Original investigation

Black Cigarette Smokers Report More Attention to Smoking Cues Than White Smokers: Implications for Smoking Cessation

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Abstract

Introduction: Black cigarette smokers have lower rates of smoking cessation compared with Whites. However, the mechanisms underlying these differences are not clear. Many Blacks live in communities saturated by tobacco advertisements. These cue-rich environments may undermine cessation attempts by provoking smoking. Moreover, attentional bias to smoking cues (attention capture by smoking cues) has been linked to lower cessation outcomes. Cessation attempts among Blacks may be compromised by attentional bias to smoking cues and a cue-rich environment.

Method: Attention to smoking cues in Black and White smokers was examined in 2 studies. In both studies, assessments were completed during 2 laboratory visits: a nonabstinent session and an abstinent session. In study 1, nontreatment-seeking smokers (99 Whites, 104 Blacks) completed the Subjective Attentional Bias Questionnaire (SABQ; a self-report measure of attention to cues) and the Smoking Stroop task (a reaction time measure of attentional bias to smoking cues). In study 2, 110 White and 74 Black treatment-seeking smokers completed these assessments and attempted to quit.

Results: In study 1, Blacks reported higher ratings than Whites on the SABQ ($p = .005$). In study 2, Blacks also reported higher ratings than Whites on the SABQ ($p = .003$). In study 2, Blacks had lower biochemical-verified point prevalence abstinence than Whites, and the between-race difference in outcome was partially mediated by SABQ ratings.

Conclusion: Blacks reported greater attention to smoking cues than Whites, possibly due to between-race differences in environments. Greater attention to smoking cues may undermine cessation attempts.

Introduction

Tobacco use is the leading cause of preventable disease and death in the United States.¹ The prevalence of smoking is roughly 20% among Black and White smokers.¹ However, Blacks have the highest rates of tobacco-related morbidity.^{2,3}

Black smokers (compared to White smokers) also have greater difficulty quitting smoking.⁴ Recent studies indicate that the odds of quitting are 44%–66% lower among Blacks.^{4–6} Some studies have reported a lack of association between race and cessation.^{7,8} However, these studies tested specific interventions and typically had small sample sizes. There appears to be consistent evidence that

Blacks have lower cessation rates in studies analyzing large-scale surveys.⁴

Blacks encounter several barriers to smoking cessation including unequal access to care⁹ and lower usage of nicotine replacement therapy.^{4,5} However, there is some evidence that Blacks have worse outcomes than Whites when receiving the same treatment.¹⁰ It is likely that a combination of environmental,¹¹ psychological,¹² and discrimination-related factors contribute to differences in smoking cessation outcomes.¹³

One risk factor for Blacks is that they live in environments which are rich in smoking cues, including advertisements.^{14,15} A meta-analysis revealed that the odds that any given advertisement was smoking-related was 70% higher in Black areas versus White areas.¹¹ In addition, point of sale advertising is associated with unplanned purchases of cigarettes,^{16,17} higher craving, and lower rates of smoking cessation.^{18,19}

A related risk factor for smoking relapse is smoking cue reactivity.^{20,21} One important psychological variable is “attentional bias,” which is often measured by reaction time measures.²² Attentional bias refers to the tendency to automatically attend to drug cues and to maintain attention on those cues. Some studies have reported that attentional bias is prospectively associated with smoking cessation outcomes.^{23–25}

In this study we used the Subjective Attentional Bias Questionnaire (SABQ), along with a reaction time task, to examine attention to smoking cues in Blacks and Whites.^{26,27} An example item on the SABQ is “How often have you found yourself staring at cigarettes and cigarette smoke?” In contrast, reaction time measures such as the Smoking Stroop (SS) primarily capture automatic attentional processes. Although self-report assessments cannot reveal detailed information about the mechanisms of the fast automatic processes that underlie attention capture, self-reported attention may provide a summary measure of the end product of those automatic attentional processes. In addition, the SABQ may capture the influence of environmental cues, and therefore provide an aggregate measure of “exposure” to smoking cues that may undermine cessation attempts.

