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Title

Effects of Cigarette Prices on Intention to Quit, Quit Attempts, and Successful Cessation Among African American Smokers.

Permalink

<https://escholarship.org/uc/item/3n61195d>

Journal

Nicotine & tobacco research : official journal of the Society for Research on Nicotine and Tobacco, 22(4)

ISSN

1462-2203

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Publication Date

2020-04-01

DOI

10.1093/ntr/nty149

Peer reviewed

TITLE PAGE

Effects of cigarette prices on intention to quit, quit attempts, and successful cessation among African American smokers

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Keywords: menthol, smoking cessation, income

Word count: main text (3,838/4,000); abstract (250/250); references (47/50)

ABSTRACT (Word count: 248/250)

Introduction. This study examined the effects of cigarette price on intention to quit, quit attempts, and successful cessation among African American smokers in the U.S. and explored whether price effects differed by income level and menthol use status. Price effects were further compared to White counterparts.

Methods. We used pooled cross-sectional data from 2006-2007 and 2010-2011 Tobacco Use Supplements to the Current Population Survey to analyze 4,213 African American recent active smokers. Three dependent variables were examined: any quit attempts in the past 12 months, successful cessation for ≥ 3 months, and intention to quit in the next 6 months. For each dependent variable, separate multiple logistic regression models were estimated to determine the impact of cigarette prices.

Results. There was no indication that price was associated with quit attempts or successful cessation, but price was positively associated with increased odds of intending to quit among African American smokers ($p < 0.001$). In contrast, prices were positively associated with intention to quit and quit attempts for White smokers. The association between price and intention to quit was significantly positive for African American low-income and menthol smokers but was not statistically significant for African American high-income and non-menthol smokers. There was no evidence of a price effect on quit attempts and successful cessation for each subgroup of African Americans.

Conclusion. Tobacco tax policy alone may not be enough to increase quit attempts or successful cessation among African Americans. Community-based cessation programs tailored towards African American smokers, especially low-income menthol smokers, are needed.

IMPLICATIONS (Word count: 86/100)

The results revealed that, among African American smokers, particularly among low-income and menthol smoking African American smokers, price appears to be positively associated with intention to quit; nevertheless, this deterrent effect does not appear to translate to actualized quit attempts or successful cessation. Increasing cigarette prices as a standalone policy may not be independently effective in increasing quit attempts and successful cessation within the African American community. Community-based cessation interventions tailored for African Americans are needed to help further translate desired cessation into actualized quit attempts.

INTRODUCTION

During the last decade, smoking prevalence in the U.S. plummeted from 20.9% in 2005 to 15.1% in 2015 [1]. While this downward trend reflects remarkable progress toward achieving the Healthy People 2020 goal of reducing adult cigarette smoking prevalence below 12.0% by 2020, racial/ethnic disparities in smoking prevalence and quit rates persist [1]. In 2015, smoking prevalence was highest among American Indian/Alaska Natives (21.9%), followed by multiracial adults (20.2%), African Americans (16.7%), Whites (16.6%), Hispanics (10.1%), and Asians (7.1%) [1]; the annual rate of successful cessation for ≥ 6 months was lowest among African Americans (4.9%), followed by Whites (7.1%), Hispanics (8.2%), and Asians (17.3%) [2].

Raising cigarette prices through tobacco taxation has been consistently shown to be effective in reducing smoking prevalence, smoking intensity, and demand for cigarettes [3-6]. According to a systematic and comprehensive review, most U.S. studies estimated that a 10% increase in cigarette prices would result in a 2%-6% reduction in the quantity of cigarettes demanded [5,7]; however, very few U.S. studies have examined the effects of cigarette prices on cessation behaviors. The results are mixed. Some studies found a positive association of cigarette prices with quit attempts [8-11] and successful cessation for ≥ 3 months [8], although one study found an insignificant association between cigarette price and successful quitting [12]. While cigarette prices increased during 1991-2010, an observational study indicated that there was no consistent trend of increased cessation at the population level among U.S. adults during this period [13].

African Americans suffer disproportionately from smoking-caused morbidity and mortality [14,15] and are less likely to quit smoking successfully compared to Whites [16, 8,17]. This disparity may be partially explained by the greater use of menthol cigarettes among African

American smokers. In 2012-2014, 84.6% of African American past 30-day smokers aged ≥ 12 years smoked menthol cigarettes compared to 28.9% of White past 30-day smokers [18]. Because of the cooling and anesthetic sensory properties of menthol and its synergistic effect with nicotine [19,20], menthol smokers may be more addicted [20,21] and find it harder to quit smoking successfully [19]. African American smokers, therefore, might respond to cigarette price increases differently from other racial/ethnic groups. Nevertheless, there is lack of research examining the impact of cigarette prices on cessation behavior among specific racial/ethnic groups, including African Americans.

This study investigated the effects of cigarette prices on three smoking cessation behaviors — intention to quit smoking, quit attempts, and successful cessation — among non-Hispanic African American (hereafter African American) smokers. These findings were compared to an analogous sample of non-Hispanic White (hereafter White) smokers. We further explored whether price effects differed by income level and menthol smoking status among African Americans. Because other tobacco control policies have been found to be also effective in reducing smoking [22], this study controlled for home smoking rules and state-level anti-smoking sentiment.

