January 2020

The Effect of Acute Interpersonal Racial Discrimination on Smoking Motivation and Behavior among Black Smokers

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by

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A thesis submitted in partial fulfillment
of the requirements for the degree of
Master of Arts
Department of Psychology
College of Arts and Sciences
University of South Florida

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Date of Approval:
January 20, 2020

Keywords: health disparities, social exclusion, African American, tobacco, Cyberball

ACKNOWLEDGMENTS

I would like to express my sincere appreciation to those who supported me throughout my master's thesis development. In particular, I am grateful for the expert feedback I've received from Dr. Vandello and Dr. Schlauch. I have the deepest gratitude for Dr. Brandon's consistent encouragement and support from my study's initial development to its final presentation. I am fortunate to have had the support of several diligent research assistants, without whom this project would not be possible. I owe a special thanks to my research assistants including Paige Steele, Danielle Curtis, Aubrey Selamu-Bell, Marisela Gutierrez, Alayna Tiffany, and Lexia Quinlisk. I am also appreciative of the endless support from my family, friends, and classmates. Thank you!

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

In comparison to White smokers, Black smokers are more likely to report both discrimination and less success in smoking cessation. No previous study has tested the causal relationship between actual experienced racial discrimination and smoking variables associated with cessation. The goal of this study was to test the casual influence of interpersonal racial discrimination on smoking motivation (i.e., the urge to smoke cigarettes, cessation self-efficacy, and smoking behavior) using a controlled experimental design. We used a virtual ball-playing game to create a laboratory model of racial discrimination. A 2x2 between-subjects factorial design (inclusion/exclusion vs. ingroup/outgroup) was used to randomly assign participants to one of four groups: 1.) included/ingroup, 2.) included/outgroup, 3.) excluded/ingroup (ostracism), and 4.) excluded/outgroup (racial discrimination). Sixty-nine Black smokers were recruited from the Tampa Bay area. Results show that participants in the excluded conditions reported lower cessation self-efficacy than those in the included conditions. Participants in the outgroup conditions had reduced latency to smoke compared to those in the ingroup conditions. There were no main effects of social inclusion on cravings or latency to smoke, no statistically significant interactions for social inclusion x group membership, and no statistically significant mediation or moderation analyses. This laboratory simulation of racial discrimination shows a causal relationship between exclusion and low cessation self-efficacy, which contributes to a better understanding of what influences low success in smoking cessation attempts among Black smokers.

INTRODUCTION

Tobacco-Related Morbidity and Mortality

On average, tobacco smokers are expected to die 10 years earlier than non-smokers (Centers for Disease Control and Prevention, 2015). Still, there are persistent differences in prevalence of disease among subgroups of smokers; that is, the risk of morbidity and mortality is even greater for some Americans. Health disparities, or disproportionate differences in health outcomes between populations, mean that groups that are historically disadvantaged and traditionally underrepresented in research have higher rates or morbidity and mortality (U.S. Department of Health and Human Services, 2014a).

In the U.S., one of the most pervasive patterns of health disparities exist among individuals who identify as Black or individuals who have low socioeconomic status (SES; U.S. Department of Health and Human Services, 2001; U.S. Department of Health and Human Services, 2014a, 2014b). These groups present with greater health disparities in comparison to Whites and individuals with higher SES, respectively (Fiore et al., 2008). For example, Blacks are more likely to die from cardiovascular disease, cancers of the respiratory system, breast cancer, and cancers of the colon, rectum, liver, and gallbladder (U.S. Cancer Statistics Working Group, 2016; U.S. Department of Health and Human Services, 2014b).

Potential Contributors to Tobacco-Related Health Disparities

Given the persistence of tobacco health disparities, it is essential that researchers develop a better understanding of factors that contribute to tobacco use among an already vulnerable population. Analyses of nationally representative data and original investigations demonstrate that Blacks have lower smoking prevalence than American Indians/Alaskan Natives (AI/AN)

and Whites, but experience substantially worse health outcomes than Whites and AI/AN (Evans-Polce, Vasilenko, & Lanza, 2015; Giovino & Gardiner, 2016; U.S. Department of Health and Human Services, 2014b). Many of the chronic diseases associated with disability and premature death can be attributed to tobacco use; therefore, one would expect groups with similar rates of smoking prevalence to have similar rates of tobacco-related morbidity and mortality. Yet, Blacks have the highest risk and prevalence of tobacco-related morbidity and mortality despite having similar or less intensive smoking behaviors than other racial groups (Abidoye, Ferguson, & Salgia, 2007; U.S. Department of Health and Human Services, 2010, 2014b).

Smoking Behavior

The discrepancy between rates of tobacco use and rates of disease has led researchers to consider what factors explain the dramatic and persistent racial differences in health outcomes. To date, most research has indicated that, in comparison to Whites, Blacks are more likely to start smoking later in life (Okuyemi, Ahluwalia, Richter, Mayo, & Resnicow, 2001; Trinidad, Gilpin, Lee, & Pierce, 2004), report being intermittent/non-daily smokers (Okuyemi et al., 2004b), and report smoking fewer cigarettes per day (CPD, ≤10 CPD; Trinidad et al., 2009), which should be associated with better health outcomes.

Smoking Cessation

Smoking patterns alone do not explain health disparities, but difficulty in quitting smoking may lead to prolonged use and increased risk of developing an illness. According to the Surgeon General Report (2014), 44.1% of Blacks who reported smoking had quit in comparison to 57.1% of Whites. An analysis of data from the 2010 National Health Interview Survey (NHIS) and data from the Tobacco Use Supplement (TUS) to the Current Population Survey showed that Blacks had the highest interest in smoking cessation and made more smoking cessation attempts

than any other racial group in the previous year (Levy et al., 2011; U.S. Department of Health and Human Services, 2014a).

The discrepancy between quit attempts and successful quitting or abstinence suggests that despite being more motivated or interested in quitting smoking than White smokers (Okuyemi, Ebersole-Robinson, Nazir, & Ahluwalia, 2004; U.S. Department of Health and Human Services, 2014a), Black smokers are unsuccessful because of some additional factor or obstacle. In a large community-based randomized controlled trial (RCT) evaluating the efficacy of nicotine gum and cessation counseling among Blacks, Okuyemi et al. (2004b) found that participants made multiple attempts to quit smoking and that they reported high levels of motivation to quit smoking. Other studies have also found that Black smokers with light usage are highly motivated to quit smoking, contrary to hypotheses that Blacks have less success quitting because of a lack of interest (Cox et al., 2011; Okuyemi, Cox, et al., 2007; Royce, Hymowitz, Corbett, Hartwell, & Orlandi, 1993). Similarly, Levy and colleagues (2011) determined that Blacks were less likely to quit, especially if they were menthol smokers.

Menthol

Menthol, a tobacco flavor additive, creates a cooling sensation and reduces the perceived irritation of smoke during inhalation. It has been hypothesized that menthol cigarettes may be more addictive because they tend to have higher nicotine/tar content (Federal Trade Commission, 2000), and provide less "harsh" respiratory irritation (Henningfield et al., 2003). The Tobacco Products and Scientific Advisory Committee (2011) of the Food and Drug Administration (FDA) concluded that there was sufficient evidence to indicate that *Black* menthol smokers have less success quitting smoking compared to Whites and nonmenthol

smokers, but there was insufficient evidence to conclude that menthol increases the risk of tobacco-related illness (Tobacco Products Scientific Advisory Committee, 2011).

Socioeconomic Status

The lower cessation success rate of Blacks may be related to their relatively higher poverty rates (25.8% vs. 11.6%; Macartney, Bishaw, & Fontenot, 2013). Individuals with lower incomes, and lower educational and occupational attainment (measures of SES) have higher smoking and disease rates than individuals with high SES (U.S. Department of Health and Human Services, 2014b). For example, adults living in poverty are 60% less successful in quitting versus adults above the poverty level (Centers for Disease Control and Prevention, 2016). Relative to Americans with higher SES, impoverished Americans continue to smoke at higher rates and have greater difficulty quitting smoking due, in part, to targeted marketing, greater tobacco outlet density, and less access to smoking cessation treatments (Centers for Disease Control and Prevention, 2016).

The socioeconomic disparity between Blacks and Whites may help explain their disproportionate health outcomes, which would be consistent with the empirical research demonstrating that lower SES is associated with worse health outcomes (Adler et al., 1994; Crimmins, Hayward, & Seeman, 2004; Pampel, Krueger, & Denney, 2010). However, Hispanics and AI/AN present a paradox to this theory because they have similar rates of poverty as Blacks (Macartney et al., 2013), but they have consistently lower rates of tobacco-related morbidity and mortality (U.S. Department of Health and Human Services, 2014b). Observed differences in SES do attenuate some of the discrepancy in disease incidence between Blacks and Whites, but health disparities persist after controlling for SES (Crimmins et al., 2004; Williams & Collins, 1995). When comparing the health outcomes of Blacks and Whites with similar SES, Blacks

consistently have worse health outcomes, suggesting that an additional factor tied to race (e.g., psychological stress) may explain the remaining variation in health disparities (Landrine & Corral, 2014). Although low SES is correlated with greater psychological stress, which contributes to extended activation of the body's stress response systems and reduced immune functioning, it does not attenuate differences based on race (Baum, Garofalo, & Yalu, 1999).

Discrimination

The disproportionate burden of illness experienced by Black smokers is a paradox that cannot be completely explained by the factors described above (Alexander et al., 2016; U.S. Cancer Statistics Working Group, 2016). A potential contributor to the persistent disparity in health outcomes may be a psychosocial stressor that is experienced more often among Blacks, specifically, perceived racial discrimination. According to the 2001 Surgeon General's report, *Mental Health, Culture, Race, and Ethnicity*, "perceived discrimination is the term used by researchers in reference to the self-reports of individuals about being the target of discrimination or racism. The term is not meant to imply that racism did not take place." The National Cancer Institute (NCI) further explains that discrimination is marked by differential treatment based on the valuation of group identities, and often favors the ingroup (U.S. National Cancer Institute, 2017).

Stress caused by discrimination is part of the daily experiences of Blacks and may contribute to the health disparities observed between Blacks and White smokers. Blacks consistently report experiencing more perceived racial discrimination than Whites (Institute of Medicine, 2003; Pascoe & Smart Richman, 2009). Given that they experience more racial discrimination in several domains of life including housing (Yinger, 1995), employment (Darity & Mason, 1998), education (Neblett, Philip, Cognurn, & Sellers, 2006), and the criminal justice

system (Alexander, 2012), they may be more susceptible to cancers, heart disease, and the other health consequences of the unique and chronic stressor (Berger & Sarnyai, 2015; Dailey, 2009; Williams, Neighbors, & Jackson, 2003). Empirical research shows that there is a strong negative relationship between acute and chronic stress and physical health (Godbout & Glaser, 2006; Kemeny & Schedlowski, 2007; Yang & Glaser, 2002).

Clark, Anderson, Clark, and Williams (1999) proposed a model of stress for Blacks that considers the effects of perceived racism, or the subjective experience of racial prejudice (attitudes and beliefs) and discrimination (actions), on physiological processes. The authors reiterate that there is sufficient evidence suggesting that stress can cause suppressed immune function, which over time contributes to poor health. The biopsychosocial model addresses the complexity of discrimination and the pathways that influence stress responses and health outcomes. A single scenario cannot have an objective level of racism because its interpretation will largely be affected by individual differences, such as, variations in income, education, neighborhood or environment resources (Clark et al., 1999). Using this model, Blacks with low SES may be more likely to experience discrimination, because of their dual marginalization, in comparison to Blacks with high SES. They may have fewer resources to cope effectively with the perceived stress. Because of their chronic stress exposure, they may experience coping fatigue (Clark et al., 1999). Both reactions would increase psychological and physiological distress, which may contribute to worse health outcomes for low SES Blacks over time.

Furthermore, responding to a stressor with maladaptive coping may increase the likelihood of initiating and maintaining risky behavior such as tobacco smoking, which would contribute to the incidence or progression of mental or physical illness. For example, a national cross-sectional survey found that Blacks reported more workplace discrimination (21%) than

Whites (4%), that discrimination was associated with increased risk of current and daily smoking (Chavez, Ornelas, Lyles, & Williams, 2015), and that psychological distress mediated the relationship between perceived discrimination and smoking (Purnell et al., 2012). That is, more experiences of discrimination were associated with a greater likelihood of smoking (Purnell et al., 2012). Williams, Neighbors, and Jackson (2003) found overwhelming evidence supporting a positive association between discrimination and poor mental well-being or depression. Another community-based sample of Black and White smokers found that Blacks reported higher perceived stress, depression, life dissatisfaction, frequency of discrimination, and awareness of their race in comparison to Whites (Nollen et al., 2016). These findings support the theory that racism can act as a stressor for Blacks by influencing psychological well-being as well as health behavior, thereby negatively affecting health (Berger & Sarnyai, 2015; Pascoe & Smart Richman, 2009; Purnell et al., 2012). These factors are associated with poor mental health and may contribute to the physiological distress known to impair immune function and increase susceptibility to illness. In short, psychological well-being may serve as a mediator between perceived racism and physiological distress that partially explains variation in health disparities.

Discrimination and Smoking

Several studies have found that experiences of racial discrimination are associated with greater nicotine dependence (Kendzor et al., 2014) and tobacco use (Bennett, Wolin, Robinson, Fowler, & Edwards, 2005; Purnell et al., 2012; U.S. National Cancer Institute, 2017). Among Black adolescents, Bennet and colleagues (2005) found that Black college students who experienced discrimination were twice as likely to be daily smokers as Black students who did not experience discrimination. The researchers also found that students who reported working full-time and living on campus reported more harassment, indicating that some contexts present

greater opportunities for discrimination. Similarly, many studies have determined that, among Blacks, racial discrimination was associated with light smoking among youth (Fagan, Brook, Rubenstone, Zhang, & Brook, 2009), higher levels of stress, greater odds of lifetime smoking (Guthrie, Young, Williams, Boyd, & Kintner, 2002), and greater odds of being a current smoker (Borrell et al., 2007; Landrine & Klonoff, 2000). It is worth noting that although the focus of this review is interpersonal racial discrimination and its association with smoking initiation and maintenance of use, smokers may also experience institutional racial discrimination when they seek tobacco cessation treatment. Specifically, there may be differential access and quality of healthcare (Institute of Medicine, 2003). For example, Black smokers are less likely to receive advice to quit smoking from their physician and less likely to be prescribed nicotine replacement therapy in comparison to Whites (Lopez-Quintero, Crum, & Neumark, 2006; Trinidad, Perez-Stable, White, Emery, & Messer, 2011).

Previous Studies of Racial Discrimination

The insidious and negative effects of racial discrimination make ethical experimental designs challenging. Many of the studies evaluating the effects of racial discrimination on health outcomes are self-report correlational designs and variations of psychophysiological designs (Harrell, Sadiki Hall, & Taliaferro, 2003; Pascoe & Smart Richman, 2009). Although some of these studies present participants with laboratory analogues of racial discrimination, few of them utilized an experimental design with active experiences of racial discrimination to determine physical or mental health outcomes (see Pascoe & Smart Richman, 2009 for a review). Most studies prompted participants to imagine an instance of racial discrimination (i.e., autobiographical memory manipulation), view racially charged images, watch a video showing someone experiencing racial discrimination, or experience discrimination from a confederate

(Mays, Cochran, & Barnes, 2007; Pascoe & Smart Richman, 2009). The findings from previous studies do consistently demonstrate a positive correlation between proxy experiences of discrimination and physiological (e.g., heart rate, salivary cortisol, blood pressure) or psychological distress.

Although these laboratory designs rarely expose participants to active racial discrimination, they do allow researchers to control the environment, collect valuable data, and establish relationships between variables. A computerized ball-throwing game, called Cyberball, maintains the aforementioned benefits, but also allows researchers to manipulate participants' experience of social ostracism or rejection (Williams, Cheung, & Choi, 2000). Study participants are told that they will engage in a mental visualization exercise with players in other rooms. They are encouraged to focus on visualization and to focus on what the other players look like, where they are playing, and the scenery of the game screen, with less focus on the game (Williams, 2009). In most studies, there are no other participants, and the games are pre-programmed to determine how many times real participants receive the ball (i.e., how often they are included or excluded). However, Zadro, Williams, and Richardson (2004) found that even when participants were told that they were playing with computer programming, they reported feeling rejected, lower levels of self-esteem, less control over their environment, and lower meaningful existence (Hartgerink, van Beest, Wicherts, & Williams, 2015; Williams, 2009). Players were represented by skin-toned avatars, photos, and players' names, as seen on the game screen in Figure 1. An option for including chat dialogue was available but was not used because of ethical concerns.

