Published in final edited form as:

Am J Health Behav. 2013 September ; 37(5): 629–634. doi:10.5993/AJHB.37.5.6.

Associations of Menthol Use with Motivation and Confidence to Quit Smoking

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Abstract

Objectives—To examine associations of menthol cigarette use with motivation and confidence to quit smoking, and potential moderation by race, among adult current smokers (N = 1067; 85% White, 15% Black).

Methods—Regression analyses, adjusted for sociodemographics and tobacco dependence, examined associations of menthol use with motivation and confidence to quit smoking with and without an interaction term for race.

Results—Main effects were not significant; however, there was a significant interaction for confidence to quit smoking ($p = .02$). Stratified analyses indicated that Black menthol users were more confident about quitting than Black non-menthol users ($p = .01$).

Conclusions—Given their relatively lower quit rates as cited in previous literature, Black menthol users appear overly confident about their ability to quit smoking.

Keywords

menthol; race; confidence and motivation to quit

A better understanding of how mentholated cigarette use affects the process of quitting smoking is needed to inform cessation interventions. The literature on the effects of menthol use on smoking cessation, however, is largely mixed, with some studies supporting that menthol smokers are less likely to quit successfully and others finding null effects.¹ However, several studies indicate that menthol smokers are more likely to make a quit attempt² and make more quit attempts³ than non-menthol smokers, but are less likely to quit.^{4–6} Moreover, some studies suggest that race is an important moderator of the associations of menthol cigarette use and quitting. For example, Black menthol smokers may have a more difficult time quitting smoking than Black non-menthol smokers^{1,7–10} or than White menthol smokers.^{7,8} Because the majority of Black smokers use mentholated cigarettes,¹⁰ it is important to understand more about why Black menthol users might be at a disadvantage when it comes to quitting.

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Conflict of Interest Statement

The authors have no competing interests pertaining to this research.

Currently, little is known about the mechanisms that might underlie relations between menthol use status and quitting behaviors, or how these factors might operate differently among Black and White smokers. Some literature suggests that menthol cigarettes, which are heavily marketed to Black smokers, may be perceived as less harmful to consumers and potentially less addictive than non-menthol cigarettes.¹¹ These inaccurate perceptions about reduced health risks and addiction potential might affect menthol smokers' motivation and confidence to quit smoking. For example, some research suggests that established menthol users may be less motivated than non-menthol users to quit smoking for several reasons, including the relatively greater palatability of mentholated smoking and perceptions that menthol cigarettes are more socially acceptable than non-menthol cigarettes.^{12,13} Moreover, because misperceptions about the harm of menthol cigarette use might be engendered by racially-targeted tobacco company marketing, relations between menthol cigarette use and motivation and confidence to quit may be particularly prominent among Black menthol smokers. Because motivation to quit smoking and confidence to quit smoking have been associated with quitting behaviors in general and are important components of theories of behavior change, more information about their associations with menthol smoking status, and potential for moderation by race, is of interest.¹⁰

We are aware of only one study examining relations between menthol cigarette use and motivation and confidence to quit smoking among a racially/ethnically diverse sample of non-treatment seeking smokers. Contrary to the suggestion that menthol smokers may have lower motivation to quit than non-menthol smokers,¹² this study indicated that Black menthol smokers were more likely to report seriously considering quitting smoking within the next 6 months relative to Black non-menthol smokers.⁵ Likewise, Black menthol smokers in this study were more likely to report they would be somewhat or very likely to succeed at quitting if they were to make a quit attempt as compared to Black non-menthol smokers.⁵ However, elevated estimations of readiness and confidence appeared to confer no cessation-related benefits, as this study reported that Black menthol smokers were less likely to quit than Black non-menthol smokers.⁵ Authors of this study suggested that a false sense of confidence in the ability to quit smoking might undermine cessation attempts among Black menthol smokers. However, additional research is needed to replicate these findings, especially when controlling for additional covariates such as the number of years smoking (which may vary between menthol and non-menthol smokers based on menthol marketing strategies targeted toward younger smokers) and income.^{10,13}

The purpose of the current study was to examine the associations of menthol cigarette use with motivation to quit smoking and confidence to quit smoking, respectively, and to examine whether associations were moderated by race, in analyses adjusted for age, sex, race, income, education, and tobacco dependence. A better understanding of the ways in which Black and White menthol and non-menthol smokers differ with regard to factors underlying a quit smoking attempt can help to inform interventions to improve quit rates.