METHODS

Data source

We analyzed data from the 2006-2007 (May and August 2006, January 2007) and 2010-2011 (May and August 2010, January 2011) waves of the Tobacco Use Supplements to the Current Population Survey (TUS-CPS). These data are nationally representative of the civilian, non-institutionalized U.S. population aged ≥ 18 . Administered as part of the CPS, the TUS-CPS

probed a variety of questions about individual's smoking patterns, and cessation behaviors, type of cigarettes smoked, and nicotine dependence. A majority (64%) of interviews were completed via telephone [23]. Only self-reporting (non-proxy) respondents were eligible to answer the full battery of TUS questions (roughly 80% of the full sample) [23].

Dependent variables

We included three measures of smoking cessation behavior.

Intention to quit smoking among current smokers. Individuals were categorized as current smokers if they reported having smoked 100 cigarettes in their lifetime and were currently smoking cigarettes every day or some days. Among current smokers, the TUS-CPS inquired whether respondents were “seriously considering quitting smoking within the next 6 months.” Respondents who answered “yes” to this question were categorized as having *intention to quit* [23,24].

Any quit attempts in the past 12 months among recent active smokers. Recent active smokers included current smokers and recent former smokers who quit less than 12 months ago. Former smokers were defined as individuals who reported having smoked 100 cigarettes in their lifetime but did not currently smoke. The TUS-CPS asked daily smokers and nondaily smokers who smoked at least 12 days in the past 30 days: “During the past 12 months, have you stopped smoking for one day or longer because you were trying to quit smoking?” Nondaily smokers who smoked fewer than 12 of the past 30 days were asked: “During the past 12 months, have you tried to quit smoking completely?” Current smokers who answered “yes” to the above questions and recent former smokers were categorized as having any past-year quit attempt [23,24].

Successful cessation among recent active smokers. Consistent with previous cross-sectional studies [8,25,26], individuals were categorized as having successfully quit smoking if they reported having stopped smoking for at least 3 months.

Explanatory variables

Cigarette price. The Tax Burden on Tobacco (TBOT) compiles annual average retail cigarette price data for each state in the U.S. as of November 1 [27]. Linear interpolation was used to estimate the net-of-tax prices for each month between consecutive pairs of November 1 prices [28,29]. To derive monthly cigarette prices, the state and federal taxes in effect for each month were added to the corresponding interpolated monthly net-of-tax price. Monthly prices were adjusted to January 2011 dollars (i.e., the last TUS-CPS survey month in our study sample) using the monthly consumer price index for all urban consumers. Since the Shapiro-Wilk test [30] rejected the null hypothesis that the price variable was normally distributed, deflated monthly prices were logarithmically transformed. We selected time periods for the price variable that matched the timeframes of the cessation behavior outcomes explored. Current monthly prices were used in the analysis of intention to quit. In the quit attempt and successful cessation analyses, prices were lagged 12 months (e.g., for the January 2011 TUS-CPS observations, January 2010 price data were used).

Home smoking rules. The TUS-CPS asked respondents, “Which statement best describes the rules about smoking inside your home?” Respondents were provided the following three options: “No one is allowed to smoke anywhere inside your home,” “Smoking is allowed in some places or at some time inside your home,” or “Smoking is permitted anywhere inside your

home.” A dichotomous variable was created indicating whether or not smoking was completely prohibited inside the home [31].

Anti-smoking sentiment. Unfavorable public sentiment towards smoking has been found to be associated with lower smoking rates and a higher willingness to quit [32]. We controlled for state-level anti-smoking sentiment using a modified version of the index gauging unobservable anti-smoking sentiment that was originally constructed by DeCicca and colleagues [33]. This modified measure (D. Kenkel, Cornell University, personal communication, 2016) was based on five common questions asked in the TUS-CPS waves during 1992-1993, 1995-1996, 1998-1999, 2001-2002 and 2006-2007 about respondent’s opinions as to whether smoking should be allowed in certain public areas (restaurants, indoor work areas, bars and cocktail lounges, and indoor sporting events) and whether there were smoking rules inside a respondent’s home. Higher index values indicated stronger levels of anti-smoking sentiment [33,34]. As only two of the five questions were asked in 2010-2011 TUS-CPS, this sentiment index was only constructed through 2006-2007. We merged the 2006-2007 sentiment index with our data by state and year, repeating the 2006-2007 sentiment index for the 2010-2011 observations [29].

Other explanatory variables. Analyses controlled for sociodemographic characteristics including gender (male and female), age (18-34, 35-49, 50-64, and ≥ 65), education (high school degree or less, some college, and college graduate), family income, and marital status (married, widowed/divorced, separated, and never married), as well as smoking intensity (nondaily, daily ≤ 9 cigarettes per day (CPD), daily 10-19 CPD, and daily ≥ 20 CPD), menthol use status, how soon to smoke the first cigarette after awakening (≥ 30 minutes, < 30 minutes, and no regular pattern), and survey year (2006-2007, and 2010-2011). Family income was measured by the percentage of the federal poverty level (FPL) according to self-reported income and household

size [12,35]. Observations were classified into one of two income categories: “low-income” for respondents with less than the median income (i.e., 134% of the FPL in our African American sample) or “high-income” for the remainder. Menthol use status was measured by the survey questions about usual cigarette type. Current smokers were asked in 2006-2007: “Is your usual cigarette brand menthol or non-menthol?” and in 2010-2011: “Do you usually smoke menthol or non-menthol cigarettes?”[23]. Former smokers were asked in 2006-2007: “Thinking back to the year before you quit, during that time, was your usual cigarette brand menthol or non-menthol?” and in 2010-2011: “Around this time 12 months ago, were you usually smoking menthol or non-menthol cigarettes?”[23] Based on these questions, cigarette type was categorized as menthol, non-menthol, and no usual type [17]. We calculated the mean variance inflation factor (VIF) for the home smoking rules, anti-smoking sentiment, income, and education variables within the African American sample. We found a mean VIF of 1.98, suggesting that multicollinearity should not be a major issue in our analysis.