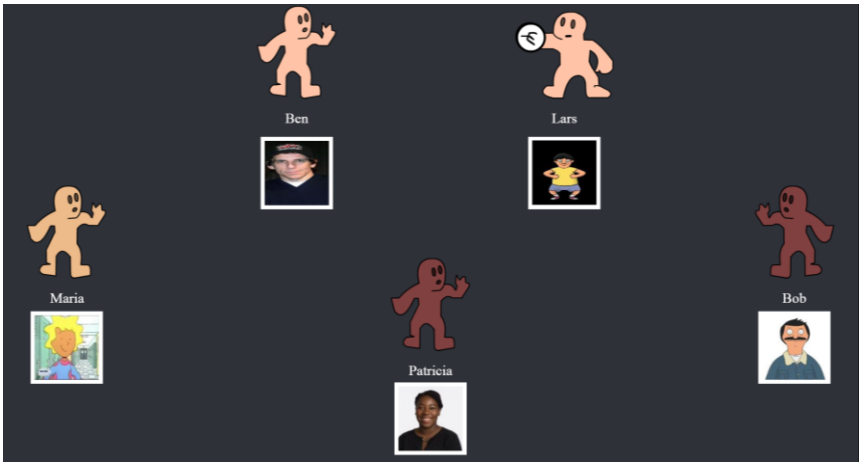

Figure 1. An example of a 5-person game of Cyberball where the participant is "Patricia," the game screen is unmodified, and skin-toned avatars, names, and participants photos are included.

Because social media is popular and interpersonal interactions occur both online and in-person, a computer-based platform for communication may be particularly insightful (Lewis, Cogburn, & Williams, 2015). Cyberball was originally created with the intention of studying the effects of ostracism, but over time it has been used to study specific types of ostracism, including racial discrimination (Gonsalkorale & Williams, 2007). Cyberball also mimics a type of discrimination commonly reported by racial and ethnic minorities: social exclusion (Smart Richman & Leary, 2009). Using the Cyberball paradigm, studies have shown that experimental manipulations can be used where participants attribute exclusion to racial discrimination (Goodwin, Williams, & Carter-Sowell, 2010; Smart Richman & Leary, 2009; Stock, Peterson, Gibbons, & Gerrard, 2013). Furthermore, studies using computer analogues of racial discrimination found that the sense of rejection associated with group membership is associated with risky sexual behavior and substance use willingness (Jamieson, Koslov, Nock, & Mendes, 2012; Stock et al., 2013), slower recovery to baseline ratings of self-esteem, control, belonging, and meaningful existence (Goodwin et al., 2010), greater reports of negative affect (Smart Richman & Leary, 2009), and greater attentional bias, heightened vigilance to discrimination,

and greater likelihood of engaging in risky health behavior (Jamieson et al., 2012). These findings are particularly relevant because they represent a motivational pathway between racial discrimination and risky health behaviors, such as smoking. For example, the feeling of rejection is associated with increased negative affect and decreased self-esteem (Priest et al., 2013). These changes in affect and confidence may increase cravings and lower self-efficacy expectancies. Furthermore, if healthy coping responses are lacking, smokers attempting to quit may have greater difficulty initiating smoking cessation or may be more likely to relapse after a cessation attempt. Ultimately, low self-efficacy and high cravings can hinder behavior change such as quitting smoking.

The body of research regarding discrimination and deleterious health behaviors and outcomes, specifically cigarette smoking and its related health disparities, would benefit from utilizing these methodologies for more robust inferences. This study attempts to evaluate whether perceived discrimination influences smoking related motivational variables (e.g., urge to smoke and cessation self-efficacy), as well as actual smoking behavior.

Factors that Motivate Smoking and Reduce Cessation Success

Evaluation of which factors motivate cigarette smoking and precipitate poor cessation outcomes reveal key constructs recurrent in the literature, including craving, cessation self-efficacy, affect, and environmental cues.

Cravings

The urge to smoke, or craving, is associated with maintenance of tobacco use and risk factors for smoking relapse (Allen, Bade, Hatsukami, & Center, 2008; Drobes & Tiffany, 1997; Ferguson & Shiffman, 2009; Shiffman et al., 1997). Craving levels can change naturally during periods of abstinence and fluctuate with time (Teneggi et al., 2002); but, they can also change in

response to environmental stimuli or cues (Carter & Tiffany, 2001; Robinson et al., 2015). Studies have found that experiencing stress and feeling negative affect increased the urge to smoke (Brandon, Wetter, & Baker, 1996; Heckman et al., 2013; Kassel, Stroud, & Paronis, 2003; Robinson et al., 2011). These findings are particularly relevant for Black smokers who report higher levels of craving and show more sensitivity and reactivity to smoking cues, in comparison to White smokers (Carter et al., 2010; Robinson et al., 2015). Consistent with previous research, Blacks also report smoking to improve mood and reduce negative affect (Bronars et al., 2015).

Self-Efficacy

Smokers with low self-efficacy expectancies, or beliefs about their abilities to change behavior (Bandura, 1977), are at greater risk for continued tobacco use and low cessation success (Strecher, DeVellis, Becker, & Rosenstock, 1986). Witkiewitz and Marlatt (2004) elaborate by considering the role of environmental stimuli and expectations associated with smoking behavior. A smoker with low-self efficacy may lack the coping skills necessary to abstain from cigarette use in a high-risk situation with environmental smoking cues. Given the smoker's low self-efficacy, he/she may rely on positive reinforcement from tobacco use such as anticipation of reduction in cravings and negative affect. Subsequently, he/she may return to previous smoking behavior (Jones, Corbin, & Fromme, 2001). Low self-efficacy may contribute to tobacco health disparities because smokers may lack the confidence to initiate a quit attempt or maintain abstinence.

Affect

Although tobacco users may anticipate that smoking will reduce their negative affect, the actual existence of a causal relationship is unclear (Kassel et al., 2003). Baker, Piper McCarthy, and Fiore (2004) posit that drug use may decrease negative affect in some instances, but that

drug users may overgeneralize the reduction in negative affect and stress caused by relief of nicotine withdrawal symptoms, thereby expecting drug use to relieve stress in multiple contexts. Balanced placebo designs have demonstrated that smokers' expectancies influence their experience of smoking, regardless of whether their cigarettes contained nicotine (e.g., Juliano & Brandon, 2002).

Blacks, in comparison to Whites, report higher levels of life stress (Pascoe & Smart Richman, 2009; see Williams et al., 2003) and cravings, both of which are associated with negative affect and poor cessation outcomes (Kassel et al., 2003; Shiffman & Waters, 2004). Blacks also report smoking to reduce the negative affect that triggers their urge to smoke. The urge to smoke and avoidance of negative affect appear to be motivational factors that may represent a heightened risk factor for relapse during smoking cessation attempts (Allen et al., 2008; Baker et al., 2004). Furthermore, self-efficacy expectancies may influence the response to cravings to smoke and the selection of coping responses to negative affect.

A potential protective factor for Black smokers is a strong and positive sense of racial identity. Specifically, previous research has found that Blacks who have positive feelings about their racial identity and positive feelings about their racial group experienced less psychological distress from racial discrimination (Sellers & Shelton, 2003).

Although these correlates and predictors of cigarette use and smoking relapse are independent measures, a central theme among them is their relationship with the avoidance or reduction of negative affect and stress (Baker et al., 2004; Brandon, 1994). The anticipation of relief from negative affect from smoking appears to motivate smoking.

Social and Environmental Cues

The socioenvironmental contexts associated with experiences of negative affect may provide further understanding of how cravings and cessation self-efficacy influence smoking behavior. Black smokers may experience tobacco-related health disparities because they have additional and more chronic stressors associated with greater negative affect. The probability of two socioenvironmental contributors to smoking that are greater for Blacks are racial discrimination and environmental smoking cues. Blacks report more experiences of discrimination (Institute of Medicine, 2003; Pascoe & Smart Richman, 2009) and life stress (Pascoe & Smart Richman, 2009; Webb Hooper & Kolar, 2015; Williams et al., 2003) than Whites, both of which are associated with greater negative affect (Carter et al., 2010; Priest et al., 2013; Schmitt, Branscombe, Postmes, & Garcia, 2014), urge to smoke (Baker et al., 2004; Carter et al., 2010), poor mental health outcomes (Harrell et al., 2003; Paradies, 2006; Paradies et al., 2015), and risk taking behavior (Jamieson et al., 2012). Furthermore, the greater likelihood of Blacks' experiencing stressors associated with negative affect may be amplified with exposure to environmental cues for smoking (Carter & Tiffany, 2001), such as greater tobacco outlet density in predominately Black and low SES neighborhoods (Fakunle et al., 2016; Loomis, Kim, Goetz, & Juster, 2013; Peterson, Lowe, & Reid, 2005; Yu, Peterson, Sheffer, Reid, & Schneider, 2010), targeted marketing that is more salient to Black smokers (Carter et al., 2010; Robinson et al., 2015), and less likelihood of having a home smoking ban (Cox et al., 2011; Levy et al., 2011; Trinidad et al., 2011).

Research Aims and Hypotheses

Blacks are more likely to report experiencing discrimination and more likely to have higher incidence rates and death rates associated with tobacco-related illness as compared to

Whites. Although previous studies have provided evidence of a relationship between proxies of racial discrimination and risk-taking behavior, no study has tested the causal relationship between actual experienced racial discrimination and smoking behavior. The correlational and population-based evidence suggest that the chronic psychological distress caused by racial discrimination may contribute to these tobacco-related health disparities via differences in smoking behavior including cessation. Such existing research is unable to demonstrate either the existence or direction of causality between racial discrimination and smoking behavior, nor control for numerous potential confounds. This study used a controlled experimental design to test the casual influence of interpersonal racial discrimination on smoking motivation (e.g., cravings, cessation self-efficacy) and immediate smoking behavior. A research study that allows for a laboratory simulation of racial discrimination may contribute to understanding whether the experience contributes to the poor success in smoking cessation attempts among Black smokers. The current study used a virtual ball playing game to create ostracized groups that should experience elevated levels of negative affect and cravings, especially when the ostracism is attributed to racial discrimination. Specifically, the goal was to utilize a controlled experimental design with high internal validity to build upon and complement previous studies with high external but low internal validity.

Experimental Design and Overview

A virtual ball-throwing program called Cyberball was used to model racial discrimination in a laboratory setting (Williams et al., 2000). A 2x2 between-subjects factorial design (see Table 1 below; inclusion/exclusion vs. ingroup/outgroup) randomly assigned participants to one of four groups: 1.) included/ingroup, 2.) included/outgroup, 3.) excluded/ingroup (ostracism), and 4.) excluded/outgroup (racial discrimination). The groups were also stratified by gender and CPD

(≤10 CPD and >10 CPD). The use of this design allowed for the testing of the effects of discrimination on smoking behavior above and beyond the effect of exclusion.

Table 1

Between-Subjects Factorial Design

	Social Inclusion	
Group Membership	*Included*	*Excluded*
Ingroup	Inclusive	Ostracized
Outgroup	Inclusive	Racial discrimination

Primary Aim: The primary aim of the current study was to evaluate the influence of acute interpersonal racial discrimination on dependent measures associated with motivation to smoke and quit smoking (cravings, cessation self-efficacy, and smoking behavior).

Hypothesis 1: Participants in the excluded, outgroup condition would attribute their exclusion more to racial discrimination compared to the other conditions.

Hypothesis 2: Given that experiencing exclusion increases negative affect and stress, it was hypothesized that there would be a main effect of social inclusion on craving and cessation self-efficacy. Specifically, participants who are excluded should show greater cravings to smoke, lower cessation self-efficacy, shorter latency to smoke, and greater puff count in comparison to those who are included.

Hypothesis 3: There would be an interaction effect between social inclusion and group membership. That is, participants who were excluded by the outgroup would demonstrate greater cravings, lower cessation self-efficacy, shorter latency to smoke, and greater puff count than those excluded by the ingroup, or those in the included conditions.

Secondary Aim: The secondary aim of the current study was to explore potential mediators and moderators of the relationship between racial discrimination and outcome measures.

Mediator

Hypothesis 1: Negative affect would mediate the relationship between racial discrimination (manipulation) and outcome measures, such that greater negative affect would be associated with greater cravings, lower cessation self-efficacy, shorter latency to smoke, and greater puff count (See Figure 2).

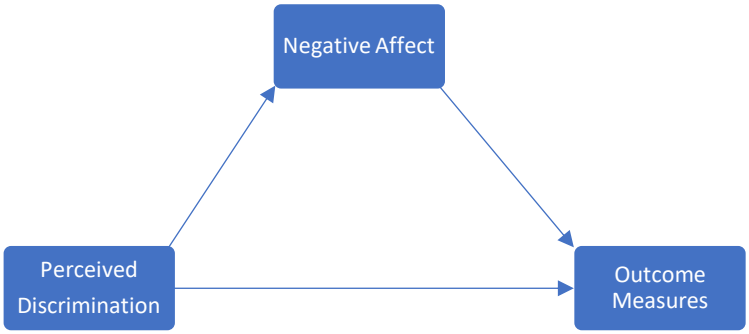

Figure 2. Mediation model demonstrating the direct effect of perceived discrimination on outcomes measures and the indirect effect of perceived discrimination on outcome measures through negative affect.

Hypothesis 2: Perceived discrimination and negative affect would sequentially mediate the relationship between exclusion and outcome measures, such that perceiving discrimination would be associated with greater negative affect, which would be associated with greater cravings, lower cessation self-efficacy, shorter latency to smoke, and greater puff count.

A serial mediation model (Figure 3) was used to parse out the influence of two potentially causally related mediators, that is, perceived discrimination and negative affect. The serial mediation model allows for the sequential testing of the following four pathways: the influence of exclusion on outcome measures (direct effect), the influence of exclusion on

outcome measures through perceived discrimination alone (indirect effect), the influence of exclusion on outcomes measures through negative affect alone (indirect effect), and the influence of exclusion on outcome measures through perceived discrimination and negative affect.

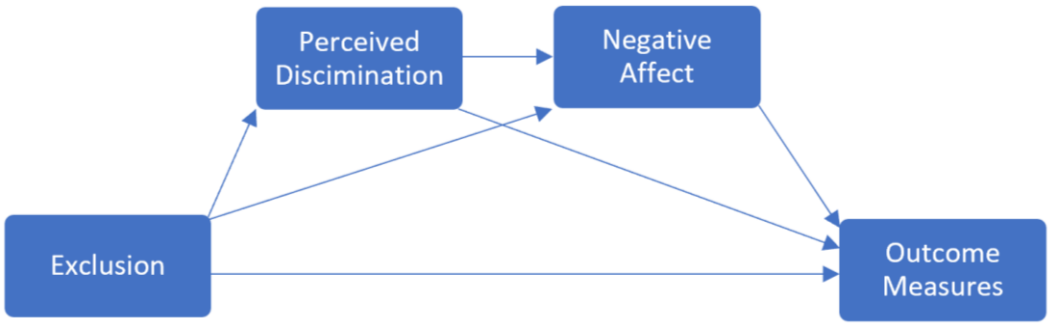

Figure 3. Serial mediation model showing the four proposed pathways for the influence of exclusion on outcomes measures.

Moderator

Hypothesis: The interaction effect (Aim 1, Hypothesis 3) would be moderated by racial identity, such that the effect of discrimination on the dependent variables would be greater among participants with less positive racial identity.

METHOD

Participants

A sample of 69 Black or African American community members enrolled in this study via 1.) advertisements on Craigslist, 2.) flyers posted on campus and throughout Tampa, 3.) canvassing in the community, and 4.) advertisements on Facebook. Eligible participants met the following criteria: 1.) ≥18 years old, 2.) self-identified as Black, 3.) lived in the U.S. since at least age 5, given that U.S. born and foreign-born Blacks experience discrimination differently (Krieger, Kosheleva, Waterman, Chen, & Koenen, 2011; Soto, Dawson-Andoh, & BeLue, 2011), 4.) spoke and read English, 5.) smoked cigarettes or cigarette-like products (i.e., cigarillos and little cigars because of their frequency of use among Black smokers) at least 4 days/week in the past 30 days, 6.) smoked at least one combustible tobacco product on days they did smoke, 7.) have been a smoker for at least a year 8.) not in any treatment to quit smoking, 9.) not engaged in a smoking cessation attempt, 10.) had access to the internet, and 11.) felt comfortable completing online assessments. We attempted to contact over 700 potential participants, completed a telephone screen with 485 of those we were able to contact, and scheduled 142 appointments (Figure 4). The final sample size of 69 was reached after excluding four participants from analyses due to the following reasons: 1.) technological issues with Cyberball, 2.) not completing the study, and 3.) deciding to withdraw their data from analysis during the debriefing.