In sum, despite the importance of smoking cues, there has been little research examining attention to smoking cues among Blacks. The purpose of this study is to examine attentional bias among Black and White smokers, using a traditional measure (SS) and a measure that captures the influence of the environment. In two studies reported in this article, the SABQ and the SS were used to assess attention to smoking cues. It was hypothesized that Blacks would report greater attention to smoking cues than Whites particularly on the SABQ, because, as noted above, it may capture both psychological (attentional bias) and environmental (cue-rich) factors. We also examined the psychometric properties of the SABQ in Blacks

and Whites. Finally, we explored whether attention to smoking cues mediated an association between race and relapse.

Method: Study 1

Participants

Participants were 90 Black and 97 White smokers, recruited from the Baltimore area, who completed the SABQ. They are a subset of a dataset in which results have been previously reported.^{26,28–30} Most pertinent to the present paper, summary statistics for SABQ scores and the SS reaction time task were presented in Robinson et al.,³⁰ stratified by race. The correlation between SABQ ratings and dependence was presented in Leventhal et al.²⁹

Study procedures are described in Leventhal et al.²⁹ The inclusion criteria were: Black or White; age 18 or older; smoking 15 or more cigarettes per day; smoking for at least 2 years; score 3+ on the Fagerström Test for Nicotine Dependence (FTND)³¹; and smoking cigarettes that deliver at least 11.0mg tar and 0.7mg nicotine as rated by the Federal Trade Commission method. The exclusion criteria were: history of a serious medical condition; treatment with nicotine replacement products within the past 6 months; use of antidepressants in the past year; use of any smoking cessation treatment within the past 6 months; pregnant or nursing; and an estimated IQ of < 78 on the Shipley Institute of Living Scale.³² Demographic and smoking characteristics of the sample are reported in Table 1. The National Institute on Drug Abuse, Intramural Research Program Institutional Review Board approved the study.

Procedure

Participants attended a screening session (for eligibility), a 90-min orientation session, and two 60-min experimental sessions (abstinent, nonabstinent). Self-reported race was assessed during the screening session with the Addiction Severity Index item: “Of what race do you consider yourself?”

Participants completed demographic and smoking history questionnaires at the orientation session, as well as the FTND. For the abstinent session, participants were asked to refrain from smoking for 12 hr. Abstinence was verified using expired-air carbon monoxide (CO) levels as described in Leventhal et al.²⁹ The nonabstinent and abstinent sessions were counterbalanced. Participants completed the SABQ, the SS task, and a subjective Stroop task at the experimental sessions.

Measures

The 6-item FTND assessed symptoms of dependence. The FTND has been validated (content and predictive validity; Etter³³) in a number of studies and has a Cronbach’s alpha of .65.³⁴

Table 1. Demographics and Smoking Characteristics

	Study 1				Study 2			
	Total N = 187	W, n = 97	B, n = 90	t/ χ^2	Total, N = 184	W, n = 110	B, n = 74	t/ χ^2
Age	36.40 (10.04)	34.51 (10.19)	38.43 (9.51)	-2.72*	43.54 (11.70)	44.52 (12.74)	44.55 (9.73)	ns
CPD	22.12 (6.61)	23.69 (6.22)	20.43 (6.64)	3.47**	20.13 (8.98)	19.75 (8.25)	19.40 (8.49)	ns
FTND	6.46 (1.72)	6.52 (1.81)	6.40 (1.63)	ns	5.33 (2.04)	5.10 (1.91)	5.36 (2.21)	ns
Female	46.52%	52.58%	40.00%	ns	46.20%	42.72%	51.35%	ns
Menthol	68.98%	43.30%	96.67%	62.14**	45.65%	20.00%	83.78%	72.54**

Unless otherwise stated, data are mean (SD). W = White; B = Black; CPD = cigarettes per day; FTND = Fagerström Test for Nicotine Dependence; ns = nonsignificant.

