful coping

strategies that may influence how individuals respond to perceived ethnic discrimination and/or provide a buffer against the negative effects of nicotine dependence on smoking cessation outcomes (e.g., difficulty quitting smoking).

Also contrary to hypotheses, the present study did not find a significant relationship between perceived ethnic discrimination and motivation to quit smoking among PWH at 3- or 6-month follow-up. This finding may be related to the fact that having a motivation to quit score 4 ("I sometimes think about quitting, but I have no plans to quit") to 9 ("I have quit smoking, but I still worry about slipping back, so I need to keep working at living smoke free") was an inclusion criterion for participation in the study. In other words, individuals were required to be in at least the contemplation stage of quitting smoking to participate in the study. This restricted the range of possible values and reduced the degree of variability in motivation to quit smoking, which may have impacted the degree of the relationship between perceived ethnic discrimination and motivation to quit smoking in this sample. To this author's knowledge, prior studies have not examined the relationship between perceived ethnic discrimination and motivation to quit smoking in the general population or among PWH, thus alternative reasons for this finding remain unclear. It is possible that this relationship was examined elsewhere but was not published due to the absence of a significant relationship between perceived ethnic discrimination and motivation to quit smoking. Motivation to quit smoking is one of the initial steps of smoking cessation as it reflects one's readiness to initiate a quit attempt (Biener & Abrams, 1991), thus it is important to understand factors that may increase or decrease motivation to quit smoking among PWH before, during, and following a quit attempt. Future research should explore the relationship and directionality between discrimination and motivation to quit smoking among

PWH, including samples that would capture the full range of motivation scores, and examining multiple forms of discrimination in relation to motivation to quit smoking.

The hypothesis that greater perceived ethnic discrimination would relate to lower self-efficacy to quit smoking was supported. At both follow-up periods, PWH with greater perceived ethnic discrimination had lower self-efficacy to quit smoking (i.e., more smoking temptations) compared to those with lower perceived ethnic discrimination. Interestingly, when analyses were conducted among the sample of PWH assigned to the Positively Smoke Free intervention, it was found that PWH with high perceived ethnic discrimination experienced increased self-efficacy to quit smoking over time. While PWH with high perceived ethnic discrimination at baseline had lower self-efficacy to quit smoking at baseline compared to PWH with low perceived ethnic discrimination, the two groups had similar self-efficacy to quit smoking at 3- and 6-month follow-ups. Self-efficacy to quit smoking increased from baseline to 3-month follow-up for both groups before leveling off at 6-month follow-up, however, the increase in self-efficacy was greater among PWH with high perceived discrimination. This finding suggests that the Positively Smoke Free intervention was helpful in improving self-efficacy to quit smoking among both groups, but especially among those with high perceived ethnic discrimination.

Greater self-efficacy to quit smoking has been associated with abstinence among PWH across several smoking cessation trials (Ingersoll, Cropsey, & Heckman, 2009; Moadel et al., 2012; Shuter et al., 2014; Stanton, Lloyd-Richardson, Papandonatos, de Dios, & Niaura, 2009; Vidrine, Arduino, & Gritz, 2006) and is an important modifiable factor related to cigarette smoking and cessation. Thus, it is important to identify factors that shape one's self-efficacy to quit smoking. One prior study examined the independent effects of perceived

discrimination and self-efficacy to quit smoking on poly-tobacco use among PWH, but the authors did not examine the relationship between perceived discrimination and self-efficacy to quit smoking (Tamí-Maury et al., 2013). Further, Alexander and colleagues (2019) found that self-efficacy mediated the relationship between everyday discrimination and smoking cessation in a community sample of adults in the US (N = 146), whereby greater discrimination was associated with lower self-efficacy to quit smoking, and lower self-efficacy was related to lower likelihood of abstinence. No studies have looked at the relationship between perceived discrimination and self-efficacy among PWH. Thus, by examining the role of perceived ethnic discrimination on self-efficacy to quit smoking, the present study is an important expansion of existing literature related to cigarette smoking among PWH.

The scale used to measure self-efficacy in the present study measured self-efficacy to quit smoking by asking participants how tempted they would be to smoke in a range of situations, with higher scores representing lower self-efficacy to quit smoking (i.e., more temptation to smoke). In this sample, PWH with greater perceived ethnic discrimination encountered situations in which they were tempted to smoke cigarettes more frequently compared to those with lower perceived ethnic discrimination. In other words, those with greater perceived ethnic discrimination had less confidence in their ability to abstain from smoking in a variety of situations (Gwaltney, Metrik, Kahler, & Shiffman, 2009; Shuter et al., 2014), which could pose a barrier to smoking cessation.

Potential reasons for this relationship remain unexplored. A review article on self-efficacy in tobacco treatment (Elshatarat, Yacoub, Khraim, Saleh, & Afaneh, 2016) summarizes factors that relate to self-efficacy to quit smoking, which may be relevant to

these findings. The authors explain that past failures to quit smoking can reduce one's self-efficacy to quit. As experiences of discrimination have been associated with difficulty quitting cigarette smoking (Kendzor, Businelle, Reitzel, Castro, et al., 2014), it is plausible that many PWH with high levels of perceived ethnic discrimination have had prior unsuccessful quit attempts, leading to reduced self-efficacy to quit smoking. Elshatarat and colleagues (2016) explain that verbal persuasion, described as the "influence of the suggestions of others on self-efficacy beliefs" (pp. 244) can also affect one's self-efficacy to quit smoking. Due to the negative experiences inherent in discrimination, it is possible that PWH with high levels of perceived ethnic discrimination have encountered frequent negative interactions that communicated exclusion, rejection, stigmatization, or devaluation, translating to reduced self-confidence and hindered self-efficacy beliefs. Verbal persuasion is particularly impactful when it comes from health care providers, and some PWH with greater perceived ethnic discrimination may have encountered stigmatization and/or discrimination by health care providers in the past (Kinsler, Wong, Sayles, Davis, & Cunningham, 2007).

In addition, Elshatarat and colleagues (2016) suggest that people use physiological and psychological feedback to make judgements about they whether they can cope with stressors without the use of cigarettes. Thus, PWH with medical and psychological comorbidities may experience symptoms that decrease their confidence in their ability to abstain from smoking under certain circumstances (e.g., pain, stress, sadness). This idea aligns with the present study's exploratory aim that examined whether perceived stress and depressive symptoms mediated the relationship between perceived ethnic discrimination and self-efficacy to quit smoking, which is elaborated on in the discussion of exploratory aims to follow. Because perceived ethnic discrimination is related to numerous negative

physiological and psychological consequences among PWH (Molina et al., 2019; Cuevas et al., 2013), these are potentially important areas to target in smoking cessation interventions aimed at increasing self-efficacy to quit smoking among PWH. To better understand the mechanisms of perceived ethnic discrimination and self-efficacy to quit smoking among PWH, it would be helpful for qualitative research to explore how these, and other factors relate to both perceived ethnic discrimination and self-efficacy to quit smoking in this population.

The first exploratory aim examined whether race and ethnicity moderated the relationship between baseline perceived ethnic discrimination and each smoking variable (i.e., abstinence, nicotine dependence, motivation to quit smoking, self-efficacy to quit smoking) at both follow-up periods. It was found that race/ethnicity did not moderate the relationship between perceived ethnic discrimination and abstinence, motivation to quit smoking, or self-efficacy to quit smoking. However, there was a three-way interaction among race/ethnicity, time, and perceived ethnic discrimination on nicotine dependence. Among participants with higher levels of perceived ethnic discrimination, Hispanic/Latino PWH reported increased nicotine dependence over time compared to Black PWH. In contrast, among those with lower perceived ethnic discrimination, there were similar levels of nicotine dependence between racial and ethnic groups. The interaction was no longer significant after adjusting for housing status and treatment condition but is worthwhile to explore further. This finding was similar to research from the general US population (Kendzor, Businelle, Reitzel, Rios, et al., 2014) that found that race/ethnicity moderated the relationship between everyday discrimination and nicotine dependence, such that greater discrimination was associated with greater nicotine dependence among Hispanic/Latino participants but not

Black or White participants. Moreover, research from the HELIUS study in the Netherlands
(N = 23,126) found that greater perceived ethnic discrimination was related to greater
nicotine dependence among respondents of African Surinamese origin, but not Ghanaian,
South-Asian Surinamese, Turkish, or Moroccan origin (Visser et al., 2017). This study did
not include Hispanic/Latino participants but it nonetheless supports the notion that the
relationship between perceived ethnic discrimination and nicotine dependence may vary
among racial and ethnic minority individuals. Further, this finding suggests that one's
minoritized status (e.g., identifying as a racial/ethnic minority) may be a key variable in the
relationship between perceived ethnic discrimination and nicotine dependence, rather than
belonging to a specific racial or ethnic minoritized group (e.g., identifying as
Hispanic/Latino).

In contrast to the abovementioned findings from the full sample of PWH in the
current study, analyses that only included PWH assigned to the Positively Smoke Free
intensive group therapy condition demonstrated that, adjusting for housing status,
race/ethnicity moderated the relationship between perceived ethnic discrimination and self-
efficacy to quit smoking. Interestingly, higher perceived ethnic discrimination was related to
lower self-efficacy to quit smoking among Hispanic/Latino PWH, but not among Black
PWH. Moreover, there was a three-way interaction between race/ethnicity, perceived ethnic
discrimination and time whereby Black PWH with high levels of baseline perceived ethnic
discrimination reported increased self-efficacy to quit smoking 3- and 6-months following
the Positively Smoke Free intervention while self-efficacy among Hispanic/Latino PWH with
high levels of baseline perceived ethnic discrimination did not change over time. These
findings suggest that high levels of perceived ethnic discrimination may disproportionately

negatively impact self-efficacy to quit smoking among Hispanic/Latino PWH. Moreover, while the Positively Smoke Free group intervention may improve self-efficacy to quit smoking among Black PWH, this does not appear to be true among Hispanic/Latino PWH.

The finding that race/ethnicity did not interact with perceived ethnic discrimination to influence other smoking variables in a sample of PWH who smoke cigarettes is congruent with previous research that examined smoking status (i.e., smoking vs. not smoking) in the general US population (Plascak et al., 2018; Unger et al., 2018; Purnell et al., 2012). For instance, Plascak et al. (2018) found that race/ethnicity did not moderate the relationship between perceived ethnic discrimination and current tobacco smoking (compared to no smoking). Similarly, Unger and colleagues (2018) found the interaction between perceived discrimination and race/ethnicity was not significantly associated with the use of any assessed tobacco products (i.e., cigarettes, e-cigarettes, cigar, pipe, hookah, smokeless). Moreover, Purnell and colleagues (2012) found that greater perceived discrimination was related to increased odds of current cigarette smoking regardless of race/ethnicity. In contrast, Borrell and colleagues (2010) found that greater perceived discrimination was associated with greater odds of current cigarette smoking among both Black and Hispanic/Latino participants, but this was no longer significant among Hispanic/Latino participants after adjusting for covariates. Similarly, Brondolo and colleagues (2015) found that greater perceived ethnic discrimination was associated with current smoking status among Black participants but not Hispanic/Latino participants. Moreover, many studies that evaluated the role of perceived discrimination on smoking outcomes included single-race (Corral & Landrine, 2012; Assari et al., 2018; Bennett et al., 2005; Guthrie et al., 2002; Hicks et al., 2018; Hurd et al., 2015; Parker et al., 2016; Parker et al., 2017; Slopen et al.,

2012) or single-ethnicity (Kendzor, Businelle, Reitzel, Castro, et al., 2014; Lorenzo-Blanco & Unger, 2015; Lorenzo-Blanco, Unger, Ritt-Olson, Soto, & Baezconde-Garbanati, 2011, 2013) samples and were unable to examine race and ethnicity as potential moderators.

Overall, research in the general population suggests that the relationship between perceived discrimination and nicotine dependence varies by race and ethnicity (Kendzor et al., 2014; Visser et al., 2017) whereas findings are mixed for current cigarette smoking status (Plascak et al., 2018; Brondolo et al., 2015). Possible reasons for these racial and ethnic differences in nicotine dependence may include cultural differences in the way that people perceive cigarette smoking. For instance, if one's culture or social network discourages cigarette smoking, they may be less likely to regularly cope with perceived ethnic discrimination by smoking. Research has shown that Black individuals in the US report lower smoking frequency, lower smoking intensity, and later smoking onset compared to other racial and ethnic groups, but that they are more likely to smoke menthol cigarettes, which may increase one's risk of nicotine dependence and quitting difficulty (Alexander et al., 2016).

Moreover, research has shown that the rates of smoking vary among Hispanic/Latino cultures (Kaplan et al., 2014), with Puerto Rican and Cuban individuals having the highest rates of cigarette smoking, and Dominican individuals having the lowest rates. Further, US-born Hispanic/Latino individuals and those with a higher level of acculturation to the dominant US culture have higher cigarette smoking rates (Kaplan et al., 2014). Black versus Hispanic/Latino individuals may also differ in the way they experience, perceive, and attach meaning to perceived ethnic discrimination, which may influence its emotional impact and the ways in which one responds to it. For instance, by examining components of perceived

ethnic discrimination in a US sample, Blair and colleagues (2021) found that Black and American Indian participants perceived higher exclusion, stigma, discrimination at school/work, and threat compared to Hispanic/Latino, East Asian, and South Asian participants, but the authors did not examine differences in the emotional impact or responses to discrimination by racial/ethnic group. More research is needed to directly compare how Black, Hispanic/Latino, and other minoritized groups interpret and respond to discrimination. Research should also consider examining perceived discrimination and nicotine dependence between ethnic subgroups (e.g., Mexican, Puerto Rican).

Some research has examined how factors related to Black racial identity influence how racial discrimination is perceived and interpreted (Lee & Ahn, 2013). A meta-analysis of Black individuals in the US found that aspects of racial identity were related to the perception of racial discrimination, including immersion-emersion (i.e., the extent to which the individual is engaged in Black culture), public regard (i.e., how positively or negatively the individual believes Black culture/people are viewed by society), encounter (i.e., the extent to which the individual has begun to question dominant White American ideology), Afrocentricity/racial centrality/private regard (i.e., the extent to which the individual identifies and affiliates with Black American/Afrocentric culture), and internalization (i.e., the extent to which an individual has a balanced view of the strengths and limitations of Black culture and other cultures). Overall, Black individuals with greater racial identity perceived more racial discrimination compared to Black individuals with lower racial identity.

Interestingly, Hispanic/Latino men may interpret experiences or discrimination as incongruent with traditional *machismo* beliefs (i.e., traditional male gender roles in

Hispanic/Latino culture) (Acosta, Andrews, Acosta Canchila, & Ramos, 2020; Liang, Salcedo, & Miller, 2011; Rojas et al., 2021). Among Mexican farmworkers in the US who endorsed high *machismo*, perceived discrimination was associated with greater depressive symptoms compared to those who endorsed low *machismo* (Acosta et al., 2020). In addition to high *machismo,* low *familismo* (i.e., importance of maintaining close relationships with family) among Hispanic/Latino individuals has been associated with greater depressive symptoms, lower social support, and alcohol misuse (Rojas et al., 2021). Moreover, research involving Hispanic/Latino students in the US demonstrated that *familismo* and *respeto* (i.e., importance of obeying authority) were associated with lower discrimination (Lorenzo-Blanco et al., 2013). Thus, it is possible that factors such as *machismo*, *familismo,* and *respeto* may influence how Hispanic/Latino individuals interpret and respond to stress, including discrimination.

Finally, there may be differences in coping resources, psychosocial stressors, and social support among Black and Hispanic/Latino individuals, which can influence whether adaptive (e.g., calling a loved one) or maladaptive (e.g., cigarette smoking) coping strategies are used in response to perceived ethnic discrimination. For instance, Bogart et al. (2017) used focus groups to explore how Black, HIV-positive MSM responded to different forms of discrimination (related to race, HIV, and sexual orientation). Cognitive and emotional avoidance and support seeking were the most common reactions to race-related discrimination, while support seeking was less likely to be used in response to discrimination related to HIV status or sexual orientation. The respondents explained that discussing topics like HIV status and sexual orientation with family and friends was less socially acceptable than discussing race-related issues.

Thus, Black PWH may feel better equipped to draw on positive resources like social support to cope with experiences of racial discrimination compared to other forms of discrimination, potentially making them less likely to use maladaptive coping strategies like cigarette smoking in response to racial discrimination. Moreover, in line with research on Hispanic/Latino cultural values highlighted above, Hispanic/Latino PWH who endorse high *familismo*, high *respeto*, and low *machismo* may be more likely to respond to discrimination and stress by seeking social and emotional support from others (Acosta et al., 2020; Liang et al., 2011; Lorenzo-Blanco et al., 2013; Rojas et al., 2021) and less likely to respond by smoking cigarettes. No prior research has examined race/ethnicity as a moderator of perceived ethnic discrimination and cigarette smoking behaviors among PWH making this present study an important expansion of the literature. Further research is needed to better understand how race and ethnicity interact with perceived ethnic discrimination in cigarette smoking behaviors among PWH, and to identify risk factors, protective factors, and reasons for smoking among PWH from diverse racial and ethnic backgrounds. Exploring and incorporating how aspects of racial (e.g., immersion-emersion, public regard, encounter, Afrocentricity/racial centrality/private regard, and internalization) and cultural identity (e.g., *machismo, familismo, respeto*) influence how PWH interpret and respond to racial discrimination will be an essential component of this work.

The second exploratory aim was to determine whether perceived stress and depressive symptoms mediate the relationship between baseline perceived ethnic discrimination and each smoking variable and both follow-ups. In this sample of PWH, perceived ethnic discrimination was related to greater depressive symptoms, greater perceived stress, and lower nicotine dependence. Depressive symptoms mediated the

relationship between perceived ethnic discrimination and nicotine dependence and the relationship between perceived ethnic discrimination and self-efficacy to quit smoking, while perceived stress did not. In addition, neither depressive symptoms nor perceived stress mediated the relationship between perceived ethnic discrimination and abstinence or motivation to quit smoking. However, when these analyses were conducted only among PWH assigned to the Positively Smoke Free intervention, depressive symptoms mediated the relationship between perceived ethnic discrimination and abstinence at 3-month follow-up, suggesting that greater perceived ethnic discrimination at baseline was associated with greater baseline depressive symptoms, which were in turn associated with lower likelihood of abstinence three months following the intervention. Thus, perceived ethnic discrimination may interfere with treatment gains (e.g., smoking cessation) by increasing individual's depressive symptoms.

The finding that perceived ethnic discrimination was related to depressive symptoms and perceived stress is in line with a large body of research with community samples (Arnold et al., 2020; Assari, Mistry, & Caldwell, 2018; Benner et al., 2018; Polanco-Roman et al., 2019; Ward et al., 2019) and samples of PWH (Bird et al., 2004; Bogart et al., 2011; Williams et al., 2017; Williamson et al., 2017).

Interestingly, although greater baseline perceived ethnic discrimination was independently associated with lower nicotine dependence at 6-month follow-up, this relationship was mediated by depressive symptoms, resulting in greater nicotine dependence among those with greater perceived ethnic discrimination and depressive symptoms. Specifically, greater perceived ethnic discrimination at baseline was associated with greater depressive symptoms at 3-month follow-up, which was, in turn, associated with greater

nicotine dependence at 6-month follow-up. While this finding was no longer significant after controlling for covariates, it suggests that experiencing depressive symptoms following perceived ethnic discrimination may contribute to increased nicotine dependence among PWH over time. Although perceived ethnic discrimination was related to both higher levels of depressive symptoms and perceived stress, perceived stress did not mediate the relationship between perceived ethnic discrimination and nicotine dependence. Thus, it is possible that PWH in this sample were more likely to cope with perceived ethnic discrimination-related depressive symptoms with cigarette use and less likely to cope with perceived ethnic discrimination-related stress with cigarette use.

Similarly, the present study found that the relationship between perceived ethnic discrimination and self-efficacy to quit smoking was mediated by depressive symptoms, but not perceived stress. In particular, greater perceived ethnic discrimination was associated with greater depressive symptoms, which were, in turn, associated with lower self-efficacy to quit smoking. In other words, PWH with greater perceived ethnic discrimination and greater depressive symptoms experienced more temptations to smoke and had less confidence in their ability to abstain from smoking when faced with these temptations.

Both of these findings can be interpreted in the context of the transactional model of stress and coping (Berjot & Gillet, 2011; Lazarus & Folkman, 1984). It is possible that PWH with high levels of perceived ethnic discrimination experience negative emotions (e.g., depression), which they respond to through cigarette smoking as a way to regulate these emotions (i.e., emotion-focused coping). If these PWH use cigarettes to cope with negative emotions on a regular basis, this can increase the risk of nicotine dependence over time. Of note, many common depressive symptoms (e.g., low motivation, fatigue, helplessness, social

withdrawal) can pose barriers to using alternative, problem-focused coping strategies (e.g., reporting discrimination, seeking tangible support) or more constructive emotion-focused coping strategies (e.g., seeking social support, exercising). As a result, these depressive symptoms can impair one's self-efficacy to use alternative coping strategies, making them more likely to turn to cigarette smoking to cope. It remains unclear why perceived stress did not mediate the relationships between cigarette smoking behaviors and perceived ethnic discrimination in the same way that depressive symptoms did. One potential explanation is that individuals with high levels of perceived stress do not encounter the same barriers (e.g., low motivation, social withdrawal) to constructive coping strategies as those with high levels of depressive symptoms and, as a result, may be more able to manage stress related to perceived ethnic discrimination without the use of cigarettes.

Some research using community samples has examined depressive symptoms and perceived stress as mediators of perceived discrimination and smoking status, but not nicotine dependence or self-efficacy, yielding mixed findings. In a large community sample of adults in Puerto Rico (Todorova et al., 2010), depressive symptoms mediated the relationship between perceived discrimination and lifetime cigarette smoking, while, in line with the present study, perceived stress did not. In contrast, Lorenzo-Blanco and colleagues (2013) found that discrimination was associated with higher perceived stress, which, in turn, was associated with greater depressive symptoms and current cigarette smoking. Thus, unlike the present study, perceived stress mediated the relationship between discrimination and cigarette use in a sample of people trying to quit smoking.