Statistical analysis

The prevalence of intention to quit smoking in the next 6 months, quit attempts in the past 12 months, and successful cessation for at least 3 months were estimated for the final African American study sample. For each cessation behavior measure, a multiple logistic regression model was estimated to determine the impact of cigarette prices, controlling for all other explanatory variables. To understand the mediating influence of income level and menthol use status, sub-analyses were also run among four subgroups of the African American sample: low-income smokers, high-income smokers, menthol smokers, and non-menthol smokers. Whether or not the price effects were significantly different for the low-income vs. high-income subgroup

and for menthol vs. non-menthol smokers were tested by re-running the multiple logistic regression models among all African American smokers, adding two additional explanatory variables: an interaction term between cigarette price and income level and an interaction term between cigarette price and menthol use status. The p values for these two interaction terms gave a significance test for the difference in price effects by income level and by menthol use status.

For comparison, multiple logistic regression analyses were also performed for the sample of White recent active smokers. To test whether the price effects differed between African Americans and Whites, we ran a multiple logistic regression models for each outcome measure on the combined sample of African American and White smokers adding two additional explanatory variables: a dichotomous race variable to indicate whether a respondent identified as African American and an interaction term between cigarette price and this race variable. The p value for the interaction term offered a significance test for the difference in the price effect between African Americans and Whites.

All analyses were conducted using Stata version 14.0 (StataCorp LP, College Station, TX). Results were estimated using the TUS-CPS self-response weights, which adjust for unequal probabilities of sample selection, non-response, and for items that can only be answered by self-respondents [23]. Because of the complex survey design of the TUS-CPS, we estimated standard errors and 95% confidence intervals by incorporating the published TUS-CPS replicate weights with Fay's balanced repeated replication [36,37]. For each regression, the adjusted odds ratios (AOR), 95% confidence intervals (CIs), and p values were estimated. Estimates were considered to be statistically significant if the two-tailed p-value was <0.05 .

Study sample

There were 5,339 self-reporting African American respondents aged ≥ 18 who met the criteria for recent active smokers. After deleting 398 respondents who did not report quit attempts ($N = 219$) or intention to quit ($N = 364$), and additional 728 respondents with missing values for the explanatory variables (including 306 for family income, 220 for home smoking rules, 283 for smoking intensity, 97 for menthol use status, and 228 for time to the first cigarette after awakening), the final study sample included 4,213 respondents. The regression analyses for intention to quit were limited to current smokers ($N = 3,903$). Using the same exclusion criteria, we arrived at a comparable study sample of 40,245 White recent active smokers for the multiple regression analyses of quit attempts and successful cessation; among them, 36,506 were current smokers and were included in the multiple regression analysis of intention to quit.

RESULTS

Among the final study sample of 4,213 African American recent active smokers, 54.3% were male, 32.4% were aged 18-34, 63.5% had no more than high school education, 44.6% were never married, 20.4% consumed ≥ 20 cigarettes daily, 49.1% smoked their first cigarette within 30 minutes after waking, 73.5% smoked menthol cigarettes, 34.1% lived in homes with smoke-free rules, 48.4% indicated intention to quit smoking in the next 6 months, 46.7% reported making at least one quit attempt in the past year, and 5.2% had successful cessation for at least 3 months (Table 1).

In comparison, within the final study sample of 40,245 White recent active smokers, 52.3% of respondents identified as male, 35.8% were aged 18-34, 55.2% had no more than high school education, 28.8% were never married, 43.9% consumed ≥ 20 cigarettes daily, 45.1% smoked their first cigarette within 30 minutes after waking, 21.9% smoked menthol cigarettes,

45.6% lived in homes with smoke-free rules, 41.3% indicated intention to quit smoking in the next 6 months, 40.7% reported making at least one quit attempt in the past year, and 6.2% had 40,245 successful cessation for at least 3 months (Table 1). The mean value of the unlogged cigarette price was lower for African Americans relative to Whites (\$4.91 and \$5.00, respectively).

Intention to quit among African Americans

Multiple regression results showed that cigarette price was positively associated with intention to quit smoking ($p < 0.001$) (Table 2). The intention-to-quit rates were significantly greater for those who lived in a 100% smoke-free home compared to those who did not (55.5% vs. 45.1%, $p < 0.001$) and menthol smokers compared to non-menthol smokers (50.9% vs. 42.5%; $p < 0.001$). The odds of having an intention to quit were significantly lower for daily smokers compared to nondaily smokers, those with no usual type of cigarettes compared to non-menthol smokers, and those with no regular pattern of when their first cigarette was smoked compared to those who smoked their first cigarette ≥ 30 minutes after waking.

Quit attempts among African Americans

Multiple regression results did not indicate a significant association between cigarette prices and quit attempts (Table 2). The quit attempt rates were significantly greater for those who lived in a 100% smoke-free home compared to those who did not (55.0% vs. 42.4%, $p < 0.001$), and for menthol smokers compared to non-menthol smokers (48.9% vs. 40.8%; $p < 0.001$). The odds of having quit attempts in the past year were significantly lower among those with high school degrees or less compared to college graduates, daily smokers compared to nondaily smokers, and

those with no regular pattern of when their first cigarette was smoked compared to those who smoked their first cigarette ≥ 30 minutes after waking.