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

The 8-item SABQ assessed the extent to which participants felt their attention was captured by tobacco cues.²⁹ An example item is “So far today, how often have you found yourself staring at cigarettes and cigarette smoke?” (Supplementary Appendix)

The SS task assessed attentional bias to smoking cues using the same task and scoring methods used by Waters et al.²⁵ Briefly, participants were instructed to indicate as rapidly and as accurately as possible which color a word was written in, by pressing one of three response buttons on a keyboard. Participants were instructed to ignore the meaning of the word itself and just to respond to the color. The task included equal numbers of smoking (e.g., “cigarette”) and neutral (e.g., “chair”) words. The SS interference effect is the difference in reaction times on smoking and neutral words. The estimated (split-half) internal reliability of the SS effect was .62 (nonabstinent session) and .76 (abstinent session).²⁶

The Subjective Stroop was administered following the SS task. The Subjective Stroop assessed the subjective sense of distraction elicited by the smoking words during the reaction time task. One item asked: “When you were responding to the colors of the words, how distracted did you feel by the words that were related to smoking?” (0–4 scale, anchored by “Not distracting at all” to “Extremely distracting”). A second item assessed distraction elicited by the non-smoking (neutral) words, and a difference score captured the Subjective Stroop. Overall participants reported more distraction on smoking words than neutral words at the nonabstinent session (Mean Subjective Stroop effect = 0.67, $SD = 1.22$, $p < .001$ [by 1-sample t test vs. 0]) and abstinent session (Mean Subjective Stroop effect = 0.96, $SD = 1.20$, $p < .001$). The Subjective Stroop effect at the abstinent session was greater than the Subjective Stroop effect at the nonabstinent session, ($t(186) = 3.24$, $p = .001$). The Subjective Stroop effect was correlated with the SS at both nonabstinent ($r(181) = .28$, $p < .001$) and abstinent sessions ($r(181) = .30$, $p < .001$).

Results

Demographics and Smoking Characteristics

t test and Pearson’s chi-square test (categorical variables) were used to examine differences in demographic variables and smoking characteristics by race (Table 1).

Reliability of SABQ

Cronbach’s alphas indicated that the 8-item SABQ exhibited good internal reliability ($\alpha > .8$) at both sessions in the total sample, in Whites only, and in Blacks only (Table 2).

An exploratory factor analysis of the SABQ using principal components analysis for the total sample revealed that a single factor explained 56.9% of the variance in the nonabstinent condition and 63.7% of the variance in the abstinent condition (Table 2). Similar results were obtained for analysis on Whites only and on Blacks only (Table 2). Examination of the scree plots and eigenvalues revealed that a single-factor solution provided a parsimonious fit to the data; the eigenvalue for the second principal component was not larger than 1.02 for any analysis. SABQ scores were computed as a mean of the items (range 0–4).

Validity of SABQ

Higher scores on the SABQ were associated with higher scores on the FTND in the abstinent condition (Table 3). The correlation was significant in the whole sample and for Whites and Blacks separately.

Higher scores on the SABQ were associated with higher scores on the Subjective Stroop during abstinence for Whites and the whole sample.

Race Differences on SABQ

SABQ ratings were as follows: Nonabstinent condition: Whites: $n = 96$, $M = 1.09$, $SD = 0.63$, Blacks: $n = 97$, $M = 1.50$, $SD = 0.80$; Abstinent condition: Whites: $n = 90$, $M = 2.44$, $SD = 1.00$, Blacks: $n = 90$, $M = 2.62$, $SD = 0.98$. Using repeated measures Analysis of variance (ANOVA), there was a main effect of race with Black smokers reporting higher ratings on the SABQ, $F(1, 184) = 7.93$, $p = .005$. The main effect of state was also significant $F(1, 184) = 277.2$, $p < .001$, with higher SABQ ratings reported at the abstinent session. The race by state interaction was not significant ($p = .12$). There were no effects of race on the Subjective Stroop ($p = .35$) or on the SS task.³⁰

Method: Study 2

Participants

Treatment-seeking smokers were recruited into a 6-week observational research smoking cessation study. The parent study was conducted at two sites with a total of 268 participants, which included 146 Whites and 100 Blacks. Participants were followed from 2 weeks pre-quit through 4 weeks post-quit. Of the 246 White and Black participants who signed the consent form, 184 participants (i.e., 110 White and 74 Black) attempted to quit smoking. Data from these 184 participants are presented in the current article.