Although prior research has not examined depressive symptoms as a mediator of perceived ethnic discrimination and nicotine dependence or self-efficacy among PWH, focus

groups conducted by Reynolds and colleagues (2004) provide valuable insight into the experiences of thirteen PWH with current and former smoking statuses. Respondents explained that their cigarette smoking increased during periods of depression as smoking provided them with a sense of relief from unpleasant emotions. Similarly, in more recent focus groups with 54 PWH who smoke (Edwards et al., 2021), respondents spoke about smoking as a way to manage their depression and increase feelings of relaxation. However, neither of these studies explored perceived discrimination in the context of depressive symptoms and cigarette smoking. One recent study by Earnshaw and colleagues (2020) found that depressive symptoms mediated the relationship between HIV-related discrimination and the number of substances used at moderate to high severity, including tobacco, as measured by the World Health Organization's Alcohol, Smoking, and Substance Involvement Screening Test (ASSIST) (WHO, 2002). This suggests that PWH may use a range of substances, including cigarettes, to manage depressive symptoms resulting from discrimination. Further research is needed to examine potential mechanisms of perceived ethnic discrimination and cigarette smoking behaviors, including depressive symptoms and perceived stress. Importantly, since qualitative research on cigarette smoking among PWH has not yet explored perceived ethnic discrimination, this could be another important area for future research. The experiences and perspectives of PWH gained through qualitative research in this area would provide meaningful insight into reasons for smoking and barriers to quitting smoking among PWH with high levels of perceived ethnic discrimination.

Clinical Implications

The prevalence of cigarette smoking among PWH is high (Asfar et al., 2021), and the resulting health consequences are immense (Crothers et al., 2009; Feldman & Anderson,

2013; Helleberg et al., 2013; Pines, Koutsky, & Buskin, 2011). Despite this, many PWH who wish to quit smoking cigarettes have difficulty doing so (Pacek & Cioe, 2015). As such, it is imperative to identify modifiable factors related to cigarette smoking, and to develop smoking cessation interventions that target these factors and improve smoking outcomes in this population. Moreover, nicotine dependence and self-efficacy to quit smoking are key variables related to smoking cessation among PWH (Stanton et al., 2020), and interventions that effectively target these have the potential to improve smoking cessation rates in this population. For this to occur, an understanding of factors that contribute to nicotine dependence and self-efficacy is critical.

Findings from the current study demonstrate that perceived ethnic discrimination was associated with nicotine dependence and self-efficacy to quit smoking, both directly and indirectly through depressive symptoms. This suggests that perceived ethnic discrimination and depressive symptoms are meaningful factors related to cigarette smoking among PWH and targeting these variables has the potential to improve not only smoking-related outcomes, but the overall physiological and mental health of PWH who smoke. These findings suggest that PWH with higher perceived ethnic discrimination may be more likely to cope with depressive symptoms and discrimination through cigarette smoking and may have lower self-efficacy to identify alternative and more adaptive coping strategies. As such, it would be beneficial for smoking cessation interventions for PWH to assess for perceived ethnic discrimination, in addition to other forms of discrimination and stigma that PWH who smoke may encounter (e.g., related to HIV, tobacco use, gender, sexual orientation, socioeconomic status). Moreover, assessing for and treating depressive symptoms among PWH who smoke

has the potential to reduce treatment interfering behaviors and barriers to care (e.g., attrition, avoidance, social withdrawal, low motivation) related to depressive symptoms.

Of note, PWH who endorse high levels of perceived ethnic discrimination and depressive symptoms may benefit from tailored interventions that increase one's reliance on adaptive coping strategies to manage experiences of discrimination and depressive symptoms (e.g., social support, exercise, psychotherapy), and reduce one's reliance on maladaptive coping strategies (e.g., cigarette smoking). A systematic review by Hitsman and colleagues (2013) and later updated by Mathew and colleagues (2017) suggest that smoking is maintained among depressed individuals because they expect smoking to alleviate low positive affect, high negative affect, and cognitive impairment. Individuals with these expectations are motivated to smoke cigarettes in response to depressive symptoms because they believe smoking will make them feel better compared to other actions (e.g., more adaptive coping strategies). Thus, Hitsman and colleagues (2013) and Mathew and colleagues (2017) argue that treatment should focus on increasing positive affect and decreasing negative affect, while correcting the belief/expectation that smoking will alleviate these negative symptoms. In a randomized controlled trial with a US sample of PWH who smoke (N = 53) (O'Cleirigh et al., 2018), a smoking cessation intervention integrating behavioral and pharmacological treatment for smoking with behavioral treatment for depression and anxiety demonstrated a higher likelihood of smoking abstinence at 6-month follow-up compared to PWH assigned to the enhanced standard care condition. The behavioral treatment for depression and anxiety included cognitive restructuring, exposure, problem-solving, and relapse prevention modules, and each session was tailored to PWH. This finding demonstrates the clinical benefits of integrating depression interventions with

smoking cessation interventions among PWH with depressive symptoms. Further, a pilot study of a smoking cessation counselling program for PWH who smoke in Canada (Balfour et al., 2017) targeted depressive symptoms through cognitive-behavioral therapy techniques (e.g., psychoeducation on depression, developing positive coping strategies, relaxation training, behavioral activation, and cognitive restructuring). At 6-month follow up, 28% of the sample demonstrated biochemically confirmed abstinence.

It is important for depressive symptoms and perceived discrimination to be targeted in a way that enhances client's self-efficacy to perform these adaptive coping strategies and resist smoking temptations. It is also essential for this to be done in a supportive, respectful, and non-judgemental environment that does not exacerbate or contribute to clients' perceptions and experiences of stigma and discrimination. Furthermore, because findings suggest that the impact of perceived ethnic discrimination on nicotine dependence may vary by race and ethnicity, smoking cessation interventions for PWH from diverse backgrounds should be culturally informed and tailored to the unique needs and experiences of each client. Some research has shown that cultural adaptations to smoking cessation interventions have a positive impact on smoking outcomes in community samples (Nierkens et al., 2013; Orleans et al., 1998; Rodriguez Esquivel, Webb Hooper, Baker, & McNutt, 2015), while other studies have found no impact on smoking outcomes (Nollen et al., 2007; Webb, 2009). None of these studies included samples of PWH who smoke, highlighting need to develop and evaluate culturally informed and tailored treatments for minoritized PWH who smoke.

Limitations

The results of this study need to be interpreted in the context of a number of limitations. First, participants were recruited from two urban medical centers (Montefiore in

the Bronx, New York and MedStar in Washington, DC) in the Northeast US and may not be representative of PWH in other geographic regions. Similarly, PWH at these study sites typically have higher rates of heterosexual transmission and lower rates of same-sex transmission compared to the national average (CDC, 2019) and these findings may not generalize to samples of PWH with other risk profiles. In addition, while the ethnic composition of this sample (25% Hispanic/Latino) is similar to PWH in the general US population (27% Hispanic/Latino), the sample's racial composition (61% Black) is not representative of PWH in the US (42% Black) (CDC, 2018b). This study did not evaluate subgroups of Black and Hispanic individuals; however, census data from the Bronx (www.data.census.gov) indicate that about 23% and 20% of the population identify as Dominican and Puerto Rican, respectively, together making up three-quarters of the Hispanic/Latino population in the Bronx. It should be noted that these are not homogenous groups in real world settings and findings from this study are unable to meaningfully capture similarities and differences among racial and ethnic groups. Due to low representation of other minoritized races (e.g., Native American, Asian) in the sample, the research questions could not be examined in these groups. Further, the discrete categories created in the race/ethnicity variable may not have captured the complexity of participants' racial and ethnic identities. For instance, those who identified "multiple race" were combined with "other" and "none" races, potentially masking important differences among groups (Mattingly, Hirschtick, & Fleischer, 2020). Relatedly, most of the values for "none" race were from participants to dropped out of the study prior to completing the baseline questionnaire making it difficult to analyze and interpret data for none/multiple/other race all together. This study also excluded White-only participants from analyses that included

perceived ethnic discrimination because it was thought that perceived racial and ethnic discrimination is less relevant among non-Hispanic/Latino White individuals. Excluding these cases may have accounted for the lack of significant findings related to perceived ethnic discrimination and race/ethnicity. Studies that have found racial and ethnic differences in perceived ethnic discrimination demonstrate that White participants report lower perceived ethnic discrimination compared to Black and Hispanic/Latino participants (Borrell et al., 2010; Burgess et al., 2008; Dailey et al., 2010; Kendzor, Businelle, Reitzel, Rios, et al., 2014).

In addition, most measures used in this study relied on self-report and could be subject to recall biases, social desirability, and under-reporting. This limitation may be particularly true for questions pertaining to sensitive and stigmatized subject matter, including AIDS status, perceived ethnic discrimination, and cigarette use. Furthermore, because this study is a secondary analysis of data from a parent study, perceived ethnic discrimination was only measured at baseline and relationships involving perceived ethnic discrimination at multiple time points could not be performed. Further, two of the scales used had poor internal consistency in the study sample (i.e., MFTQ, PSS-4), and many of the scales have not been previously validated in samples of Black and Hispanic/Latino individuals and/or samples of PWH. In addition, findings are limited to perceived discrimination associated with race and ethnicity, though there are other forms of discrimination encountered by PWH (e.g., related to HIV status, substance use, sexual orientation) that may not have been captured by the PEDQ-CV-B scale. As such, the intersectionality among multiple forms of discrimination beyond race makes it difficult to disentangle the unique effects of race-related discrimination on tobacco use behavior. Future

research should examine the role of intersecting identities (e.g., related to gender, sexual orientation, SES, HIV-status, substance use) and related experiences of discrimination. In addition, only the full scale for perceived ethnic discrimination was used as factor analysis did not support the use of subscales in this sample, thus individual components of perceived ethnic discrimination (i.e., exclusion/rejection, stigmatization/devaluation, discrimination at work/school, threat/aggression) could not be assessed.

Moreover, multiple analyses were conducted as part of this study, which may have increased the risk of making a Type 1 error (i.e., incorrectly finding significant results). To account for use of multiple comparisons, Bonferroni adjusted p-values were used in primary and secondary analyses. Moreover, due to limited power, null findings should be interpreted with caution. In addition, the study was limited by some of its inclusion criteria. For instance, English fluency was an inclusion criterion, potentially limiting generalizability to PWH who speak other languages (e.g., Spanish). A pilot study for a Spanish version of the group intervention was offered and found no interest, so the main study was restricted to the English version. Another inclusion criterion was having a motivation to quit smoking score of 4-9, which limited the variability of motivation to quit smoking in this sample.

Further, the multisite nature of this study is both a strength and limitation. It is a strength as it allows for a larger, more diverse sample in comparison to a single site study which can increase the generalizability of results and statistical power. However, treatment site may confound key variables like race and ethnicity as the two cities from which data was collected differ demographically. In addition, treatment site was not included as a higher order factor in the models since there were only three sites and mixed modeling requires at least five to meaningfully include as a separate level. In addition, it is possible that there were

important, unmeasurable external factors and world events that took place during the study (e.g., the shooting of Eric Garner in NYC; Obama leaving office) that may have played a role on the perceptions of ethnic discrimination and cigarette smoking outcomes of participants in this sample.

The completion rate of the parent study was high (84.2%), however 15.8% of the cohort did not attend the final study visit and missing data may not be randomly distributed. However, missing data analysis was conducted and suggested that the distribution of missing data was acceptable for all study variables. Like most intensive behavioral treatment trials, there was more attrition from the group therapy intervention condition than the control condition. Relatedly, a handful of participants dropped out of the study before completing the baseline questionnaire due to a gap in time between randomization and the baseline study visit for some participants in the intervention condition. Because of this participant drop-out, perceived ethnic discrimination scores were not available for some participants and the role of perceived ethnic discrimination on attrition could not be evaluated. Similarly, certain groups are less likely to enroll in a smoking cessation study (e.g., individuals with high perceived ethnic discrimination, low motivation to quit smoking, incarcerated or institutionalized individuals, etc.) and are not adequately represented in the current sample. Finally, due to the design of the parent study, it was not possible to assess of the relative effectiveness of the group treatment setting compared to other therapeutic interventions (e.g., individual counseling), nor was it possible to evaluate the relative roles of counseling and pharmacotherapy in smoking cessation outcomes.

Conclusions

While perceived ethnic discrimination was not related to smoking abstinence or motivation to quit smoking among PWH in the intent-to-treat sample, perceived ethnic discrimination was related nicotine dependence and self-efficacy to quit smoking, which were both mediated by depressive symptoms. Higher perceived ethnic discrimination at baseline was associated with greater depressive symptoms at 3-month follow-up, which was related to greater nicotine dependence and lower self-efficacy to quit smoking at 6-month follow-up. In addition, in the Positively Smoke Free sample, greater perceived discrimination was indirectly related to lower likelihood of abstinence at 3-month follow-up, through greater depressive symptoms. This suggests that targeting depressive symptoms related to perceived ethnic discrimination may improve smoking cessation outcomes among PWH.

Moreover, the interaction between race/ethnicity, time, and perceived ethnic discrimination was associated with nicotine dependence such that Hispanic/Latino participants with high perceived ethnic discrimination reported greater nicotine dependence over time compared to Black participants with higher perceived ethnic discrimination. In the Positively Smoke Free sample, PWH with greater perceived ethnic discrimination experienced increased self-efficacy to quit smoking over time, suggesting that the intervention was helpful at improving self-efficacy to quit smoking and reducing smoking temptations among PWH with high levels of perceived ethnic discrimination. Race and ethnicity and time moderated the relationship between perceived ethnic discrimination and self-efficacy to quit smoking such that Black participants with high perceived discrimination reported increased self-efficacy to quit smoking over time while self-efficacy to quit smoking did not change over time among Hispanic/Latino participants with high perceived ethnic

discrimination. These findings suggest that perceived ethnic discrimination, depressive symptoms, and race/ethnicity are important factors to consider in the development and implementation of smoking cessation treatment interventions for PWH. More research on the impact and mechanisms of perceived ethnic discrimination and other forms of discrimination on cigarette smoking among PWH is needed.

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Tables

Table 1. Baseline characteristics of the overall sample (N = 442) and for participants in the intervention and control condition

Variable	Total (N = 442) M(SD) or N(%) or Mdn [IQR]	Intervention Condition (N = 216) M(SD) or N(%) or Mdn [IQR]	Control Condition (N = 226) M(SD) or N(%) or Mdn [IQR]	p
Age	50.6 (9.1)	50.3 (9)	50.8 (9.2)	.550
Gender				.604
Male	218 (52.8%)	106 (55.5)	112 (50.5%)	
Female	184 (44.6%)	80 (41.9)	104 (46.8%)	
Transgender	11 (2.7%)	5 (2.6)	6 (2.7%)	
Race/ethnicity				.013*
None/multiple/other	88 (19.9%)	57 (26.4%)	31 (13.7%)	
White, non-Hispanic	28 (6.3%)	11 (5.1%)	17 (7.5%)	
Hispanic/Latino	59 (13.3%)	25 (11.6%)	34 (15%)	
Black, non-Hispanic	249 (56.3%)	113 (52.3%)	136 (60.2%)	
Black, Hispanic	18 (4.1%)	10 (4.6%)	8 (3.5%)	
Income	7,003 [11,152]	5,500 [11,235]	8,000 [11,000]	.256
Employment				.966
Full-time	20 (4.9%)	9 (4.9%)	11 (5%)	
Part-time	30 (7.4%)	13 (7%)	17 (7.7%)	
Unemployed/disabled	356 (87.7%)	163 (88.1%)	193 (87.3%)	
Education				.253
≤Elementary	19 (4.6%)	7 (3.7%)	12 (5.4%)	
Some HS	118 (28.6%)	60 (31.4%)	58 (26.1%)	
HS grad	120 (29.1%)	58 (30.4%)	62 (27.9%)	
Some college	115 (27.8%)	53 (27.7%)	62 (27.9%)	
College grad	41 (9.9%)	13 (6.8%)	28 (12.6%)	
Housing				
Stable	332 (80.4%)	155 (81.2%)	177 (79.7%)	.811
Transitional or homeless	81 (19.6%)	36 (18.8%)	45 (20.3%)	
Marital status				.747
Married/living w partner	76 (18.4%)	37 (19.4%)	39 (17.6%)	
Single	336 (81.6%)	154 (80.6)	182 (82.4%)	
AIDS dx				.448
Yes	185 (44.9%)	81 (42.6%)	104 (46.8%)	
No	227 (55.1%	109 (57.4%)	118 (53.2%)	

Note. Intervention condition received Positively Smoke Free; Response totals do not equal cohort size for all items due to incomplete reporting; Valid percentages used; Randomization was stratified on Black race; M(SD) = Mean(Standard Deviation); Mdn[IQR] = Median [Interquartile range]; HS = High School; AIDS dx = Lifetime AIDS diagnosis

*p<.05

Table 2. Baseline characteristics by race/ethnicity (N = 326)

Variable	Black, non-Hispanic/Latino (N = 249) M(SD) or N(%) or Mdn [IQR]	Hispanic/Latino (N = 77) M(SD) or N(%) or Mdn [IQR]	p
Age	50.5 (8.6)	49.6 (10.6)	.514
Gender			.939
Male	128 (51.4%)	38 (49.4%)	
Female	113 (45.4%)	37 (48.1%)	
Transgender	8 (3.2%)	2 (2.6%)	
Income	8,000 [12, 173]	4, 876 [9,100]	.756
Employment			.448
Full-time	11 (4.5%)	1 (1.3%)	
Part-time	21 (8.6%)	6 (7.8%)	
Unemployed/disabled	212 (86.9%)	70 (90.9%)	
Education			.004**
≤Elementary	12 (4.8%)	6 (7.8%)	
Some HS	57 (22.9%)	30 (39.0%)	
HS grad	79 (31.7%)	18 (23.4%)	
Some college	82 (32.9%)	13 (16.9%)	
College grad	19 (7.6%)	10 (13.0%)	
Housing			.066
Stable	198 (79.5%)	69 (89.6%)	
Transitional or homeless	51 (20.5%)	8 (10.4%)	
Marital status			.946
Married/living w partner	45 (18.1%)	13 (16.9%)	
Single	204 (81.9%)	64 (83.1%)	
AIDS dx			.706
Yes	105 (42.2%)	35 (45.5%)	
No	144 (57.8%)	42 (54.5%)	

Note. Intervention condition received Positively Smoke Free; Response totals do not equal cohort size for all items due to incomplete reporting; Valid percentages used; Randomization was stratified on Black race; M(SD) = Mean(Standard Deviation); Mdn[IQR] = Median [Interquartile range]; HS = High School; AIDS dx = Lifetime AIDS diagnosis
*p<.05; ** p<.01

Table 3. Treatment and clinical characteristics for the full sample and for the intervention and control conditions (N = 442)

Variable	Total (N = 442) M(SD) or N(%) or Mdn [IQR]	Intervention Condition (N = 216) M(SD) or N(%) or Mdn [IQR]	Control Condition (N = 226) M(SD) or N(%) or Mdn [IQR]	p
Site				1.00
Montefiore CPL	235 (53.2%)	115 (53.2%)	120 (53.1%)	
Montefiore CHCC	107 (24.2%)	52 (24.1%)	55 (24.3%)	
Georgetown UH	100 (22.6%)	49 (22.7%)	51 (22.6%)	
3-month abstinence†				.036*
Yes	36 (8.1%)	24 (11.1%)	12 (5.3%)	
No	406 (91.9%)	192 (88.9%)	214 (94.7%)	
6-month abstinence†				.661
Yes	57 (12.9%)	22 (10.2%)	27 (11.9%)	
No	385 (87.1%)	194 (89.8%)	199 (88.1%)	
3-month abstinence††				.036*
Yes	43 (9.7%)	28 (13%)	15 (6.6%)	
No	399 (90.3%)	188 (87%)	211 (93.4%)	
6-month abstinence††				.92
Yes	57 (12.9%)	27 (12.5%)	30 (13.3%)	
No	385 (87.1%)	189 (87.5%)	196 (86.7%)	
ND	5.3 (2)	5.2 (1.9)	5.5 (2)	.291
SE	3.5 (0.7)	3.5 (0.7)	3.6 (0.7)	.37
MQ	7.4 (1.3)	7.4 (1.3)	7.3 (1.3)	.32
PSS	6.4 (2.9)	6.3 (2.8)	6.4 (2.7)	.79
CESD	40 (11.7)	39.9 (11.7)	40.1 (11.8)	.879
PED	1.8 (0.7)	1.9 (0.8)	1.8 (0.6)	.313

Note. Intervention condition received Positively Smoke Free; Response totals do not equal cohort size for all items due to incomplete reporting; Valid percentages used; Randomization was stratified on Black race; M(SD) = Mean(Standard Deviation); Mdn[IQR] = Median [Interquartile range]; CPL = Center for Positive Living; CHCC = Comprehensive Health Care Center; UH = University Hospital; ND = Nicotine dependence, measured by the Modified Fagerström Tolerance Questionnaire (MFTQ); SE = Smoking cessation self-efficacy, measured by the Self-Efficacy/Temptation Scale – Long Form; MQ = Motivation to quit smoking, measured by the Contemplation Ladder; PSS = Perceived stress, measured by the Short Form Perceived Stress Scale (PSS-4); CESD = Center for Epidemiologic Studies Depression Scale; PED = Perceived Ethnic Discrimination, measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B).

†7-day point prevalence abstinence based on self-report and exhaled carbon monoxide (ECO) level of <6 parts per million (ppm)
††7-day point prevalence abstinence based on self-report and exhaled carbon monoxide (ECO) level of <10 parts per million (ppm)

*p<.05

Table 4. Treatment and clinical characteristics by race/ethnicity (N = 326)

Variable	Black, non-Hispanic/Latino (N = 249) M(SD) or N(%) or Mdn [IQR]	Hispanic/Latino (N = 77) M(SD) or N(%) or Mdn [IQR]	p
Treatment group			
Intervention	113 (45.4%)	35 (45.5%)	.547
Control	136 (54.6%)	42 (54.5%)	
Site			<..001***
Montefiore CPL	120 (48.2%)	58 (75.3%)	
Montefiore CHCC	63 (26.5%)	17 (22.1%)	
Georgetown UH	66 (26.5%)	2 (2.6%)	
3-month abstinence†			.125
Yes	26 (10.4%)	3 (3.9%)	
No	223 (89.6%)	74 (96.1%)	
6-month abstinence†			.346
Yes	35 (14.1%)	7 (9.1%)	
No	214 (85.9%)	70 (90.9%)	
3-month abstinence††			.212
Yes	31 (12.4%)	5 (6.5%)	
No	218 (87.6%)	72 (93.5%)	
6-month abstinence††			.262
Yes	41 (16.5%)	8 (10.4%)	
No	208 (83.5%)	69 (89.6%)	
ND	5.4 (2)	5.5 (2.2)	.622
SE	3.6 (0.7)	3.5 (0.8)	.845
MQ	7.3 (1.3)	7.5 (1.5)	.316
PSS	6.4 (2.8)	6.0 (2.9)	.367
CESD	38.7 (11.6)	41.5 (13.1)	.073
PED	1.8 (0.7)	1.7 (0.6)	.204

Note. Intervention condition received Positively Smoke Free; Response totals do not equal cohort size for all items due to incomplete reporting; Valid percentages used; Randomization was stratified on Black race; M(SD) = Mean(Standard Deviation); Mdn[IQR] = Median [Interquartile range]; CPL = Center for Positive Living; CHCC = Comprehensive Health Care Center; UH = University Hospital; ND = Nicotine dependence, measured by the Modified Fagerström Tolerance Questionnaire (MFTQ); SE = Smoking cessation self-efficacy, measured by the Self-Efficacy/Temptation Scale – Long Form; MQ = Motivation to quit smoking, measured by the Contemplation Ladder; PSS = Perceived stress, measured by the Short Form Perceived Stress Scale (PSS-4); CESD = Center for Epidemiologic Studies Depression Scale; PED = Perceived Ethnic Discrimination, measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B).