Successful cessation among African Americans

Multiple regression results did not show a significant association between cigarette prices and successful cessation (Table 2). The successful cessation rates were significantly greater for those who lived in a 100% smoke-free home relative to those who did not (10.2% vs. 2.6%; $p < 0.001$). The odds of successful cessation were significantly lower for those aged 50-64 compared to those aged 18-34, those with high school degree or less compared to college graduates, those who were never married compared to those who were married, and daily smokers who consumed < 20 cigarette per day compared to nondaily smokers.

Comparison of price effects on cessation behaviors between African American and White smokers

Table 3 presents the results from multiple regression analyses on recent active White smokers. Cigarette price was positively associated with intention to quit smoking ($p < 0.001$) and quit attempts ($p < 0.001$) but not significantly associated with successful cessation. Results from a multiple regression model for the combined sample of African American and White smokers, the interaction term between price and the race dummy variable was significant in the quit attempt analysis ($p < 0.001$) but not the intention to quit or successful cessation analyses. The results, therefore, indicate that, compared to Whites, African Americans were more price-sensitive in terms of actual quit attempts.

Impact of prices on cessation behaviors across different African American subgroups

Cigarette price was positively associated with intention to quit for African American low-income smokers and menthol smokers but not predictive of intention to quit among African American high-income and non-menthol smokers (Table 4). There was no evidence of a price effect on quit attempts and successful cessation for each of the subgroups explored. According to the multiple regression models for the whole African American sample, the interaction terms indicated no significant difference in the impact of price on the cessation behavior outcomes explored between low-income and high-income subgroups and between menthol and non-menthol smokers.

DISCUSSION

To our knowledge, this is the first study to examine the effect of cigarette prices on intention to quit, quit attempts, and smoking cessation among African American and White smokers. Our results indicate that, among African Americans, cigarette price was positively associated with intention to quit smoking but was not significantly associated with quit attempts and successful cessation; however, among Whites, cigarette price was positively associated with both intention to quit smoking and quit attempts but was not significant associated with successful cessation. Our findings are consistent with a study which found no association between cigarette price and successful quitting for ≥ 3 months [12] but are inconsistent with a study which found a positive association between cigarette price and successful cessation for U.S. adults aged ≥ 18 [8]. While our results for White smokers confirmed a positive association between cigarette prices and quit attempts that was reported by a previous study [8], this

association did not appear for African Americans. Given the size of the African American sample, there may have been insufficient statistical power to detect this effect.

This study indicates that, among African American smokers, cigarette price deterrents are positively associated with intention to quit, particularly among low-income and menthol smoking groups, although this association was not statistically significant among the high-income and non-menthol subgroups. For African American smokers as a whole and the African American low-income and menthol smoking subgroups, this deterrent effect, however, does not appear to translate to actualized quit attempts. On the contrary, cigarette price deterrents appear to be positively associated with both intention to quit smoking and quit attempts among White smokers. Previous studies have shown that African Americans experience disproportionately higher tobacco-related morbidity and mortality than Whites [14,15] and have a lower successful cessation rate relative to Whites (4.9% vs. 7.1% in 2015) [2]. Studies have also found a positive association between multiple quit attempts and successful cessation [38; 39]. Within this context, our results suggest that increasing cigarette prices as a standalone policy may not be independently effective in increasing quit attempts among African Americans. Therefore, cigarette taxes alone may not reduce the disparity of successful cessation rate and tobacco-related burden between African Americans and Whites. Other cessation policies are needed to help African American smokers transition from having intention to quit to making quit attempts.

In our study sample, 27.9% and 40.4% of low- and high-income African American recent active smokers lived in homes with smoke-free rules. The comparable rates among White recent active smokers were 39.5% and 51.8%, respectively. Our results show that for both African American smokers and White smokers, smoke-free home rules were positively associated with intention to quit, any quit attempts, and successful cessation after controlling for other covariates.

Our estimated results regarding the association between smoke-free home rules and successful cessation (AOR=3.7 for African American smokers, and AOR=1.5 for White smokers) complement the finding from a U.S. study that found that adults who lived in a smoke-free home had greater odds (AOR=4.8) of successfully quitting for ≥ 3 months compared with those without smoke-free rules at home [12].

Our findings also resonate with the existing work exploring the impact of smoking menthol cigarettes on smoking cessation within the African American community. Paralleling previous studies, we found that among African Americans, menthol use was positively associated with intention to quit [40] and quit attempts [8,17]. While some studies found a negative association between menthol use and successful cessation among African Americans [8,40,41], our results revealed no indication of such a link [17].

While the mechanisms involved in a given quit attempt are impossible to fully describe, one must question the influence of menthol use in this process. Based on our results, cigarette price increases appeared to motivate intention to quit among menthol smoking African Americans. At the micro-level, the chemical properties of menthol flavoring potentially make the product more addictive [18,20,42]. At the macro-level, it has been shown that tobacco companies demographically target menthol promotions and advertisements towards African Americans [43]. Of note, we found that the average price of cigarettes in our study was lower for African Americans relative to Whites (Table 1). For instance, in face of declining cigarette sales, tobacco companies utilize discounting and signage practices as well as other marketing mix strategies to promote menthol cigarette sales among African Americans in urban areas [44]. Such practices may dampen the effectiveness of price controls and other tobacco control measures in promoting cessation within this group [45].