Participants were included in the study if they were aged 18–65; reported smoking at least 10 cigarettes per day for the last year; were motivated to quit smoking within 4 weeks; had a home address and telephone number; were able to speak, read, and write in English at an eight-grade level; and reported that English was their first language. Participants were excluded if they had active substance abuse or dependence; regular use of tobacco products other than cigarettes; use of nicotine replacement products or other smoking cessation medications; another household member enrolled in the study; self-reported color-blindness; expired breath CO < 10 ppm³⁵; pregnant or breast feeding; and indication of current suicidal ideation or depression. This study was approved by the Institutional Review Boards at the Uniformed Services University of the Health Sciences and The University of Texas M. D. Anderson Cancer Center.

Procedure

Exclusion and inclusion criteria were assessed during a phone interview. Eligible participants attended the orientation session, during which expired breath CO was assessed to confirm smoking status (≥ 10 ppm was the cutoff). Participants were included in this analysis if they selected: “Anglo American/Euro American/White” or “African American/Black” on a demographic questionnaire. Income, age, and education were also assessed. Tobacco dependence was assessed using the FTND.

Eligible participants attended up to five additional laboratory visits. There were two pre-quit laboratory visits, a quit day visit (week 0), a visit 1 week post quit day (week +1), and a visit at the end of treatment (week +4, 4 weeks after week 0). At each study visit participants completed a battery of self-report and cognitive assessments. At the beginning of the sessions, participants completed self-report measures including the SABQ. Data from the other assessments will be reported elsewhere. At the quit day session some participants volunteered to participate in an ecological momentary

Table 2. SABQ: Cronbach's Alphas and Variance Explained by First Factor

	Study 1						Study 2					
	Variance explained			Cronbach's alpha			Variance explained			Cronbach's alpha		
	Total	W	B	Total	W	B	Total	W	B	Total	W	B
	N = 153 ^a	n = 81 ^a	n = 72 ^a	N = 153 ^a	n = 81 ^a	n = 72 ^a	N = 182	n = 108 ^b	n = 74 ^b	N = 182	n = 108 ^b	n = 74 ^b
SABQ NON	56.9%	52.2%	59.3%	.88	.86	.89	35.8%	36.9%	35.3%	.72	.71	.73
SABQ AB	63.7%	63.5%	64.3%	.89	.91	.89	45.9%	43.3%	46.9%	.82	.80	.84
SABQ quit day	n/a	n/a	n/a	n/a	n/a	n/a	53.8%	51.4%	53.1%	.86	.85	.89

W = White; B = Black; SABQ = Subjective Attentional Bias Questionnaire; NON = nonabstinent session; AB = abstinent session.

^aNonsignificant based on subjects with complete data on all 8 SABQ items.

^bNonsignificant for quit day were 109 (W) and 73 (B).

Table 3. Correlations Between SABQ and FTND/Stroop

	Study 1									Study 2					
	FTND			Lab Stroop			Subjective Stroop			FTND			PDA Stroop ^d		
	Total	W	B	Total	W	B	Total	W	B	Total	W	B	Total	W	B
	N = 186 ^a	n = 96 ^a	n = 90	N = 182 ^a	n = 95	n = 87 ^a	N = 186 ^a	n = 96	n = 90	N = 182	n = 108 ^b	n = 74 ^b	N = 108	n = 61 ^c	n = 47 ^c
SABQ NON	.13	.18	.13	.02	.02	.01	.13	.08	.22*	.17*	.03	.32**	.28**	.29*	.26
SABQ AB	.34**	.32**	.38**	.03	-.17	.14	.19**	.31**	.07	.22**	.08	.35**	.19*	.23*	.13
SABQ quit day	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	.25**	.21*	.28*	.07	.16	-.02

FTND = Fagerström Test for Nicotine Dependence; PDA = personal digital assistant; W = White; B = Black; SABQ = Subjective Attentional Bias Questionnaire; AB = abstinent; NON = nonabstinent session.