†7-day point prevalence abstinence based on self-report and exhaled carbon monoxide (ECO) level of <6 parts per million (ppm)

††7-day point prevalence abstinence based on self-report and exhaled carbon monoxide (ECO) level of <10 parts per million (ppm)

***p<.001

Table 5. Associations among baseline characteristics and perceived ethnic discrimination (N = 412)

Baseline characteristics	Perceived Ethnic Discrimination	
	Test statistic	p
Age	$r = -.02$	.742
Gender	$F = 2.3$	.103
Race/Ethnicity	$t = -1.3$	.204
Income	$\rho = -.05$	.322
Employment	$F = 2$	.139
Education	$F = 0.6$	.651
Housing	$F = 3.4**$	.001
Marital status	$t = -1.5$	.126
AIDS dx	$t = -0.6$	.524
Site	$F = 1.5$	.226
Treatment	$t = -1$	.313

Note. Race/ethnicity includes Hispanic/Latino ethnicity (including Hispanic/Black) and Black race (excluding Hispanic/Black) participants; AIDS dx = Lifetime AIDS diagnosis; Perceived ethnic discrimination measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B) **$p<.01$

Table 6. Associations among baseline characteristics and abstinence outcomes (N = 442)

Baseline characteristics	3-month abstinence (ECO <6ppm)		6-month abstinence (ECO <6ppm)		3-month abstinence (ECO <10ppm)		6-month abstinence (ECO <10ppm)	
	Test statistic	p	Test statistic	p	Test statistic	p	Test statistic	p
Age	$t = -0.8$	.423	$t = -0.1$	.954	$t = -0.7$	.482	$t = 0.7$	.462
Gender	$X^2 = 1$	.561	$X^2 = 1.6$	.389	$X^2 = 0.6$	.771	$X^2 = 1.6$	.446
Race/Ethnicity	$X^2 = 2.3$	.125	$X^2 = 0.9$	.346	$X^2 = 1.6$	.212	$X^2 = 1.3$	.262
Income	$U = 5247$	.887	$U = 7231$	.69	$X^2 = 1.6$	.451	$X^2 = 1.4$	.459
Employment	$X^2 = 1.3$	.599	$X^2 = 0.5$	.874	$U = 5942$	.892	$U = 8015$	.698
Education	$X^2 = 1.1$	.897	$X^2 = 8.8$	.057	$X^2 = 1$	.584	$X^2 = 0.04$	.981
Housing	$X^2 = 8**$	.005	$X^2 = 2.5$	.086	$X^2 = 1.6$	.815	$X^2 = 5.1$	.268
Marital status	$X^2 = 0.2$	.495	$X^2 = 0$	1	$X^2 = 7.6**$	.006	$X^2 = .9$	.286
AIDS dx	$X^2 = 0.2$	.666	$X^2 = 1.9$	.168	$X^2 = 0.1$	.752	$X^2 = 0.1$	.709
Site	$X^2 = 0.8$	.698	$X^2 = 0.1$	.959	$X^2 = 0.6$	.44	$X^2 = 3.1$	.06
Treatment	$X^2 = 4.2*$	.036	$X^2 = 0.2$	.65	$X^2 = 0.6$	.752	$X^2 = 0.01$	1
PED	$t = -0.6$	.522	$t = -0.6$	.569	$t = -0.7$	.503	$t = -1$	.339

Note. 7-day point prevalence abstinence based on self-report and exhaled carbon monoxide (ECO) level of <6 parts per million (ppm); Race/ethnicity includes Hispanic/Latino ethnicity (including Hispanic/Black) and Black race (excluding Hispanic/Black) participants; AIDS dx = Lifetime AIDS diagnosis; PED = Perceived Ethnic Discrimination; *p<.05, **p<.01

Table 7. Bivariate correlations among main study variables (N = 442)

	1	2	3	4	5	6
1. PED	-					
2. ND	.07	-				
3. MQ	.06	-.13**	-			
4. SE	.21**	.51**	-.10*	-		
5. PS	.34**	.13**	-.04	.21**	-	
6. CESD	.43**	.21**	-.01	.34**	.62**	-
n	100	100	98	98	100	100

*p < .05; **p < .01

Note. PED = Perceived Ethnic Discrimination; ND = Nicotine Dependence; SE = Self-Efficacy; MQ = Motivation to Quit Smoking; PS = Perceived Stress; CES-D = Depressive symptoms

Table 8. Logistic regression for perceived ethnic discrimination and 3-month abstinence status (ECO <6ppm) with and without adjusting for housing status and treatment condition (N = 384)

Included	Unadjusted			Adjusted		
	b [SE]	OR	95% CI	*b* [SE]	OR	95% CI
Constant	-2.25 [0.25]			-21.61 [4653.76]		
PED	-0.22 [0.37]	0.81	0.38, 1.67	-0.01 [0.38]	.99	0.47, 2.08

Note. PED = Perceived Ethnic Discrimination, measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B) (median split); 7-day point prevalence abstinence based on self-report and exhaled carbon monoxide (ECO) level of <6 parts per million (ppm); Covariates include housing status (stable vs. unstable) and treatment condition (intervention vs. control)

Table 9. Logistic regression for perceived ethnic discrimination and 6-month abstinence status (ECO <6ppm) with and without adjusting for housing status and treatment condition (N = 384)

Included	Unadjusted			Adjusted		
	b [SE]	OR	95% CI	*b* [SE]	OR	95% CI
Constant	-1.83 [0.21]			-2.61 [0.57]		
PED	-0.36 [0.33]	0.70	0.37, 1.33	-0.26 [0.33]	0.77	0.40, 1.47

Note. PED = Perceived Ethnic Discrimination, measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B) (median split); 7-day point prevalence abstinence based on self-report and exhaled carbon monoxide (ECO) level of <6 parts per million (ppm); Covariates include housing status (stable vs. unstable) and treatment condition (intervention vs. control)

Table 10. Logistic regression for perceived ethnic discrimination and 3-month abstinence status (ECO <10ppm) with and without adjusting for housing status and treatment condition (N = 384)

Included	Unadjusted			Adjusted		
	b [SE]	OR	95% CI	*b* [SE]	OR	95% CI
Constant	-2.08 [0.23]			-2.13 [0.46]		
PED	-0.18 [0.34]	0.84	0.43, 1.65	-0.15 [0.31]	0.86	0.48, 1.57

Note. PED = Perceived Ethnic Discrimination, measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B) (median split); 7-day point prevalence abstinence based on self-report and exhaled carbon monoxide (ECO) level of <10 parts per million (ppm); Covariates include housing status (stable vs. unstable) and treatment condition (intervention vs. control)

Table 11. Logistic regression for perceived ethnic discrimination and 6-month abstinence status (ECO <10ppm) with and without adjusting for housing status and treatment condition (N = 384)

Included	Unadjusted			Adjusted		
	b [SE]	OR	95% CI	*b* [SE]	OR	95% CI
Constant	-1.71 [-0.21]			-4.65 [1.06]		
PED	-0.21 [0.30]	0.81	0.45, 1.47	0.004 [0.35]	1.00	0.5, 2.0

Note. PED = Perceived Ethnic Discrimination, measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B) (median split); 7-day point prevalence abstinence based on self-report and exhaled carbon monoxide (ECO) level of <10 parts per million (ppm); Covariates include housing status (stable vs. unstable) and treatment condition (intervention vs. control)

Table 12. ANCOVA for perceived ethnic discrimination by abstinence group (ECO <6ppm), adjusting for housing status and treatment condition (N = 384)

Included	$F(1, 379)$	p	η^2
Intercept	335.52	<.001	.47
Housing status	11.90	.001**	.03
Treatment condition	0.50	.481	.001
Abstinence group	0.25	.862	.002

Note. PED = Perceived Ethnic Discrimination, measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B) (average score); 7-day point prevalence abstinence based on self-report and exhaled carbon monoxide (ECO) level of <6 parts per million (ppm); abstinence group = abstinent at both follow ups, abstinent and neither follow up, abstinent at 3-month only, abstinent at 6-mont only; Housing status = stable vs. unstable; Treatment condition = intervention vs. control; **$p < 01$.

Table 13. ANCOVA for perceived ethnic discrimination by abstinence group (ECO <10ppm), adjusting for housing status and treatment condition (N = 384)

Included	$F(1, 379)$	p	η^2
Intercept	378.66	<.001	.50
Housing status	11.91	.001**	.03
Treatment condition	0.49	.483	.001
Abstinence group	0.40	.754	.003

Note. PED = Perceived Ethnic Discrimination, measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B) (average score); 7-day point prevalence abstinence based on self-report and exhaled carbon monoxide (ECO) level of <10 parts per million (ppm); abstinence group = abstinent at both follow ups, abstinent and neither follow up, abstinent at 3-month only, abstinent at 6-mont only; Housing status = stable vs. unstable; Treatment condition = intervention vs. control; **$p < 01$.

Table 14. Covariance Structure AIC values

Covariance Structure	AIC
Heterogeneous First Order Autoregressive	5174.6
First Order Autoregressive	5218.2
First Order Ante-Dependence	5159.8
Autoregressive Moving Average	5220.5
First Order Factor Analytic (Constant Diagonal Offset)**	5167.5
First Order Factor Analytic (Heterogeneous Diagonal Offset)*	5161.8
Huynh-Feldt*	5166.4
Heterogeneous Toeplitz*	5209.8
Unstructured*	5161.8

* Iteration was terminated but convergence has not been achieved

** The final Hessian matrix is not positive definite although all convergence criteria are satisfied

Table 15. Estimated effect of perceived ethnic discrimination on nicotine dependence from baseline to 6-month follow up (N = 384)

Parameter	Estimate	95% CI
Intercept	5.03	4.49, 5.57
3-month follow up	3.18***	2.39, 3.97
6-month follow up	3.14***	2.46, 3.81
PED	0.19	-0.09, 0.46
PED x 3-month follow up	0.04	-0.37, 0.46
PED x 6-month follow up	-0.58***	-0.93, -0.24

Note. PED = Perceived Ethnic Discrimination, measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B); Nicotine Dependence measured by Modified Fagerström Tolerance Questionnaire (MFTQ)
***p≤. 001

Table 16. Estimated effect of perceived ethnic discrimination on motivation to quit smoking from baseline to 6-month follow up (N = 384)

Parameter	Estimate	95% CI
Intercept	7.10	6.71, 7.48
3-month follow up	0.39	-0.24, 1.02
6-month follow up	0.57	-0.09, 1.23
PED	0.14	-0.05, 0.34
PED x 3-month follow up	-0.005	-0.33, 0.32
PED x 6-month follow up	-0.11	-0.46, 0.23

Note. PED = Perceived Ethnic Discrimination, measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B); Motivation to quit smoking measured by the Contemplation Ladder

Table 17. Estimated effect of perceived ethnic discrimination on self-efficacy to quit smoking from baseline to 6-month follow up (N = 384)

Parameter	Estimate	95% CI
Intercept	3.16	3.00, 3.32
3-month follow up	-0.25*	-0.51, -0.003
6-month follow up	-0.38**	-0.63, -0.13
PED	0.21***	0.13, 0.29
PED x 3-month follow up	-0.15*	-0.28, -0.02
PED x 6-month follow up	-0.09	-0.22, 0.04

Note. PED = Perceived Ethnic Discrimination, measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B); Smoking cessation self-efficacy measured by the Self-Efficacy/Temptation Scale – Long Form
*p <.05; **p < .01; ***p<. 001

Table 18. Logistic regression for perceived ethnic discrimination and 3-month abstinence status (ECO <6ppm), with race/ethnicity as a moderator (N = 326)

Included	Unadjusted			Adjusted		
	b [SE]	OR	95% CI	b [SE]	OR	95% CI
Constant	-3.79 [1.22]			-23.49 [5126]		
PED	-0.88 [0.68]	0.42	0.11, 1.58	-0.81 [0.69]	0.44	0.12, 1.70
Race/ethnicity	0.61 [0.75]	1.85	0.43, 7.97	0.68 [0.75]	1.98	0.46, 8.53
PED*Race/ethnicity	0.22 [0.22]	1.24	0.81, 1.91	0.27 [0.22]	1.31	0.85, 2.03

Note. PED = PED = Perceived Ethnic Discrimination, measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B) (median split); 7-day point prevalence abstinence based on self-report and exhaled carbon monoxide (ECO) level of <6 parts per million (ppm); Covariates include housing status (stable vs. unstable) and treatment condition (intervention vs. control); Race/ethnicity includes Hispanic/Latino ethnicity (including Hispanic/Black) and Black race (excluding Hispanic/Black) participants

Table 19. Logistic regression for 6-month abstinence status (ECO <6ppm), with race/ethnicity as a moderator (N = 326)

Included	Unadjusted			Adjusted		
	b [SE]	OR	95% CI	*b* [SE]	OR	95% CI
Constant	-2.17 [0.84]			-2.92[1.03]		
PED	-1.32 [0.58]	0.27	0.09, 0.84	-1.31 [0.58]	0.14	0.002, 11.19
Race/ethnicity	-0.18 [0.56]	0.84	0.28, 2.51	-0.18 [0.56]	0.83	0.28, 2.50
PED *Race/ethnicity	0.35 [0.19]	1.42	0.98, 2.04	0.39[0.19]	1.48	1.02, 2.15

Note. PED = Perceived Ethnic Discrimination, measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B) (median split); 7-day point prevalence abstinence based on self-report and exhaled carbon monoxide (ECO) level of <6 parts per million (ppm); Covariates include housing status (stable vs. unstable) and treatment condition (intervention vs. control); Race/ethnicity includes Hispanic/Latino ethnicity (including Hispanic/Black) and Black race (excluding Hispanic/Black) participants

Table 20. Logistic regression for 3-month abstinence status (ECO <10ppm), with race/ethnicity as a moderator (N = 326)

Included	Unadjusted			Adjusted		
	b [SE]	OR	95% CI	*b* [SE]	OR	95% CI
Constant	-2.86 [0.98]			-5.54 [1.46]		
PED	-0.86 [0.61]	0.42	0.13, 1.39	-0.79 [0.62]	0.45	0.14, 1.52
Race/ethnicity	0.16 [0.63]	1.18	0.34, 4.03	0.23 [0.63]	1.26	0.37, 4.33
PED*Race/ethnicity	0.25 [0.20]	1.29	0.87, 1.90	0.29 [0.20]	1.34	0.90, 2.00

Note. PED = Perceived Ethnic Discrimination, measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B) (median split); 7-day point prevalence abstinence based on self-report and exhaled carbon monoxide (ECO) level of <10 parts per million (ppm); Covariates include housing status (stable vs. unstable) and treatment condition (intervention vs. control); Race/ethnicity includes Hispanic/Latino ethnicity (including Hispanic/Black) and Black race (excluding Hispanic/Black) participants

Table 21. Logistic regression for 6-month abstinence status (ECO <10ppm), with race/ethnicity as a moderator (N = 326)

Included	Unadjusted			Adjusted		
	b [SE]	OR	95% CI	b [SE]	OR	95% CI
Constant	-2.12 [0.80]			-2.65 [0.94]		
PED	-1.08 [0.53]	0.34	0.12, 0.97	-1.07 [0.53]	0.34	0.12, 0.98
Race/ethnicity	-0.07 [0.53]	0.93	0.33, 2.61	-0.08[0.53]	0.93	0.33, 2.61
PED*Race/ethnicity	0.31 [0.18]	1.36	0.97, 1.92	0.34 [0.18]	1.40	1.00, 1.99

Note. PED = Perceived Ethnic Discrimination, measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B) (median split); 7-day point prevalence abstinence based on self-report and exhaled carbon monoxide (ECO) level of <10 parts per million (ppm); Covariates include housing status (stable vs. unstable) and treatment condition (intervention vs. control); Race/ethnicity includes Hispanic/Latino ethnicity (including Hispanic/Black) and Black race (excluding Hispanic/Black) participants

Table 22. Fixed effects of time, perceived ethnic discrimination, and race/ethnicity on nicotine dependence (N = 326)

Included	Unadjusted		Adjusted	
	$F(df_1, df_2)$	p	$F(df_1, df_2)$	p
Intercept	$F(1, 305) = 260.97$	<.001	$F(1, 334) = 77.82$	<.001
Time	$F(2, 269) = 11.97$	<.001***	$F(2, 326) = 4.56$	.011*
PED	$F(1, 310) = 0.91$	.340	$F(1, 333) = 0.13$	.717
Race/Ethnicity	$F(1, 305) = 0.36$	.547	$F(1, 335) = 0.16$	.387
Time*PED	$F(2, 278) = 2.37$	.095	$F(2, 311) = 0.37$	.694
Time*Race/Ethnicity	$F(4, 269) = 5.85$	.003**	$F(2, 334) = 1.07$	.343
PED*Race/Ethnicity	$F(1, 310) = 0.48$	.489	$F(1, 335) = 0.08$	.777
Time*PED*Race/Ethnicity	$F(2, 278) = 4.71$	.010**	$F(2, 320) = 1.09$	.338

Note. PED = Perceived Ethnic Discrimination, measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B); Nicotine Dependence measured by Modified Fagerström Tolerance Questionnaire (MFTQ); Race/ethnicity includes Hispanic/Latino ethnicity (including Hispanic/Black) and Black race (excluding Hispanic/Black) participants; Time includes baseline, 3-month follow up and 6-month follow up; with and without adjusting for housing status (stable vs. unstable) and treatment condition (intervention vs. control); *p<.05; **p≤.01; ***p<.001

Table 23. Fixed effects of time, perceived ethnic discrimination, and race/ethnicity on motivation to quit smoking (N = 326)

Included	Unadjusted		Adjusted	
	$F(df_1, df_2)$	p	$F(df_1, df_2)$	p
Intercept	$F(1, 306) = 1309.05$	<.001	$F(1, 339) = 200.43$	<.001
Time	$F(2, 298) = 2.03$	.133	$F(2, 331) = 0.71$	.494
PED	$F(1, 315) = 0.32$	.574	$F(1, 349) = 0.16$	.694
Race/Ethnicity	$F(1, 306) = 1.51$	.221	$F(1, 378) = 0.01$	.909
Time*PED	$F(2, 306) = 0.68$	.510	$F(2, 305) = 0.52$	.594
Time*Race/Ethnicity	$F(2, 299) = 0.27$	.763	$F(2, 333) = 0.12$	.891
PED*Race/Ethnicity	$F(1, 315) = 1.09$	.296	$F(1, 350) = 0.02$	.966
Time*PED*Race/Ethnicity	$F(2, 306) = 0.56$	.571	$F(2, 309) = 0.28$	.757

Note. PED = Perceived Ethnic Discrimination, measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B); Motivation to quit smoking measured by the Contemplation Ladder; Race/ethnicity includes Hispanic/Latino ethnicity (including Hispanic/Black) and Black race (excluding Hispanic/Black) participants; Time includes baseline, 3-month follow up and 6-month follow up; with and without adjusting for housing status (stable vs. unstable) and treatment condition (intervention vs. control)

Table 24. Fixed effects of time, perceived ethnic discrimination, and race/ethnicity on self-efficacy to quit smoking (N = 326)

Included	Unadjusted		Adjusted	
	$F(df_1, df_2)$	p	$F(df_1, df_2)$	p
Intercept	$F(1, 1872) = 403.50$	<.001	$F(1, 328) = 135.94$	<.001
Time	$F(2, 650) = 6.52$	.002**	$F(2, 321) = 1.64$	.195
PED	$F(1, 1823) = 12.26$	<.001***	$F(1, 318) = 0.04$	.849
Race/Ethnicity	$F(1, 1842) = 2.76$	.097	$F(1, 328) = 0.49$	.485
Time*PED	$F(2, 655) = 0.21$	.815	$F(2, 300) = 0.18$	.834
Time*Race/Ethnicity	$F(2, 650) = 2,62$	.073	$F(2, 324) = 0.31$	.732
PED*Race/Ethnicity	$F(1, 1823) = 3.54$	.060	$F(1, 319) = 0.65$	.421
Time*PED*Race/Ethnicity	$F(2, 655) = 2.91$	.055	$F(2, 305) = 0.15$	.861

Note. PED = Perceived Ethnic Discrimination, measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B); Smoking cessation self-efficacy measured by the Self-Efficacy/Temptation Scale – Long Form; Race/ethnicity includes Hispanic/Latino ethnicity (including Hispanic/Black) and Black race (excluding Hispanic/Black) participants; Time includes baseline, 3-month follow up and 6-month follow up; with and without adjusting for housing status (stable vs. unstable) and treatment condition (intervention vs. control); *p<.05; **p<.01; ***p<.001