There are several limitations to this work. The data are cross-sectional, making causation difficult to determine. Second, cigarette prices can be defined in a variety of ways. We relied on the TBOT estimates [27]. A recent study pointed out that the TBOT price data do not capture the actual cigarette prices faced by individuals who live in counties/cities, which impose local cigarette taxes and may overstate actual cigarette price for individuals who purchase cigarettes from Indian reservations or other states with lower taxes [46]. Third, this study does not examine the relationship between price expectations and cessation behaviors. Future work could test rational addiction in the current framework of smoking cessation behavior. Finally, for those who quit smoking in the past year, we assumed that cigarette type remained constant during the 12 months before quitting. This assumption does not hold if individuals switched away from menthol brands in attempting to quit, though this is uncommon among African Americans [47].

This study adds to the limited literature exploring the effect of cigarette prices on cessation behavior within the African American community as whole and across subpopulations of this group. Our findings indicated a difference in the price effects on quit attempts between African Americans and Whites. Among African Americans, the results further revealed a discrepancy between the deterrent effect of price on intention to quit and the deterrent effect of price on actualized quit attempts, emphasizing the need for more research in this area. Tobacco tax policy alone may not be enough to increase quit attempts or successful cessation among some groups of African American smokers. Community-based interventions and cessation programs tailored towards African American smokers, especially low-income and menthol smokers, are needed.

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ACKNOWLEDGEMENTS

FUNDING

This study was funded by the Tobacco Related Disease Research Program (TRDRP) grant #22RT-0112.

DECLARATION OF INTERESTS

No conflicts of interest to declare.

Table 1. Distribution of the Final Study Sample of Non-Hispanic (NH) African American and NH White Recent Active Smokers Aged ≥ 18 by Demographic Characteristics, Other Explanatory Variables, and Dependent Variables

	NH African American (N=4,213)		NH White (N=40,245)	
	N	Column %	N	Column %
Demographic characteristics:				
Gender				
Male	2,026	54.3	19,264	52.3
Female	2,187	45.8	20,981	47.7
Age				
18 to 34	1,093	32.4	12,097	35.8
35 to 49	1,435	33.5	13,383	31.5
50 to 64	1,315	27.5	11,218	25.4
≥ 65	370	6.6	3,547	7.2
Education				
High school degree or less	2,694	63.5	21,894	55.2
Some college	1,185	29.0	12,959	31.5
College graduate	334	7.5	5,392	13.3
Family income ^a				
Low-income	2,130	50.5	20,338	50.5
High-income	2,083	49.5	19,907	49.5
Marital status				
Married	1,101	25.4	18,216	43.5
Widowed/divorced	1,015	21.8	10,640	24.0
Separated	340	8.3	1,386	3.7
Never married	1,757	44.6	10,003	28.8
Other explanatory variables:				
Home smoking rules				
Smoking allowed inside home	2,871	65.9	22,406	54.4
Smoking not allowed inside home	1,342	34.1	17,839	45.6
Anti-smoking sentiment				
Low ($-0.12 \leq \text{index} < 0.02$)	1,229	29.2	12,075	34.5
Moderate ($0.02 \leq \text{index} < 0.25$)	1,645	39.1	14,724	35.9
High ($0.25 \leq \text{index} \leq 0.58$)	1,339	31.8	13,446	29.6
Smoking intensity				
Nondaily smoker	1,025	24.8	6,296	15.7
Daily ≤ 9 CPD smoker	1,015	23.9	4,127	10.3
Daily 10-19 CPD smoker	1,322	31.0	12,166	30.1
Daily ≥ 20 CPD smoker	851	20.4	17,656	43.9
Menthol use status				
Non-menthol	997	23.7	31,079	75.8
Menthol	3,096	73.5	3,324	21.9
No usual type	120	2.9	842	2.3
Time to first cigarette after awakening				
≥ 30 minutes	2,039	48.6	17,754	53.6
< 30 minutes	2,088	49.1	22,013	45.1
No regular pattern	86	2.3	478	1.3
Survey year				

	NH African American (N=4,213)		NH White (N=40,245)	
	N	Column %	N	Column %
2006-2007	2,138	51.0	18,080	53.9
2010-2011	2,075	49.2	22,165	46.1
Dependent variables:				
Intention to quit in next 6 months ^b				
No	2,016	51.6	20,987	58.7
Yes	1,887	48.4	15,519	41.3
Quit attempts in past 12 months				
No	2,266	53.3	23,694	59.3
Yes	1,947	46.7	16,551	40.7
Successful cessation for at least 3 months				
No	4,009	94.8	37,752	93.8
Yes	204	5.2	2,493	6.2
Cigarette price variables:				
	Mean (SE)		Mean (SE)	
Real price (original form, unlog)	4.907 (0.024)		5.003 (0.008)	
Real price (log)	1.563 (0.004)		1.585 (0.002)	
Real price (log) x income level ^c	0.773 (0.017)		0.788 (0.006)	
Real price (log) x menthol status ^d	2.810 (0.015)		2.010 (0.006)	

Note. N = unweighted sample size; CPD = cigarettes per day; SE = standard error. All the percentages were estimated from the weighted analysis.

^a Low-income (or high-income) defined as having less than (or $\geq$) the median income. In the NH African American sample, the median income was 134% the federal poverty level (FPL). In the NH White sample, the median income was 247% the FDL.

^b Only among current smokers.

^c A dummy variable that equals 1 for low-income smokers and 0 otherwise.

^d A dummy variable that equals 1 for menthol smokers and 0 otherwise.