^aNonsignificant for AB session were: FTND N = 187, n = 97 (W), n = 90 (B); Stroop N = 183, n = 95 (W), n = 88 (B); subjective Stroop N = 187, n = 97 (W), n = 90 (B).

^bNonsignificant for quit day were 109 (W) and 73 (B).

^cNonsignificant for quit day were N = 109, n = 63 (W), n = 46 (B).

^dAdministered in the field for 1 week.

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

assessment study which involved carrying a personal digital assistant (PDA) for 1 week in the field after the quit day (see Waters et al.²⁷ for EMA protocol). On the PDA, self-report and reaction time data were collected including the SS task.

For the two pre-quit sessions, participants were instructed to smoke as usual before one of the sessions ("nonabstinent" session) and to abstain from smoking for 12 hr before the other sessions ("abstinent session"). Abstinence was verified, and order of completion of nonabstinent and abstinent sessions was counterbalanced across participants.

Measures

The SS task assessed attentional bias to smoking cues as described in Waters et al.²⁷ As noted above, the task was administered on a PDA (HP iPAQ Pocket PC) in the field for 1 week.

The FTND and SABQ were described above. In study 2, the SABQ assessed experiences "during the past week" at the two pre-quit sessions, and "so far today" at the quit day session.

To assess the number of cigarettes smoked each day, participants were required to make an entry in a smoking diary before they went to bed every day. To verify reports of abstinence, cotinine levels in saliva, and CO levels in exhaled breath (using a CO monitor) were assessed.

Relapse status was coded as "abstinent" ("0") at week +4 (end of study) under the following conditions: (a) no reported smoking on the smoking diary or at the week +4 laboratory assessment for the past 7 days; (b) breath CO level < 10 ppm at week +4; and (c) level of cotinine in saliva < 15 ng/ml at week +4. All other subjects were coded as "relapsed" ("1") including study drop-outs.

Participants did not receive pharmacotherapy but did receive five brief counseling sessions at each study visit and two brief telephone counseling sessions at weeks +2 and +3. All participants received the same treatment.

Results

Demographics

As with study 1, Blacks were more likely to smoke menthol cigarettes (Table 1).

Reliability of SABQ

Cronbach's alphas indicated that the 8-item SABQ exhibited adequate internal reliability ($\alpha > .7$) at all three sessions in the total sample, in Whites only, and in Blacks only (Table 2).

An exploratory factor analysis of the SABQ using principal components analysis for the total sample revealed that a single factor explained 38.8% of the variance at the nonabstinent session, 45.9% of the variance at the abstinent session, and 53.8% on quit day (Table 2). Similar results were obtained for analysis on Whites only and on Blacks only (Table 2). As with study 1, examination of the scree plots and eigenvalues revealed that a single-factor solution provided a reasonable fit to the data; the eigenvalue for the second principal component was not larger than 1.46 for any analysis. SABQ scores were computed as a mean of the items (range 0–4).

Validity of SABQ

Across all participants, higher scores on the SABQ were associated with higher scores on the FTND at all three sessions (Table 3). This pattern was also found for Blacks when examined separately. Higher scores on the SABQ were associated with greater attentional bias assessed on the PDA for the whole sample in the abstinent session and nonabstinent session.