Figures

Figure 1. Consort flow diagram
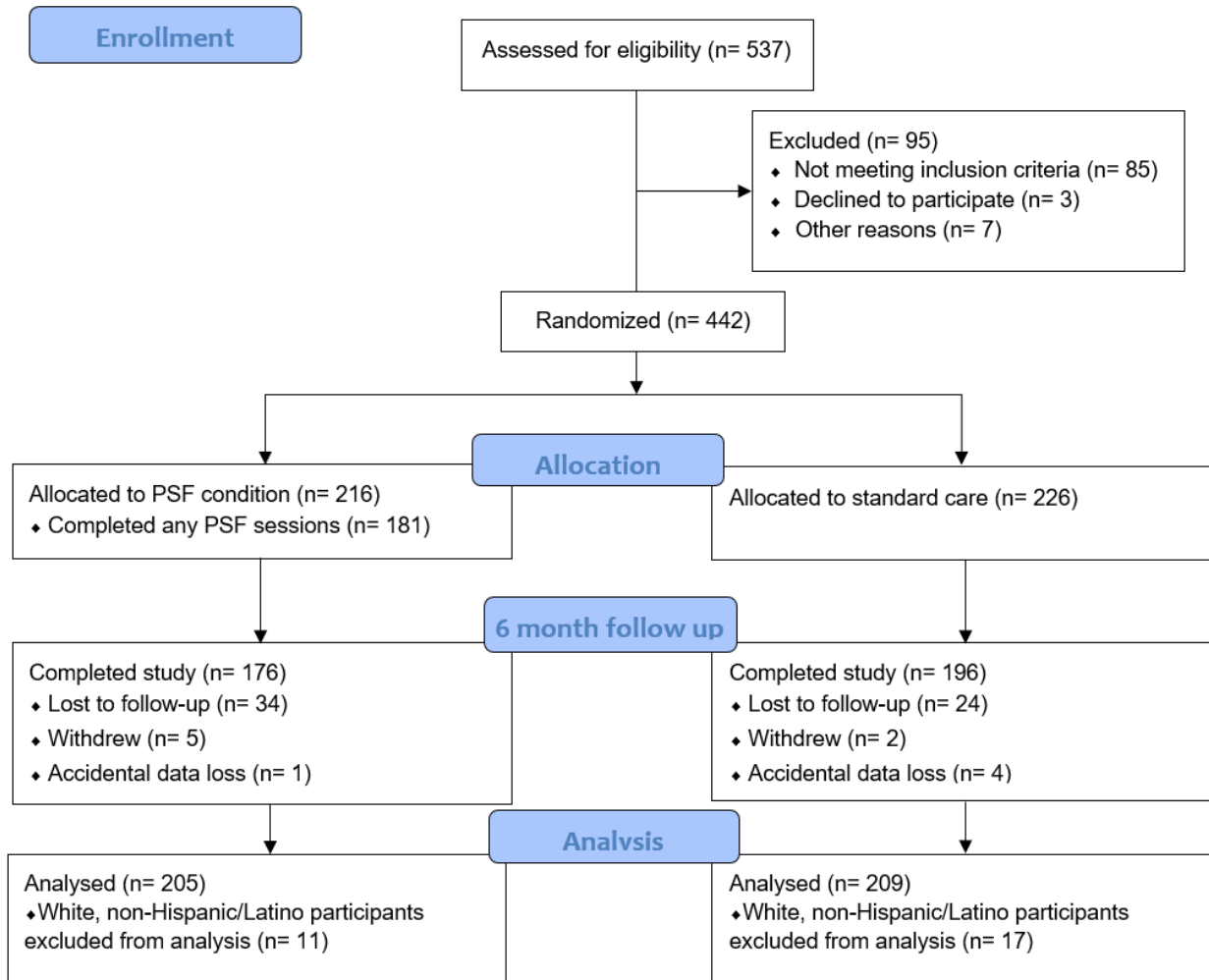
Note. Figure created using information from Stanton et al., 2020
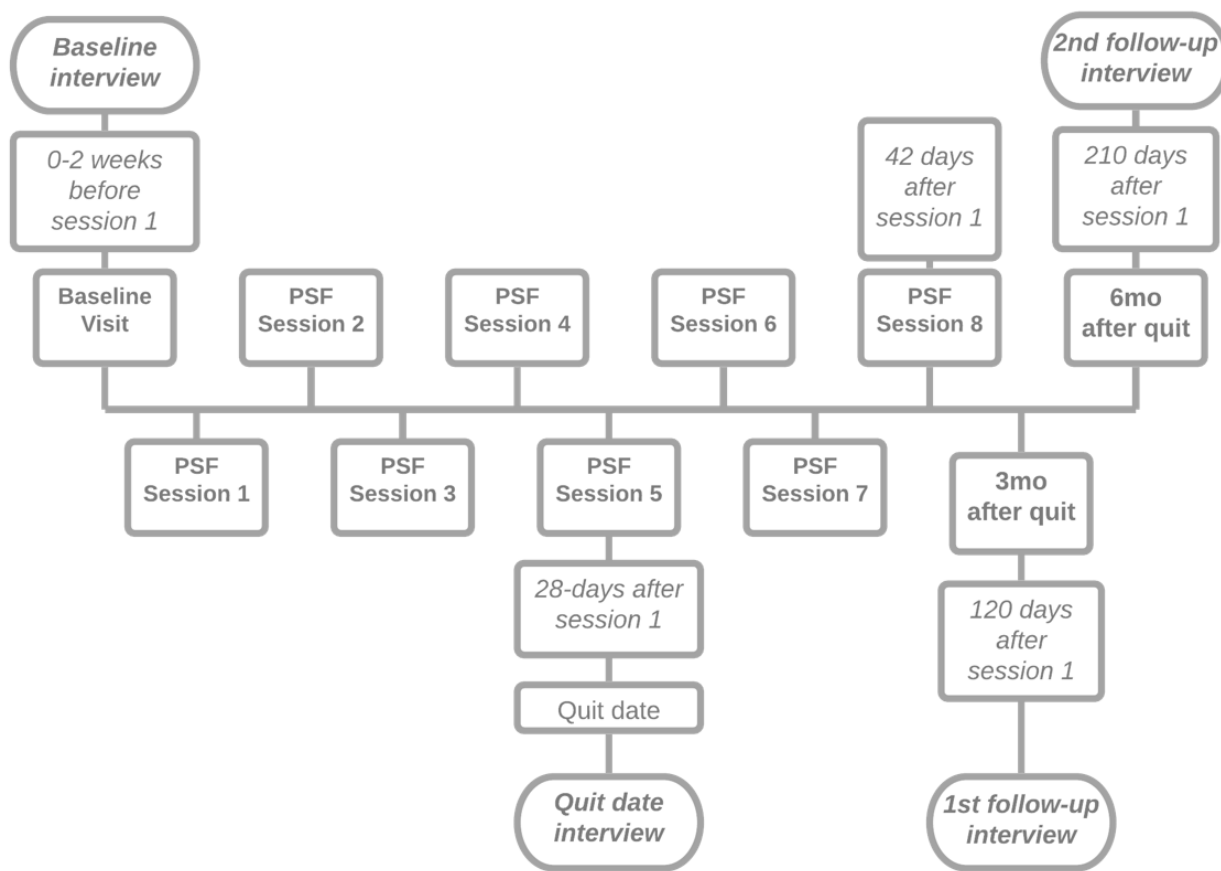
Figure 2. Timeline of group therapy intervention and study visits

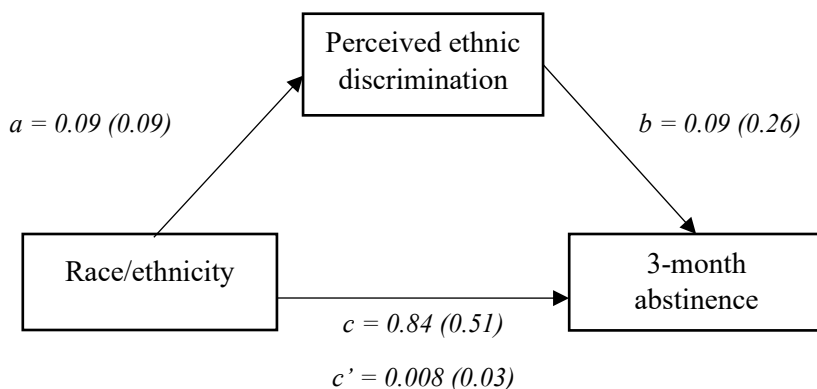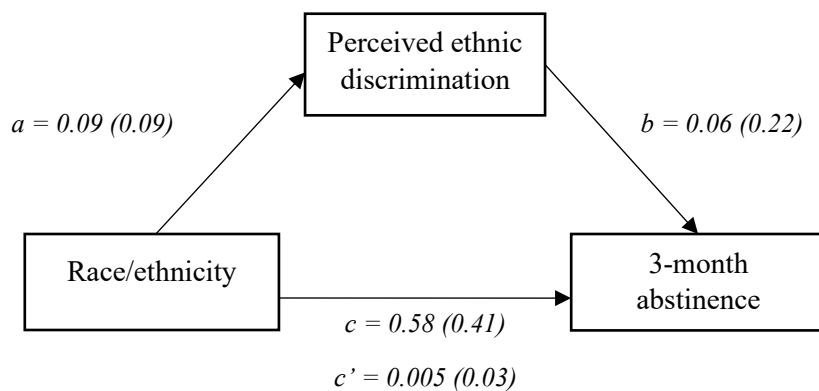*Note.* Figure created using information from Stanton et al., 2020; PSF = Positively Smoke Free; mo = month

Figure 3. Simple mediation of the relationship between race/ethnicity and 3-month abstinence (<6ppm) with perceived ethnic discrimination as a mediator (N = 326)

Note. Perceived ethnic discrimination measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B); Race/ethnicity includes Hispanic/Latino ethnicity (including Hispanic/Black) and Black race (excluding Hispanic/Black) participants; 7-day point prevalence abstinence based on self-report and exhaled carbon monoxide (ECO) level of <6 parts per million (ppm); total (c), direct (c′), and indirect effects (a*b); finding reported as β(SE).

$a = 0.11\ (0.09)$

$b = -0.07\ (0.24)$

$c = 0.50\ (0.44)$

$c' = -0.01\ (0.04)$

Figure 4. Simple mediation of the relationship between race/ethnicity and 6-month abstinence (<6ppm) with perceived ethnic discrimination as a mediator (N = 326)

Note. Perceived ethnic discrimination measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B); Race/ethnicity includes Hispanic/Latino ethnicity (including Hispanic/Black) and Black race (excluding Hispanic/Black) participants; 7-day point prevalence abstinence based on self-report and exhaled carbon monoxide (ECO) level of <6 parts per million (ppm); total (c), direct (c′), and indirect effects (a*b); finding reported as β(SE).

Figure 5. Simple mediation of the relationship between race/ethnicity and 3-month abstinence (<6ppm) with perceived ethnic discrimination as a mediator, adjusting for housing status and treatment group (N = 326)

Note. Perceived ethnic discrimination measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B); Race/ethnicity includes Hispanic/Latino ethnicity (including Hispanic/Black) and Black race (excluding Hispanic/Black) participants; 7-day point prevalence abstinence based on self-report and exhaled carbon monoxide (ECO) level of <6 parts per million (ppm); housing status includes stable vs. unstable; treatment group includes Positively Smoke Free (PSF) intervention vs. control; total (c), direct (c′), and indirect effects (a*b); finding reported as β(SE).

Figure 6. Simple mediation of the relationship between race/ethnicity and 6-month abstinence (<6ppm) with perceived ethnic discrimination as a mediator, adjusting for housing status and treatment group (N = 326)

Note. Perceived ethnic discrimination measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B); Race/ethnicity includes Hispanic/Latino ethnicity (including Hispanic/Black) and Black race (excluding Hispanic/Black) participants; 7-day point prevalence abstinence based on self-report and exhaled carbon monoxide (ECO) level of <6 parts per million (ppm); housing status includes stable vs. unstable; treatment group includes Positively Smoke Free (PSF) intervention vs. control; total (c), direct (c′), and indirect effects (a*b); finding reported as β(SE).

Figure 7. Simple mediation of the relationship between race/ethnicity and 3-month abstinence (<10ppm) with perceived ethnic discrimination as a mediator (N = 326)

Note. Perceived ethnic discrimination measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B); Race/ethnicity includes Hispanic/Latino ethnicity (including Hispanic/Black) and Black race (excluding Hispanic/Black) participants; 7-day point prevalence abstinence based on self-report and exhaled carbon monoxide (ECO) level of <10 parts per million (ppm) ; total (c), direct (c′), and indirect effects (a*b); finding reported as β(SE).

Figure 8. Simple mediation of the relationship between race/ethnicity and 6-month abstinence (<10ppm) with perceived ethnic discrimination as a mediator (N = 326)

Note. Perceived ethnic discrimination measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B); Race/ethnicity includes Hispanic/Latino ethnicity (including Hispanic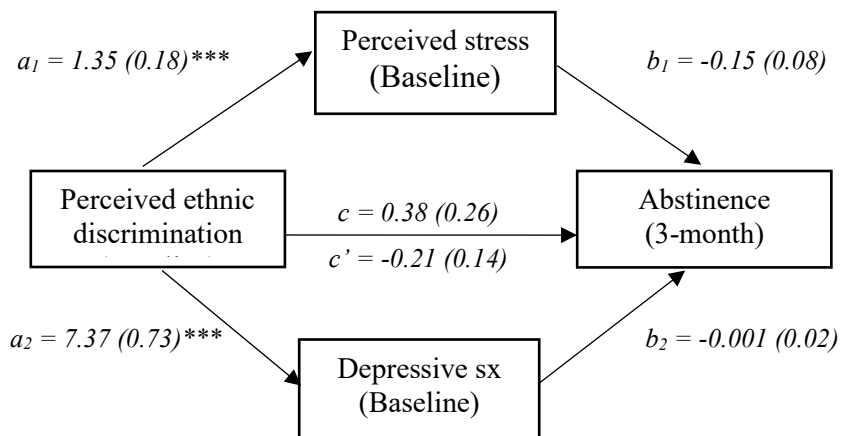/Black) and Black race (excluding Hispanic/Black) participants; 7-day point prevalence abstinence based on self-report and exhaled carbon monoxide (ECO) level of <10 parts per million (ppm); total (c), direct (c′), and indirect effects (a*b); finding reported as β(SE).

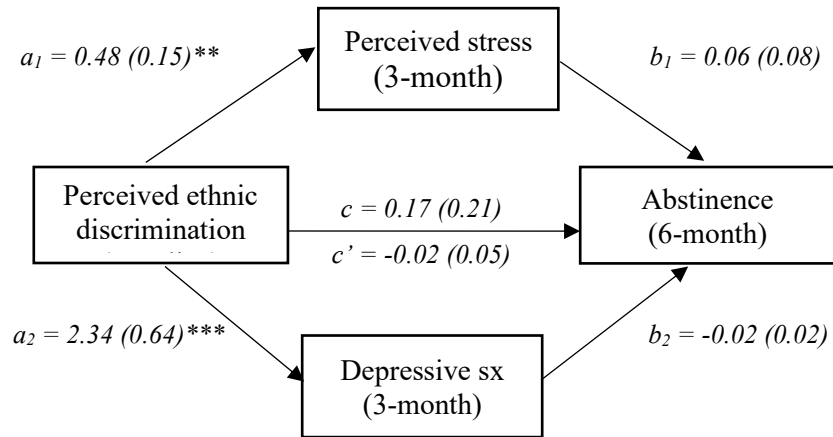Figure 9. Simple mediation of the relationship between race/ethnicity and 3-month abstinence (<10ppm) with perceived ethnic discrimination as a mediator, adjusting for housing status and treatment group (N = 326)

Note. Perceived ethnic discrimination measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B); Race/ethnicity includes Hispanic/Latino ethnicity (including Hispanic/Black) and Black race (excluding Hispanic/Black) participants; 7-day point prevalence abstinence based on self-report and exhaled carbon monoxide (ECO) level of <10 parts per million (ppm); housing status includes stable vs. unstable; treatment group includes Positively Smoke Free (PSF) intervention vs. control; total (c), direct (c′), and indirect effects (a*b); finding reported as β(SE).

Figure 10. Simple mediation of the relationship between race/ethnicity and 6-month abstinence (<10ppm) with perceived ethnic discrimination as a mediator, adjusting for housing status and treatment group (N = 326)

Note. Perceived ethnic discrimination measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B); Race/ethnicity includes Hispanic/Latino ethnicity (including Hispanic/Black) and Black race (excluding Hispanic/Black) participants; 7-day point prevalence abstinence based on self-report and exhaled carbon monoxide (ECO) level of <10 parts per million (ppm); housing status includes stable vs. unstable; treatment group includes Positively Smoke Free (PSF) intervention vs. control; total (c), direct (c′), and indirect effects (a*b); finding reported as β(SE).

Figure 11. Nicotine dependence by perceived ethnic discrimination from baseline to 6-month follow up (N = 384)

Note. PED = perceived ethnic discrimination, measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B) (median split); ND = Nicotine dependence, measured by the Modified Fagerström Tolerance Questionnaire (MFTQ)
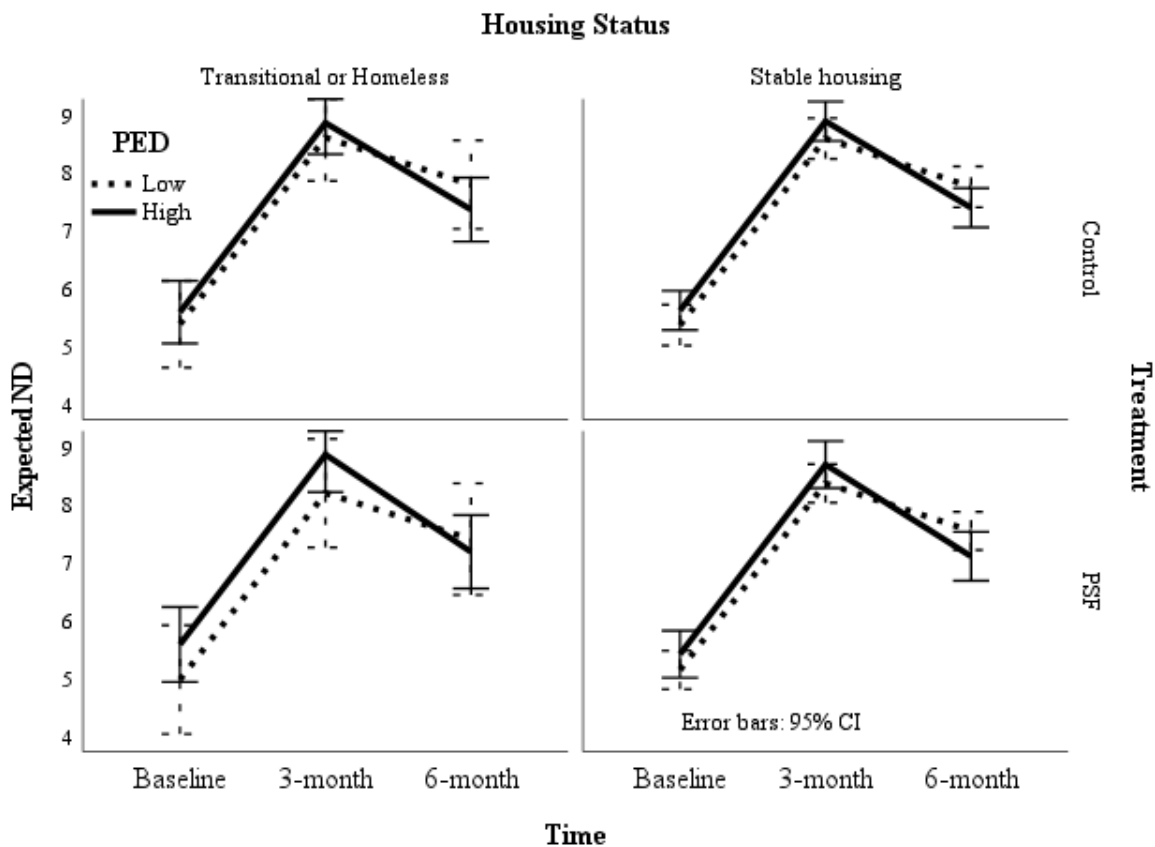
Figure 12. Nicotine dependence by perceived ethnic discrimination, treatment condition, and housing status from baseline to 6-month follow up (N = 384)

Note. PED = perceived ethnic discrimination, measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B) (median split); ND = Nicotine dependence, measured by the Modified Fagerström Tolerance Questionnaire (MFTQ); PSF = Positively Smoke Free intervention
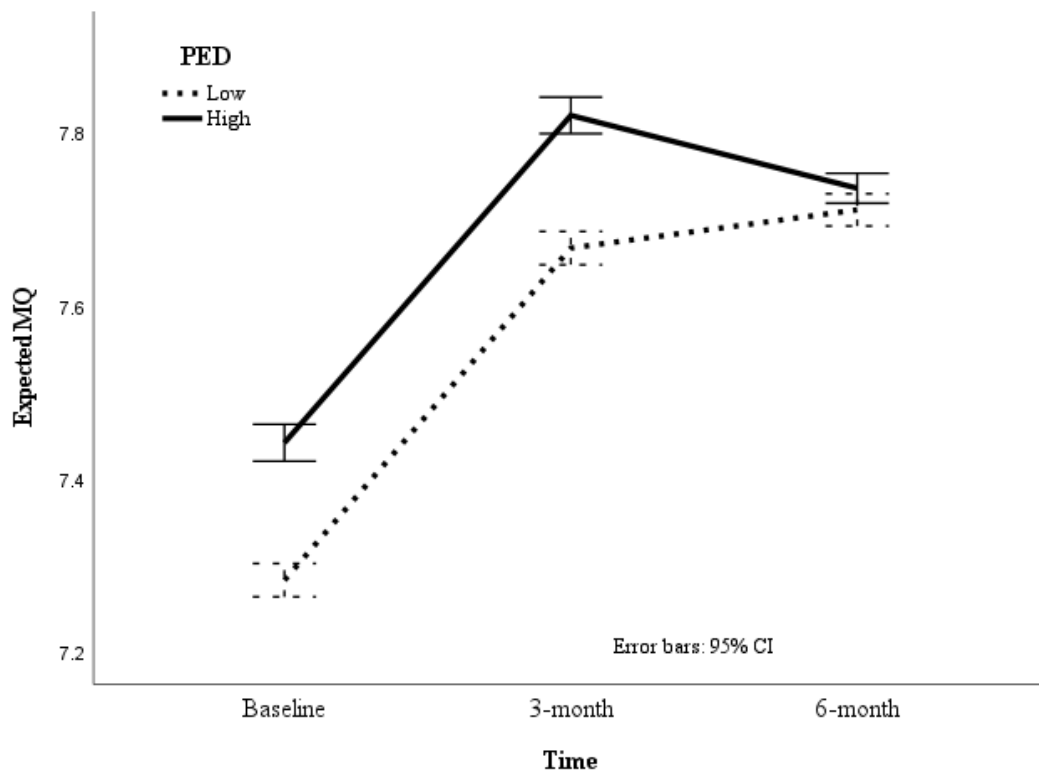
Figure 13. Motivation to quit smoking by perceived ethnic discrimination from baseline to 6-month follow up (N = 384)