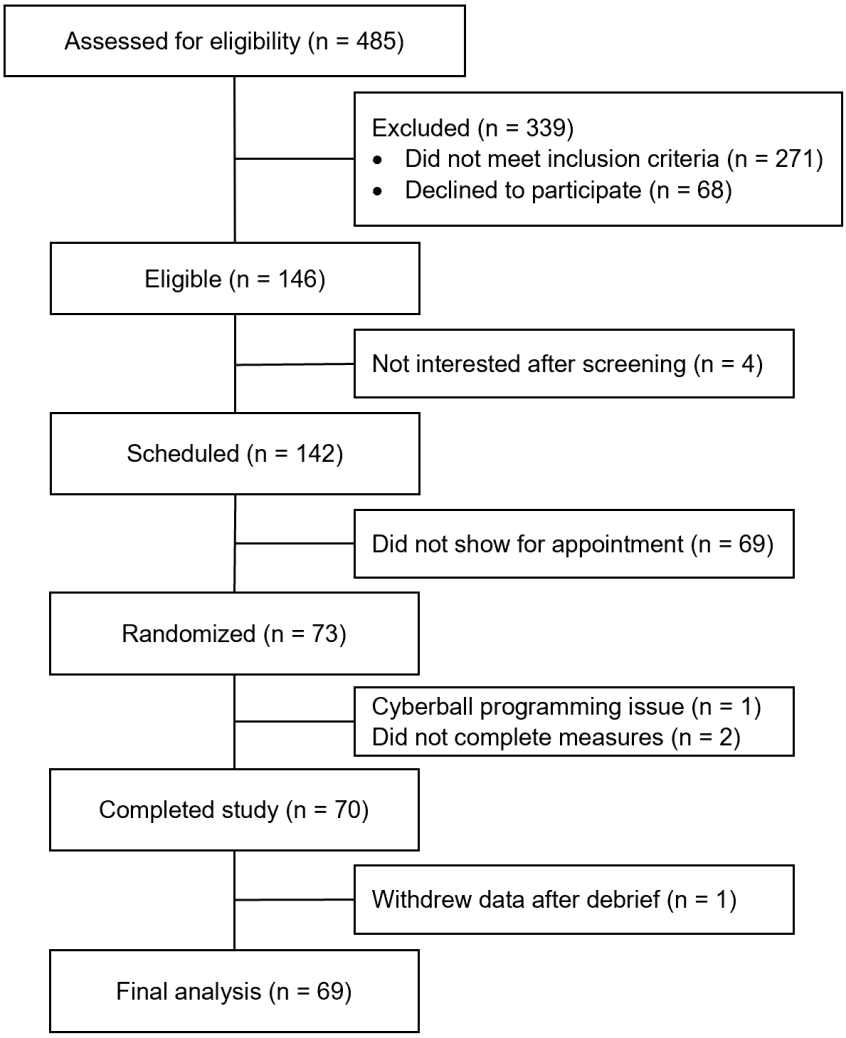

Figure 4. Participant recruitment flow diagram.

A power analysis was conducted using GPower (version 3.1.9.2) to determine that 152 participants would be necessary to achieve a power of 0.80 to detect a medium effect size (f=.23) for a 2 (social inclusion) X 2 (group membership), between-subjects ANOVA with α=.05 (two-tailed; Faul, Erdfelder, Lang, & Buchner, 2007). However, we were not able to reach the recruitment goal after approximately one year of employing multiple strategies. The final sample size of 69 yielded an estimated power of 0.46.

Materials

Demographic Questionnaire

The demographic questionnaire (Appendix C) collected basic information from participants including their age and racial/ethnic identity. These data were used to provide summary information about participants including mean age, measures of SES, and verification of racial and ethnic identity.

Smoking Status

The smoking status questionnaire (Appendix D) assessed participants' current smoking pattern, smoking history, and dependence using the Fagerström Test for Nicotine Dependence (FTND) and the Cigarette Dependence Scale. The FTND is among the most commonly used assessments of tobacco use and dependence (Heatherton et al., 1991). The 6-item FTND attempts to assess the behavioral aspects of tobacco use as well as nicotine dependence (Heatherton et al., 1991). Okuyemi and colleagues (2007) reported the FTND performed fairly at detecting nicotine dependence in a population of treatment-seeking Black, light smokers. In the current study, reliability of the FTND was poor (α=.491; Table 2). The low reliability is consistent with previous studies (Pomerleau, Carton, Lutzke, Flessand, & Pomerleau, 1994; Stavem, Rogeberg, Olsen, & Boe, 2008). The suggested scoring system for the FTND was based on a sample of middle-aged, treatment-seeking White smokers in Ontario. The categories are: 1-2=very low dependence, 3-4=low dependence, 5=medium dependence, 6-7=high dependence, 8-10=very high dependence (Fagerstrom, Heatherton, & Kozlowski, 1991).

Table 2

Internal Consistency for Baseline, Pre- and Post-Test Scales

Scale	Baseline α	Pre-Test α	Post-Test α
Fagerström Test of Nicotine Dependence	.49	-	-
Heaviness of Smoking Index	.32	-	-
Cigarette Dependence Scale-5	.65	-	-
Rosenberg Self-Esteem Scale	.85	-	-
Perceived Stress Scale	.74	-	-
PANAS Negative Affect	.88	.89	.90
PANAS Positive Affect	.90	.91	.94
PANAS Hostility	.80	.83	.82
Questionnaire of Smoking Urges- Brief	.94	.90	.92

Note. α indicates Cronbach's alpha' Cravings as measured as sum score on Questionnaire of Smoking Urges-Brief; Negative Affect as measured by sum score on PANAS negative affect subscale; Positive Affect as measured by sum score on the PANAS positive affect subscale; Hostility as measured by sum score on the PANAS hostility subscale.

Etter, Le Houezec, and Pernerger (2003) developed the 5-item (score ranges 5-25) *Cigarette Dependence Scale* (CDS-5) to assess cigarette dependence. The scale assesses continued used despite the desire to quit, lack of control over use, and cravings. The CDS also provides incremental validity over the FTND as it is sensitive to changes in tobacco use and dependence over time. Okuyemi and colleagues (2007) evaluated the validity of the CDS-5 in a sample of treatment-seeking Blacks, and reported that it had high test-retest ($r \geq 0.83$) reliability and internal consistency (Cronbach's $\alpha \geq 0.84$). The researchers concluded that the CDS-5 was suitable for assessing nicotine dependence among Black, light smokers. Scores on the CDS and FTND were used to determine participants' level of nicotine dependence. In the current study, reliability was fair ($\alpha = .65$, see Table 2).

Expired Air Carbon Monoxide

Breath carbon monoxide (CO) was assessed after informed consent and after a smoking latency assessment (described in *Outcome Measures*). Expired CO, as measured by exhaling into a carbon monoxide monitor, is a reliable and immediate form of biochemical verification. It is most useful for detecting recent tobacco exposure, and in a sample of Black, light smokers Marrone and colleagues (2011) determined that a cut score of ≥5 parts per million correctly identified 94% of smokers and 98% of non-smokers.

Perceived Racial/Ethnic Discrimination

The Schedule of Racist Events (SRE) is an 18-item questionnaire that assesses lifetime and past-year experiences of racial discrimination (Landrine & Klonoff, 1996; Landrine & Klonoff, 2000). The measure assesses experiences of discrimination across multiple social contexts and prompts participants to rate the amount of stress associated with the encounter. Total scores on the SRE for recent events, entire life, and stress from discrimination events were used to assess participants' previous experiences of racial discrimination and the amount of stress they associated with each experience.

Stress

The Perceived Stress Scale (PSS) is a 10-item, Likert-scale measure that assesses an individual's perception or appraisal of how stressful events have been in the past month (Cohen, Kamarck, & Mermelstein, 1983). Financial strain, a correlate of stress, was also assessed in the baseline questionnaire (Pyle, Haddock, Poston, Bray, & Williams, 2007). The total score on the PSS provided information regarding baseline levels of stress for participants and may be used as a covariate in analyses.

Self-Esteem

Trait self-esteem was assessed at baseline with the Rosenberg Self-Esteem Scale (RSE). The RSE is a 10-item, Likert-scale questionnaire that assesses an individual's positive and negative feelings regarding their sense of worth and confidence (Rosenberg, 1965). The Single-Item Self-Esteem Scale (SISE; Robins, Hendin, & Trzesniewski, 2001) assessed state self-esteem at baseline, and pre- and post-session to evaluate whether the experimental manipulation influenced participants' self-esteem. The one-item measure is sensitive to change and has strong convergent validity with the RSE. There were significant positive correlations between scores on the RSE and scores on the baseline (r=.711, p <.01), pre-test (r=.627, p <.01), and post-test SISE (r=.613, p <.01) indicating that the scales have convergent validity.

Racial/Ethnic Identity

A strong sense of racial/ethnic identity may be a protective factor for mental health outcomes (Sellers, Caldwell, Schmeelk-Cone, & Zimmerman, 2003). The positive regard and race centrality subscales of the Multidimensional Inventory of Black Identity (MIBI; Sellers, Smith, Shelton, Rowley, & Chavous, 1998) were used to assess the strength of racial/ethnic identity. The original scale includes 56 items with 7-point, Likert-scale options ranging from 1 (strongly disagree) to 7 (strongly agree). Scores on the two MIBI subscales were proposed to be used in moderation analyses to evaluate whether positive feelings of racial/ethnic identity are associated with less changes in cravings and cessation self-efficacy in ostracized groups. MIBI scores are calculated by taking the average of scores for each subscale.

Lifestyle Questionnaire

The Satisfaction with Life Scale (1985) was used to assess participants' sense of quality of life. The measure was administered to bolster the broad cover story for the study. This score is calculated using a sum score.

Outcome Measures

Manipulation Check

Williams (2009) developed a 12-item Likert scale questionnaire to be used as a manipulation check post-Cyberball, that is, to ensure the manipulation caused feelings associated with ostracism. Items from the Belonging and Self-Esteem subscales of Williams' (2009) questionnaire were used to evaluate how participants responded to the manipulation. Participants were also asked whether they attributed their exclusion to factors like their race or gender to determine whether the exclusion/outgroup manipulation was successful in creating an experience of racial discrimination (Goodwin et al., 2010; Stock et al., 2013).

Craving

One of the dependent variables, craving, was assessed using the 10-item Questionnaire of Smoking Urges-Brief (QSU-B; Cox, Tiffany, & Christen, 2001). The measure has been validated in populations of heavy, black smokers (15-20 CPD; Weinberger et al., 2007) and moderate to heavy smokers (Cox et al., 2001). It was administered with the demographic questionnaire and other baseline measures and was administered again after the Cyberball task. Scores on the QSU-B were used to assess urge to smoke or cravings.

Mood

A modified Positive and Negative Affect Schedule-Expanded Form (PANAS-X; Watson & Clark, 1999) was used to assess trait-based mood over the last two weeks at baseline, and

state-based negative and positive affect after the Cyberball task. Rather than include all the potential expanded subscales from the PANAS-X, this study added the additional items from the scale of hostility (i.e., angry, scornful, disgusted, loathing) in an effort to capture feelings that may manifest as a result of experiencing racial discrimination (Jamieson et al., 2012). Scores for negative affect can range from 10-50 with lower scores indicating lower levels of negative affect. Scores for positive affect can range from 10-50 with higher scores indicating higher levels of positive affect.

Smoking Behavior

Greater levels of cravings and greater negative affect are associated with shorter latency to smoke (elapsed time to lighting a cigarette) and greater number of puffs, and serves as a behavioral measure of tobacco use (Conklin & Perkins, 2005; Heckman et al., 2015; Sayette et al., 2000). After completing the post-Cyberball questionnaires, participants were asked to smoke a cigarette (and take at least one puff) while the experimenter checked the documents and prepared payment in an adjacent room. The smoking session was recorded so raters could review them for coding latency to smoke and number of puffs. The coders reviewed the tape and recorded the elapsed time to the cigarette being lit and the number of puffs participants take as indicated by the glow of the cigarette. The interrater reliability for latency to smoke was acceptable ($\kappa = .72$). The interrater reliability for number of puffs was poor ($\kappa = .56$) with 39 exact matches for puff count, 25 differences of 1 puff, and 5 differences of greater than 1 puff. A third rater reviewed the smoking session to determine the final puff count. Residual differences that were greater than 1 puff count were averaged to provide a final puff count.

Cessation Self-Efficacy

As part of the baseline questionnaire, participants rated their confidence in their ability to quit smoking in the next year using a 5-point Likert scale (0=no confidence to 4=extremely confident). Post-Cyberball, participants rated their current motivation to quit smoking (Appendix J; Hedeker & Mermelstein, 1996).

Modified Cigarette Evaluation Questionnaire (mCEQ; Cappelleri et al., 2007)

This is a 12-item, 7-point Likert scale questionnaire that was used to assess participants' satisfaction from smoking after the ad libitum smoking session. This questionnaire was administered to bolster the cover story for the behavioral assessment, and it may be used for exploratory analyses. The 12 items are used to create a sum score ranging from 12-84.

Procedure

Recruitment

Participants were recruited from the Tampa Bay community through canvassing and posting flyers, Facebook, and Craigslist advertisements. To maintain the integrity of the research design, participants were given only the broad description of the study and that its purpose is to understand the role of culture, life experience, and smoking on computer users' online interactions. In November 2018, we increased participant payment from $20 to $30, and in December 2018 we changed the name of the study from "Mental Imagery in Smokers" to "Imagination in Smokers."

Telephone Contact

The first telephone contact with participants was used to determine initial eligibility. Prior to being scheduled for an appointment, potential participants were asked about their age, race, smoking frequency and history, and intentions to quit smoking (Appendix A). If eligible,

they were asked to complete the baseline questionnaire via an emailed link, administered through Qualtrics (Qualtrics, Provo, UT). The link to the survey contained an initial consent to complete the survey, including a demographic questionnaire, and assessments of smoking status, self-esteem, self-efficacy, cravings, affect, and experiences of discrimination. Participants reviewed and signed a second consent form prior to beginning any tasks associated with the one-time, in-person appointment. Participants scheduled their appointment during the telephone screen and were reminded that they must complete the survey prior to coming in for the in-person session. Participants were also be asked to bring one pack of their own cigarettes to the appointment for the behavioral assessment of smoking. Participants were sent text message reminders and/or phone calls to complete the baseline questionnaire, and to remind them about their scheduled in-person session. Figure 5 and Table 3 show a summary and detailed outline of the study procedures, respectively.

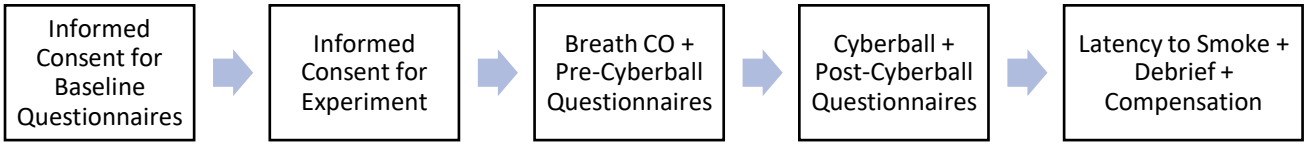

Figure 5. Summary of study procedure.

Table 3

Outline of Study Procedures

Part 1: Participant Recruitment

- Participants were recruited from Tampa through flyers and advertisements on Craigslist

Part 2: Screening of Participants

- Upon contacting the study, participants were screened for inclusion criteria (Appendix A)
- Participants were scheduled for the in-person appointment for the experimental session
- They were sent the online baseline questionnaire after scheduling the appointment; and they were informed that they cannot attend the in-person appointment until they complete the questionnaire.
- They were asked to bring in their own pack of cigarettes, cigarillos, or little cigars.

Part 3: Baseline Questionnaires (20 minutes)

Table 3 (continued)

- Demographic Form (Appendix C)
- Tobacco Smoking Status and History (Appendix D)
- Contemplation Ladder
- Cessation Self-Efficacy
- Rosenberg Self-Esteem Scale
- Single Item Self Esteem Scale
- Schedule of Racist Events
- Perceived Stress Scale
- Questionnaire of Smoking Urges-Brief
- Positive and Negative Affect Scale-Extended

Part 4: Informed Consent and Randomization (Appendix B; 10 minutes)

- Participants were randomized to one of the four conditions, and stratified by gender and cigarettes per day (CPD)

Part 5: Pre-Cyberball Questionnaires and Exhaled Carbon Monoxide (5 minutes)

- Exhaled Carbon Monoxide (CO)
- Positive and Negative Affect Scale-Extended
- Questionnaire of Smoking Urges-Brief
- Cessation Self-Efficacy
- Contemplation Ladder
- Single-Item Self-Esteem Scale

Part 6: Cyberball (5 minutes)

- Research assistants read the welcome page to participants
- Participants were asked if they understand the task before starting Cyberball

Part 7: Post-Cyberball Questionnaires (3 minutes)

- Manipulation Check (Appendix F)
- Positive and Negative Affect Scale-Extended
- Questionnaire of Smoking Urges-Brief
- Cessation Self-Efficacy
- Contemplation Ladder
- Single-Item Self-Esteem Scale

Part 8: Latency to Smoke (10 minutes)

- Participants were asked to take at least one puff of their cigarette, cigarillo, or little cigar before completing a questionnaire about the experience
- Modified Cigarette Evaluation Questionnaire

Part 9: Debriefing and Compensation (5 minutes)

Online Baseline Assessment

Before accessing the baseline questionnaire, participants were informed that the questionnaire was the initial step to participate in the research study. The consent explained the nature of the questions being asked and express that their participation was voluntary. The

baseline assessment included the following questionnaires: Demographic Information, Tobacco Smoking Status and History, Other Smoking or Vaping Status, Rosenberg Self-Esteem Scale, Single Item Self-Esteem Scale, Schedule of Racist Events, Perceived Stress Scale, Questionnaire of Smoking Urges-Brief, Contemplation Ladder, Cessation Self-Efficacy, Positive and Negative Affect Scale-Expanded, and the Multidimensional Inventory of Identity. Upon completion of the questionnaire, participants were reminded of their in-person study session.