Table 2. Prevalence of and Estimated Results from the Multiple Logistic Regression Models on Intention to Quit, Quit Attempts, and Successful Cessation Among Non-Hispanic African American Smokers Aged ≥18

Explanatory variables	Intention to quit smoking in the next 6 months among current smokers (N = 3,903)			Any quit attempts in the past 12 months among recent active smokers (N = 4,213)			Successful cessation for ≥3 months among recent active smokers (N = 4,213)		
	Prev (%)	Coeff	AOR (95% CI)	Prev (%)	Coeff	AOR (95% CI)	Prev (%)	Coeff	AOR (95% CI)
Real price (log)	n/a	0.93	2.55 (1.56-4.15)***	n/a	n/a	n/a	n/a	n/a	n/a
Lagged real price (log)	n/a	n/a	n/a	n/a	0.36	1.44 (0.87-2.37)	n/a	-0.25	0.78 (0.25-2.37)
Home smoking rules									
Smoking allowed inside home	45.1	REF	REF	42.4	REF	REF	2.6	REF	REF
Smoking not allowed inside home	55.5	0.31	1.37 (1.16-1.61)***	55.0	0.33	1.40 (1.19-1.64)***	10.2	1.31	3.71 (2.49-5.54)***
Anti-smoking sentiment (continuous)	n/a	-0.02	0.98 (0.77-1.25)	n/a	0.05	1.05 (0.84-1.31)	n/a	0.20	1.22 (0.72-2.06)
Gender									
Male	48.4	0.04	1.04 (0.90-1.20)	46.5	0.01	1.01 (0.88-1.16)	5.3	-0.15	0.86 (0.61-1.21)
Female	48.3	REF	REF	47.0	REF	REF	5.1	REF	REF
Age									
18 to 34	47.7	REF	REF	49.3	REF	REF	6.2	REF	REF
35 to 49	49.7	0.16	1.17 (0.95-1.44)	46.5	-0.03	0.97 (0.80-1.19)	4.7	-0.36	0.70 (0.44-1.10)
50 to 64	49.6	0.17	1.19 (0.96-1.47)	45.5	-0.05	0.95 (0.76-1.20)	4.4	-0.49	0.61 (0.38-0.98)*
≥65	39.4	-0.23	0.80 (0.57-1.11)	40.1	-0.26	0.77 (0.54-1.10)	6.0	-0.14	0.87 (0.45-1.69)
Education									
High school degree or less	46.6	-0.24	0.78 (0.56-1.10)	44.2	-0.41	0.67 (0.48-0.93)*	4.1	-0.75	0.47 (0.28-0.80)**
Some college	50.3	-0.22	0.81 (0.57-1.15)	49.7	-0.27	0.76 (0.56-1.05)	6.6	-0.34	0.71 (0.43-1.19)
College graduate	57.3	REF	REF	56.7	REF	REF	9.4	REF	REF
Family income									
Low-income	45.8	REF	REF	45.4	REF	REF	4.5	REF	REF
High-income	51.0	0.09	1.10 (0.92-1.32)	48.0	-0.03	0.97 (0.83-1.13)	5.9	-0.09	0.91 (0.65-1.28)
Marital status									
Married	50.3	REF	REF	48.4	REF	REF	7.6	REF	REF

Explanatory variables	Intention to quit smoking in the next 6 months among current smokers (N = 3,903)			Any quit attempts in the past 12 months among recent active smokers (N = 4,213)			Successful cessation for ≥3 months among recent active smokers (N = 4,213)		
	Prev (%)	Coeff	AOR (95% CI)	Prev (%)	Coeff	AOR (95% CI)	Prev (%)	Coeff	AOR (95% CI)
Widowed/divorced	48.4	-0.04	0.96 (0.77-1.21)	46.1	-0.02	0.98 (0.79-1.23)	5.5	-0.12	0.89 (0.58-1.36)
Separated	46.3	-0.08	0.92 (0.68-1.24)	43.8	-0.11	0.90 (0.67-1.21)	3.7	-0.45	0.64 (0.31-1.31)
Never married	47.7	-0.13	0.88 (0.72-1.08)	46.6	-0.15	0.86 (0.71-1.05)	4.0	-0.76	0.47 (0.31-0.72)***
Smoking intensity									
Nondaily	62.7	REF	REF	62.8	REF	REF	9.8	REF	REF
Daily ≤9 CPD	50.6	-0.53	0.59 (0.46-0.75)***	50.7	-0.50	0.61 (0.48-0.77)***	4.0	-0.95	0.39 (0.24-0.61)***
Daily 10-19 CPD	44.1	-0.74	0.47 (0.37-0.60)***	39.6	-0.89	0.41 (0.33-0.51)***	2.7	-1.23	0.29 (0.18-0.47)***
Daily ≥20 CPD	35.8	-1.02	0.36 (0.27-0.48)***	33.3	-1.07	0.34 (0.27-0.44)***	4.8	-0.46	0.63 (0.37-1.09)
Menthol use status									
Non-menthol	42.5	REF	REF	40.8	REF	REF	5.6	REF	REF
Menthol	50.9	0.34	1.40 (1.17-1.68)***	48.9	0.33	1.39 (1.16-1.67)***	5.1	0.01	1.01 (0.70-1.45)
No usual type	33.4	-0.56	0.57 (0.35-0.94)*	39.1	-0.21	0.81 (0.48-1.37)	4.5	-0.43	0.65 (0.21-2.04)
Time to first cigarette after awakening									
≥30 minutes	54.7	REF	REF	53.6	REF	REF	6.3	REF	REF
<30 minutes	42.9	-0.17	0.85 (0.71-1.00)	40.4	-0.16	0.85 (0.72-1.00)	4.2	0.11	1.11 (0.77-1.61)
No regular pattern	31.1	-0.86	0.42 (0.23-0.79)**	32.1	-0.78	0.46 (0.27-0.78)**	4.0	-0.32	0.73 (0.28-1.89)
Survey year									
2006-2007	51.1	0.56	1.75 (1.45-2.10)***	46.6	-0.16	1.18 (0.98-1.42)	4.7	-0.13	0.88 (0.61-1.26)
2010-2011	45.4	REF	REF	46.8	REF	REF	5.8	REF	REF

Note. N = unweighted sample size; Prev = prevalence; Coeff = Coefficient; AOR = adjusted odds ratio; CI = confidence interval; CPD = cigarettes per day. All the estimates were based on weighted analysis.