Note. PED = perceived ethnic discrimination, measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B) (median split); MQ = Motivation to quit smoking, measured by the Contemplation Ladder
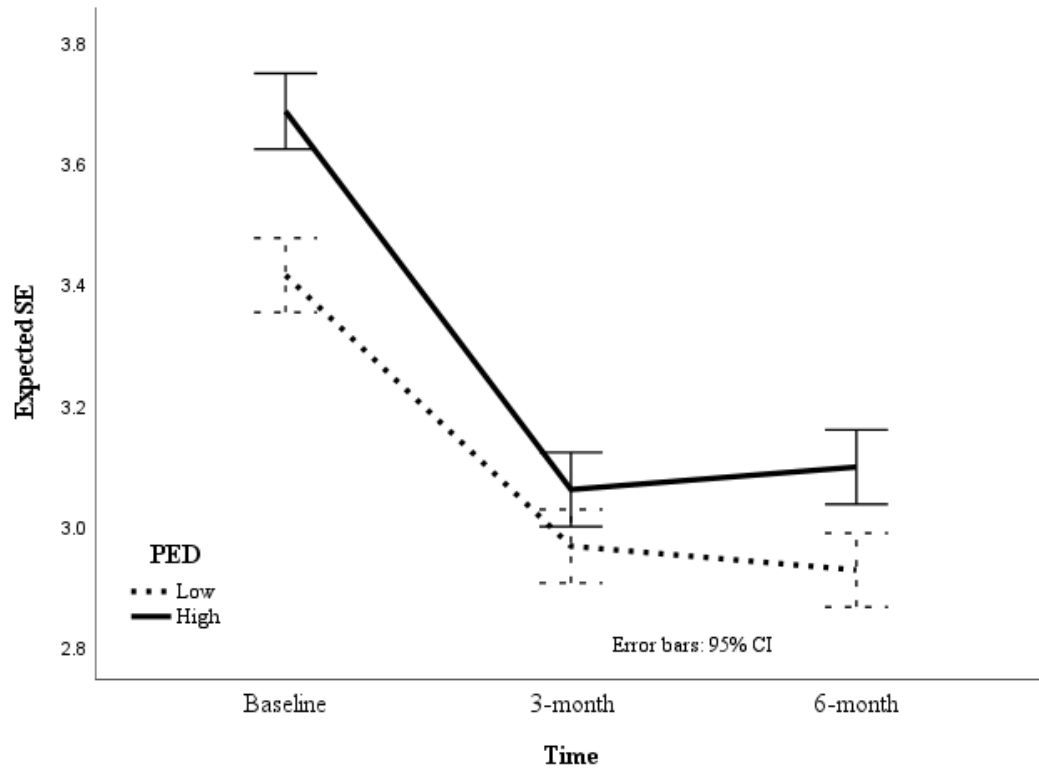
Figure 14. Self-efficacy to quit smoking by perceived ethnic discrimination from baseline to 6-month follow up (N = 384)

Note. PED = perceived ethnic discrimination, measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B) (median split); SE = Smoking cessation self-efficacy, measured by the Self-Efficacy/Temptation Scale – Long Form
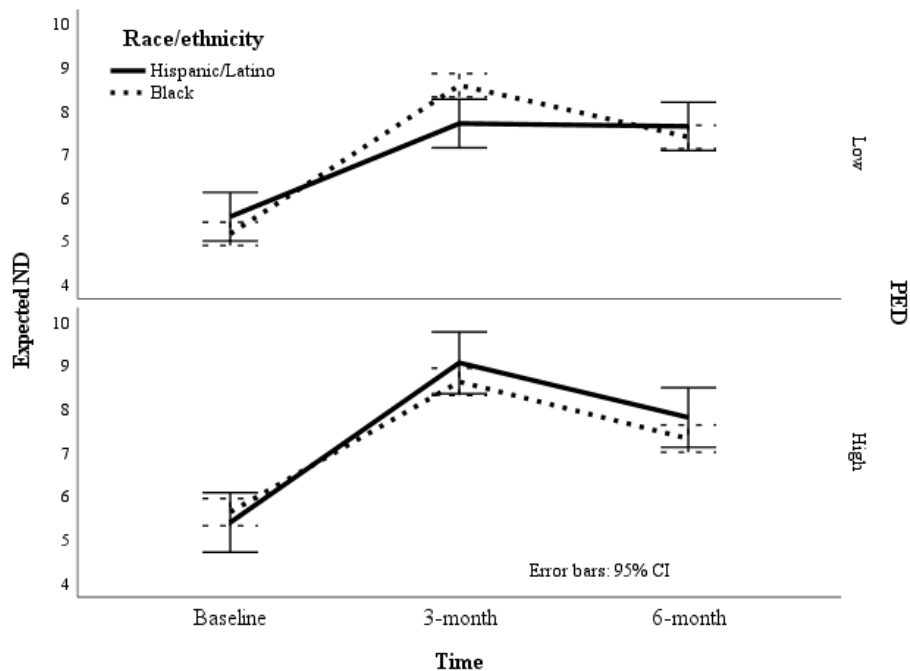
Figure 15. Three-way interaction among time, race/ethnicity, and perceived ethnic discrimination on nicotine dependence (N = 326)

Note. PED = perceived ethnic discrimination, measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B) (median split); ND = Nicotine dependence, measured by the Modified Fagerström Tolerance Questionnaire (MFTQ); Race/ethnicity includes Hispanic/Latino ethnicity (including Hispanic/Black) and Black race (excluding Hispanic/Black) participants

Figure 16. Parallel mediation of the relationship between perceived ethnic discrimination and 3-month abstinence (<6ppm) with depressive symptoms and perceived stress as mediators (N = 384)
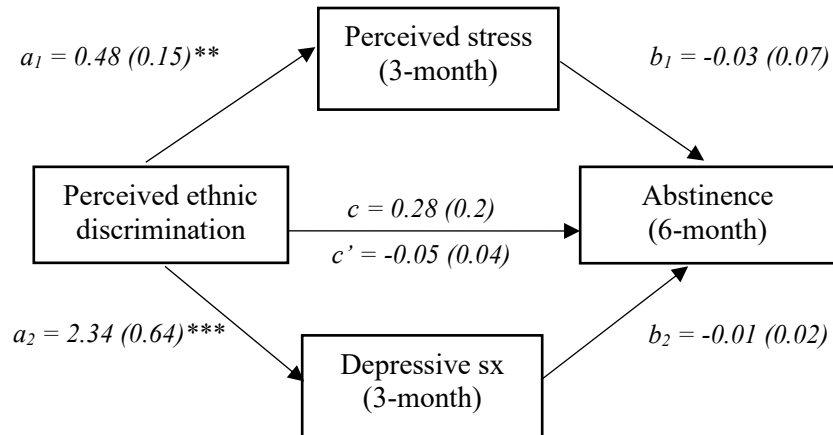
Figure 17. Parallel mediation of the relationship between perceived ethnic discrimination and 6-month abstinence (<6ppm) with depressive symptoms and perceived stress as mediators (N = 384)

Note. Perceived ethnic discrimination measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B); Perceived stress, measured by the Short Form Perceived Stress Scale (PSS-4); Depressive symptoms, measured by Center for Epidemiologic Studies Depression Scale (CES-D); 7-day point prevalence abstinence based on self-report and exhaled carbon monoxide (ECO) level of <6 parts per million (ppm); total (c), direct (c′), and indirect effects (a*b); finding reported as β(SE).
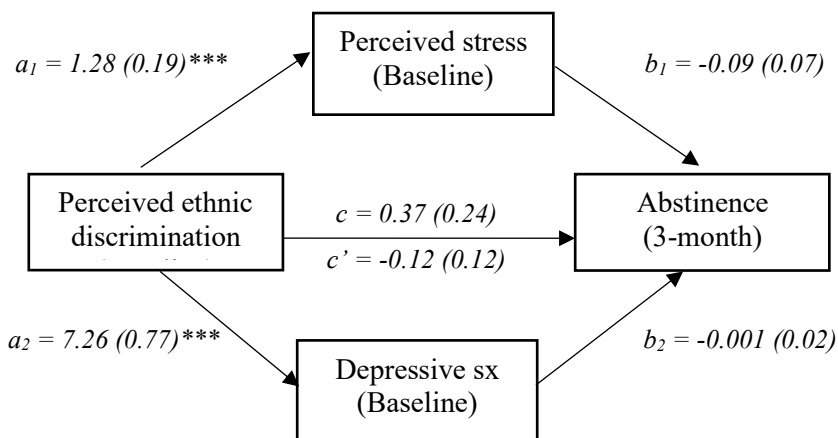***p<.01; ***p<.001*

Figure 18. Parallel mediation of the relationship between perceived ethnic discrimination and 3-month abstinence (<6ppm) with depressive symptoms and perceived stress as mediators, adjusting for housing status and treatment group (N = 384)

Note. Perceived ethnic discrimination measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B); Perceived stress, measured by the Short Form Perceived Stress Scale (PSS-4); Depressive symptoms, measured by Center for Epidemiologic Studies Depression Scale (CES-D); 7-day point prevalence abstinence based on self-report and exhaled carbon monoxide (ECO) level of <6 parts per million (ppm); housing status includes stable vs. unstable; treatment group includes Positively Smoke Free (PSF) intervention vs. control; total (c), direct (c′), and indirect effects (a*b); finding reported as β(SE).
***p<.001

Figure 20. Parallel mediation of the relationship between perceived ethnic discrimination and 3-month abstinence (<10ppm) with depressive symptoms and perceived stress as mediators (N = 384)

Note. Perceived ethnic discrimination measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B); Perceived stress, measured by the Short Form Perceived Stress Scale (PSS-4); Depressive symptoms, measured by Center for Epidemiologic Studies Depression Scale (CES-D); 7-day point prevalence abstinence based on self-report and exhaled carbon monoxide (ECO) level of <10 parts per million (ppm); total (c), direct (c′), and indirect effects (a*b); finding reported as β(SE).
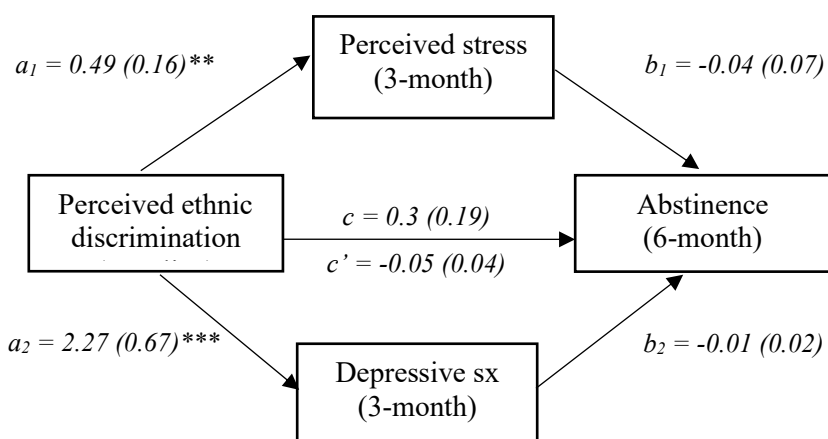****p<.001*

Figure 21. Parallel mediation of the relationship between perceived ethnic discrimination and 6-month abstinence (<10ppm) with depressive symptoms and perceived stress as mediators (N = 384)

Note. Perceived ethnic discrimination measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B); Perceived stress, measured by the Short Form Perceived Stress Scale (PSS-4); Depressive symptoms, measured by Center for Epidemiologic Studies Depression Scale (CES-D); 7-day point prevalence abstinence based on self-report and exhaled carbon monoxide (ECO) level of <10 parts per million (ppm); total (c), direct (c′), and indirect effects (a*b); finding reported as β(SE).
**p<.01; ***p<.001

$a_1 = 1.28\ (0.19)***$

Perceived stress
(Baseline)

$b_1 = -0.09\ (0.07)$

Perceived ethnic
discrimination

$c = 0.37\ (0.24)$

$c' = -0.12\ (0.12)$

Abstinence
(3-month)

$a_2 = 7.26\ (0.77)***$

Depressive sx
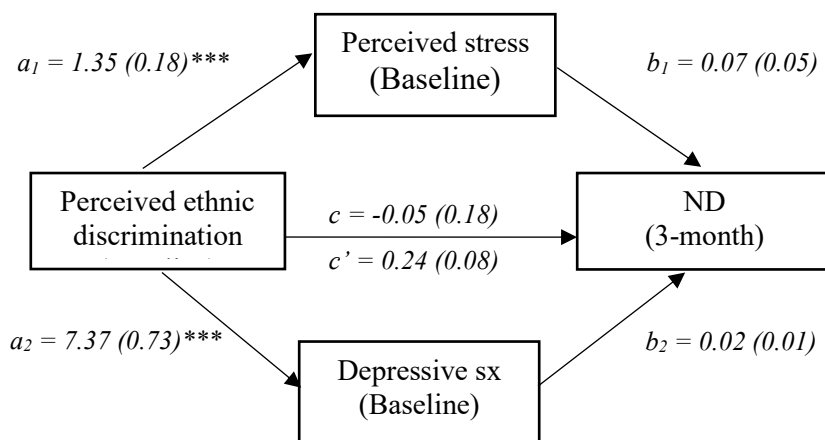(Baseline)

$b_2 = -0.001\ (0.02)$

Figure 22. Parallel mediation of the relationship between perceived ethnic discrimination and 3-month abstinence (<10ppm) with depressive symptoms and perceived stress as mediators, adjusting for housing status and treatment group (N = 384)

Note. Perceived ethnic discrimination measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B); Perceived stress, measured by the Short Form Perceived Stress Scale (PSS-4); Depressive symptoms, measured by Center for Epidemiologic Studies Depression Scale (CES-D); 7-day point prevalence abstinence based on self-report and exhaled carbon monoxide (ECO) level of <10 parts per million (ppm); housing status includes stable vs. unstable; treatment group includes Positively Smoke Free (PSF) intervention vs. control; total (c), direct (c′), and indirect effects (a*b); finding reported as β(SE).
***p<.001

Perceived stress
(3-month)

$a_1 = 0.49\ (0.16)^{**}$

$b_1 = -0.04\ (0.07)$

Perceived ethnic
discrimination

Abstinence
(6-month)

$c = 0.3\ (0.19)$

$c' = -0.05\ (0.04)$

$a_2 = 2.27\ (0.67)^{***}$

$b_2 = -0.01\ (0.02)$
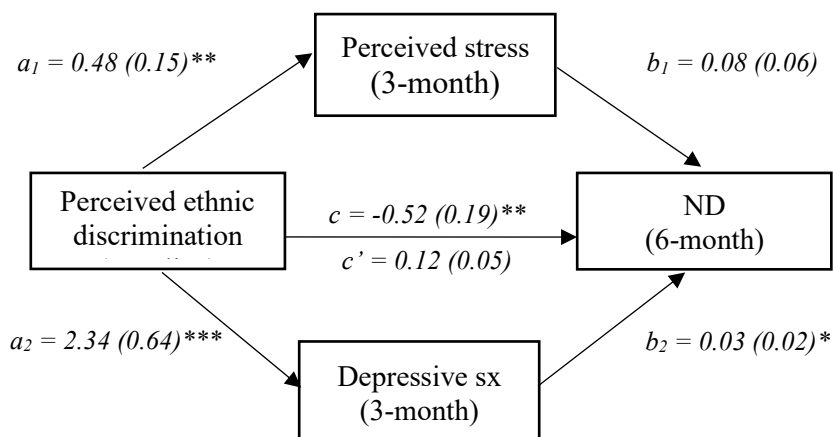
Depressive sx
(3-month)

Figure 23. Parallel mediation of the relationship between perceived ethnic discrimination and 6-month abstinence (<10ppm) with depressive symptoms and perceived stress as mediators, adjusting for housing status and treatment group (N = 384)

Note. Perceived ethnic discrimination measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B); Perceived stress, measured by the Short Form Perceived Stress Scale (PSS-4); Depressive symptoms, measured by Center for Epidemiologic Studies Depression Scale (CES-D); 7-day point prevalence abstinence based on self-report and exhaled carbon monoxide (ECO) level of <10 parts per million (ppm); housing status includes stable vs. unstable; treatment group includes Positively Smoke Free (PSF) intervention vs. control; total (c), direct (c'), and indirect effects (a*b); finding reported as β(SE).
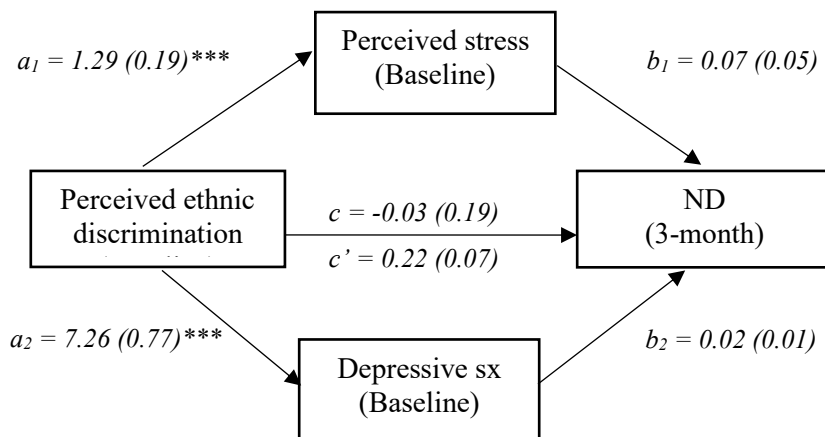**$p<.01$; ***$p<.001$

Figure 24. Parallel mediation of the relationship between perceived ethnic discrimination and 3-month nicotine dependence with depressive symptoms and perceived stress as mediators (N = 384)

Note. Perceived ethnic discrimination measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B); Perceived stress, measured by the Short Form Perceived Stress Scale (PSS-4); Depressive symptoms, measured by Center for Epidemiologic Studies Depression Scale (CES-D); ND = Nicotine dependence, measured by the Modified Fagerström Tolerance Questionnaire (MFTQ); total (c), direct (c′), and indirect effects (a*b); finding reported as β(SE).
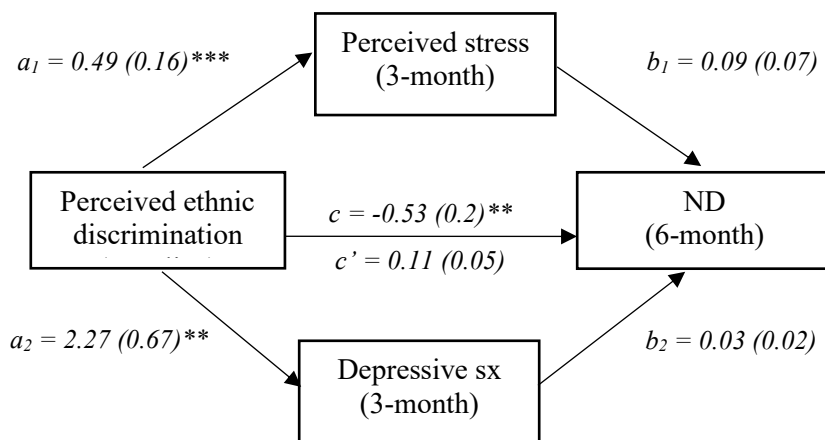***$p<.001$

Figure 25. Parallel mediation of the relationship between perceived ethnic discrimination and 6-month nicotine dependence with depressive symptoms and perceived stress as mediators (N = 384)

Note. Perceived ethnic discrimination measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B); Perceived stress, measured by the Short Form Perceived Stress Scale (PSS-4); Depressive symptoms, measured by Center for Epidemiologic Studies Depression Scale (CES-D); ND = Nicotine dependence, measured by the Modified Fagerström Tolerance Questionnaire (MFTQ); total (c), direct (c′), and indirect effects (a*b); finding reported as β(SE).
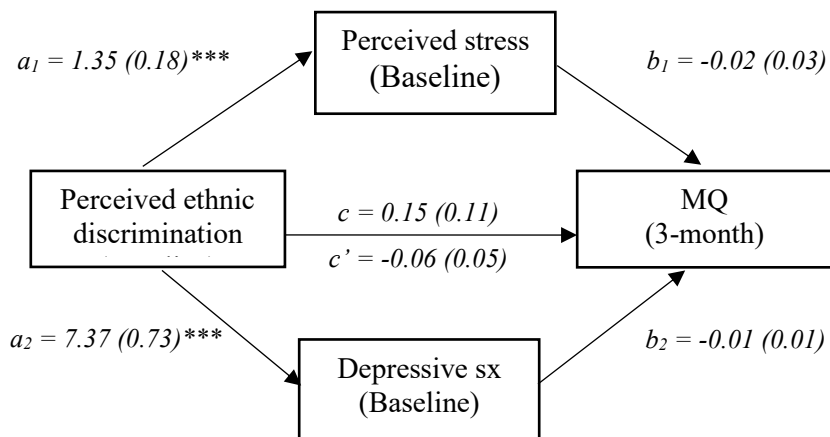*p*≤.05, ***p*<.001 ****p*<.001*

Figure 26. Parallel mediation of the relationship between perceived ethnic discrimination and 3-month nicotine dependence with depressive symptoms and perceived stress as mediators, adjusting for housing status and treatment group (N = 384)

Note. Perceived ethnic discrimination measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B); Perceived stress, measured by the Short Form Perceived Stress Scale (PSS-4); Depressive symptoms, measured by Center for Epidemiologic Studies Depression Scale (CES-D); ND = Nicotine dependence, measured by the Modified Fagerström Tolerance Questionnaire (MFTQ); housing status includes stable vs. unstable; treatment group includes Positively Smoke Free (PSF) intervention vs. control; total (c), direct (c′), and indirect effects (a*b); finding reported as β(SE).
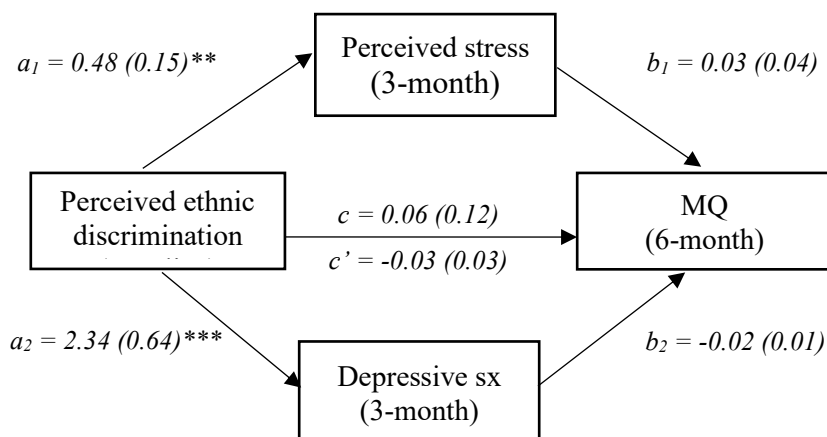****p<.001*

Figure 27. Parallel mediation of the relationship between perceived ethnic discrimination and 6-month nicotine dependence with depressive symptoms and perceived stress as mediators, adjusting for housing status and treatment group (N = 384)