Pre-Cyberball Assessment

Prior to beginning the experimental session, participants provided a breath carbon monoxide sample. Participants also completed the following measures: Single Item Self-Esteem Scale, Questionnaire of Smoking Urges-Brief, Contemplation Ladder, and the Positive and Negative Affect Scale-Extended.

Experimental Session

Cyberball's interface allows researchers to program structural components of the virtual game, including play duration, number of players, number of ball tosses, the order of who receives ball tosses, and player information (Hartgerink et al., 2015). The program has an initial user page that explains that the game is an exercise in mental visualization and that the other "players" are in nearby rooms. A photo was taken of participants and was then uploaded into the game as part of the participant's user profile. Participants saw photos and avatars of other players [not real participants] (Figure 6). Each study participant played with 3 other, same-sex "players" for a game duration of 30 ball-tosses (approximately 3 to 5 minutes). Participants randomized to the ingroup conditions played with 3 Black players and received the ball 8 times (included) or twice (excluded). Participants in the outgroup conditions played with 3 White players. The outgroup participants received the ball 8 times (included) or twice (excluded).

Figure 6. An example of the included (left) and excluded (right) Cyberball conditions.

Cyberball Administration

When the experimenter met the participant in the waiting room, she made a scripted statement meant to enhance the belief that other players are real, such as 1.) "You're the last to arrive so the other players are waiting for you. We can get you set up quickly." or 2.) "We're just waiting on one more participant, but we can get you set up in the meantime." After participants entered the experimental room, they were asked to provide the pack of cigarettes they were instructed to bring to the session. The 11 participants that forgot to bring their own cigarettes were provided with a cigarette similar to their preferred brand. The sessions were conducted in an experimental room on a Windows desktop computer that meets the Cyberball system requirements to load the software. The program was initially run through Chrome browser and was launched by the experimenter via a pre-programmed link. However, in March 2019, the online version of the game ceased functioning and the desktop version of the game was used instead. A series of sealed randomization envelopes were created that included stratification by sex and cigarettes per day. The experimenter selected a randomization envelope that corresponded to the participant's sex and CPD as seen in his/her baseline survey. The experimenter reviewed the welcome screen to Cyberball with the participant (see Figure 7), reminded the participant that the study is interested in how well they can mentally visualize tasks that they would perform later, and told the participants that they would be playing with

participants in other rooms (Williams et al., 2000). The experimenter emphasized the importance of the visualization task by encouraging participants to imagine that they were actually playing a game of catch and to consider the following: “What do the other players look like? Where are they? What is the temperature and weather? What does the geography look like?” (Williams, 2009). The participant began the game by pressing “PLAY” on the home screen.

Figure 7. The welcome screen of Cyberball that informs participants about the mental visualization task and provides prompts for improving engagement.

Post-Cyberball

Participants were provided with post-session questionnaires. Upon completion of the questionnaires, the experimenter asked the participant to place a cigarette in an ashtray provided by the experimenter and to place his/her lighter adjacent to the ashtray. The experimenter told participants that we were interested in their reactions to smoking. Thus, we would like them to

smoke their cigarette and then complete the mCEQ. They were told that they could smoke as much as they would like while they are in the room, but they should take at least one puff. The participants were told that the experimenter needs to review the paperwork and prepare the payment, which took approximately 10 minutes. At a later time, two raters watched video-recordings of participants smoking, and the raters recorded the time to the cigarette being lit and the number of puffs participants take as indicated by the glow of the cigarette (Shiffman et al., 2013). When discrepant times were found, a third rater reviewed the recording to determine the source of the discrepancy.

Manipulation Check

After completing the task, participants completed a series of questions regarding their urges and how they felt after the game. The manipulation check (Appendix F) evaluated whether participants in the outgroup/exclusion group attributed their exclusion to racial discrimination. The items were taken from previous Cyberball studies that determined self-esteem, belonging, sense of control, and meaningful existence are significantly reduced among ostracized groups (Williams, 2006, 2009). In addition, it would verify that the exclusion induced feelings associated with negative affect.

Compensation and Debriefing

Participants were informed of the actual purpose of the study upon completion of the study task and questionnaires. They were also be reminded of their opportunity to withdraw their data from final analysis. After participants indicated that they understand the true intent of the experiment, they were initially compensated $20 for their time, but in November 2018 the payment was increased to $30.

RESULTS

Demographics and Baseline Characteristics

As shown in Table 4, the final sample of 69 Black or African American smokers was primarily male (63.77%), single (71.01%), heterosexual (84.06%), non-Hispanic (92.75%), and reported an average age of 41.88 years. Approximately half of the participants obtained a high school education (46.38%), and 42% reported an annual income of less than $10,000. Commensurate with previous literature, participants smoked an average of 12.18 (SD=7.15) cigarettes per day, and over half of them reported smoking ≤10 cigarettes per smoking day. Similarly, 83.8% of participants smoked menthol cigarettes, and of those who smoked little cigars, 60% smoked menthol flavor. Participants were high on nicotine dependence with a mean score of 4.32 (SD=2) as measured by the FTND and 16.84 (SD=4.26) on the CDS-5. Although three-quarters of the sample reported thinking of quitting in the next 6 months, only 27.5% of participants reported planning on quitting in the next 30 days. A mean score of 5.38 (SD=2.9) on the Contemplation Ladder suggest that participants were considering quitting smoking, but they were not ready to make a quit attempt. In response to a single-item motivation question, "How motivated are you to stop smoking," participants reported moderate motivation to quit smoking (*M*=4.17, SD=1.88; How motivated are you to stop smoking? Likert scale 1 – not much at all to 7 – extremely motivated) and over 56% of participants reported little to no confidence in their ability to quit smoking for one year.

Table 4

Baseline Demographic, Smoking, and Clinical Characteristics

Demographic variables	Percentage or M (SD) N=69
Sex: Male	63.77%
Age: M (SD)	40.88 (13.65)
Marital status: Single	71.01%
Sexual Orientation: Heterosexual	84.06%
Education	
Less than high school	8.70%
High School/GED	46.38%
Some college or more	44.92%
Employed/Student	52.20%
Self-reported annual income	
<$10,000	42.03%
$10,000-$29,999	39.13%
$30,000+	18.84%
Hispanic: No	92.75%
Born in U.S.: Yes	97.10%
Smoking-Related Variables	
Cigarettes Per Day	12.18 (7.15)
10 or less	55.90%
Years Smoking	20.49 (5.47)
Menthol Cigarettes: Yes	83.8%
Little Cigar Use: Yes	28.9%
Menthol: Yes	60%
Little Cigarettes Per Day	5.10 (5.12)
Self-Rated Addiction (0-100)	76.29 (25.98)

Table 4 (continued)

Thinking of Quitting- 6 months	75.4%
Planning Quitting- 30 days	27.5%
Past Year Quit Attempt	44.9%
Ever Quit Attempt	71%
Number of Quit Attempts (N=46)	6.22 (8.36)
Longest Quit Attempt Length (N=61)	
Minutes to Days	37.7%
Weeks	14.8%
Months	34.4%
Years	13.1%
Cigarette Dependence Scale-5 (Range: 5-25)	16.84 (4.26)
Fagerström Test of Nicotine Dependence	4.32 (2)
Heaviness of Smoking Index	2.49 (1.31)
Other Tobacco Use	
Cigarillos Only	27.5%
Electronic Cigarettes Only	11.6%
Cigarillos and E-Cigs	17.4%
Cigars and Cigarillos	7.2%
Cigars, Cigarillos, E-cigs	5.8%
No other products	30.4%
Psychosocial Variables	
Contemplation Ladder	5.38 (2.9)
Cravings (Range 10-70)	42.44 (14.04)
Self-Esteem (Range 1-7)	5.3 (1.84)
Rosenberg Self-Esteem Scale (Range 10-35)	19 (5.5)

Table 4 (continued)

Motivation to Quit (Range 1-7)	4.17 (1.88)
Confidence to Quit- 1 Year (Range 1-5)	2.68 (1.23)
Racist Experiences- Past Year	42.99 (16.85)
Racist Experiences- Entire Life	50.14 (18.71)
Positive Affect (Range 10-50)	35.84 (8.69)
Negative Affect (Range 10-50)	22.34 (8.29)
PANAS Hostility (Range 4-20)	8.16 (3.77)

Primary Hypotheses

Hypothesis 1—Participants in the excluded, outgroup condition will attribute their exclusion more to racial discrimination compared to the other conditions (manipulation check): The results of chi-square analyses partially supported the proposed hypothesis for the manipulation check. Table 5 shows the results of ANOVAs for the manipulation checks, and Tables 6 and 7 show the estimated marginal means by condition and factor, respectively. As seen in Table 6, there were no statistically significant effects for the main effect of group membership for the following manipulation checks: 1) how often participants believed they received the ball, 2) how much participants felt ignored during the game, 3) participants' sense of belonging during the game, and 4) participants' self-esteem during the game. However, there were statistically significant main effects of inclusion, as follows:

(1) Participants' perception of how many times they received the ball, $F(1,67) = 139.85$, $p < .001$; $\eta p^2 = .69$. Participants in the included conditions reported receiving the ball more (estimated marginal means for estimated received ball throws score = 6.45) than participants in the excluded conditions (1.82).

(2) Participants' perception of how much they were ignored during the game (Likert scale from 0 not at all to 4 very much), $F(1,68) = 45.84$, $p < .001$; $\eta p^2 = .29$. Participants who were excluded reported being ignored more (estimated marginal means of sense of being ignored score = 3.05) than participants who were included by the group (1.39).

(3) Participants' self-reported feeling of belonging, $F(1,67) = 51.36$, $p < .001$; $\eta p^2 = .45$. Participants who were excluded reported lower sense of belonging (estimated marginal means on sense of belonging manipulation check score = 11.27) as compared to those in the included conditions (20.19).

(4) Participants' self-reported self-esteem, $F(1,66) = 11.88$, $p = .001$; $\eta p^2 = .16$. Participants who were in the excluded conditions reported lower self-esteem (estimated marginal means of self-esteem manipulation check score = 16.34) than participants in the included conditions (20.38).

The remainder of the manipulation checks assessed for the extent to which participants attributed their exclusion to aspects of their appearance or identity (e.g., race, age, gender). Table 8 shows the frequency of participant responses to each question. As seen in Table 9, there was a statistically significant difference in the factor of inclusion on attributing being left out of the group to appearance, $\chi^2(1, N=69) = 6.25$, $p = .01$. Participants in the excluded conditions were more likely report being treated differently because of their appearance (41%) as compared to participants in the included conditions (14%). There was also a statistically significant difference in the factor of group membership on attributing being left out of the group to race, $\chi^2(1, N=69) = 17.87$, $p < .001$. Participants who played with the outgroup were more likely to attribute their exclusion to race (34%) as compared to those who played with the ingroup (0%).

Table 5

2 X 2 Between-Subjects ANCOVAs for the Manipulation Checks controlling for Age

Manipulation Check Variable	Sum of Squares	*df*	Mean Squares	*F*	*p*	Partial Eta Squared
Estimated Received Ball Throws						
Inclusion (A)	**352.41**	**1**	**352.41**	**139.85**	**.00**	**.70**
Group Membership (B)	.02	1	.02	.01	.94	.00
A*B	.68	1	.68	.27	.61	.00
Age	.14	1	.14	.06	.82	.00
Error	158.75	63	2.52			
Total	525.12	67				
Sense of Being Ignored						
Inclusion (A)	**45.84**	**1**	**45.84**	**26.19**	**.00**	**.29**
Group Membership (B)	.00	1	.00	.00	1	.00
A*B	1.69	1	1.69	.96	.33	.02
Age	**8.42**	**1**	**8.42**	**4.81**	**.03**	**.07**
Error	112.05	64	1.75			
Total	179.16	68				
Sense of Belonging Scale						
Inclusion (A)	**1278.96**	**1**	**1278.96**	**51.36**	**.00**	**.45**
Group Membership (B)	2.70	1	2.70	.11	.74	.00
A*B	1.36	1	1.36	.05	.82	.00
Age	28.62	1	28.62	1.15	.29	.02
Error	1568.77	63	24.90			
Total	3055.81	67				
Self-Esteem Scale						
Inclusion (A)	**266.58**	**1**	**266.58**	**11.88**	**.00**	**.16**
Group Membership (B)	.30	1	.30	.01	.91	.00
A*B	17.90	1	17.9	.90	.38	.01
Age	27.47	1	27.47	1.22	.27	.02
Error	1391.85	62				
Total	1728.66	66				

Note. ANCOVAs used age as a covariate. Bold indicates statistically significantly results. Estimated Received Ball Throws refers to the manipulation check questions, "How many times do you think you received the ball?"; Sense of Being Ignored refers to the manipulation check question, "How much were you ignored during the game?" (Likert scale 0 – not at all to 4- very much); All items in this table are from the manipulation check.

Table 6

Manipulation Check Estimated Marginal Means by Condition from ANCOVAs – M (SE)

Manipulation Check Variable	Ingroup Included[1]	Ingroup Excluded[1]	Outgroup Included[2]	Outgroup Excluded[1]
Estimated Received Ball Throws	6.54 (.39)	1.71 (.41)[3]	6.37 (.39)	1.94 (.39)
Sense of Being Ignored	1.54 (.32)	2.89 (.33)	1.23 (.32)	3.20 (.32)
Sense of Belonging Scale	19.84 (1.21)	11.21 (1.3)	20.54 (1.22)	11.34 (1.21)
Self-Esteem Scale	20.83 (1.16)	15.75 (1.24)	19.93 (1.15)	16.93 (1.15)

Note. ANCOVAs used age as a covariate. Estimated Received Ball Throws refers to the manipulation check questions, "How many times do you think you received the ball?"; Sense of Being Ignored refers to the manipulation check question, "How much were you ignored during the game?" (Likert scale 0 – not at all to 4- very much); [1]*N* = 17; [2]*N* = 18; [3]*N* =16

Table 7

Manipulation Check Estimated Marginal Means by Factor controlling for Age– M (SE)

	Inclusion		Group Membership	
	Included[1]	Excluded[2]	Ingroup[2]	Outgroup[1]
Estimated Received Ball Throws	6.45 (.27)	1.82 (.28)	4.12 (.27)	4.15 (.27)
Sense of Being Ignored	1.39 (.23)	3.05 (.23)	2.22 (.23)	2.22 (.23)
Sense of Belonging	20.19 (.85)	11.27 (.88)	15.52 (.90)	15.94 (.89)
Self-Esteem	20.38 (.81)	16.34 (.84)	18.29 (.85)	18.43 (.81)

Note. ANCOVAs used age as a covariate. Estimated Received Ball Throws refers to the manipulation check questions, "How many times do you think you received the ball?"; Sense of Being Ignored refers to the manipulation check question, "How much were you ignored during the game?" (Likert scale 0 – not at all to 4- very much); [1]*N* = 35; [2]*N* = 34.

Lastly, participants in the racial discrimination condition attributed their exclusion to race more than any other condition. When examining both factors simultaneously, a chi-square test of independence with a Bonferroni correction for multiple comparisons revealed that participants in the racial discrimination condition (excluded, outgroup), were more likely to report being treated differently because of their race (47%) , as compared to participants who were included by the outgroup (22%), and participants who were in either ingroup (0%), χ^2 (1, *N*=69) = 13.84, $p <$ .001.

There were no statistically significant differences in attribution of exclusion based on (1) gender or age for either factor, (2) appearance for the factor of group membership, and (3) race for the factor of inclusion.

Table 8

Frequencies of Responses for Manipulation Checks by Condition

Attribution of Discrimination	Ingroup Included	Ingroup Excluded	Outgroup Included	Outgroup Excluded
Appearance				
Yes	2	6	3	8
No	15	11	15	9
Race				
Yes	0	0	4	8
No	17	17	14	9
Gender				
Yes	0	0	1	0
No	17	17	17	17
Age				
Yes	2	5	2	0
No	15	12	16	17

Note. The root of the question for all items in the table is "Do you believe you were treated differently because of your… [appearance, race, gender, age].

Table 9

Chi-Square Analyses for Manipulation Checks by Factor

	Inclusion				Group Membership			
Attribution	Included	Excluded	χ^2	*p*	Ingroup	Outgroup	χ^2	*p*
Appearance			**6.25**	**.01**				
Yes	5	14			8	11	.54	.46
No	30	20			26	24		
Race			1.76	.19			**14.11**	**.00**
Yes	4	8			0	12		
No	31	26			34	23		
Gender								
Yes	1	0	.99	.32	0	1	.986	.32
No	34	34			34	34		
Age			.16	.69				
Yes	4	5			7	2	3.36	.07
No	31	29			27	33		

Note. Bold indicates statistically significant results. The root of the question for all items in the table is "Do you believe you were treated differently because of your… [appearance, race, gender, age].