Race Differences on SABQ

SABQ ratings were as follows: Nonabstinent condition: Whites: $n = 108$, $M = 1.18$, $SD = 0.57$, Blacks: $n = 74$, $M = 1.38$, $SD = 0.60$; Abstinent condition: Whites: $n = 108$, $M = 1.27$, $SD = 0.64$, Blacks: $n = 74$, $M = 1.59$, $SD = 0.75$. Using repeated measures ANOVA, there was a main effect of race with Blacks reporting higher ratings on the SABQ, $F(1, 178) = 8.89$, $p = .003$. The main effect of State was also significant $F(1, 178) = 10.6$, $p = .001$, with higher SABQ ratings reported at the abstinent session. This was the case even though the SABQ assessed experiences “during the past week” rather than “so far today” in the pre-quit sessions in study 2. The race by state interaction was not significant ($p = .20$). On the quit day, there was not a significant race difference on the SABQ (Blacks: $M = 1.37$, $SD = 0.82$; Whites: $M = 1.25$, $SD = 0.76$). However, the between-race difference on the SABQ at quit day was not significantly smaller than the between-race difference on the SABQ at the two pre-quit sessions ($p = .16$). There was no between-race difference on the PDA Stroop ($p = .45$).

SABQ as Mediator of Relapse

Blacks (“1”) had higher odds of relapse (vs. Whites, “0”) at week +4, $OR = 3.76$, 95% $CI = 1.55, 9.08$, $p = .003$. A mediation analysis was conducted using the causal steps³⁶ to examine the SABQ as a mediator of the association between race and relapse.

Linear regression was utilized to examine the relationship between race and the SABQ. In these analyses, SABQ scores were averaged across the three sessions because the between-race differences in SABQ scores did not differ significantly across sessions. Blacks had higher scores on the mean SABQ, $b = .21$, $SE = 0.08$, $t(183) = 2.56$, $p = .01$. Logistic regression was used to examine the association between the mean SABQ and relapse while controlling for race. Participants with higher scores on the mean SABQ had higher odds of relapse at week +4, $OR = 2.46$, 95% $CI = 1.32, 7.95$, $p = .02$. For every one unit increase on the mean SABQ, the odds of relapse were 2.46 times higher. The relationship between race and relapse remained significant when the SABQ was included in the model ($p = .01$).

An additional logistic regression was conducted to examine the quit day SABQ as a predictor of relapse. This analysis was conducted because the quit day SABQ was the most proximal assessment to relapse, and because the data revealed that quit day SABQ appeared most strongly associated with relapse (Figure 1). When controlling for race, participants with higher scores on the quit day SABQ had higher odds of relapse at week +4, $OR = 2.59$, 95% $CI = 1.38, 4.86$, $p = .002$.

Blacks ($M = 13.64$ years, $SD = 2.12$) and Whites ($M = 14.66$ years, $SD = 2.25$) differed in years of education ($p = .002$). However, inclusion of years of education as a covariate did not change any of the results. Blacks and Whites also differed in reported income (assessed on 11-point scale) ($p < .001$). Inclusion of income as a covariate reduced the association between race and mean SABQ to near significance ($p = .08$) but did not alter any of the other results presented above. Inclusion of study site as a covariate did not change the results of any of the analyses reported above. If $CO \leq 3$ ppm was used to validate reports of abstinence,³⁷ the results did not change (effect of race at week +4, $OR = 3.69$, 95% $CI = 1.44, 9.44$, $p = .007$; effect of mean SABQ at week +4, $OR = 2.70$, 95% $CI = 1.17, 6.22$, $p = .02$).

Discussion

This study examined the SABQ as a measure of attention to smoking cues among Blacks. The main findings were as follows. First, across two studies, the SABQ exhibited adequate psychometric properties in both Blacks and Whites. Second, across two studies, Blacks reported higher ratings on the SABQ than Whites. Last, in study 2, SABQ ratings partially mediated the association between race and relapse.

The data suggest that the SABQ exhibited adequate reliability in two studies. Most importantly, when assessed during abstinence

Figure 1. Session SABQ scores for abstainers and relapsers. Study 2: Mean SABQ “over the past week” (nonabstinent, abstinent) or “so far today” (QD) (± 1 SE) of subsequent abstainers and relapsers. SABQ = Subjective Attentional Bias Questionnaire; QD = quit day. Nonsignificant: nonabstinent (38 abstainers, 144 relapsers); abstinent (37 abstainers, 145 relapsers); QD (38 abstainers, 144 relapsers).