Note. Perceived ethnic discrimination measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B); Perceived stress, measured by the Short Form Perceived Stress Scale (PSS-4); Depressive symptoms, measured by Center for Epidemiologic Studies Depression Scale (CES-D); ND = Nicotine dependence, measured by the Modified Fagerström Tolerance Questionnaire (MFTQ); housing status includes stable vs. unstable; treatment group includes Positively Smoke Free (PSF) intervention vs. control; total (c), direct (c′), and indirect effects (a*b); finding reported as β(SE). **$p<.01$***$p<.001$
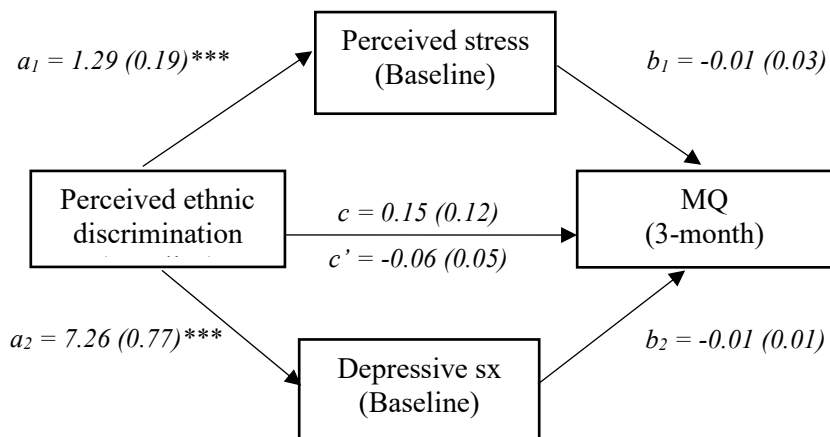
Figure 28. Parallel mediation of the relationship between perceived ethnic discrimination and 3-month motivation to quit smoking with depressive symptoms and perceived stress as mediators (N = 384)

Note. Perceived ethnic discrimination measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B); Perceived stress, measured by the Short Form Perceived Stress Scale (PSS-4); Depressive symptoms, measured by Center for Epidemiologic Studies Depression Scale (CES-D); MQ = Motivation to quit smoking measured by the Contemplation ladder; total (c), direct (c′), and indirect effects (a*b); finding reported as β(SE).
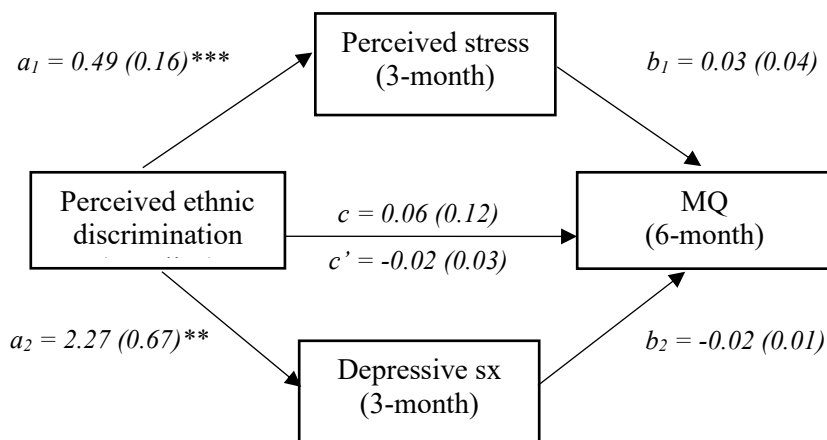****p<.001*

Figure 29. Parallel mediation of the relationship between perceived ethnic discrimination and 6-month motivation to quit smoking with depressive symptoms and perceived stress as mediators (N = 384)

Note. Perceived ethnic discrimination measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B); Perceived stress, measured by the Short Form Perceived Stress Scale (PSS-4); Depressive symptoms, measured by Center for Epidemiologic Studies Depression Scale (CES-D); MQ = Motivation to quit smoking measured by the Contemplation ladder; total (c), direct (c′), and indirect effects (a*b); finding reported as β(SE).
*$p \leq .05$, **$p < .001$ ***$p < .001$

Figure 30. Parallel mediation of the relationship between perceived ethnic discrimination and 3-month motivation to quit smoking with depressive symptoms and perceived stress as mediators, adjusting for housing status and treatment group (N = 384)

Note. Perceived ethnic discrimination measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B); Perceived stress, measured by the Short Form Perceived Stress Scale (PSS-4); Depressive symptoms, measured by Center for Epidemiologic Studies Depression Scale (CES-D); MQ = Motivation to quit smoking, measured by the Contemplation Ladder; housing status includes stable vs. unstable; treatment group includes Positively Smoke Free (PSF) intervention vs. control; total (c), direct (c′), and indirect effects (a*b); finding reported as β(SE).
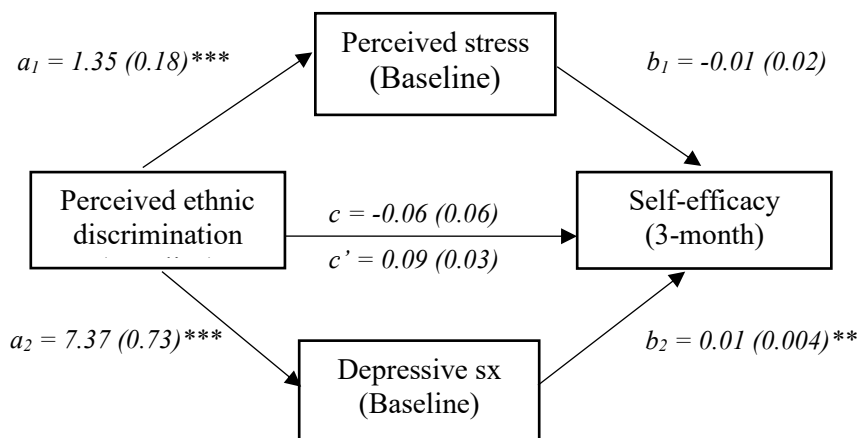*** $p<.001$

Figure 31. Parallel mediation of the relationship between perceived ethnic discrimination and 6-month motivation to quit smoking with depressive symptoms and perceived stress as mediators, adjusting for housing status and treatment group (N = 384)

Note. Perceived ethnic discrimination measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B); Perceived stress, measured by the Short Form Perceived Stress Scale (PSS-4); Depressive symptoms, measured by Center for Epidemiologic Studies Depression Scale (CES-D); MQ = Motivation to quit smoking, measured by the Contemplation Ladder; housing status includes stable vs. unstable; treatment group includes Positively Smoke Free (PSF) intervention vs. control; total (c), direct (c′), and indirect effects (a*b); finding reported as β(SE).
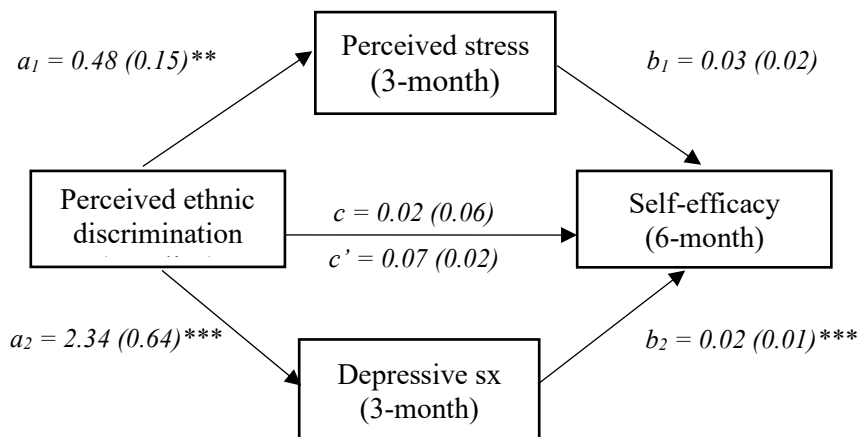**p<.01, ***p<.001

Figure 32. Parallel mediation of the relationship between perceived ethnic discrimination and 3-month self-efficacy to quit smoking with depressive symptoms and perceived stress as mediators (N = 384)

Note. Perceived ethnic discrimination measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B); Perceived stress, measured by the Short Form Perceived Stress Scale (PSS-4); Depressive symptoms, measured by Center for Epidemiologic Studies Depression Scale (CES-D); Smoking cessation self-efficacy, measured by the Self-Efficacy/Temptation Scale – Long Form; total (c), direct (c′), and indirect effects (a*b); finding reported as β(SE). **$p<.01$, ***$p<.001$
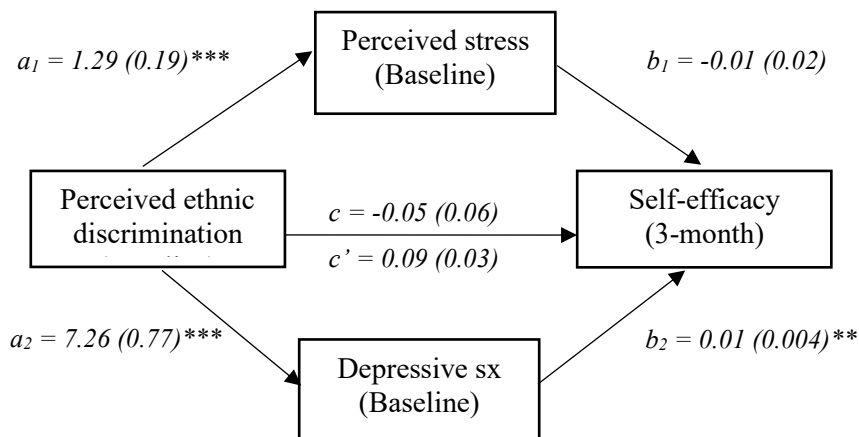
Figure 33. Parallel mediation of the relationship between perceived ethnic discrimination and 6-month self-efficacy to quit smoking with depressive symptoms and perceived stress as mediators (N = 384)

Note. Perceived ethnic discrimination measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B); Perceived stress, measured by the Short Form Perceived Stress Scale (PSS-4); Depressive symptoms, measured by Center for Epidemiologic Studies Depression Scale (CES-D); Smoking cessation self-efficacy, measured by the Self-Efficacy/Temptation Scale – Long Form; total (c), direct (c′), and indirect effects (a*b); finding reported as β(SE). **p<.01, ***p<.001

Perceived stress
(Baseline)

Perceived ethnic
discrimination

Self-efficacy
(3-month)

Depressive sx
(Baseline)

$a_1 = 1.29\ (0.19)^{***}$

$b_1 = -0.01\ (0.02)$

$c = -0.05\ (0.06)$

$c' = 0.09\ (0.03)$

$a_2 = 7.26\ (0.77)^{***}$
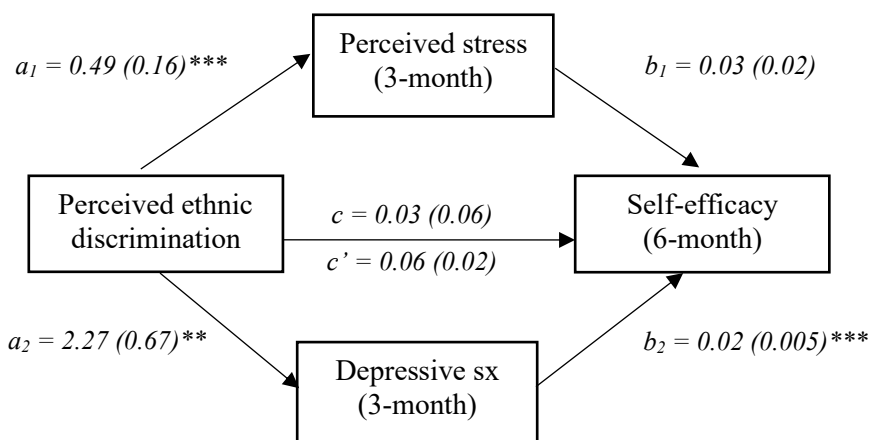
$b_2 = 0.01\ (0.004)^{**}$

Figure 34. Parallel mediation of the relationship between perceived ethnic discrimination and 3-month self-efficacy to quit smoking with depressive symptoms and perceived stress as mediators, adjusting for housing status and treatment group (N = 384)

Note. Perceived ethnic discrimination measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B); Perceived stress, measured by the Short Form Perceived Stress Scale (PSS-4); Depressive symptoms, measured by Center for Epidemiologic Studies Depression Scale (CES-D); Smoking cessation self-efficacy, measured by the Self-Efficacy/Temptation Scale – Long Form; housing status includes stable vs. unstable; treatment group includes Positively Smoke Free (PSF) intervention vs. control; total (c), direct (c′), and indirect effects (a*b); finding reported as β(SE). **$p<.01$, ***$p<.001$

Figure 35. Parallel mediation of the relationship between perceived ethnic discrimination and 6-month self-efficacy to quit smoking with depressive symptoms and perceived stress as mediators, adjusting for housing status and treatment group (N = 384)

Note. Perceived ethnic discrimination measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B); Perceived stress, measured by the Short Form Perceived Stress Scale (PSS-4); Depressive symptoms, measured by Center for Epidemiologic Studies Depression Scale (CES-D); Smoking cessation self-efficacy, measured by the Self-Efficacy/Temptation Scale – Long Form; housing status includes stable vs. unstable; treatment group includes Positively Smoke Free (PSF) intervention vs. control; total (c), direct (c′), and indirect effects (a*b); finding reported as β(SE).
***p<.001

Supplemental Tables and Figures

Supplemental Table 1. Logistic regression for perceived ethnic discrimination and 3-month abstinence status (ECO <6ppm) in intervention condition, with and without adjusting for housing status (N = 205)

	Unadjusted			Adjusted		
Included	b [SE]	OR	95% CI	b [SE]	OR	95% CI
Constant	-1.97 [0.32]			-21.35 [7214.21]		
PED	-0.003 [0.47]	0.99	0.40, 2.49	0.21 [0.47]	1.23	0.49, 3.11

Note. PED = Perceived Ethnic Discrimination, measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B) (median split); 7-day point prevalence abstinence based on self-report and exhaled carbon monoxide (ECO) level of <6 parts per million (ppm); Housing status (stable vs. unstable) included as covariate

Supplemental Table 2. Logistic regression for perceived ethnic discrimination and 6-month abstinence status (ECO <6ppm) in intervention condition, with and without adjusting for housing status (N = 205)

Included	Unadjusted			Adjusted		
	b [SE]	OR	95% CI	*b* [SE]	OR	95% CI
Constant	-2.08 [0.34]			-2.72[0.81]		
PED	-0.01 [0.49]	0.99	0.38, 2.56	-0.07 [0.49]	1.07	0.41, 2.83

Note. PED = Perceived Ethnic Discrimination, measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B) (median split); 7-day point prevalence abstinence based on self-report and exhaled carbon monoxide (ECO) level of <6 parts per million (ppm); Housing status (stable vs. unstable) included as covariate

Supplemental Table 3. Logistic regression for perceived ethnic discrimination and 3-month abstinence status (ECO <10ppm) in intervention condition, with and without adjusting for housing status (N = 205)

Included	Unadjusted			Adjusted		
	b [SE]	OR	95% CI	*b* [SE]	OR	95% CI
Constant	-1.87 [0.31]			-3.60 [1.07]		
PED	0.11 [0.44]	0.81	0.47, 2.64	0.28 [0.45]	1.32	0.55, 3.17

Note. PED = Perceived Ethnic Discrimination, measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B) (median split); 7-day point prevalence abstinence based on self-report and exhaled carbon monoxide (ECO) level of <10 parts per million (ppm); Housing status (stable vs. unstable) included as covariate

Supplemental Table 4. Logistic regression for perceived ethnic discrimination and 6-month abstinence status (ECO <10ppm) in intervention condition with and without adjusting for housing status (N = 205)

Included	Unadjusted			Adjusted		
	b [SE]	OR	95% CI	b [SE]	OR	95% CI
Constant	-1.87 [0.31]			-2.00 [0.62]		
PED	0.11 [0.44]	1.11	0.47, 2.64	0.13 [0.45]	1.14	0.47, 2.73

Note. PED = Perceived Ethnic Discrimination, measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B) (median split); 7-day point prevalence abstinence based on self-report and exhaled carbon monoxide (ECO) level of <10 parts per million (ppm); Housing status (stable vs. unstable) included as covariate
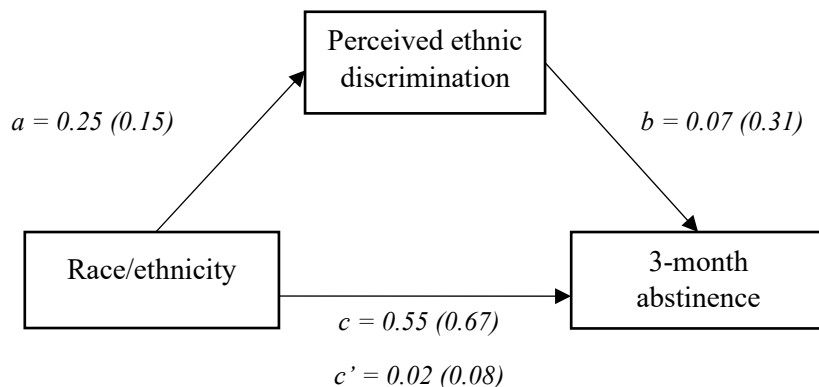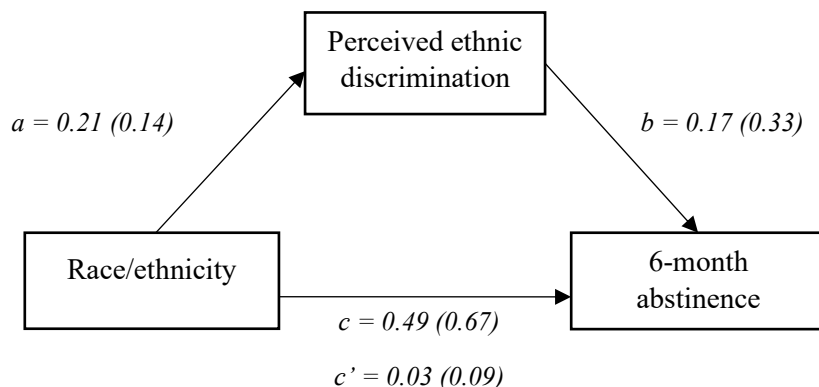
Supplemental Figure 1. Simple mediation of the relationship between race/ethnicity and 3-month abstinence (<6ppm) with perceived ethnic discrimination as a mediator in intervention condition (N = 148)

Note. Perceived ethnic discrimination measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B); Race/ethnicity includes Hispanic/Latino ethnicity (including Hispanic/Black) and Black race (excluding Hispanic/Black) participants; 7-day point prevalence abstinence based on self-report and exhaled carbon monoxide (ECO) level of <6 parts per million (ppm); total (c), direct (c′), and indirect effects (a*b); finding reported as β(SE).
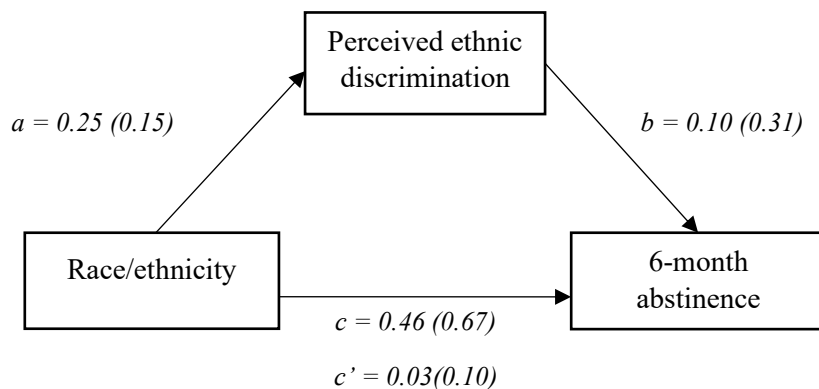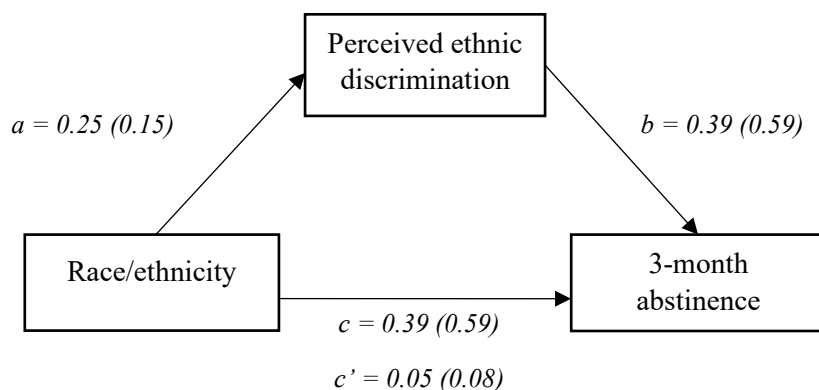
Supplemental Figure 2. Simple mediation of the relationship between race/ethnicity and 6-month abstinence (<6ppm) with perceived ethnic discrimination as a mediator in intervention condition (N = 148)

Note. Perceived ethnic discrimination measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B); Race/ethnicity includes Hispanic/Latino ethnicity (including Hispanic/Black) and Black race (excluding Hispanic/Black) participants; 7-day point prevalence abstinence based on self-report and exhaled carbon monoxide (ECO) level of <6 parts per million (ppm); total (c), direct (c′), and indirect effects (a*b); finding reported as β(SE).
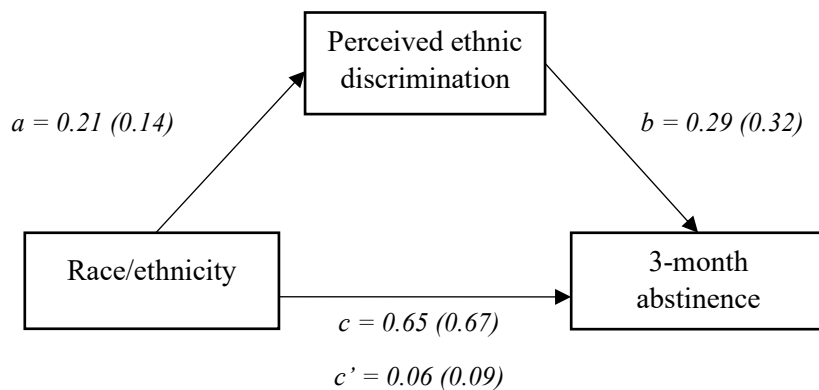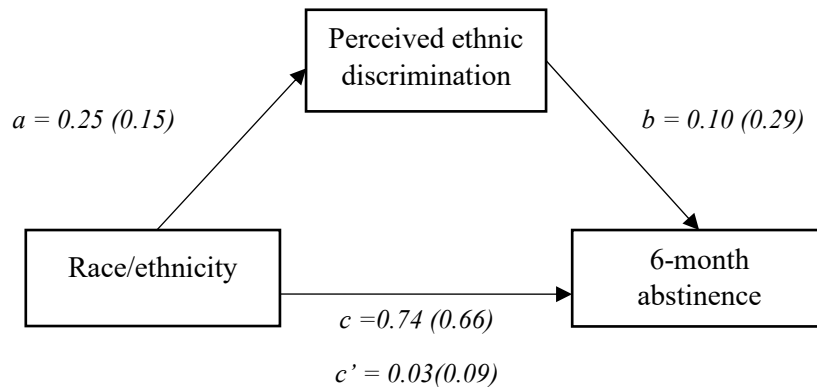
Supplemental Figure 3. Simple mediation of the relationship between race/ethnicity and 3-month abstinence (<6ppm) with perceived ethnic discrimination as a mediator in intervention condition (N = 148), adjusting for housing status

Note. Perceived ethnic discrimination measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B); Race/ethnicity includes Hispanic/Latino ethnicity (including Hispanic/Black) and Black race (excluding Hispanic/Black) participants; 7-day point prevalence abstinence based on self-report and exhaled carbon monoxide (ECO) level of <6 parts per million (ppm); housing status includes stable vs. unstable; total (c), direct (c′), and indirect effects (a*b); finding reported as β(SE).

a = 0.21 (0.14)

Perceived ethnic discrimination

b = 0.17 (0.33)

Race/ethnicity

6-month abstinence

c = 0.49 (0.67)

c' = 0.03 (0.09)

Supplemental Figure 4. Simple mediation of the relationship between race/ethnicity and 6-month abstinence (<6ppm) with perceived ethnic discrimination as a mediator in intervention condition (N = 148), adjusting for housing status
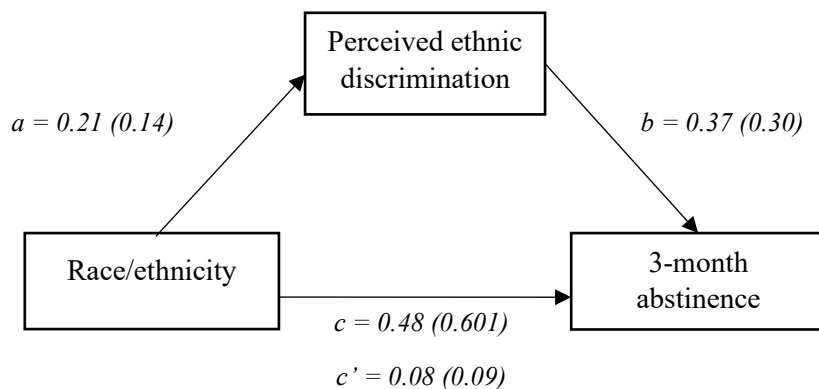
Note. Perceived ethnic discrimination measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B); Race/ethnicity includes Hispanic/Latino ethnicity (including Hispanic/Black) and Black race (excluding Hispanic/Black) participants; 7-day point prevalence abstinence based on self-report and exhaled carbon monoxide (ECO) level of <6 parts per million (ppm); housing status includes stable vs. unstable; total (c), direct (c′), and indirect effects (a*b); finding reported as β(SE).