Hypothesis 2—Given that experiencing exclusion increases negative affect and stress, it was hypothesized that there would be a main effect of social inclusion on craving and cessation self-efficacy. Specifically, participants who are excluded should show greater cravings to smoke, lower cessation self-efficacy, shorter latency to smoke, and greater puff count in comparison to

those who are included: Table 10 shows the means for baseline, pre- and -post measures by condition. Contrary to hypotheses, there were no statistically significant main effects of inclusion for cravings, latency to smoke, or number of puffs taken during the smoking session (Table 11). A significant main effect of social inclusion was observed for cessation self-efficacy, F (1,63) = 5.84, $p < .05$; $\eta p^2 = .085$ (Figure 8). Participants who were excluded during Cyberball reported lower post-task confidence in their ability to quit smoking for one year (estimated marginal mean of cessation self-efficacy score = 1.88) than participants who were included (1.56).

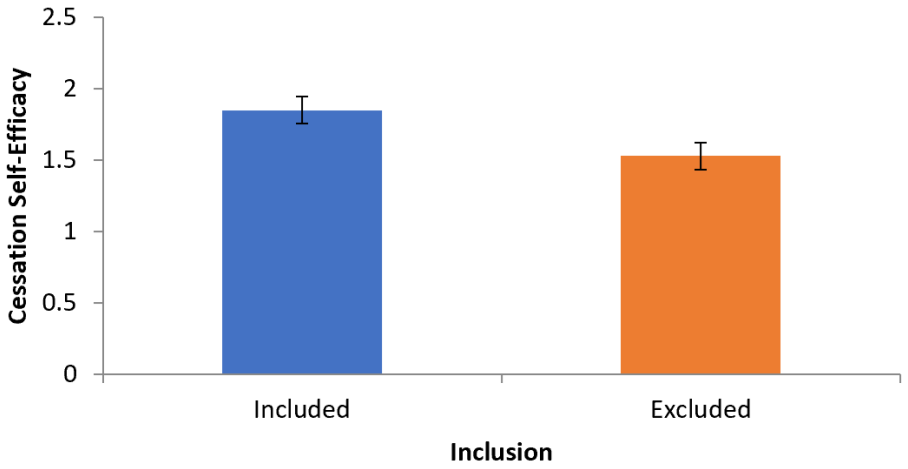

Figure 8. Significant main effect of inclusion on post-task measures of cessation self-efficacy. Error bars represent standard errors of the mean.

Although it was not hypothesized, there were significant main effects of group membership on latency to smoke (Figure 9; F (1,61) = 4.60, $p < .05$; $\eta p^2 = .070$). Participants who played with all white players had a shorter latency to smoke (estimated marginal mean of seconds to light tobacco product = 9.96) than participants who played with all black players (14.52). Tables 12 and 13 show the estimated marginal means by condition and factor, respectively.

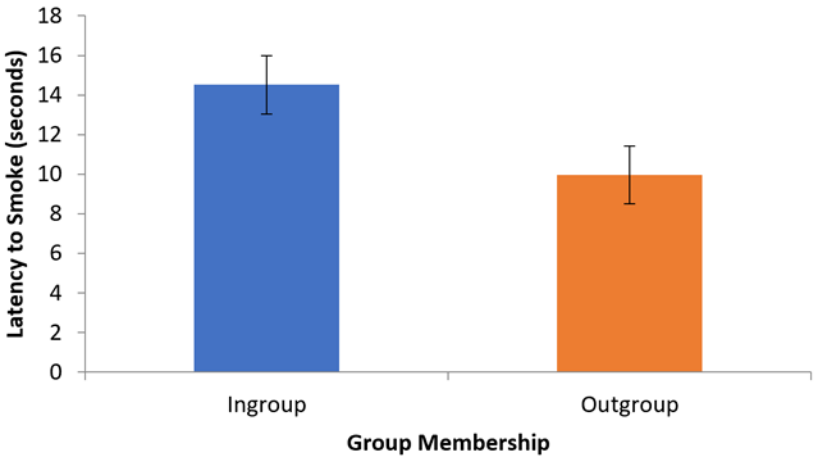

Figure 9. Significant main effect of group membership on post-task latency to smoke. Error bars represent standard errors of the mean.

Hypothesis 3—There would be an interaction effect between social inclusion and group membership. That is, participants who were excluded by the outgroup would demonstrate greater cravings, lower cessation self-efficacy, shorter latency to smoke, and greater puff count than those excluded by the ingroup, or those in the included conditions: There were no statistically significant interaction effects between social inclusion and group membership for cravings, cessation self-efficacy, latency to smoke, or number of puffs taken during the smoking session.

Table 10

Baseline, Pre- and Post-Task Scores for all Repeated Measures

		Ingroup Included		Ingroup Excluded		Outgroup Included		Outgroup Excluded	
Measure	Baseline	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Negative Affect	22.34	18.76	17.06	21.18	21.53	22.94	20.78	19.76	16.75
Positive Affect	35.84	33.88	43.41	35.93	34.38	33.88	34.06	37.65	37.38
Hostility	8.16	7.56	6.29	8.06	8.12	8.72	8.18	7.25	6.41
Craving	42.45	46.58	44.88	43.58	46.71	43.94	44.56	39.65	41.67
Self-Esteem	5.30	5.35	5.47	5.71	5.53	5.44	5.50	5.82	6.00
Motivation to Quit	4.17	4.29	4.00	3.71	3.35	4.11	3.72	4.35	4.65
Confidence to Quit	1.68	1.82	2.00	1.64	1.41	1.17	1.50	1.94	2.00

Notes: Negative affect, positive affect, and hostility are subscales of the PANAS-X. Cravings are scores from the Questionnaire on Smoking Urges – Brief. Self-esteem was taken from the Single Item Self Esteem (Likert scale 1 – not very true of me to 7 – very true of me). Motivation to quit was taken from a single item assessment (Likert scale 1 not much motivation – 7 extremely motivated). Baseline, pre- and -post task statistics represent the mean.

Table 11

2 X 2 Between-Subjects ANOVAs for Outcome Measures controlling for Age and Menthol Use

Source	Sum of Squares	*df*	Mean Squares	*F*	*p*	Partial Eta Squared
Cravings (QSU)						
Inclusion (A)	29.44	1	29.44	.33	.57	.01
Group Membership (B)	9.18	1	9.18	.10	.75	.00
A*B	118.75	1	118.75	1.33	.25	.02
Pre-Test Cravings	**5229.81**	**1**	**5229.81**	**58.73**	**.00**	**.50**
Age	234.69	1	234.69	2.64	.11	.04
Menthol	272.46	1	272.46	3.06	.09	.05
Error	5253.85	59	89.05			
Total	12,014.12	65				
Cessation Self-Efficacy						
Inclusion (A)	**1.69**	**1**	**1.69**	**5.84**	**.02**	**.09**
Group Membership (B)	.641	1	.64	2.21	.14	.03
A*B	.124	1	.12	.43	.52	.01
Age	.060	1	.06	.21	.65	.00
Pre-Test Self-Efficacy	**98.33**	**1**	**98.33**	**339.04**	**.00**	**.84**
Error	18.27	63	.29			
Total	121.77	68				
Latency to Smoke (seconds)						
Inclusion (A)	.789	1	.789	.01	.92	.00
Group Membership (B)	**316.86**	**1**	**316.86**	**4.60**	**.04**	**.07**
A*B	.597	1	.60	.01	.93	.00
Age	237.22	1	237.22	3.44	.07	.05
Menthol	65.2	1	65.2	.95	.33	.02
Error	4201.55	61	68.88			
Total	4,662.58	67				
Number of Puffs						
Inclusion (A)	68.39	1	68.39	2.33	.13	.04
Group Membership (B)	3.87	1	3.87	.13	.72	.00
A*B	16.82	1	16.82	.57	.45	.01
Age	15.41	1	15.41	.53	.47	.01
Menthol	**152.18**	**1**	**152.18**	**5.19**	**.03**	**.08**
Error	1,817.62	62	29.32			
Total	2,074.87	68				

Note. ANCOVAs used age, menthol, and pre-test scores (where applicable) as covariates. Bold indicates statistically significant results.

Table 12

Estimated Marginal Means by Condition from ANCOVAs for Primary Outcomes – M (SE)

Outcome Measure	Ingroup Included[1]	Ingroup Excluded[1]	Outgroup Included[2]	Outgroup Excluded[1]
Cravings	41.76 (2.38)	45.81 (2.36)	45.25 (2.3)	43.91 (2.46)
Cessation Self-Efficacy	1.80 (.14)	1.38 (.14)	1.91 (.14)	1.67 (.13)
Latency to Smoke (seconds)	14.32 (2.09)	14.73 (2.07)	9.94 (2.09)	9.97 (2.02)
Number of Puffs	14.73 (1.36)	11.70 (1.35)	14.24 (1.32)	13.19 (1.32)

Note. ANCOVAs used age, menthol, and pre-test scores (where applicable) as covariates.; [1]*N* = 17; [2]*N* = 18; [3]*N* =16

Table 13

Estimated Marginal Means by Factor from ANCOVAs for Primary Outcomes– M (SE)

	Inclusion		Group Membership	
	Included[1]	Excluded[2]	Ingroup[2]	Outgroup[1]
Cravings	43.50 (1.63)	44.86 (1.69)	43.78 (1.70)	44.58 (1.70)
Cessation Self-Efficacy	1.85 (.10)	1.53 (.10)	1.59 (.10)	1.79 (.10)
Latency to Smoke (seconds)	12.13 (1.46)	12.35 (1.44)	14.52 (1.48)	9.96 (1.46)
Number of Puffs	14.48 (.94)	12.44 (.94)	13.21 (.10)	13.71 (.94)

Note. ANCOVAs used age, menthol, and pre-test scores (where applicable) as covariates. [1]*N* = 35; [2]*N* = 34.

Exploratory Analyses

Mediation

The secondary aim of this study was to explore potential mediators and moderators of the relationship between racial discrimination and outcome measures. Given that most of the primary hypotheses were not supported, mediation analyses were conducted to assess the relationship between perceived racial discrimination during the experiment (independent variable), negative affect (mediator), and the outcomes of cessation self-efficacy and latency to smoke. Analyses of mediation were conducted using the PROCESS macro developed by Hayes. The analyses included covariates of pre-test negative affect, pre-test cessation self-efficacy, age, and cigarettes per day. The statistical significance of the indirect (mediated) effect was estimated using 10,000 bootstrapped samples and 95% confidence interval. The bootstrapped analysis did

not yield a statistically significant indirect effect, β = -.04; 95% CI = -.27 - .04, n.s., direct effect, β = -.03; 95% CI = -.44 - .37, n.s., or total effect, β = -.07; 95% CI = -.49 - .34, n.s.

Similar analyses were conducted, but with latency to smoke as the outcome. The bootstrapped analysis did not yield a statistically significant indirect effect, β = -.002; 95% CI = -1.63 - .55, n.s., direct effect, β = 4.92; 95% CI = -1.30 – 11.13, n.s., or total effect, β = 4.92; 95% CI = -1.20 – 11.03, n.s.

In sum, the results of the PROCESS Model 4 analyses did not support post-test negative affect as a mediator of the relationship between perceived racial discrimination (as assessed by responses on the manipulation check) and cessation self-efficacy or latency to smoke, $p > .05$.

Moderation

To assess whether racial identity moderated the relationship between perceived discrimination and outcomes measures, a series of two-way ANCOVAs were conducted. The covariates included in the ANCOVAs were as follows: applicable pre-test scores and baseline scores for centrality of and public regard for racial identity. Centrality of black racial identity, or the degree to which an individual believes their race is a central part of their identity, served as the moderator of the relationships between discrimination and the outcome variables. Public regard was a second measure of black racial identity and was the degree to which participants believed the public has a positive or negative view of Black/African Americans. If significant, the moderated relationship would indicate that the effect of perceived discrimination varied as a function of how much participants' black identity was tied to their confidence, specifically upon their cessation self-efficacy. Neither centrality of or public regard for racial identity independently, nor in conjunction, were significant moderators of the relationship between discrimination and latency to smoke, cessation self-efficacy, or cravings.

Associations between Discrimination and Indicators of Well-Being

Further exploratory analyses were conducted to assess for the association between recent and lifetime experiences of discrimination, the stress related to those events, and multiple measures of well-being. The results of the analyses show significant negative associations between lifetime discrimination and life satisfaction, $r(68) = -.31$, $p < .05$. Discrimination-related stress was negatively associated with life satisfaction, $r(68) = -.37$, $p < .01$, self-esteem. $r(68) = -.25$, $p < .05$, and age of initiation of tobacco use, $r(68) = -.25$, $p < .05$. Lifetime discrimination, $r(68) = .29$, $p < .05$, recent discrimination, $r(68) = .33$, $p < .01$, and discrimination-related stress, $r(68) = .36$, $p < .01$ were positively associated with perceived stress. Similarly, perceived stress was positively associated with baseline cravings, $r(68) = .351$, $p < .01$.

DISCUSSION

This study contributes to understanding the relationship between perceived racial discrimination and smoking motivation and behavior. Cyberball, our laboratory analog of racial discrimination, was effective in simulating awareness of being excluded, given that participants accurately reported whether they were ignored by the program. Furthermore, excluded participants reported lower sense of belonging and lower self-esteem, which is consistent with previous research.

Although Cyberball was effective in eliciting negative feelings associated with ostracism, it was not effective in creating a consistent sense of exclusion based on race. A greater proportion of participants in the racial discrimination (excluded/outgroup) condition believed that they were excluded because of their race, however, it was less than half of participants in the condition. The lack of attribution of exclusion due to race may be related to participants interpreting their exclusion as ambiguous without additional social input or other contextual cues. Real-life encounters of racial discrimination may be ambiguous in nature (Bennett, Merritt, Edwards, & Collers, 2004). Individuals may be unsure of the intention of the perpetrator and instead may rely on their own past experiences for inference (Bennet et al., 2004). Future laboratory simulations of racial discrimination should consider ethical techniques that reduce the ambiguity of the cause of participants' exclusion. This study design intentionally assessed post-task variables immediately following Cyberball, which allowed for assessment of automatic processing of the experience of exclusion. Whereas this strategy was likely effective in capturing participants' first reactions to the paradigm, it did not allow time for elaborative interpretation.

Real-world experiences of discrimination rarely *require* automatic appraisal, and for that reason, future studies may consider providing participants with a longer delay between playing Cyberball and post-task assessments.

Another potential issue may be participant characteristics. Specifically, there may have been fundamental differences between participants in the racial discrimination condition who believed they were racially discriminated against versus the participants in the same condition who did not attribute their exclusion to race. Further subgroup analyses to identify such differences were not interpretable due to the small sample size. Future studies may consider the influence of socioeconomic factors (e.g., education, income), features of racial identity, and past life experiences (e.g., recent racial discrimination) on the perception of discrimination.

Our findings show that experiences of social exclusion, regardless of its attribution, negatively influenced cessation self-efficacy. This relationship is important because it provides evidence that social exclusion is a potential contributing factor to the difficulties Black smokers experience in smoking cessation. Racial discrimination is a common and salient form of discrimination for Black and African Americans. Although participants in this study did not attribute their exclusion to discrimination, these findings suggest that social exclusion without further context may be sufficient to reduce cessation self-efficacy. The experience of social exclusion is robust enough to hinder cessation self-efficacy, which may limit an individual's overall quit success.

We also found that participating in the outgroup conditions reduced latency to smoke. However, there was no effect of inclusion on latency to smoke. This finding may suggest that participants did not attribute their exclusion to discrimination, but that they were cognizant of

being an outsider. Participants' status as an "outsider" may have contributed to a sense of discomfort that participants attempted to attenuate with smoking.

We found negative associations between experiences of/stress from racial discrimination and the following: life satisfaction, self-esteem, and age of initiation of tobacco use. This corroborates previous research findings which show that discrimination has insidious and broad deleterious effects on well-being and health (Pascoe & Smart Richman, 2009). Discrimination and discrimination-related stress were also positively associated with perceived stress, which in turn was positively associated with cravings. Future research may benefit from evaluating the influence of perceived stress related to discrimination and cravings to smoke.

Limitations

The current study was limited in its statistical power given our small sample size. We utilized multiple recruitment strategies in our effort to combat the challenge of recruiting racial/ethnic minorities from a community sample in a sprawling metropolitan area. We were not able to reach our recruitment goal of 152 smokers. Future studies could offer cessation services in return for participation, offer vouchers for travel, or focus on establishing relationships with community stakeholders who can assist in recruitment. The sample size likely contributed to the null mediation and moderation results. Given the challenges in assessing meaningful differences in such a small sample, we evaluated the relationships between experiences of racial discrimination and smoking-related variables.

Our simulation of racial discrimination was not successful in creating a consistent sense of race-based exclusion across participants. It is unclear what elements of the procedure were ambiguous to participants, especially because there is evidence to suggest that Black and African Americans have lower thresholds for racism than Whites (Carter & Murphy, 2015). A specific

limitation of Cyberball may be the strength of the affect induction and cognitions that are associated with a computer-based experience of discrimination. Although the game is effective in creating a sense of exclusion, it may not be an effective model of what it feels like to experience discrimination in the real-world.

Conclusion

This study attempted to create a laboratory representation of racial discrimination among Black smokers. We were able to elicit responses associated with social exclusion including lower sense of belonging and self-esteem, however, the ambiguous nature of the discrimination condition did not yield consistent perception of racially-based exclusion among participants. The results of this study indicate that social exclusion, regardless of its source, is a risk factor for lower cessation self-efficacy.