SABQ ratings were correlated with FTND scores in Blacks in two samples, with a moderate effect size (r s of .38 and .35 for study 1 and 2 respectively). SABQ ratings were only weakly or non-significantly correlated with reaction time measures of attentional bias. The absence of association could reflect substantive differences in the psychological processes assessed by the instruments, or it could reflect method factors. For example, the SABQ assesses cognitive processes at different time periods (“so far today” or “during the past week”) than those assessed by the reaction time measures.

The SABQ likely assesses a combination of environmental and psychological factors. The following observations support the view that it assesses psychological variables. First, SABQ ratings were elevated when participants were assessed in abstinence, which demonstrates that SABQ ratings can change when the environment is constant. Second, over all participants, SABQ ratings correlated with the subjective distraction experienced on the SS task in the abstinence session. This must reflect psychological processes in that the number of cues is constant in the Stroop task. On the other hand, the SABQ items may also assess environmental factors. For example, a smoker would be more likely to notice cigarettes if there were many more smoking stimuli in the environment. Overall, the SABQ may provide an aggregate assessment of attention to smoking cues that may provoke relapse.

The between-race differences on the SABQ were robust. It is not clear to what extent between-race differences on the SABQ reflect between-race differences in environments (“environmental hypothesis”) or between-race differences in psychological factors (“psychological hypothesis”). Between-race differences on the SABQ may reflect the fact that Blacks live in environments in which there are more cues (differences in environment). Alternatively, even in an environment with the same density of smoking cues, Blacks may attend more to smoking cues (differences in psychology).

The current data provide more support for the environmental hypothesis for the following reasons. First, in study 1 there were no between-race differences in attentional bias on laboratory measures (SS or subjective Stroop) in which the number of cues were controlled. Second, in study 2 there was no between-race difference on the PDA Stroop task conducted in the field. Third, it is well established that Blacks live in environments with a disproportionately high density of smoking cues, such as tobacco advertisements.³⁸ If the environmental hypothesis were correct, it would be consistent with the literature on the effects of residential segregation on health outcomes which suggest that place may be more important than race.³⁹

The mediation analysis in study 2 revealed that SABQ ratings partially mediated the association between race and relapse. This finding suggests that environmental differences may contribute to between-race differences in relapse. Other cultural factors, such as discrimination, may account for the unmediated path.

A limitation of the current study is that it did not include an objective measure of the number of smoking cues (e.g., advertisements) in the participant’s environment. Second limitation was that the studies recruited relatively “heavy” smokers, who reported smoking at least 15 cigarettes per day in study 1 and at least 10 cigarettes per day in study 2. A large proportion of Blacks smoke fewer than 10 cigarettes per day;⁴⁰ this limitation reduces the external validity of the study. Third limitation is that participants were excluded if they used other tobacco products. This also reduces the external validity of findings as many Blacks may be dual tobacco users.⁴¹

Nonetheless, these findings have several public health implications. Black smokers appear to be influenced by the presence of smoking cues. Blacks attempting to quit may be particularly disadvantaged if they live in environments with many environmental smoking cues including advertisements, the sight of other people smoking, the smell of cigarettes, or other paraphernalia. This finding also suggests that Black smokers may benefit from interventions that help them manage confrontations with smoking cues. Cognitive Behavioral Therapy treatments that emphasize coping with smoking cues may be beneficial. In addition, interventions that change a smoker’s perception of their environment, such as Attention Re-training,⁴² may be beneficial for Blacks. Finally, an intervention that reduces the number of cues in the environment by modifying tobacco advertising policies could be beneficial for Black smokers.⁴³

Supplementary Material

Supplementary Appendix can be found online at <http://www.ntr.oxfordjournals.org>

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Declaration of Interests

None declared.

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