METHODS

Participants

Data were collected as part of an ongoing lung cancer case-control study at The University of Texas MD Anderson Cancer Center. Data in the current study were from self-reported non-Hispanic White and non-Hispanic Black current smokers in the control group of the parent study who reported their menthol use status (N = 1067). Current smokers were defined as individuals who endorsed smoking at least 100 cigarettes in their lifetimes and smoking within the last year. Control participants were recruited from a large multidisciplinary healthcare system in Houston, Texas. Exclusion criteria for control participants included prior chemotherapy or radiotherapy, recent blood transfusions, or

historical/current cancer diagnoses. Although there were also Hispanic (N = 63) and smokers of other race/ethnicities (N = 2) in the parent database, they were excluded from the present study because of their potential to create unstable estimates when further divided into menthol use status groups.

Procedures

Data in the current study were from a questionnaire administered to participants in the parent study during the baseline data collection, which were collected between February 1996 and July 2011.

Measures

Sociodemographics—Sociodemographics included participant age, sex, race (non-Hispanic Black or non-Hispanic White), income (< \$40,000/ year, \$40,000 – \$74,999/year, and \$75,000/year annual household income), and education (<high school graduate/<12 years of education, high school graduate/GED recipient/12 years of education, or >high school graduate/>12 years of education, which included technical/vocational training, some college, and college graduate).

Tobacco dependence—Tobacco dependence was assessed using the number of years smoked and the Heaviness of Smoking Index (HSI), which was calculated from the number of cigarettes smoked per day and the time to the first cigarette of the day.¹⁴ Scores on the HSI could range from 0 to 6. The HSI was handled as continuous variable in analyses.¹⁵ Both the number of years smoked and the HSI were included as covariates in analyses.

Menthol use status—Menthol use was assessed by a single item assessing if participant's usual brand of cigarettes was menthol or non-menthol. Results yielded a binary predictor variable (non-menthol vs. menthol; reference group = non-menthol).

Motivation to quit—Motivation to quit smoking was assessed with a single item asking how much the participant wants to quit smoking. Response options were not at all, a little, somewhat, very much, and extremely. Scores ranged from 1 to 5, with higher scores representing greater motivation.

Confidence to quit—Confidence to quit smoking was assessed with a single item asking how confident the participant was that they could quit smoking for good if they wanted to. Response options were not at all, a little, somewhat, very much, and extremely. Scores ranged from 1 to 5, with higher scores representing greater confidence about quitting.

Data Analysis

Preliminary analyses explored differences in participant characteristics by menthol use status using chi-square tests for categorical variables and t-tests for continuous variables. Main analyses examined the effect of menthol use on motivation and confidence to quit smoking, respectively, using linear regression models [PROC GLM], while controlling for age, sex, race, income, education, and tobacco dependence. Following this, the interactions of race and menthol use status on motivation and confidence to quit smoking were tested by including an interaction term (race * menthol use status) in both of the adjusted models. Significant interaction results were further examined in analyses stratified by race. All analyses were performed using Statistical Analysis Software version 9.2 (SAS Institute, Cary, NC).