Supplemental Figure 5. Simple mediation of the relationship between race/ethnicity and 3-month abstinence (<10ppm) with perceived ethnic discrimination as a mediator in intervention condition (N = 148)
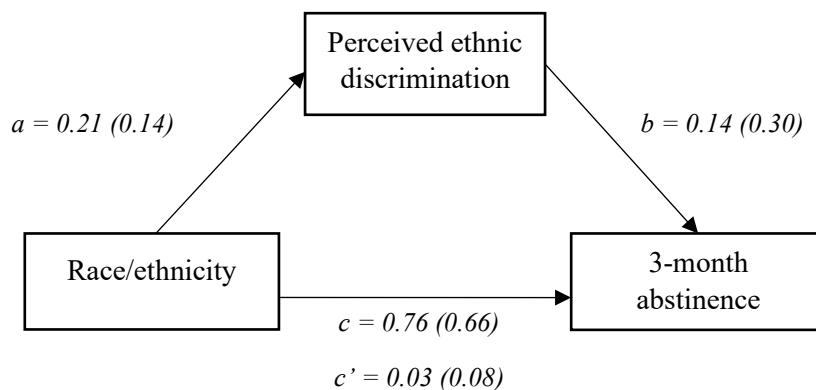
Note. Perceived ethnic discrimination measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B); Race/ethnicity includes Hispanic/Latino ethnicity (including Hispanic/Black) and Black race (excluding Hispanic/Black) participants; 7-day point prevalence abstinence based on self-report and exhaled carbon monoxide (ECO) level of <10 parts per million (ppm) ; total (c), direct (c′), and indirect effects (a*b); finding reported as β(SE).

Supplemental Figure 6. Simple mediation of the relationship between race/ethnicity and 6-month abstinence (<10ppm) with perceived ethnic discrimination as a mediator in intervention condition (N = 148)

Note. Perceived ethnic discrimination measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B); Race/ethnicity includes Hispanic/Latino ethnicity (including Hispanic/Black) and Black race (excluding Hispanic/Black) participants; 7-day point prevalence abstinence based on self-report and exhaled carbon monoxide (ECO) level of <10 parts per million (ppm); total (c), direct (c′), and indirect effects (a*b); finding reported as β(SE).

Supplemental Figure 7. Simple mediation of the relationship between race/ethnicity and 3-month abstinence (<10ppm) with perceived ethnic discrimination as a mediator in intervention condition (N = 148), adjusting for housing status

Note. Perceived ethnic discrimination measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B); Race/ethnicity includes Hispanic/Latino ethnicity (including Hispanic/Black) and Black race (excluding Hispanic/Black) participants; 7-day point prevalence abstinence based on self-report and exhaled carbon monoxide (ECO) level of <10 parts per million (ppm); housing status includes stable vs. unstable; total (c), direct (c'), and indirect effects (a*b); finding reported as β(SE).

Supplemental Figure 8. Simple mediation of the relationship between race/ethnicity and 6-month abstinence (<10ppm) with perceived ethnic discrimination as a mediator in intervention condition (N = 148), adjusting for housing status

Note. Perceived ethnic discrimination measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B); Race/ethnicity includes Hispanic/Latino ethnicity (including Hispanic/Black) and Black race (excluding Hispanic/Black) participants; 7-day point prevalence abstinence based on self-report and exhaled carbon monoxide (ECO) level of <10 parts per million (ppm); housing status includes stable vs. unstable; total (c), direct (c′), and indirect effects (a*b); finding reported as β(SE).

Supplemental Table 5. Estimated effect of perceived ethnic discrimination on nicotine dependence from baseline to 6-month follow up in the intervention-only sample (N = 190)

Parameter	Estimate	95% CI
Intercept	4.75	4.02, 5.47
3-month follow up	3.51***	2.25, 4.76
6-month follow up	3.79***	2.89, 4.68
PED	0.28	-0.07, 0.64
PED x 3-month follow up	-0.84***	-1.28, -0.41
PED x 6-month follow up	-0.36	-1.01, 0.29

Note. PED = Perceived Ethnic Discrimination, measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B); Nicotine Dependence measured by Modified Fagerström Tolerance Questionnaire (MFTQ)
***p≤. 001

Supplemental Table 6. Estimated effect of perceived ethnic discrimination on motivation to quit smoking from baseline to 6-month follow up in the intervention-only sample (N = 190)

| Parameter	Estimate	95% CI
Intercept	7.12	6.57, 7.66
3-month follow up	0.50	-0.40, 1.40
6-month follow up	0.14	-0.71, 0.99
PED	0.17	-0.10, 0.44
PED x 3-month follow up	-0.02	-0.49, 0.45
PED x 6-month follow up	0.15	-0.29, 0.58

Note. PED = Perceived Ethnic Discrimination, measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B); Motivation to quit smoking measured by the Contemplation Ladder

Supplemental Table 7. Estimated effect of perceived ethnic discrimination on self-efficacy to quit smoking from baseline to 6-month follow up in the intervention-only sample (N = 190)

Parameter	Estimate	95% CI
Intercept	3.01	2.75, 3.28
3-month follow up	-0.10	-0.48, 0.29
6-month follow up	-0.18	-0.55, 0.19
PED	0.27***	0.13, 0.40
PED x 3-month follow up	-0.29**	-0.49, -0.10
PED x 6-month follow up	-0.25**	-0.43, -0.06

Note. PED = Perceived Ethnic Discrimination, measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B); Smoking cessation self-efficacy measured by the Self-Efficacy/Temptation Scale – Long Form
p <.05; **p* ≤ .01; ***p*<. 001
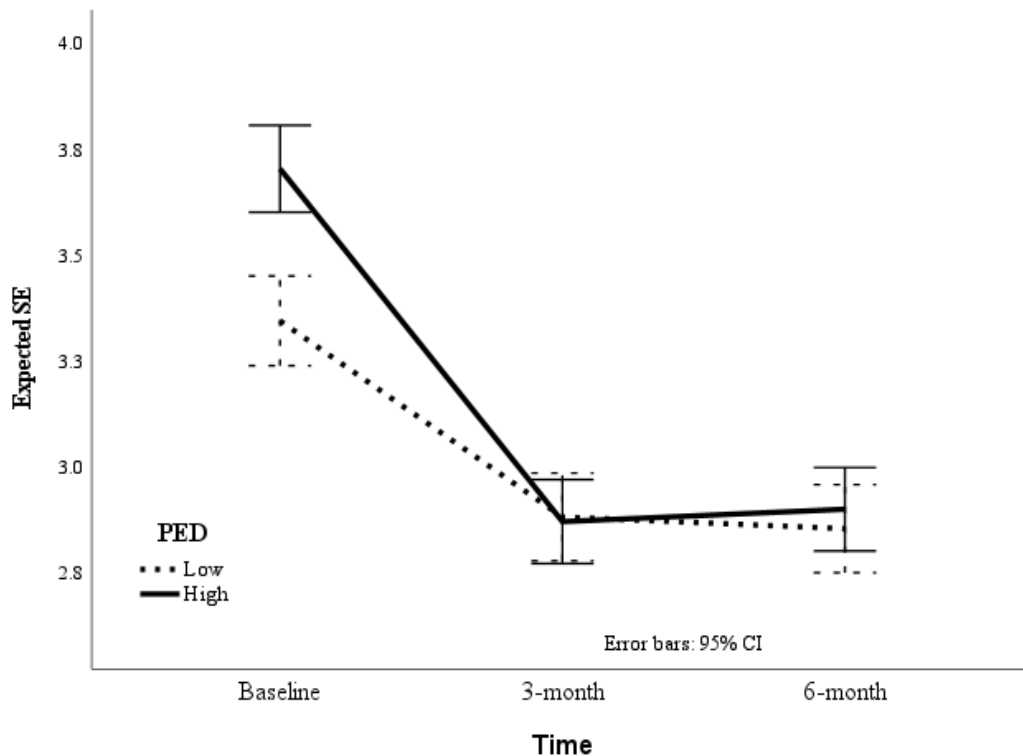
Supplemental Figure 9. Self-efficacy to quit smoking by perceived ethnic discrimination from baseline to 6-month follow up in intervention-only sample (N = 190)

Note. PED = perceived ethnic discrimination, measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B) (median split); SE = Smoking cessation self-efficacy, measured by the Self-Efficacy/Temptation Scale – Long Form

Supplemental Table 8. Logistic regression for perceived ethnic discrimination and 3-month abstinence status (ECO <6ppm) in the intervention-only sample, with race/ethnicity as a moderator (N = 216)

Included	Unadjusted			Adjusted		
	b [SE]	OR	95% CI	b [SE]	OR	95% CI
Constant	-2.57 [1.27]			-22.35 [8394]		
PED	-0.65 [0.83]	0.52	0.10, 2.63	-0.80 [0.83]	0.45	0.09, 2.31
Race/ethnicity	0.11 [0.82]	1.12	0.23, 5.53	-0.06 [0.82]	0.94	0.19, 4.72
PED*Race/ethnicity	0.21 [0.24]	1.24	0.77, 2.00	0.38 [0.26]	1.46	0.88, 2.42

Note. PED = PED = Perceived Ethnic Discrimination, measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B) (median split); 7-day point prevalence abstinence based on self-report and exhaled carbon monoxide (ECO) level of <6 parts per million (ppm); Housing status (stable vs. unstable) included as covariate; Race/ethnicity includes Hispanic/Latino ethnicity (including Hispanic/Black) and Black race (excluding Hispanic/Black) participants

Supplemental Table 9. Logistic regression for 6-month abstinence status (ECO <6ppm) in the intervention-only sample, with race/ethnicity as a moderator (N = 216)

Included	Unadjusted			Adjusted		
	b [SE]	OR	95% CI	*b* [SE]	OR	95% CI
Constant	-2.33 [1.27]			-2.92[1.52]		
PED	-1.17 [0.88]	0.19	0.06, 1.75	-1.20 [0.88]	0.30	0.05, 1.69
Race/ethnicity	-0.20 [0.82]	0.82	0.17, 4.10	-0.24 [0.82]	0.79	0.16, 3.93
PED *Race/ethnicity	0.35 [0.25]	1.42	0.87, 2.30	0.39[0.26]	1.48	0.90, 2.44

Note. PED = Perceived Ethnic Discrimination, measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B) (median split); 7-day point prevalence abstinence based on self-report and exhaled carbon monoxide (ECO) level of <6 parts per million (ppm); Housing status (stable vs. unstable) included as covariate; Race/ethnicity includes Hispanic/Latino ethnicity (including Hispanic/Black) and Black race (excluding Hispanic/Black) participants

Supplemental Table 10. Logistic regression for 3-month abstinence status (ECO <10ppm) in the intervention-only sample, with race/ethnicity as a moderator (N = 216)

Included	Unadjusted			Adjusted		
	b [SE]	OR	95% CI	b [SE]	OR	95% CI
Constant	-1.98 [1.13]			-3.85 [1.58]		
PED	-0.74 [0.77]	0.48	0.11, 2.15	-0.86 [0.78]	0.42	0.09, 1.96
Race/ethnicity	-0.29 [0.75]	0.75	0.17, 3.24	-0.43 [0.76]	0.65	0.15, 2.87
PED*Race/ethnicity	0.31 [0.22]	1.37	0.88, 2.12	0.45 [0.25]	1.57	0.97, 2.54

Note. PED = Perceived Ethnic Discrimination, measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B) (median split); 7-day point prevalence abstinence based on self-report and exhaled carbon monoxide (ECO) level of <10 parts per million (ppm); Housing status (stable vs. unstable) included as covariate; Race/ethnicity includes Hispanic/Latino ethnicity (including Hispanic/Black) and Black race (excluding Hispanic/Black) participants

Supplemental Table 11. Logistic regression for 6-month abstinence status (ECO <10ppm) in the intervention-only sample, with race/ethnicity as a moderator (N = 216)

Included	Unadjusted			Adjusted		
	b [SE]	OR	95% CI	b [SE]	OR	95% CI
Constant	-2.67 [1.26]			-3.02 [1.44]		
PED	-1.01 [0.80]	0.37	0.08, 1.77	-1.03 [0.80]	0.36	0.07, 1.73
Race/ethnicity	-0.17 [0.79]	1.19	0.25, 5.57	0.14 [0.79]	1.15	0.24, 5.43
PED*Race/ethnicity	0.31 [0.23]	1.36	0.87, 2.13	0.34 [0.24]	1.40	0.88, 2.23

Note. PED = Perceived Ethnic Discrimination, measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B) (median split); 7-day point prevalence abstinence based on self-report and exhaled carbon monoxide (ECO) level of <10 parts per million (ppm); Housing status (stable vs. unstable) included as covariate; Race/ethnicity includes Hispanic/Latino ethnicity (including Hispanic/Black) and Black race (excluding Hispanic/Black) participants

Supplemental Table 12. Fixed effects of time, perceived ethnic discrimination, and race/ethnicity on nicotine dependence in intervention-only sample (N = 148)

Included	Unadjusted		Adjusted	
	$F(df_1, df_2)$	p	$F(df_1, df_2)$	p
Intercept	$F(1, 132) = 103.92$	<.001	$F(1, 156) = 25.11$	<.001
Time	$F(2, 119) = 6.35$	.002**	$F(2, 150) = 3.18$	.045*
PED	$F(1, 132) = 1.05$	.307	$F(1, 148) = 0.23$	.633
Race/Ethnicity	$F(1, 132) = 1.32$	.253	$F(1, 148) = 0.62$	.431
Time*PED	$F(2, 120) = 0.48$	.618	$F(2, 131) = 0.33$	.722
Time*Race/Ethnicity	$F(2, 119) = 3.48$	.034*	$F(2, 138) = 2.65$	.074
PED*Race/Ethnicity	$F(1, 132) = 1.45$	.230	$F(1, 146) = 0.32$	.571
Time*PED*Race/Ethnicity	$F(2, 120) = 3.63$	.029*	$F(2, 133) = 2.18$	.117

Note. PED = Perceived Ethnic Discrimination, measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B); Nicotine Dependence measured by Modified Fagerström Tolerance Questionnaire (MFTQ); Race/ethnicity includes Hispanic/Latino ethnicity (including Hispanic/Black) and Black race (excluding Hispanic/Black) participants; Time includes baseline, 3-month follow up and 6-month follow up; with and without adjusting for housing status (stable vs. unstable); *p<.05; **p≤.01; ***p<.001

Supplemental Table 13. Fixed effects of time, perceived ethnic discrimination, and race/ethnicity on motivation to quit smoking in intervention-only sample (N = 148)

Included	Unadjusted		Adjusted	
	$F(df_1, df_2)$	p	$F(df_1, df_2)$	p
Intercept	$F(1, 140) = 560.08$	<.001	$F(1, 169) = 100.77$	<.001
Time	$F(2, 134) = 2.19$	.116	$F(2, 147) = 0.66$	.519
PED	$F(1, 140) = 0.04$	.840	$F(1, 147) = 0.23$	.631
Race/Ethnicity	$F(1, 140) = 0.26$	.611	$F(1, 154) = 0.27$	.602
Time*PED	$F(2, 134) = 0.76$	.741	$F(2, 132) = 0.33$	.717
Time*Race/Ethnicity	$F(2, 134) = 0.62$	.538	$F(2, 138) = 0.37$	.690
PED*Race/Ethnicity	$F(1, 140) = 0.32$	.573	$F(1, 143) = 0.12$	.731
Time*PED*Race/Ethnicity	$F(2, 134) = 1.38$	.256	$F(2, 132) = 0.51$	.602

Note. PED = Perceived Ethnic Discrimination, measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B); Motivation to quit smoking measured by the Contemplation Ladder; Race/ethnicity includes Hispanic/Latino ethnicity (including Hispanic/Black) and Black race (excluding Hispanic/Black) participants; Time includes baseline, 3-month follow up and 6-month follow up; with and without adjusting for housing status (stable vs. unstable); *p<.05; **p≤.01; ***p<.001

Supplemental Table 14. Fixed effects of time, perceived ethnic discrimination, and race/ethnicity on self-efficacy to quit smoking in intervention-only sample (N = 148)

Included	Unadjusted		Adjusted	
	$F(df_1, df_2)$	p	$F(df_1, df_2)$	p
Intercept	$F(1, 1872) = 403.50$	<.001	$F(1, 151) = 40.81$	<.001
Time	$F(2, 650) = 6.52$	.006**	$F(2, 132) = 3.54$	.032*
PED	$F(1, 1823) = 12.26$	.004**	$F(1, 139) = 0.12$	.733
Race/Ethnicity	$F(1, 1842) = 2.76$	.017*	$F(1, 146) = 0.25$	.616
Time*PED	$F(2, 655) = 0.21$	.614	$F(2, 123) = 0.24$	.787
Time*Race/Ethnicity	$F(2, 650) = 2,62$	.009**	$F(2, 127) = 3.43$	.035*
PED*Race/Ethnicity	$F(1, 1823) = 3.54$	.014*	$F(1, 137) = 0.00$	.996
Time*PED*Race/Ethnicity	$F(2, 655) = 2.91$	.002**	$F(2, 123) = 2.91$	.058

Note. PED = Perceived Ethnic Discrimination, measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B); Smoking cessation self-efficacy measured by the Self-Efficacy/Temptation Scale – Long Form; Race/ethnicity includes Hispanic/Latino ethnicity (including Hispanic/Black) and Black race (excluding Hispanic/Black) participants; Time includes baseline, 3-month follow up and 6-month follow up; with and without adjusting for housing status (stable vs. unstable); *p<.05; **p<.01; ***p<.001
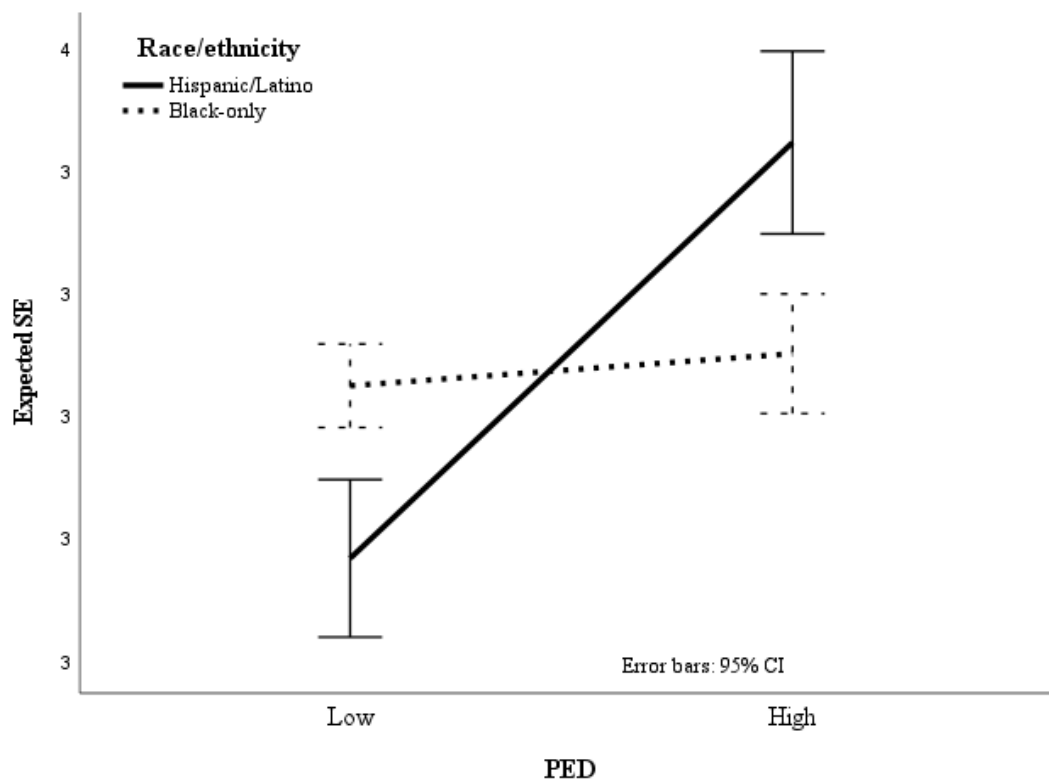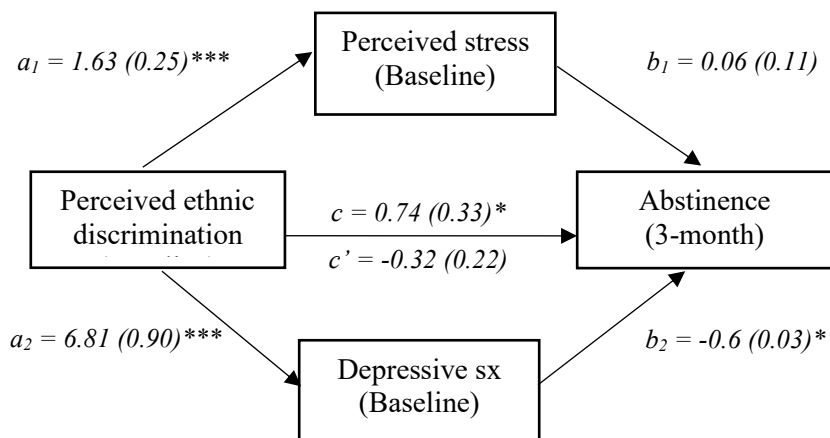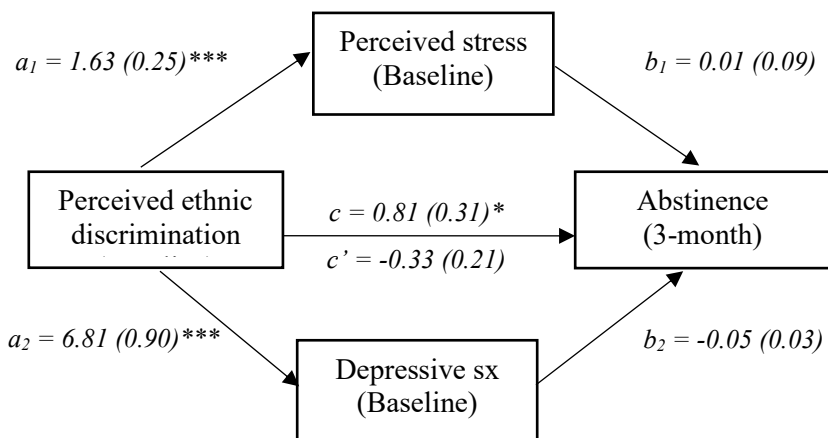
Supplemental Figure 10. Interaction between perceived ethnic discrimination and race/ethnicity on self-efficacy to quit smoking in intervention-only sample (N = 216)