REFERENCES

Abidoye, O., Ferguson, M. K., & Salgia, R. (2007). Lung carcinoma in African Americans. *Nature Clinical Practice Oncology, 4*, 118-129. doi:10.1038/ncponc0718

Adler, N. E., Boyce T., Chesney, M. A., Cohen, S., Folkman, S., Robert L. Kahn, & Syme, a. S. L. (1994). Socioeconomic status and health: the challenge of gradient. *American Psychologist, 49*(1), 15-24.

Alexander, L. A., Trinidad, D. R., Sakuma, K. L., Pokhrel, P., Herzog, T. A., Clanton, M. S., . . . Fagan, P. (2016). Why We Must Continue to Investigate Menthol's Role in the African American Smoking Paradox. *Nicotine Tob Res, 18 Suppl 1*, S91-101. doi:10.1093/ntr/ntv209

Alexander, M. (2012). *The new Jim Crow: mass incarceration in the age of colorblindness*: The New Press.

Allen, S. S., Bade, T., Hatsukami, D., & Center, B. (2008). Craving, withdrawal, and smoking urges on days immediately prior to smoking relapse. *Nicotine & Tobacco Research, 10*(1), 35-45.

Baker, T. B., Piper, M. E., McCarthy, D. E., Majeskie, M. R., & Fiore, M. C. (2004). Addiction motivation reformulated: an affective processing model of negative reinforcement. *Psychological Review, 111*(1), 33-51. doi:10.1037/0033-295X.111.1.33

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84*(2), 191-215.

Baum, A., Garofalo, J. P., & Yalu, A. M. (1999). Socioeconomic status and chronic stress: Does stress account for SES effects on health? *Annals New York Academy of Sciences, 896*, 131-144.

Bennett, G. G., Wolin, K. Y., Robinson, E. L., Fowler, S., & Edwards, C. L. (2005). Perceived racial/ethnic harassment and tobacco use among African American young adults. *American Journal of Public Health, 95*(2), 238-240. doi:10.2105/AJPH.2004.037812)

Berger, M., & Sarnyai, Z. (2015). "More than skin deep": stress neurobiology and mental health consequences of racial discrimination. *Stress, 18*(1), 1-10. doi:10.3109/10253890.2014.989204

Borrell, L. N., Jacobs, D. R., Jr., Williams, D. R., Pletcher, M. J., Houston, T. K., & Kiefe, C. I. (2007). Self-reported racial discrimination and substance use in the Coronary Artery Risk Development in Adults Study. *American Journal of Epidemiology, 166*(9), 1068-1079.

Brandon, T. H. (1994). Negative affect as motivation to smoke. *Current Directions in Psychological Science, 3*(2), 33-37.

Brandon, T. H., Wetter, D. W., & Baker, T. B. (1996). Affect, expectancies, uges and smoking: do they conform to models of drug motivation and relapse? *Experimental and Clinical Psychopharmacology, 4*(1), 29-36.

Bronars, C. A., Faseru, B., Krebill, R., Mayo, M. S., Snow, T. M., Okuyemi, K. S., . . . Cox, L. S. (2015). Examining Smoking Dependence Motives among African American Light Smokers. *J Smok Cessat, 10*(2), 154-161. doi:10.1017/jsc.2014.7

Cappelleri, J. C., Bushmakin, A. G., Baker, C. L., Merikle, E., Olufade, A. O., & Gilbert, D. G. (2007). Confirmatory factor analyses and reliability of the modified cigarette evaluation

questionnaire. *Addictive Behaviors, 32*(5), 912-923. doi:https://doi.org/10.1016/j.addbeh.2006.06.028

Carter, B. L., Paris, M. M., Lam, C. Y., Robinson, J. D., Traylor, A. C., Waters, A. J., . . . Cinciripini, P. M. (2010). Real-time craving differences between black and white smokers. *American Journal on Addictions, 19*(2), 136-140. doi:10.1111/j.1521-0391.2009.00020.x

Carter, B. L., & Tiffany, S. T. (2001). The cue-availability paradigm: The effects of cigarette availability on cue reactivity in smokers. *Experimental and Clinical Psychopharmacology, 9*(2), 183-190. doi:10.1037/1064-1297.9.2.183

Carter, E. R., & Murphy, M. C. (2015). Group-based Differences in Perceptions of Racism: What Counts, to Whom, and Why? *Social and Personality Psychology Compass, 9*(6), 269-280. doi:10.1111/spc3.12181

Centers for Disease Control and Prevention. (2015). Smoking & Tobacco Use: Fast Facts. Retrieved from https://www.cdc.gov/tobacco/data_statistics/fact_sheets/fast_facts/index.htm#toll

Centers for Disease Control and Prevention. (2016). *Cigarette Smoking and Tobacco Use Among People of Low Socioeconomic Status*. Retrieved from http://www.cdc.gov/tobacco/disparities/low-ses/index.htm.

Chavez, L. J., Ornelas, I. J., Lyles, C. R., & Williams, E. C. (2015). Racial/ethnic workplace discrimination: association with tobacco and alcohol use. *Am J Prev Med, 48*(1), 42-49. doi:10.1016/j.amepre.2014.08.013

Clark, R., Anderson, B. A., Clark, V. R., & Williams, D. R. (1999). Racism as a stressor for African Americans: A biopsychosocial model. *American Psychologist, 54*(10), 805-816.

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior, 24*(4), 385-396.

Conklin, C. A., & Perkins, K. A. (2005). Subjective and reinforcing effects of smoking during negative mood induction. *Journal of Abnormal Psychology, 114*(1), 153-164.

Cox, L. S., Faseru, B., Mayo, M. S., Krebill, R., Snow, T. S., Bronars, C., . . . Ahluwahlia, J. S. (2011). Design, baseline characteristics, and retention of African American light smokers into a randomized trial involving biological data. *Trials, 12*(22), 1-12.

Cox, L. S., Tiffany, S. T., & Christen, A. G. (2001). Evaluation of the brief questionnaire of smoking urges (QSU-brief) in laboratory and clinical settings. *Nicotine & Tobacco Research, 3*(1), 7-16. doi:10.1080/14622200020032051

Crimmins, E. M., Hayward, M. D., & Seeman, T. E. (2004). Race/ethnicity, socioeconomic status, and health. In N. B. Anderson, R. A. Bulatao, & B. Cohen (Eds.), *Critical perspective on racial and ethnic differences in health in late life*. Washington, D.C.: National Academies Press.

Dailey, D. E. (2009). Social stressors and strengths as predictors of infant birth weight in low income African American women. *Nursing Research, 58*(5), 340-347.

Darity, W. A., & Mason, P. L. (1998). Evidence on discrimination in employment: codes of color, codes of gender. *Journal of Economic Perspectives, 12*(2), 63-90.

Drobes, D. J., & Tiffany, S. T. (1997). Induction of smoking urge through imaginal and in vivo procedures: physiological and self-report manifestations. *Journal of Abnormal Psychology, 106*(1), 15-25.

Etter, J. F., Le Houezec, J., & Perneger, T. V. (2003). A self-administered questionnaire to measure dependence on cigarettes: the cigarette dependence scale. *Neuropsychopharmacology, 28*(2), 359-370. doi:10.1038/sj.npp.1300030

Evans-Polce, R. J., Vasilenko, S. A., & Lanza, S. T. (2015). Changes in gender and racial/ethnic disparities in rates of cigarette use, regular heavy episodic drinking, and marijuana use: ages 14 to 32. *Addict Behav, 41*, 218-222. doi:10.1016/j.addbeh.2014.10.029

Fagan, P., Brook, J. S., Rubenstone, E., Zhang, C., & Brook, D. W. (2009). Longitudinal precursors of young adult light smoking among African Americans and Puerto Ricans. *Nicotine Tob Res, 11*(2), 139-147. doi:10.1093/ntr/ntp009

Fagerstrom, T. F., Heatherton, L. T., & Kozlowski, K. (1991). The Fagerstrom Test for Nicotine Dependence: a revision of the Fagerstrom Tolerance Questionnaire. *British Journal of Addiction, 86*, 1119-1127.

Fakunle, D. O., Milam, A. J., Furr-Holden, C. D., Butler, J., 3rd, Thorpe, R. J., Jr., & LaVeist, T. A. (2016). The inequitable distribution of tobacco outlet density: the role of income in two Black Mid-Atlantic geopolitical areas. *Public Health, 136*, 35-40. doi:10.1016/j.puhe.2016.02.032

Faul, F., Erdfelder, E., Lang, A. G., & Buchner, A. (2007). G* Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior research methods, 39*(2), 175-191.

Federal Trade Commission. (2000). *Report of 'tar,', nicotine, and carbon monoxide of the smoke of 1294 varieties of domestic cigarettes for the year 1998*

Ferguson, S. G., & Shiffman, S. (2009). The relevance and treatment of cue-induced cravings in tobacco dependence. *Journal of Substance Abuse Treatment, 36*(3), 235-243. doi:10.1016/j.jsat.2008.06.005

Fiore, M. C., Jaén, C. R., Bailey, T. B. B. W. C., Benowitz, N. L., Curry, S. J., Dorfman, S. F., . . . Wewers, M. E. (2008). *Treating tobacco use and dependence: 2008 update*. Rockville, MD: U.S. Department of Health and Human Services. Public Health Service.

Giovino, G. A., & Gardiner, P. S. (2016). Understanding Tobacco Use Behaviors Among African Americans: Progress, Critical Gaps, and Opportunities. *Nicotine Tob Res, 18 Suppl 1*, S1-6. doi:10.1093/ntr/ntv234

Godbout, J. P., & Glaser, R. (2006). Stress-induced immune dysregulation: implications for wound healing, infectious disease and cancer. *Journal of Neuroimmune Pharmacology, 1*(4), 421-427.

Gonsalkorale, K., & Williams, K. D. (2007). The KKK won't let me play: ostracism even by a despised outgroup hurts. *European Journal of Social Psychology, 37*(6), 1176-1186. doi:10.1002/ejsp.392

Goodwin, S. A., Williams, K. D., & Carter-Sowell, A. R. (2010). The psychological sting of stigma: The costs of attributing ostracism to racism. *Journal of Experimental Social Psychology, 46*(4), 612-618. doi:10.1016/j.jesp.2010.02.002

Guthrie, B. J., Young, A. M., Williams, D. R., Boyd, C. J., & Kintner, E. K. (2002). African american girls' smoking habits and day-to-day experiences with racial discrimination. *Nursing Research, 51*(3), 183-190.

Harrell, J. P., Sadiki Hall, B. A., & Taliaferro, J. (2003). physiological responses to racism and discrimination: an assessment of the evidence. *American Journal of Public Health, 93*(2), 243-248.

Hartgerink, C. H., van Beest, I., Wicherts, J. M., & Williams, K. D. (2015). The ordinal effects of ostracism: a meta-analysis of 120 Cyberball studies. *PLoS One, 10*(5), e0127002. doi:10.1371/journal.pone.0127002

Heckman, B. W., Carpenter, M. J., Correa, J. B., Wray, J. M., Saladin, M. E., Froeliger, B., . . . Brandon, T. H. (2015). Effects of experimental negative affect manipulations on ad libitum smoking: a meta-analysis. *Addiction, 110*(5), 751-760. doi:10.1111/add.12866

Heckman, B. W., Kovacs, M. A., Marquinez, N. S., Meltzer, L. R., Tsambarlis, M. E., Drobes, D. J., & Brandon, T. H. (2013). Influence of affective manipulations on cigarette craving: a meta-analysis. *Addiction, 108*(12), 2068-2078. doi:10.1111/add.12284

Hedeker, D., & Mermelstein, R. (1996). Application of random-effects regression models in relapse research. *Addiction, 91*, S211-229.

Henningfield, J., Benowitz, N., Ahijevych, K., Garrett, B., Connolly, G., & Wayne, G. F. (2003). Does menthol enhance the addictiveness of cigarettes? An agenda for research. *Nicotine & Tobacco Research, 5*(1), 9-11. doi:10.1080/1462220031000070543

Institute of Medicine. (2003). Washington (DC): The National Academies Press.

Jamieson, J. P., Koslov, K., Nock, M. K., & Mendes, W. B. (2012). Experiencing discrimination increases risk taking. *Psychol Sci, 24*(2), 131-139. doi:10.1177/0956797612448194

Jones, B. T., Corbin, W., & Fromme, K. (2001). A review of expectancy theory and alcohol consumption. *Addiction, 96*(1), 57-72.

Juliano, L. M., & Brandon, T. H. (2002). Effects of nicotine dose, instructional set, and outcome expectancies on the subjective effects of smoking in the presence of a stressor. *Journal of Abnormal Psychology, 111*(1), 88-97. doi:10.1037/0021-843x.111.1.88

Kassel, J. D., Stroud, L. R., & Paronis, C. A. (2003). Smoking, stress, and negative affect: Correlation, causation, and context across stages of smoking. *Psychological Bulletin, 129*(2), 270-304. doi:10.1037/0033-2909.129.2.270

Kemeny, M. E., & Schedlowski, M. (2007). Understanding the interaction between psychosocial stress and immune-related diseases: a stepwise progression. *Brain, behavior, and immunity, 21*(8), 1009-1018.

Kendzor, D. E., Businelle, M. S., Reitzel, L. R., Rios, D. M., Scheuermann, T. S., Pulvers, K., & Ahluwalia, J. S. (2014). Everyday discrimination is associated with nicotine dependence among African American, Latino, and White smokers. *Nicotine & Tobacco Research, 16*(6), 633-640. doi:10.1093/ntr/ntt198

Krieger, N., Kosheleva, A., Waterman, P. D., Chen, J. T., & Koenen, K. (2011). Racial discrimination, psychological distress, and self-rated health among US-born and foreign-born Black Americans. *American Journal of Public Health, 101*(9), 1704-1713.

Landrine, H., & Corral, I. (2014). Advancing research on racial-ethnic health disparities: improving measurement equivalence in studies with diverse samples. *Front Public Health, 2*, 282. doi:10.3389/fpubh.2014.00282

Landrine, H., & Klonoff, E. A. (1996). The Schedule of Racist Events: A Measure of Racial Discrimination and a Study of Its Negative Physical and Mental Health Consequences. *Journal of Black Psychology, 22*(2), 144-168. doi:10.1177/00957984960222002

Landrine, H., & Klonoff, E. A. (2000). Racial discrimination and cigarette smoking among Blacks: findings from two studies. *Ethnicity & Disease, 10*(2), 195-202.

Levy, D. T., Blackman, K., Tauras, J., Chaloupka, F. J., Villanti, A. C., Niaura, R. S., . . . Abrams, D. B. (2011). Quit attempts and quit rates among menthol and nonmenthol smokers in the United States. doi:10.2105/AJPH.2011.300178)

Lewis, T. T., Cogburn, C. D., & Williams, D. R. (2015). Self-reported experiences of discrimination and health: scientific advances, ongoing controversies, and emerging issues. *Annual Review of Clinical Psychology, 11*, 407-440. doi:10.1146/annurev-clinpsy-032814-112728

Loomis, B. R., Kim, A. E., Goetz, J. L., & Juster, H. R. (2013). Density of tobacco retailers and its association with sociodemographic characteristics of communities across New York. *Public Health, 127*(4), 333-338.

Lopez-Quintero, C., Crum, R. M., & Neumark, Y. D. (2006). Racial/ethnic disparities in report of physician-provided smoking cessation advice: analysis of the 2000 National Health Interview Survey. *American Journal of Public Health, 96*(12), 2235-2239. doi:10.2105/AJPH.2005.071035)

Macartney, S., Bishaw, A., & Fontenot, K. (2013). *Poverty rates for selected detailed race and hispanic groups by state and place: 2007-2011*.

Marrone, G. F., Shakleya, D. M., Scheidweiler, K. B., Singleton, E. G., Huestis, M. A., & Heishman, S. J. (2011). Relative performance of common biochemical indicators in detecting cigarette smoking. *Addiction, 106*(7), 1325-1334. doi:10.1111/j.1360-0443.2011.03441.x

Mays, V. M., Cochran, S. D., & Barnes, N. W. (2007). Race, race-based discrimination, and health outcomes among African Americans. *Annu Rev Psychol, 58*, 201-225. doi:10.1146/annurev.psych.57.102904.190212

Neblett, E. W., Philip, C. L., Cognurn, C. D., & Sellers, R. M. (2006). African American adolescents' discrimination experiences and academic achievement: Racial socialization as a cultural compensatory and protective factor. *Journal of Black Psychology, 32*(2), 199-218.

Nollen, N. L., Ahluwalia, J. S., Lei, Y., Yu, Q., Scheuermann, T. S., & Mayo, M. S. (2016). Adult Cigarette Smokers at Highest Risk for Concurrent Alternative Tobacco Product Use Among a Racially/Ethnically and Socioeconomically Diverse Sample. *Nicotine Tob Res, 18*(4), 386-394. doi:10.1093/ntr/ntv110

Okuyemi, K. S., Ahluwalia, J. S., Banks, R., Harris, K. J., Mosier, M. C., Nazir, N., & Powell, J. (2004b). Differences in smoking and quitting experiences by levels of smoking among African Americans. *Ethnicity & Disease, 14*, 127-133.