RESULTS

Participant Characteristics

Participants (N = 1067; 156 Black, 911 White smokers) were 56 years of age on average. There were fewer menthol than non-menthol smokers in the sample (313 menthol users versus 754 non-menthol users). Overall, 24.3% of men (N = 126) in the study were menthol users and 33.9% of women (N = 186) in the study were menthol users. Among Black smokers, 66.8% (N = 104) endorsed menthol cigarette use, whereas 22.9% (N = 209) of White smokers endorsed menthol cigarette use. Among Black smokers, 62.1% of men (N = 41) and 69.7% of women (N = 62) were menthol users. Among White smokers, 18.8% of men (N = 85) and 27.0% of women (N = 124) were menthol users. Participant characteristics for the sample as a whole and by menthol use status are in Table 1.

Preliminary Analyses

Preliminary analyses indicated significantly higher scores on the Heaviness of Smoking Index among non-menthol versus menthol smokers. There were also significant differences between menthol and non-menthol users by race, sex, and annual household income (Table 1).

Main Analyses

The main effects of menthol use status on motivation to quit smoking were non-significant [$\beta = -.09$, SE = .09; $F = 1.02$; $p = .31$; N = 981] in analyses adjusted for age, sex, race, income, education, and tobacco dependence. Likewise, the main effects of menthol use status on confidence to quit smoking were also non-significant [$\beta = .05$, SE = .09; $F = .35$; $p = .55$; N = 980].

In the first interaction analysis, race was not a significant moderator of relations between menthol use status and motivation to quit smoking ($p = .35$). However, there was a significant interaction effect for race and menthol use status for confidence to quit smoking ($p = .02$). Among Black smokers, menthol users endorsed, on average, 0.49 higher values for confidence than non-menthol users. This pattern was reversed among White smokers, with menthol users endorsing .05 lower mean values for confidence than non-menthol users. Follow-up analyses stratified the sample by race and examined relations between menthol use status and confidence to quit smoking. Menthol use was significantly associated with confidence to quit smoking in adjusted analyses among Black smokers [$\beta = 0.51$, SE = .20; $F = 6.42$; $p = .01$; N = 147)], but not among White smokers [$\beta = -0.05$, SE = .10; $F = .23$; $p = .63$; N = 833)] smokers (Table 2).

DISCUSSION

This study found that menthol cigarette use was not associated with motivation or confidence to quit smoking among the sample as a whole. However, there was a significant interaction effect between race and menthol use status on confidence to quit smoking. Specifically, Black menthol smokers reported significantly greater confidence about quitting relative to Black non-menthol smokers. These results are similar to a previous study, which also found that Black menthol smokers had greater odds of endorsing that they were somewhat or very likely to succeed at quitting smoking relative Black to non-menthol smokers.⁵ The present study adds to the literature by confirming that these findings generalize to another group of smokers, and are resilient to the inclusion of additional covariates not found in the previous study (ie, income, number of years of smoking). The literature does not unequivocally support that menthol use status affects smoking cessation; however, several studies have reported lower quit rates among Black menthol smokers

relative to their non-menthol smoking counterparts.^{1,7-10} Therefore, current results and those of Trinidad and colleagues⁵ before us suggest that Black menthol smokers may perceive a false sense of confidence in their ability to quit smoking that is not borne out in the cessation literature. Such perceptions may be engendered by tobacco marketing strategies directed toward minority smokers suggesting lower harm and less addiction potential from menthol than non-menthol cigarette use.^{11,13}