*Statistically significant at $p < 0.05$; **Statistically significant at $p < 0.01$; ***Statistically significant at $p < 0.001$.

Table 3. Prevalence of and Adjusted Odds Ratio Estimates from the Multiple Logistic Regression models on Intention to Quit, Quit Attempts, and Successful Cessation Among Non-Hispanic White Smokers Aged ≥ 18 : Tobacco Use Supplement to the Current Population Survey, 2006-2007 and 2010-2011

Explanatory variables	Intention to quit smoking in the next 6 months among current smokers			Any quit attempts in the past 12 months among recent active smokers			Successful cessation for ≥ 3 months among recent active smokers		
	(N = 36,506)			(N = 40,245)			(N = 40,245)		
	Prev (%)	Coeff	AOR (95% CI)	Prev (%)	Coeff	AOR (95% CI)	Prev (%)	Coeff	AOR (95% CI)
Real monthly price (log)	n/a	0.49	1.63 (1.38,1.92)***	n/a	n/a	n/a	n/a	n/a	n/a
Lagged real monthly price (log)	n/a	n/a	n/a	n/a	0.44	1.55 (1.31,1.82)***	n/a	0.22	1.25 (0.90,1.72)
Home smoking rules									
Smoking allowed inside home	36.3	REF	REF	32.6	REF	REF	2.4	REF	REF
Smoking forbidden inside home	48.0	0.30	1.35 (1.27,1.43)***	50.4	0.50	1.66 (1.57,1.75)***	10.6	1.52	4.59 (4.08,5.15)***
Anti-smoking sentiment (continuous)	n/a	0.06	1.06 (0.97,1.16)	n/a	0.06	1.06 (0.98,1.15)	n/a	0.09	1.10 (0.93,1.29)
Gender									
Male	40.2	-0.04	0.96 (0.92,1.01)	39.8	-0.06	0.94 (0.90,0.99)*	5.9	-0.26	0.77 (0.69,0.86)***
Female	42.4	REF	REF	41.8	REF	REF	6.5	REF	REF
Age									
18 to 34	42.0	REF	REF	47.4	REF	REF	7.7	REF	REF
35 to 49	42.4	0.09	1.10 (1.02,1.18)*	38.0	-0.23	0.80 (0.74,0.86)***	5.2	-0.33	0.72 (0.63,0.83)***
50 to 64	40.9	0.08	1.08 (1.00,1.17)	36.4	-0.24	0.79 (0.73,0.86)***	5.1	-0.23	0.79 (0.68,0.92)**
≥ 65	34.1	-0.22	0.80 (0.72,0.90)***	34.9	-0.31	0.74 (0.66,0.82)***	6.8	0.22	1.25 (1.01,1.54)*
Education									
High school degree or less	37.6	-0.14	0.87 (0.80,0.94)**	37.1	-0.03	0.97 (0.90,1.05)	4.9	-0.39	0.68 (0.58,0.80)***
Some college	45.6	0.08	1.09 (1.00,1.18)	45.0	0.15	1.16 (1.07,1.26)***	7.0	-0.16	0.85 (0.73,0.99)*
College graduate	46.9	REF	REF	45.2	REF	REF	9.4	REF	REF

Explanatory variables	Intention to quit smoking in the next 6 months among current smokers			Any quit attempts in the past 12 months among recent active smokers			Successful cessation for ≥3 months among recent active smokers		
	(N = 36,506)			(N = 40,245)			(N = 40,245)		
	Prev (%)	Coeff	AOR (95% CI)	Prev (%)	Coeff	AOR (95% CI)	Prev (%)	Coeff	AOR (95% CI)
Family income									
Low-income	39.0	REF	REF	39.4	REF	REF	5.1	REF	REF
High-income	43.7	0.02	1.02 (0.97,1.08)	42.0	-0.01	0.99 (0.93,1.05)	7.3	0.18	1.20 (1.06,1.34)**
Marital status									
Married	43.0	REF	REF	40.2	REF	REF	6.8	REF	REF
Widowed/divorced	39.4	-0.06	0.94 (0.88,1.00)*	37.3	0.02	1.02 (0.96,1.09)	4.9	-0.08	0.92 (0.80,1.06)
Separated	37.7	-0.18	0.84 (0.73,0.96)*	39.0	-0.01	0.99 (0.87,1.14)	4.5	-0.26	0.77 (0.56,1.07)
Never married	40.7	-0.17	0.85 (0.79,0.91)***	44.6	-0.03	0.97(0.90,1.04)	6.4	-0.14	0.87 (0.76,0.99)*
Smoking intensity									
Nondaily	57.3	REF	REF	61.2	REF	REF	11.0	REF	REF
Daily ≤9 CPD	47.0	-0.39	0.68 (0.60,0.76)***	50.3	-0.42	0.66(0.60,0.72)***	6.6	-0.49	0.61 (0.51,0.73)***
Daily 10-19 CPD	43.7	-0.49	0.61 (0.56,0.66)***	40.7	-0.7	0.50(0.46,0.54)***	4.5	-0.73	0.48 (0.41,0.56)***
Daily ≥20 CPD	32.9	-0.89	0.41 (0.38,0.45)***	31.1	-0.95	0.39(0.36,0.42)***	5.5	-0.16	0.85 (0.71,1.02)
Menthol use status									
Non-menthol	41.6	REF	REF	40.7	REF	REF	6.2	REF	REF
Menthol	41.1	-0.04	0.96 (0.90,1.02)	40.6	-0.05	0.95 (0.89,1.01)	5.8	-0.06	0.94 (0.84,1.07)
No usual type	32.1	-0.47	0.62 (0.50,0.78)***	41.7	-0.10	0.90 (0.75,1.09)	8.6	0.34	1.41 (1.03,1.93)*
Time to first cigarette after awakening									
≥30 minutes	47.2	REF	REF	48.9	REF	REF	7.4	REF	REF
<30 minutes	36.7	-0.06	0.95 (0.89,1.00)	34.0	-0.15	0.86 (0.81,0.91)***	5.2	0.05	1.05 (0.92,1.20)
No regular pattern	28.1	-0.79	0.45 (0.33,0.63)***	33.0	-0.63	0.53 (0.41,0.70)***	6.5	-0.10	0.90 (0.59,1.39)
Survey year									
2006-2007	43.1	0.35	1.42 (1.34,1.52)***	40.0	0.09	1.09 (1.03,1.17)**	6.1	0.09	1.10 (0.97,1.25)
2010-2011	39.1	REF	REF	41.6	REF	REF	6.2	REF	REF