Okuyemi, K. S., Ahluwalia, J. S., Richter, K. P., Mayo, M. S., & Resnicow, K. (2001). Differences among African American light, moderate, and heavy smokers. *Nicotine Tob Res, 3*(1), 45-50. doi:10.1080/14622200020032097

Okuyemi, K. S., Cox, L. S., Nollen, N., Snow, T. M., Kaur, H., Choi, W. S., . . . Ahluwahlia, J. S. (2007). Baseline Characteristics and Recruitment stratefies in a Randomized Clinical Trial of African American light smokers. *American Journal of Health Promotion, 21*(3), 183-191.

Okuyemi, K. S., Ebersole-Robinson, M., Nazir, N., & Ahluwalia, J. S. (2004). African-American menthol and nonmenthol smokers: Differences in smoking and cessation experiences. *Journal of the National Medical Asssociation, 96*(9), 1208-1211.

Okuyemi, K. S., Pulvers, K. M., Cox, L. S., Thomas, J. L., Kaur, H., Mayo, M. S., . . . Ahluwalia, J. S. (2007). Nicotine dependence among African American light smokers: a comparison of three scales. *Addict Behav, 32*(10), 1989-2002. doi:10.1016/j.addbeh.2007.01.002

Pampel, F. C., Krueger, P. M., & Denney, J. T. (2010). Socioeconomic Disparities in Health Behaviors. *Annu Rev Sociol, 36*, 349-370. doi:10.1146/annurev.soc.012809.102529

Paradies, Y. C. (2006). Defining, conceptualizing and characterizing racism in health research. *Critical Public Health, 16*(2), 143-157. doi:10.1080/09581590600828881

Paradies, Y. C., Ben, J., Denson, N., Elias, A., Priest, N., Pieterse, A., . . . Gee, G. (2015). Racism as a Determinant of Health: A Systematic Review and Meta-Analysis. *PLoS One, 10*(9), e0138511. doi:10.1371/journal.pone.0138511

Pascoe, E. A., & Smart Richman, L. (2009). Perceived discrimination and health: a meta-analytic review. *Psychological Bulletin, 135*(4), 531-554. doi:10.1037/a0016059

Peterson, N. A., Lowe, J. B., & Reid, R. J. (2005). Tobacco outlet density, cigarette smoking prevalence, and demographics at the county level of analysis. *Substance Use & Misuse, 40*(11), 1627-1635.

Pomerleau, C. S., Carton, S. M., Lutzke, M. L., Flessland, K. A., & Pomerleau, O. F. (1994). Reliability of the Fagerstrom Tolerance Questionnaire and the Fagerstrom Test for Nicotine Dependence. *Addictive Behaviors, 19*(1), 33-39.

Priest, N., Paradies, Y., Trenerry, B., Truong, M., Karlsen, S., & Kelly, Y. (2013). A systematic review of studies examining the relationship between reported racism and health and wellbeing for children and young people. *Social Science & Medicine, 95*, 115-127. doi:10.1016/j.socscimed.2012.11.031

Purnell, J. Q., Peppone, L. J., Alcaraz, K., McQueen, A., Guido, J. J., Carroll, J. K., . . . Morrow, G. R. (2012). Perceived Discrimination, Psychological Distress, and Current Smoking Status: Results From the Behavioral Risk Factor Surveillance System Reactions to Race Module, 2004–2008. *American Journal of Public Health, 102*(5), 844-851. doi:10.2105/AJPH.2012.300694)

Pyle, S. A., Haddock, C. K., Poston, W. S., Bray, R. M., & Williams, J. (2007). Tobacco use and perceived financial strain among junior enlisted in the U.S. Military in 2002. *Preventive Medicine, 45*(6), 460-463. doi:10.1016/j.ypmed.2007.05.012

Qualtrics. Provo, UT, USA.

Robins, R. W., Hendin, H. M., & Trzesniewski, K. H. (2001). Measuring Global Self-Esteem: Construct Validation of a Single-Item Measure and the Rosenberg Self-Esteem Scale. *Personality and Social Psychology Bulletin, 27*(2), 151-161. doi:10.1177/0146167201272002

Robinson, C. D., Pickworth, W. B., Heishman, S. J., Wetter, D. W., Cinciripini, P. M., Li, Y., . . . Waters, A. J. (2015). Black Cigarette Smokers Report More Attention to Smoking Cues Than White Smokers: Implications for Smoking Cessation. *Nicotine & Tobacco Research, 17*(8), 1022-1028. doi:10.1093/ntr/ntu263

Robinson, J. D., Lam, C. Y., Carter, B. L., Minnix, J. A., Cui, Y., Versace, F., . . . Cinciripini, P. M. (2011). A multimodal approach to assessing the impact of nicotine dependence,

nicotine abstinence, and craving on negative affect in smokers. *Exp Clin Psychopharmacol, 19*(1), 40-52. doi:10.1037/a0022114

Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton, NJ: Princeton University Press.

Royce, J. M., Hymowitz, N., Corbett, K., Hartwell, T. D., & Orlandi, M. A. (1993). Smoking cessation factors among African Americans and whites. *American Journal of Public Health, 83*(2), 220-226.

Sayette, M. A., Shiffman, S., Tiffany, S. T., Niaura, R. S., Martin, C. S., & Shadel, W. G. (2000). The measurement of drug craving. *Addiction, 95*(Suppl 2), S189-S210.

Schmitt, M. T., Branscombe, N. R., Postmes, T., & Garcia, A. (2014). The consequences of perceived discrimination for psychological well-being: a meta-analytic review. *Psychological Bulletin, 140*(4), 921-948. doi:10.1037/a0035754

Sellers, R. M., Caldwell, C. H., Schmeelk-Cone, K. H., & Zimmerman, M. A. (2003). Racial Identity, Racial Discrimination, Perceived Stress, and Psychological Distress among African American Young Adults. *Journal of Health and Social Behavior, 44*(3), 302. doi:10.2307/1519781

Sellers, R. M., & Shelton, J. N. (2003). The role of racial identity in perceived racial discrimination. *Journal of Personality and Social Psychology, 84*(5), 1079-1092. doi:10.1037/0022-3514.84.5.1079

Sellers, R. M., Smith, M. A., Shelton, J. N., Rowley, S. A., & Chavous, T. M. (1998). Multidimensional model of racial identity: a reconceptualization of African American racial identity. *Personality and Social Psychology Review, 2*(1), 18-39. doi:10.1207/s15327957pspr0201_2

Shiffman, S., Dunbar, M., Kirchner, T., Li, X., Tindle, H., Anderson, S., & Scholl, S. (2013). Smoker reactivity to cues: effects on craving and on smoking behavior. *J Abnorm Psychol, 122*(1), 264-280. doi:10.1037/a0028339

Shiffman, S., Engberg, J. B., Paty, J. A., Perz, W. G., Gnys, M., Kassel, J. D., & Hickcox, M. (1997). A day at a time: Predicting smoking lapse from daily urge. *Journal of Abnormal Psychology, 106*, 104–116. doi: 10.1037/0021-843X.106.1.104

Shiffman, S., & Waters, A. J. (2004). Negative affect and smoking lapses: a prospective analysis. *J Consult Clin Psychol, 72*(2), 192-201. doi:10.1037/0022-006X.72.2.192

Smart Richman, L., & Leary, M. R. (2009). Reactions to discrimination, stigmatization, ostracism, and other forms of interpersonal rejection: a multimotive model. *Psychological Review, 116*(2), 365-383. doi:10.1037/a0015250

Soto, J. A., Dawson-Andoh, N. A., & BeLue, R. (2011). The relationship between perceived discrimination and Generalized Anxiety Disorder among African Americans, Afro Caribbeans, and non-Hispanic Whites. *J Anxiety Disord, 25*(2), 258-265. doi:10.1016/j.janxdis.2010.09.011

Stavem, K., Rogeberg, O. J., Olsen, J. A., & Boe, J. (2008). Properties of the Cigarette Dependence Scale and the Fagerstrom Test of Nicotine Dependence in a representative sample of smokers in Norway. *Addiction, 103*(9), 1441-1449. doi:10.1111/j.1360-0443.2008.02278.x

Stock, M. L., Peterson, L. M., Gibbons, F. X., & Gerrard, M. (2013). The effects of racial discrimination on the HIV-risk cognitions and behaviors of Black adolescents and young adults. *Health Psychology, 32*(5), 543-550. doi:10.1037/a0028815

Strecher, V. J., DeVellis, B. M., Becker, M. H., & Rosenstock, I. M. (1986). The role of self-efficacy in achieving health behavior change. *Health Education Quarterly, 13*(1), 73-91.

Teneggi, V., Tiffany, S. T., Squassante, L., Milleri, S., Ziviani, L., & Bye, A. (2002). Smokers deprived of cigarettes for 72 h: effect of nicotine patches on craving and withdrawal. *Psychopharmacology, 164*(2), 177-187.

Tobacco Products Scientific Advisory Committee. (2011). *Menthol cigarettes and public health: Review of the scientific evidence and recommendations*. Retrieved from

Trinidad, D. R., Gilpin, E. A., Lee, L., & Pierce, J. P. (2004). Do the majority of Asian-American and African-American smokers start as adults? . *American Journal of Preventive Medicine, 26*(2), 156-158.

Trinidad, D. R., Perez-Stable, E. J., Emery, S. L., White, M. M., Grana, R. A., & Messer, K. S. (2009). Intermittent and light daily smoking across racial/ethnic groups in the United States. *Nicotine Tob Res, 11*(2), 203-210. doi:10.1093/ntr/ntn018

Trinidad, D. R., Perez-Stable, E. J., White, M. M., Emery, S. L., & Messer, K. (2011). A nationwide analysis of US racial/ethnic disparities in smoking behaviors, smoking cessation, and cessation related factors. *American Journal of Public Health, 101*(4), 699-706. doi:10.2105/AJPH.2010

U.S. Cancer Statistics Working Group. (2016). *United States Cancer Statistics: 1999-2014 Cancer Incidence and Mortality Web-based Report.* Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institutes.

U.S. Department of Health and Human Services. (2001). *Mental Health, Culture, Race, and Ethnicity-A supplement to Mental Health: A report of the Surgeon General*. Rockville, MD.

U.S. Department of Health and Human Services. (2010). *Ending the Tobacco Epidemic: A tobacco control strategic action plan for the U.S. Department of Health and Human Services*. Washington, DC: Office of the Assistant Secretary for Health.

U.S. Department of Health and Human Services. (2014a). *Foundation Health Measures: Disparities. Healthy People 2020.* Retrieved from https://www.healthypeople.gov/2020/about/foundation-health-measures/Disparities#5.

U.S. Department of Health and Human Services. (2014b). *The health consequences of smoking-50 years of progress*. Atlanta, GA.

U.S. National Cancer Institute. (2017). *A socioecological approach to addressing tobacco-related health disparities*. Bethesda, MD: U.S. Department of Health and Human Services, National Institutes of Health, National Cancer Institute; 2017. Retrieved from http://cancercontrol.cancer.gov/brp/tcrb/monographs/22/index.html.

Watson, D., & Clark, L. (1999). THE PANAS-X: Manual for the Positive and Negative Affect Schedule - Expanded Form.

Webb Hooper, M., & Kolar, S. K. (2015). Distress, race/ethnicity and smoking cessation in treatment-seekers: implications for disparity elimination. *Addiction, 110*(9), 1495-1504. doi:10.1111/add.12990

Weinberger, A. H., Reutenauer, E. L., Allen, T. M., Termine, A., Vessicchio, J. C., Sacco, K. A., . . . George, T. P. (2007). Reliability of the Fagerstrom Test for Nicotine Dependence, Minnesota Nicotine Withdrawal Scale, and Tiffany Questionnaire for Smoking Urges in

smokers with and without schizophrenia. *Drug and Alcohol Dependence, 86*(2-3), 278-282. doi:10.1016/j.drugalcdep.2006.06.005

Williams, D. R., & Collins, C. (1995). US Socioeconomic and Racial Differences in Health: Patterns and Explanations. *Annual Review of Sociology, 21*, 349-386.

Williams, D. R., Neighbors, H. W., & Jackson, J. S. (2003). Racial/ethnic discrimination and health: Findings from community studies. *American Journal of Public Health, 93*, 200-208.

Williams, K. (2006). Cyberball: a program for use in research on interpersonal ostracism and acceptance. *Behavior research methods, 38*(1), 174-180.

Williams, K. (2009). Chapter 6: Ostracism. *41*, 275-314. doi:10.1016/s0065-2601(08)00406-1

Williams, K., Cheung, C., & Choi, W. S. (2000). Cyberostracism: Effects of being ignored over the Internet. *Journal of Personality and Social Psychology, 79*(748–62).

Witkiewitz, K., & Marlatt, G. A. (2004). Relapse prevention for alcohol and drug problems: that was Zen, this is Tao. *American Psychologist, 59*(4), 224-235. doi:10.1037/0003-066X.59.4.224

Yang, E. V., & Glaser, R. (2002). Stress-induced immunomodulation and the implications for health. *International Immunopharmacology, 2*(2), 315-324.

Yinger, J. (1995). Closed doors, opportunities lost: The continuing costs of housing discrimination. *JSTOR*, 405-406. doi:10.1016/s0363-8111(96)90043-0

Yu, D., Peterson, N. A., Sheffer, M. A., Reid, R. J., & Schneider, J. E. (2010). Tobacco outlet density and demographics: analysing the relationships with a spatial regression approach. *Public Health, 124*(7), 412-416.

Zadro, L., Williams, K. D., & Richardson, R. (2004). How low can you go? Ostracism by a computer is sufficient to lower self-reported levels of belonging, control, self-esteem, and meaningful existence. *Journal of Experimental Social Psychology*, *40*(4), 560-567. doi:10.1016/j.jesp.2003.11.006

APPENDICES

Appendix A: Screener

Thank you for your interest in the study. This study is called Imagination in Smokers. Before telling you more about how the study works, I would like to ask you a few questions to see if you are eligible to participate in the study. Everything will be kept confidential, and we will only use your answers to determine if you qualify for this study. If you are eligible, I will give you more information about the study. Does that sound okay?

Name: _____

Phone number: _____

How did you hear about the study (circle one)?: Flyer Craigslist Friend

Question	Answer	Qualified	NOT Qualified
How old are you?		**18+**	<18
What race do you most identify with? (If they say yes, make sure they endorse Black)		**Black, African-American**	Anything else
How long have you lived in the U.S.?		**At least since age 5**	
Do you speak and read English well?		**Yes**	No
Do you have any visual impairment that is not corrected by glasses or contacts?		**No**	Yes
Do you currently smoke tobacco products?		**YES**	NO
What do you smoke?		**Cigarettes, little cigars, cigarillos**	e-cigarettes, snus, smokeless tobacco, cigars
How long have you been smoking _____?		**1 year or more**	Less than 1 year
How many days a week do you smoke _____?		**4-7**	3 or less
Has this been your smoking most days for the past month?		**YES, NO (smoked more before)**	NO (smoked less before)
On days you smoke, how many _____ do you smoke?		**1+**	0
Are you currently using any treatment or seeking counseling to quit smoking? That includes quitline, counseling, nicotine patch/gum/lozenge/inhaler, varenicline, Chantix, buproprion, or Wellbutrin.		**NO**	YES
Do you have access to the internet via a computer or smartphone?		**YES**	NO
Do you feel comfortable completing questionnaires on the computer?		**YES**	NO

If participant does not qualify: Based on your responses, you are not eligible to participate in this study. However, you may be eligible for other studies conducted in our lab currently or in the future. If it is okay with you, we'll keep some basic information, including your name, phone number, and smoking rate, and use it to contact you about other studies. Are you interested in doing that?

> **If NO:** Okay, thank you again for your time today.
>
> **If YES:** Okay. We may enter this information into a database, which will be accessed by our staff that is working on different projects. They will contact you from there.

If participant does qualify: Based on your responses, you are eligible to participate in the study. I'm going to tell you more about it so you can decide if you want to participate. Feel free to ask me questions at any point.

- This is a study to find out more about how smokers visualize a physical activity
- You will be asked to complete an online survey before attending an in-person session. The online survey will take 30 minutes.
- The online survey will ask you to answer questions about who you are, your mood, smoking history, and life experiences.
- You will be asked to attend a one-time appointment that will last up to 1.5 hrs
- During this time, you will complete several tasks, including
    - Answering questions about your tobacco use, mood, and cravings.
    - Completing a task on the computer using your imagination, and answering questions about the experience.
    - Smoke a cigarette or little cigar and tell us what you think about it
    - Providing breath samples for carbon monoxide testing
    - Being recorded for a small portion of the in-person session
- You will be compensated for your time with 4 (1 credit for each ½ hour or fraction thereof of participation in the study) SONA credits if you are a psychology student. Therefore, if you complete all parts of your study visit, you will earn up to 4 extra credit points. If you are not a psychology student, you will be compensated with $30.
- At the beginning of your in-person appointment, we will describe the study to you in more detail, as well as tell you more about being a research participant and the procedures involved. We will review an informed consent form and give you time to read and sign before we begin any study procedures.
- We ask that you do not smoke for 3 hours before the in-person appointment so that everyone has smoked the same amount just before the study starts. We will give you a breath test before the appointment starts. This will let us know if you smoked recently.