The relations of menthol use and higher confidence about quitting smoking found among Black smokers in this sample may have relevance to cessation interventions. For example, it may be that inflated confidence about quitting leads to insufficient preparation and, ultimately, the greater number of unsuccessful quit attempts among minority menthol smokers seen in the literature. If so, our results suggest that cessation interventions among Black menthol smokers should emphasize realistic expectations and include adequate preparation for quitting. However, it is likely that confidence varies over time and situations. Because the current study was not an intervention study, the majority of participants were probably not undergoing a specific quit attempt. Therefore, it is possible that confidence ratings might decrease markedly as the Black menthol users in this sample experienced the challenges inherent in quitting smoking firsthand.¹⁶ If true, cessation interventionists might need to work with Black menthol users (in particular) to help build their confidence back up throughout the post-quit period by assisting with planning for relapse prevention and highlighting everyday successes. It is important to note that our findings differ from those of a previous study conducted among Black light smokers enrolled in an intervention study, which found that menthol smokers endorsed lower confidence to quit than non-menthol smokers.⁹ The apparently conflicting findings, however, may be attributable participant differences between samples (eg, light smokers versus all smokers). It is also possible, however, that the lower confidence ratings among the treatment seeking Black menthol users in the other study were engendered by the anticipation of an imminent quit attempt, as per our earlier supposition. These ideas are speculative, of course, but suggest directions for future investigation.

The relations of menthol use and higher confidence about quitting smoking found among Black smokers in this sample may also have relevance to public health messages about quitting smoking. Specifically, they suggest that Black menthol users may underestimate the difficulty of quitting smoking relative to Black non-menthol users. Therefore, it is important to promote the message within Black communities that menthol use confers no benefits when quitting smoking and may in fact impair the ability to successfully quit. This message could also be promoted more broadly, so that Black and perhaps other minority menthol smokers who are not currently considering a quit attempt, or who do not intend to seek assistance for a future quit attempt, better understand the challenges in achieving smoking abstinence and the availability of cessation assistance. Although this study was not designed to address factors underlying the relation between menthol use and confidence among Black smokers, it may be that greater exposure to racially-targeted marketing and beliefs in the medicinal value of menthol cigarettes contribute to underestimations of quitting difficulty.¹³ Future studies might investigate how these and other factors contribute to high ratings of confidence about quitting among Black menthol users relative to non-menthol users.

In this study, there were no significant relations between menthol use status and motivation to quit, and no significant interactions by race. These findings appear to differ from the only previous study in the area examining racial interactions, which found that Black menthol smokers had greater odds of seriously considering quitting relative to non-menthol smokers.⁵ Our results, however, appear to complement those of a previous study conducted among low-income Black smokers from an inner-city health center, which found no differences in readiness to quit smoking by menthol use status.¹⁷ Mixed findings may reflect

differences in construct definition and measurement between studies (eg, motivation versus readiness), but suggest that additional studies may be needed to better understand how menthol use status and motivation to quit smoking may be related.

Limitations of this study include that the participants were recruited from health clinics; therefore, results may not generalize to other samples (eg, uninsured smokers). In addition, the study design was cross-sectional in nature. Future studies should include data on quit attempts and smoking cessation to establish causal relations, and more meaningfully contribute to recommendations for cessation intervention improvements. Future studies should also include greater proportions of more diverse racial/ethnic minority groups, and particularly Hispanic smokers given the growing minority-majority status of Hispanics in the United States. The current study was limited in this regard due to the inadequate representation of Hispanic current smokers in the parent study.

In conclusion, this study adds to the extant literature on relations between menthol cigarette use and confidence to quit smoking, and suggests that menthol use is associated with greater confidence in the ability to quit among non-treatment seeking, Black current smokers. These results are similar to that of a previous study in the area⁵ and demonstrate that findings replicate when controlling for additional covariates of relevance (ie, income, number of years smoking). Given several previous reports citing lower quit rates among Black menthol versus non-menthol smokers,^{1,7–10} however, these results suggest that Black menthol users may be overly confident about their ability to quit smoking. Future research should incorporate longitudinal designs, include quit attempts, and assess factors that underlie relations between menthol use and confidence among Black menthol smokers in order to better inform cessation and public health interventions.

Human Subjects Statement

Study procedures were approved by the Institutional Review Board at The University of Texas MD Anderson Cancer Center, and written informed consent was obtained from all participants.

Acknowledgments

The parent study was supported by the National Cancer Institute (R01CA55769 and R01CA127219, PI: M.R. Spitz). The current work was supported by the National Institutes of Health through MD Anderson's Cancer Center Support Grant (CA016672) and The University of Texas MD Anderson Cancer Center via start-up funds (to L.R. Reitzel). Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the project supporters.