Note. PED = perceived ethnic discrimination, measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B) (median split); SE = Smoking cessation self-efficacy, measured by the Self-Efficacy/Temptation Scale – Long Form; Race/ethnicity includes Hispanic/Latino ethnicity (including Hispanic/Black) and Black race (excluding Hispanic/Black) participants
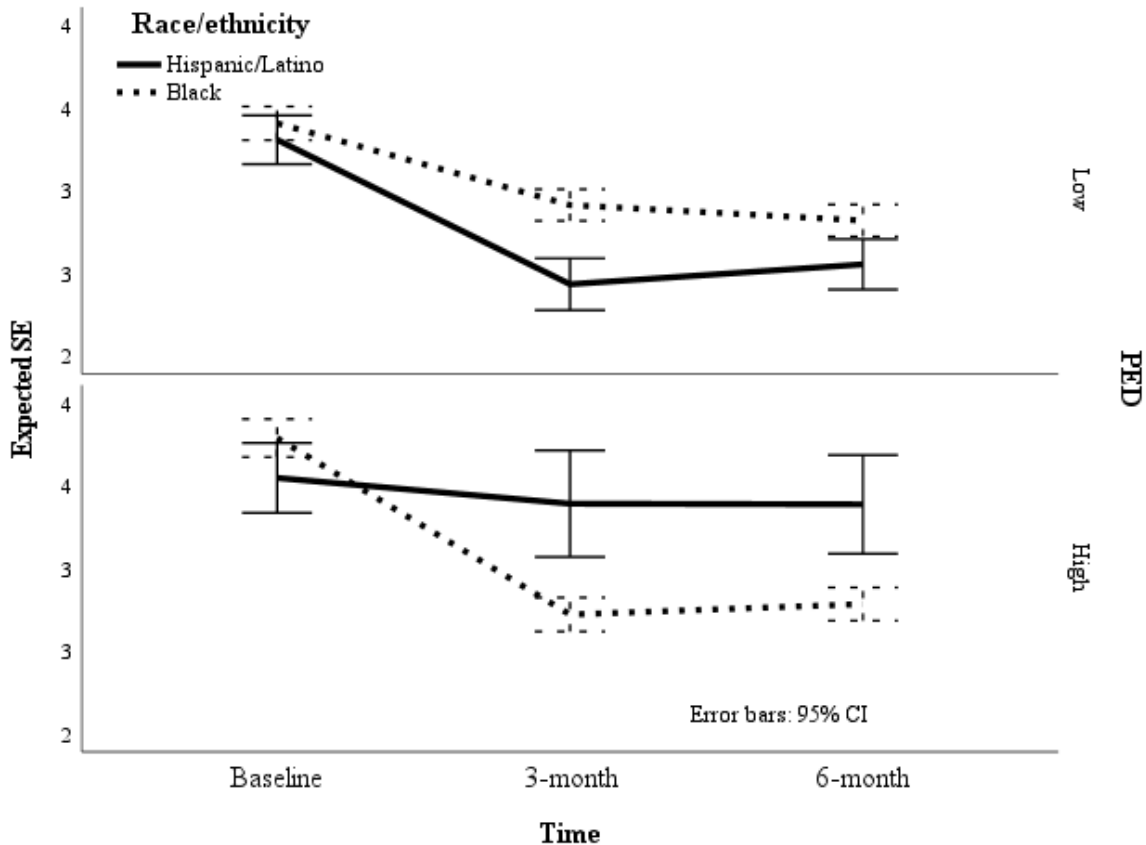
Supplemental Figure 11. Three-way interaction between perceived ethnic discrimination, race/ethnicity, and time on self-efficacy to quit smoking in intervention-only sample (N = 216)

Note. PED = perceived ethnic discrimination, measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B) (median split); SE = Smoking cessation self-efficacy, measured by the Self-Efficacy/Temptation Scale – Long Form; Race/ethnicity includes Hispanic/Latino ethnicity (including Hispanic/Black) and Black race (excluding Hispanic/Black) participants
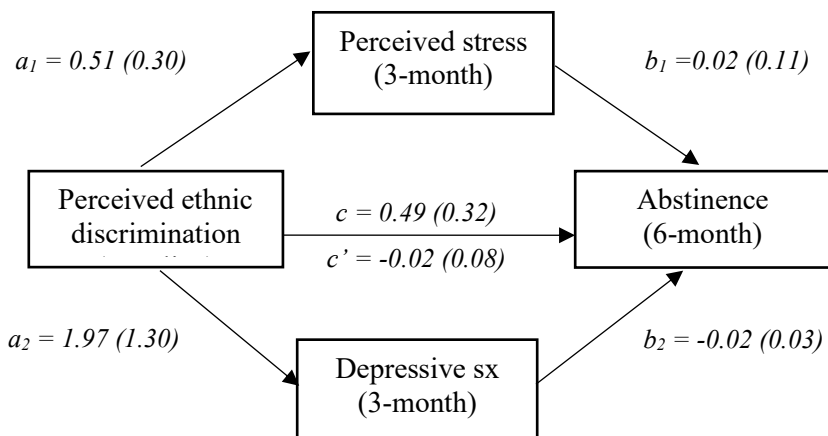
Supplemental Figure 12. Parallel mediation of the relationship between perceived ethnic discrimination and 3-month abstinence (<6ppm) with depressive symptoms and perceived stress as mediators, adjusting for housing status, in intervention-only sample (N = 190)
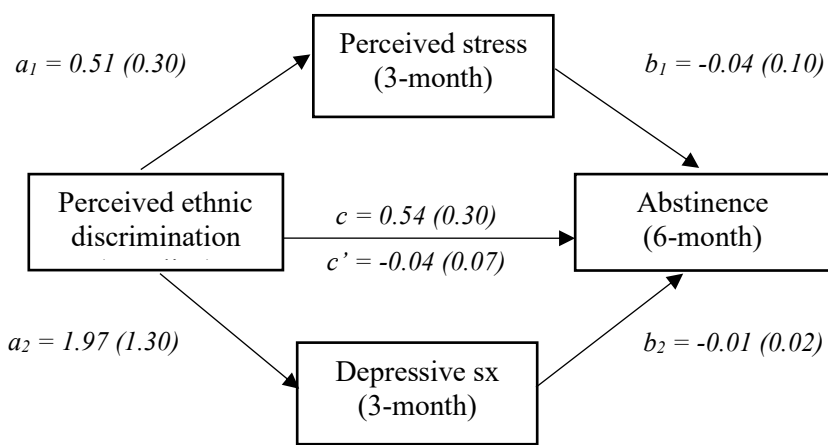
Note. Perceived ethnic discrimination measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B); Perceived stress, measured by the Short Form Perceived Stress Scale (PSS-4); Depressive symptoms, measured by Center for Epidemiologic Studies Depression Scale (CES-D); 7-day point prevalence abstinence based on self-report and exhaled carbon monoxide (ECO) level of <6 parts per million (ppm); housing status includes stable vs. unstable; total (c), direct (c'), and indirect effects (a*b); finding reported as β(SE).
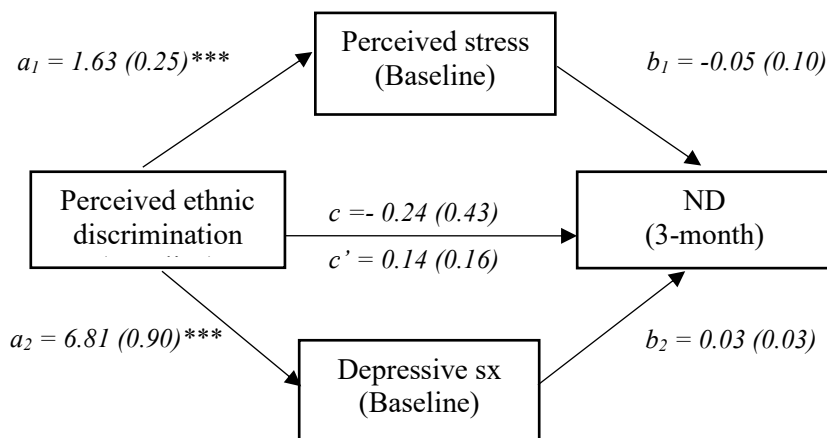*p<.05;***p<.001

Supplemental Figure 13. Parallel mediation of the relationship between perceived ethnic discrimination and 3-month abstinence (<10ppm) with depressive symptoms and perceived stress as mediators, adjusting for housing status, in intervention-only sample (N = 190)

Note. Perceived ethnic discrimination measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B); Perceived stress, measured by the Short Form Perceived Stress Scale (PSS-4); Depressive symptoms, measured by Center for Epidemiologic Studies Depression Scale (CES-D); 7-day point prevalence abstinence based on self-report and exhaled carbon monoxide (ECO) level of <10 parts per million (ppm); housing status includes stable vs. unstable; total (c), direct (c′), and indirect effects (a*b); finding reported as β(SE).
*p<.05; ***p<.001

Supplemental Figure 14. Parallel mediation of the relationship between perceived ethnic discrimination and 6-month abstinence (<6ppm) with depressive symptoms and perceived stress as mediators, adjusting for housing status, in intervention-only sample (N = 148)
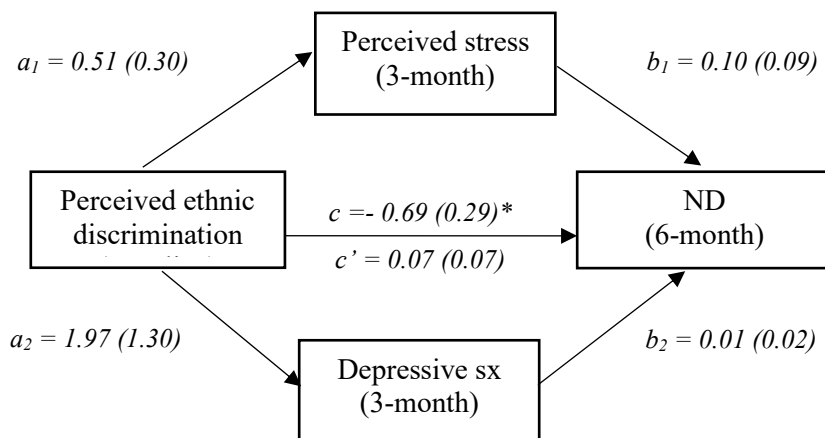
Note. Perceived ethnic discrimination measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B); Perceived stress, measured by the Short Form Perceived Stress Scale (PSS-4); Depressive symptoms, measured by Center for Epidemiologic Studies Depression Scale (CES-D); 7-day point prevalence abstinence based on self-report and exhaled carbon monoxide (ECO) level of <6 parts per million (ppm); housing status includes stable vs. unstable; total (c), direct (c′), and indirect effects (a*b); finding reported as β(SE).

Supplemental Figure 15. Parallel mediation of the relationship between perceived ethnic discrimination and 6-month abstinence (<10ppm) with depressive symptoms and perceived stress as mediators, adjusting for housing status, in intervention-only sample (N = 148)

Note. Perceived ethnic discrimination measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B); Perceived stress, measured by the Short Form Perceived Stress Scale (PSS-4); Depressive symptoms, measured by Center for Epidemiologic Studies Depression Scale (CES-D); 7-day point prevalence abstinence based on self-report and exhaled carbon monoxide (ECO) level of <10 parts per million (ppm); housing status includes stable vs. unstable; total (c), direct (c′), and indirect effects (a*b); finding reported as β(SE).

Supplemental Figure 16. Parallel mediation of the relationship between perceived ethnic discrimination and 3-month nicotine dependence with depressive symptoms and perceived stress as mediators, adjusting for housing status, in intervention-only sample (N = 190)

Note. Perceived ethnic discrimination measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B); Perceived stress, measured by the Short Form Perceived Stress Scale (PSS-4); Depressive symptoms, measured by Center for Epidemiologic Studies Depression Scale (CES-D); ND = Nicotine dependence, measured by the Modified Fagerström Tolerance Questionnaire (MFTQ); housing status includes stable vs. unstable; total (c), direct (c′), and indirect effects (a*b); finding reported as β(SE).
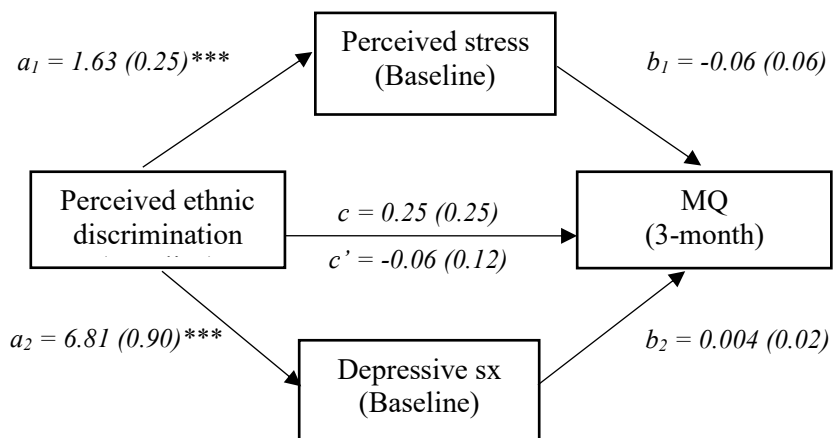****p<.001*

Supplemental Figure 17. Parallel mediation of the relationship between perceived ethnic discrimination and 6-month nicotine dependence with depressive symptoms and perceived stress as mediators, adjusting for housing status, in intervention-only sample (N = 148)
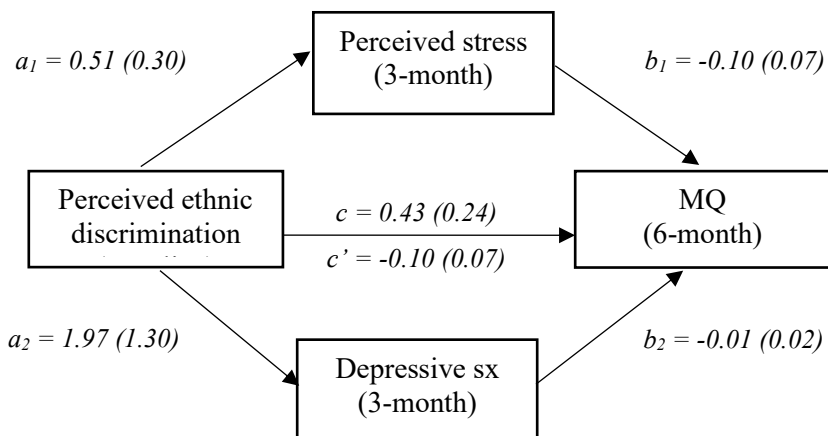
Note. Perceived ethnic discrimination measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B); Perceived stress, measured by the Short Form Perceived Stress Scale (PSS-4); Depressive symptoms, measured by Center for Epidemiologic Studies Depression Scale (CES-D); ND = Nicotine dependence, measured by the Modified Fagerström Tolerance Questionnaire (MFTQ); housing status includes stable vs. unstable; total (c), direct (c′), and indirect effects (a*b); finding reported as β(SE).
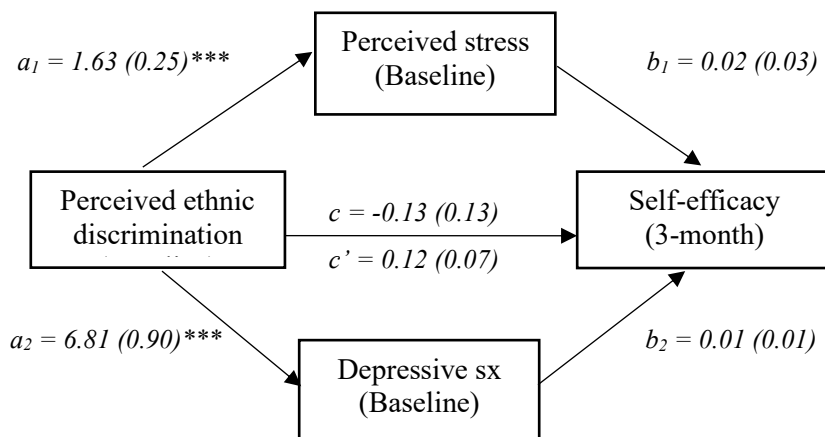*p<.05

Supplemental Figure 18. Parallel mediation of the relationship between perceived ethnic discrimination and 3-month motivation to quit smoking with depressive symptoms and perceived stress as mediators, adjusting for housing status, in intervention-only sample (N = 190)

Note. Perceived ethnic discrimination measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B); Perceived stress, measured by the Short Form Perceived Stress Scale (PSS-4); Depressive symptoms, measured by Center for Epidemiologic Studies Depression Scale (CES-D); MQ = Motivation to quit smoking measured by the Contemplation ladder; housing status includes stable vs. unstable; total (c), direct (c'), and indirect effects (a*b); finding reported as β(SE). ****p<.001*

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Supplemental Figure 19. Parallel mediation of the relationship between perceived ethnic discrimination and 6-month motivation to quit smoking with depressive symptoms and perceived stress as mediators, adjusting for housing status, in intervention-only sample (N = 148)

Note. Perceived ethnic discrimination measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B); Perceived stress, measured by the Short Form Perceived Stress Scale (PSS-4); Depressive symptoms, measured by Center for Epidemiologic Studies Depression Scale (CES-D); MQ = Motivation to quit smoking measured by the Contemplation ladder; housing status includes stable vs. unstable; total (c), direct (c′), and indirect effects (a*b); finding reported as β(SE).
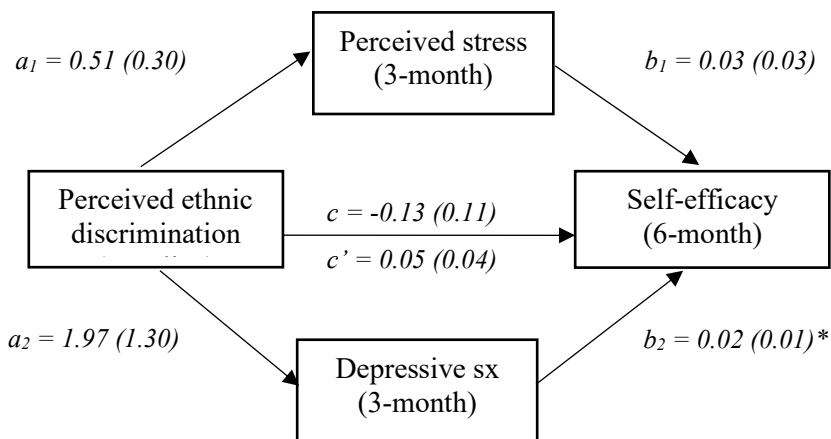
Supplemental Figure 20. Parallel mediation of the relationship between perceived ethnic discrimination and 3-month self-efficacy to quit smoking with depressive symptoms and perceived stress as mediators, adjusting for housing status, in intervention-only sample (N = 190)

Note. Perceived ethnic discrimination measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B); Perceived stress, measured by the Short Form Perceived Stress Scale (PSS-4); Depressive symptoms, measured by Center for Epidemiologic Studies Depression Scale (CES-D); Smoking cessation self-efficacy, measured by the Self-Efficacy/Temptation Scale – Long Form; housing status includes stable vs. unstable; total (c), direct (c′), and indirect effects (a*b); finding reported as β(SE).
*** $p<.001$

Supplemental Figure 21. Parallel mediation of the relationship between perceived ethnic discrimination and 6-month self-efficacy to quit smoking with depressive symptoms and perceived stress as mediators, adjusting for housing status, in intervention-only sample (N = 148)

Note. Perceived ethnic discrimination measured by the Brief Perceived Ethnic Discrimination Questionnaire (PEDQ-CV-B); Perceived stress, measured by the Short Form Perceived Stress Scale (PSS-4); Depressive symptoms, measured by Center for Epidemiologic Studies Depression Scale (CES-D); Smoking cessation self-efficacy, measured by the Self-Efficacy/Temptation Scale – Long Form; housing status includes stable vs. unstable; total (c), direct (c′), and indirect effects (a*b); finding reported as β(SE).
*p<.05