Note. N = unweighted sample size; Prev = prevalence; Coeff = Coefficient; AOR = adjusted odds ratio; CI = confidence interval; CPD = cigarettes per day. All the estimates were based on weighted analysis.

*Statistically significant at p <0.05; **Statistically significant at p <0.01; ***Statistically significant at p < 0.001.

Table 4. The Association^a of Cigarette Prices, and Home Smoking Rules with Intention to Quit, Quit Attempts, and Successful Cessation Among All Recent Active Non-Hispanic White Smokers and among Four Subgroups of Non-Hispanic African American Recent Active Smokers Aged ≥18

Dependent variables	All recent active White smokers (N = 40,245)		Among low-income subgroup (N = 2,130)		Among high-income subgroup (N = 2,083)		Among non-menthol smoker subgroup (N = 997)		Among menthol smoker subgroup (N = 3,096)	
	Coeff	AOR (95% CI)	Coeff	AOR (95% CI)	Coeff	AOR (95% CI)	Coeff	AOR (95% CI)	Coeff	AOR (95% CI)
1. Intention to quit smoking in the next 6 months:^b										
Real monthly price (log)	0.49	1.63 (1.38,1.92)***	1.26	3.51 (1.75-7.02)***	0.66	1.94 (0.95-3.96)	0.64	1.90 (0.58-6.21)	0.99	2.68 (1.52-4.73)***
Home smoking rules										
Smoking allowed inside home	REF	REF	REF	REF	REF	REF	REF	REF	REF	REF
Smoking forbidden inside home	0.30	1.35 (1.27,1.43)***	0.31	1.37 (1.07-1.75)*	0.31	1.36 (1.08-1.72)**	0.33	1.40 (0.97-2.02)	0.3	1.35 (1.10-1.64)**
2. Any quit attempts in the past 12 months:										
Lagged real monthly price (log)	0.44	1.55 (1.31,1.82)***	0.58	1.79 (0.90-3.54)	0.17	1.19 (0.57-2.46)	0.79	2.21 (0.59-8.34)	0.25	1.28 (0.74-2.22)
Home smoking rules										
Smoking allowed inside home	REF	REF	REF	REF	REF	REF	REF	REF	REF	REF
Smoking forbidden inside home	0.50	1.66 (1.57,1.75)***	0.2	1.22 (0.98-1.52)	0.44	1.56 (1.24-1.96)***	0.5	1.64 (1.18-2.28)**	0.29	1.34 (1.11-1.61)**
3. Successful cessation for ≥3 months:										
Lagged real monthly price (log)	0.22	1.25 (0.90,1.72)	-0.62	0.54 (0.08-3.43)	0.0	1.00 (0.26-3.90)	-0.53	0.59 (0.08-4.26)	-0.11	0.90 (0.21-3.80)
Home smoking rules										

	All recent active White smokers (N = 40,245)			Among low-income subgroup (N = 2,130)		Among high-income subgroup (N = 2,083)		Among non-menthol smoker subgroup (N = 997)		Among menthol smoker subgroup (N = 3,096)	
Smoking allowed inside home	REF	REF	REF	REF	REF	REF	REF	REF	REF	REF	REF
Smoking forbidden inside home	1.52	4.59 (4.08,5.15)***	0.97	2.63 (1.49-4.63)***	1.66	5.25 (3.16-8.70)***	1.96	7.11 (2.86-17.67)***	1.24	3.47 (2.09-5.76)***	

Note. N = unweighted sample size; Coeff = Coefficient; AOR = adjusted odds ratio; CI = confidence interval

^aEstimated from the multiple logistic regression model which controls for all other explanatory variables.

^bAnalyzed only among current smokers (N = 36,506 for recent active non-Hispanic White smokers, 1,994 for non-Hispanic African American low-income, 1,909 for non-Hispanic African American low-income high-income, 917 for non-Hispanic African American low-income non-menthol, and 2,874 for non-Hispanic African American low-income menthol subgroups, respectively).

*Statistically significant at p <0.05; **Statistically significant at p <0.01; ***Statistically significant at p <0.001.