We are grateful for the efforts of the investigators and personnel associated with the parent study who collected the data included in the current work. In particular, we greatly appreciate Xifeng Wu, MD, PhD, Chair and Professor, Department of Epidemiology at The University of Texas MD Anderson Cancer, who generously allowed this secondary data analysis and who worked with us to obtain access to the data. In addition, we would like to acknowledge The University of Texas MD Anderson Cancer Center's Duncan Family Institute, which enabled the collaboration that resulted in this work.

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Table 1

Participant Characteristics, Including Comparisons by Menthol Use Status

Covariate/Outcome	Menthol User		Non-Menthol User		Total Sample	
	N	%/std	N	%/std	N	%/std
Age						
	55.81	10.27	55.96	10.89	55.92	10.71
	<i>Missing</i>	<i>0</i>	<i>0</i>		<i>0</i>	
Race						
Non-Hispanic Black	104	33.23	52	6.90	156	14.62
Non-Hispanic White	209	66.77	702	93.10	911	85.38
	<i>Missing</i>	<i>0</i>	<i>0</i>		<i>0</i>	
Sex						
Male	126	40.38	392	51.99	518	48.59
Female	186	59.62	362	48.01	548	51.41
	<i>Missing</i>	<i>1</i>	<i>0</i>		<i>1</i>	
Annual Household Income						
<\$40,000	108	36.49	203	28.71	311	31.01
\$40,000–\$74,999	114	38.51	233	32.96	347	34.60
\$75,000	74	25.00	271	38.33	345	34.40
	<i>Missing</i>	<i>17</i>	<i>47</i>		<i>64</i>	
Education						
<High school/<12 years	22	7.07	55	7.32	77	7.24
High school/GED/12 years	63	20.26	159	21.14	222	20.88
>High school/>12 years	226	72.67	538	71.54	764	71.87
	<i>Missing</i>	<i>2</i>	<i>2</i>		<i>4</i>	
HSI						
	2.54	1.69	2.82	1.65	2.74	1.67
	<i>Missing</i>	<i>1</i>	<i>1</i>		<i>2</i>	
Number of Years Smoked						
	35.03	12.91	35.93	12.37	35.67	12.53
	<i>Missing</i>	<i>0</i>	<i>1</i>		<i>1</i>	
Motivation to Quit						
	3.40	1.27	3.45	1.19	3.43	1.21
	<i>Missing</i>	<i>7</i>	<i>10</i>		<i>17</i>	

Covariate/Outcome	Menthol User		Non-Menthol User		Total Sample	
	N = 313	N = 754	N = 1067			
	N/Mean	%/std	N/Mean	%/std	N/Mean	%/std
Confidence to Quit	3.21	1.25	3.14	1.21	3.16	1.22
	Missing	7	10		17	

Note.

T-tests or chi-square tests were used to evaluate significant differences between menthol and non-menthol users. Missing data were maintained in analyses. Std = standard deviation. HSI= Heaviness of Smoking Index.

Relations between Menthol Use and Motivation and Confidence to Quit Among All Participants and By Race

Table 2

Outcome	All Participants (N = 981/980)		Non-Hispanic White (N = 833)		Non-Hispanic Black (N = 147)	
	β	SE	β	SE	β	SE
Motivation to Quit	-0.09	0.09	0.31	-	-	-
Confidence to Quit	0.05	0.09	0.55	-0.05	0.10	0.63
					0.51	0.20
						0.01

Note.

Non-menthol use was the reference group in all analyses. Regression analyses that included all participants were adjusted for age, sex, race, income, education, and tobacco dependence. Stratified regression analyses were adjusted for age, sex, income, education, and tobacco dependence. Missing data were maintained in analyses, and presented sample sizes represent those included in analyses. SE = standard error.