- Your participation is voluntary, which means you can stop at any time.
- It's important that you know any information that we collect is kept confidential and is only accessible to members of the study team.
- Do you have any questions for me at this time?

Are you interested in participating?

If NO: Would you like us to keep your name and phone number in case there are other studies in the lab that you may be eligible for?

If YES: Okay, now we're going to schedule an appointment. Can I have your email address so I can send you a confirmation, which will include our address, directions, and our phone number?

Email: _____

Appointment Date and Time: _____

Your appointment is scheduled for _____. Please complete the questionnaire within the next 48 hours. If you are not able to complete the questionnaire, we will have to reschedule or cancel our appointment.

If we need to call you, can we leave you a voicemail?
Would you like a text reminder?

Our address is 4115 East Fowler Ave, Tampa FL, 33617. If you have any questions about the study, please give us a call at 813-745-7883. If you need to cancel or reschedule, call and give us as much notice as possible. We receive a lot of phone calls about this study, and if you do not show up to an appointment without cancelling, we will move you to the bottom of the waiting list. Do you have any questions right now?

Thank you for your time today, we will see you soon! Have a great day!

Appendix B: Informed Consent Form

Moffitt Cancer Center / University of South Florida (USF)

Informed Consent to Participate in Research
Information to Consider Before Taking Part in this Research Study

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You are being asked to take part in a research study. Research studies include only people who choose to take part. This document is called an informed consent form. Please read this information carefully and take your time making your decision. Ask the researcher or study staff to discuss this consent form with you, please ask him/her to explain any words or information you do not clearly understand. We encourage you to talk with your family and friends before you decide to take part in this research study. The nature of the study, risks, inconveniences, discomforts, and other important information about the study are listed below.

The purpose of this study is to understand the role of culture, life experience, and smoking on reaction to an online imagination task. As a part of your participation you will be asked to complete several tasks including: questionnaires related to smoking status, mood, an imagination task, and a smoking session. The duration of the study will be approximately 2 hours.

We are asking you to take part in a research study called: **The Imagination in Smokers Study**.

The person who is in charge of this research study is **Thomas Brandon, PhD.** This person is called the **Principal Investigator**. However, other research staff may be involved and can act on behalf of the person in charge. Patricia Calixte-Civil is the Project Director and will help with study coordination.

The research will be conducted at

Moffitt Cancer Center, at the Tobacco Research and Intervention Program (TRIP) Facility and at the University of South Florida (USF).

Why is this research being done?

The purpose of this study is to understand the role of culture, life experience, and smoking on reaction to an imagination task. This research question will be addressed through a series of questionnaires, an imagination task on the computer, and a smoking session.

Why are you being asked to take part?

We are asking you to take part in this research study because we are examining how people's culture, life experiences, and smoking behavior influence their mental imagination. You are a USF student or community member who smokes and is fluent in English.

What will happen during this study?

If you take part in this study, you will be asked to complete one in-person session.

We will record a small portion of the session today using a video recorder. If you do not wish to be recorded, you can choose not to participate in the study. We will also be able to view you from the room next door so at times we may observe you. However, we will not be recording for most of the session. Video recordings will be used to verify that study procedures were followed and to understand participant's reactions within the study. The recordings will be stored on Moffitt servers on password-protected computers, until study results are published. Results will only be accessible to study staff. The video recordings will not be shown to any other professionals.

First, we will ask you to provide a carbon monoxide breath sample to verify that you did not smoke before the appointment. We will also ask you to complete questionnaires about your smoking, mood, and cravings.

Second, you will be asked to complete an online imagination task. Before beginning the task, we will ask to take a photo of you that will only be used for the purpose of the task. You will be asked to complete an online imagination task. The task will last less than 10 minutes. During the task, you will sit in front of a computer and use a computer mouse to complete the task. During the imagination task, you will interact with participants who will be in other rooms here at TRIP.

Should you experience discomfort from this task, and wish to discontinue participation, you may do so at any time.

Third, you will be asked to complete questionnaires about your mood and cravings after completing the imagination task on the computer.

Fourth, we will ask you to smoke one of your usual cigarettes or little cigars. We will ask you to complete a questionnaire about your smoking session and a second carbon monoxide test.

The expected duration of your participation is approximately 2 hours. It is one session that will take place at the Tobacco Research and Intervention Program

How many people will take part in this study?

The study will enroll approximately 152 participants.

What other choices do you have if you do not participate?

You do not have to participate in this research study. Your participation in this study is voluntary. You can decide not to be in the study and you can change your mind about being in the study at any time. There will be no penalty to you, and you won't lose any benefits.

Benefits

We are unsure if you will directly receive any benefits by taking part in this research study. However, this research may contribute to a better understanding of how life experiences influence smoking behavior and that can be used for the development of treatments for helping people to quit smoking.

Risks or Discomfort

This research is considered to be minimal risk. That means that the risks associated with this study are the same as what you face every day. However, you may experience some discomfort answering questions about your mood, behaviors, or life experiences or during/after the imagination task.

If you experience distress or discomfort due to any part of the study, please notify study staff. Also, you may contact the University of South Florida Psychological Services Center at 813-974-2496. You may also call the Crisis Center of Tampa Bay at 813-964-1964 or the National Suicide Prevention Lifeline at 1-800-273-TALK (8255), both of which are available 24 hours a day, 7 days a week. In addition, a list of community resources will be provided at the end of this study – or upon request at any time (even if you decide not to participate).

Will you be paid for taking part in this study?

For students recruited through SONA, you will be compensated with 1 credit for each ½ hour or fraction thereof of participation in the study. Therefore, if you complete all parts of your study visit, you will earn up to 4 extra credit points.

For all other participants, you will be paid $30 if you complete the study. If you are deemed ineligible to participate or withdraw your participation before you finish your study visit, you will be paid an amount proportional to the time you've committed to the study, with $5 being the minimum compensation.

Will it cost anything to be in this study?

With the exception of any transportation costs associated with getting to and from the study site, there will be no costs to you as a result of being in this study.

The use and disclosure of your personal health information

We understand that information about you and your health is personal, and we are committed to protecting the privacy of that information. Because of this commitment, we must obtain your written authorization before we use or disclose your information for this study.

Moffitt Cancer Center and the University of South Florida may work together on research projects, and so may other persons or entities under an organized health care arrangement. By signing this form, you are permitting researchers at Moffitt Cancer Center to use personal health information for research purposes within its organized health care arrangements. You are also allowing the Moffitt Cancer Center to disclose your personal health information to outside organizations. We may publish what we find out from this study. If we do, we will not let anyone know your name. We will not publish anything that would let people know who you are.

If you do not agree to the use and disclosure described above, you cannot be in the study.

Who will disclose, receive, and/or use your information?

Federal law says we must keep your study records private. We will keep the records of this study private by keeping them in a locked area or on a secure computer. To do this research, the following people and/or organization(s) will be allowed to disclose, use, and receive your information, but they may only use and disclose the information to the other parties on this list, to you or your personal representative, or as permitted by law:

Every research site for this study, including the Moffitt Cancer Center, and each site's study team, research staff and medical staff;

Any person who provides services or oversight responsibilities in connection with this study;

Every member of the Moffitt Cancer Center workforce who provides services in connection with this study;

The person who is responsible for the study nationwide or worldwide (study chairperson);

Any laboratories and other individuals and organizations that use your health information in connection with this study;

Any federal, state, or local governmental agency that regulates the study (such as the U.S. Department of Health & Human Services (DHHS) and Office for Human Research Protections (OHRP));

Other government agencies in this or other countries;

The designated Protocol Review and Monitoring Committees, Institutional Review Boards, Privacy Boards, Data and Safety Monitoring Board and their related staff that have oversight responsibilities for this study;

The National Cancer Institute in evaluating the ongoing research of the Moffitt Cancer Center as a Comprehensive Cancer Center;

The organizations and people listed above may employ or pay various consultants and companies to help them understand, analyze and conduct this study. All of these people may not be known now, but if you would like to have more specific information about this at any time during the study, you may ask the study doctor and your questions will be answered.

Moffitt Cancer Center cannot guarantee the privacy of your information, or block further use or distribution, after the information has left the Moffitt Cancer Center. Others listed above may further disclose your information, and may no longer be covered by federal privacy regulations.

If all information that does or can identify you is removed from your records, the remaining information will no longer be subject to this authorization and may be used or shared for other purposes.

You might have the right to see and copy your health records related to this research. You might not be able to see or copy some of your records until after all participants finish the study. If it is necessary for your care, your records will be provided to you or your regular doctor.

What information will be used or disclosed?

By signing below, you authorize the use and disclosure of your entire study record. The purpose for the uses and disclosures you are authorizing is to conduct the study explained to you during the informed consent and research authorization process and to ensure that the information relating to that study is available to all parties who may need it for research purposes.

Your authorization to use your health information will never expire unless and until you expressly revoke it in writing to the investigator on the first page of this form. If you revoke your authorization, you will not be able to continue in the study.

By signing this form, you authorize the use and/or disclosure of your protected health information described above. Your information may also be used as necessary for your research-related treatment, to collect payment for your research-related treatment (when applicable), and to run the business operations of the Moffitt Cancer Center.

Any data collected prior to your letter will continue to be used as necessary to preserve the integrity of the study, however no additional information will be collected after you withdraw your authorization.

You will receive a signed copy of this form.

What happens if you decide not to take part in this study?

You should only take part in this study if you want to volunteer. You should not feel that there is any pressure to take part in the study, to please the investigator or the research staff. You are free to participate in this research or withdraw at any time. There will be no penalty or loss of benefits you are entitled to receive if you stop taking part in this study, and your decision to participate or not to participate will not affect your student status or any course grade.

Where can you get the answers to your questions, concerns, or complaints?

If you have any questions, concerns or complaints about this study, or experience an adverse event or unanticipated problem, please call Patricia Calixte-Civil at813-745-7833 or Thomas Brandon, PhD at 813-745-1756, as soon as possible.

If you have questions about your rights as a research patient at Moffitt Cancer Center, call the Corporate Compliance Department at The Moffitt Cancer Center at (813) 745-1869.

If you have questions about your rights, general questions, complaints or concerns about this research, or questions about your rights as a person taking part in this study, call the Division of Research Integrity and Compliance of the University of South Florida at (813) 974-5638.

Consent to Take Part in this Research Study

and Authorization to Collect, Use and Share Your Health Information

It is up to you to decide whether you want to take part in this study. If you want to take part, please sign the form, if the following statements are true. A representative of the Moffitt Cancer Center must answer your questions completely before providing this form to you. You or your personal representative should read this form and understand it before signing below.

I freely give my consent to take part in this study and authorize that my health information as agreed above, be collected/disclosed in this study. I understand that by signing this form I am agreeing to take part in research. I have received a signed copy of this form to take with me.

CONSENT TO BE VIDEO RECORDED

_____ Yes, my study session may be video-recorded.
_____ No, my study session may not be video-recorded.

_____ _____
Signature of Person Taking Part in Study Date

_____
Printed Name of Person Taking Part in Study

Statement of Person Obtaining Informed Consent / Research Authorization

I attest that the participant named above had enough time to consider this information, had an opportunity to ask questions, and voluntarily agreed to be in this study.

_____ _____
Signature of Person Obtaining Informed Consent / Research Authorization Date

_____
Printed Name of Person Obtaining Informed Consent / Research Authorization

Appendix C: Demographic Questionnaire (partial)

The following questions are about yourself and your life situation. All answers will be kept confidential.

1. What is your age? _____

2. Date of Birth: _____/_____/_____
   Month Day Year

3. What is your gender (check one)?
   - □ Male
   - □ Female
   - □ Non-binary
   - □ Transgender MTF
   - □ Transgender FTM

4. What is your marital status (**check one**)?
   - □ Single
   - □ Married
   - □ Separated
   - □ Divorced
   - □ Widowed
   - □ Committed relationship & cohabitating

5. Which of the following best represents your current sexual orientation (**check one**)?
   - □ Lesbian
   - □ Gay
   - □ Bisexual
   - □ Straight
   - □ Other _____

6. With which racial/ethnic category do you **identify** yourself? (**check all that apply**)
   - ❑ Black / African American
   - ❑ White / Caucasian
   - ❑ Asian / Pacific Islander / Native Hawaiian

7. Are you Hispanic/Latino?
   - ❑ Yes (please specify the country) _____
   - ❑ No

8. How many years have you lived in the U.S. (write one number)? _____ years

9. Were you born in the U.S?
   - □ Yes
   - □ No

10. What is the highest grade level you have completed (check **one**)?
    - □ Did not graduate high school
    - □ High school graduate
    - □ Technical school/Associates degree
    - □ 4-year college degree
    - □ Some school beyond 4-year degree
    - □ Professional degree (e.g., MD, JD, PhD)

11. What is your employment status?

□ Full-time
□ Part-time _____ hours
□ Per-diem
□ Unemployed
□ Retired

12. What is your total household income (**check one**)?

□ Under $10,000
□ $10,000 - $19,999
□ $20,000 - $29,999
□ $30,000 - $39,999
□ $40,000 - $49,999
□ $50,000 - $59,999
□ $60,000 - $69,999
□ $70,000 - $79,999
□ $80,000 - $89,999
□ $90,000 and over

13. Including yourself, how many people are in your household? _____

14. How many times in the past 12 months have you experienced serious money problems?

□ Never/Does not apply
□ Once
□ Twice
□ Three or more times

15. During the past 12 months, how much stress did you experience from problems with money?

□ None at all
□ A little
□ Some
□ A lot

Appendix D: Tobacco Smoking Status and History (partial)

1. When did you last smoke a cigarette? _____
    a. If today, what time?

2. When did you last smoke a little cigar? _____
    a. If today, what time?

3. When did you last smoke a cigarillo? _____
    a. If today, what time?

4. In a typical week, how many days do you smoke cigarettes? (check one)

□ 7 days/week
□ 6 days/week
□ 5 days/week
□ 4 days/week
□ 3 days/week
□ 2 days/week
□ 1 days/week
□ I haven't smoked in the last week

5. On average, how many cigarettes do you currently smoke per day? _____ cigarettes

6. Do you smoke menthol flavored cigarettes? □ Yes □ No

4. Which brand of cigarettes do you consider your regular brand (please be specific)?

_____ (for example, Marlboro Menthol Lights)

16. How old were you when you smoked your first cigarette? _____ years old

17. How old were you when you first became a regular smoker? _____ years old

18. How many years have you been smoking? _____ Years

19. Have you tried to quit smoking?

    □ Yes → if yes, how many times have you tried to quit? _____

    □ No

Apprendix E: Manipulation Check (partial)

1. How many times do you think you received the ball? _____

2. How much were you ignored or excluded during the game?

Not at all	0	1	2	3	4	Very Much

3. Do you believe you were treated differently because of your appearance?
   □ Yes □ No
4. Do you believe you were treated differently because of your race?
   □ Yes □ No
5. Do you believe you were treated differently because of your gender?
   □ Yes □ No
6. Do you believe you were treated differently because of your age?
   □ Yes □ No

What do you believe is the purpose of this study?

_____

Appendix F: Pre-Debrief Assessment

"Sometimes people have suspicions leading up to or during this; did you have any?"

_____

_____

_____

"Tell me what you think we were trying to study."

_____

_____

_____

Appendix G: Debriefing Form

Thank you for being a part of this study. Your contribution means a lot to us! We hope it was an interesting and worthwhile experience for you!

There are two parts of this study that we didn't explain well at the start of the study. I want to tell you about these parts. I also want to explain why we didn't talk about them at the start of the study.

The first part is that the goal of this study is to know more about how smokers respond to being left out of the group. We also want to know how smokers respond to being left out of the group because of their race. The experience of being left out, like racial discrimination, is being studied more. Research has shown that people who experience being left out also make risky health choices, like smoking. The information we got today will help our knowledge of how Black smokers respond racism. These data will help tell us what social and life experiences make you want to smoke. This can help us create better prevention and treatment programs for smokers. Knowing this could have affected your responses. That is why we didn't tell you at the start.

The second part is about the experiment you did. The start page said you were playing with people in the other room. That was not true. The other people were not real. They were programmed, like characters in a video game. To be clear, you were the only person in this experiment. We did this so we can compare your reactions with people who experience discrimination. When we told you the others were real people, we hoped that it would make your experience feel more real.

Since we didn't tell you about every part of the study, you can ask that your data not be used. But, please keep in mind that none of your personal information can be connected to your responses. Also, we will not tell anyone about your being in this study.

Are you ok with having your data included in the study's analysis? YES ____ NO _____

Since this study isn't finished, please do not share the details of what you did today with anyone. If you do, the study results will be less meaningful. We want this study to inform what we know about Black smokers. If participants know about every part of the study before they begin, we cannot reach that goal. This is a VERY important part of your role a research participant.

Do you have any questions about the study? YES _____ NO _____

Do you agree not to tell others what I just told you?

YES _____ NO _____