



HHS Public Access

Author manuscript

Tob Control. Author manuscript; available in PMC 2016 February 05.

Published in final edited form as:

Tob Control. 2015 November ; 24(6): 609–615. doi:10.1136/tobaccocontrol-2014-051765.

The Prevalence of Brand Switching Among Adult Smokers in the US, 2006–2011: Findings from the ITC US Surveys

Monica E. Cornelius, PhD, MPH^{1,2}, K. Michael Cummings, PhD, MPH^{1,2}, Geoffrey T. Fong, PhD^{3,4}, Andrew Hyland, PhD⁵, Pete Driezen, MSc³, Frank J. Chaloupka, PhD⁶, David Hammond, PhD³, Richard J. O'Connor, PhD⁵, and Maansi Bansal-Travers, PhD⁵

¹Department of Psychiatry & Behavioral Sciences, Medical University of South Carolina, Charleston SC, USA

²Hollings Cancer Center, Medical University of South Carolina, Charleston SC, USA

³Department of Psychology, University of Waterloo, Waterloo ON, Canada

⁴Ontario Institute for Cancer Research, Toronto ON, Canada

⁵Department of Health Behavior, Roswell Park Cancer Institute, Buffalo NY, USA

⁶Institute for Health Research and Policy, University of Illinois at Chicago, Chicago IL, USA

Abstract

Background—Recent studies have suggested that about 1 in 5 smokers report switching brands per year. However, these studies only report switching between brands. The current study estimated the rates of switching both within and between brand families and examining factors associated with brand and brand style switching.

Corresponding Author: K. Michael Cummings, PhD, MPH, Professor, Department of Psychiatry & Behavioral Sciences, Medical University of South Carolina, 68 President Street, BE 103-L, Charleston, SC 29425, Office Phone: 843-876-2429, cummingk@musc.edu.

Statement of Contributorship

Cornelius, Driezen, Cummings, Chaloupka, Hammond, O'Connor, and Bansal-Travers contributed to data analysis and interpretation, and in drafting the manuscript and revising critically for important intellectual content. Fong, Cummings, and Hyland contributed to the study conception and survey design, and in drafting the manuscript and revising it critically for intellectual content. All authors have read and approved the final manuscript and agree to be accountable for all aspects of the work

Ethics approval:

All of the data collection methods were reviewed and approved by the following review panels: Roswell Park Cancer Institute Institutional Review Board, the University of Waterloo Human Research Ethics Committee, and the Medical University of South Carolina Institutional Review Board.

Patient consent:

Obtained.

Provenance and peer review:

Not commissioned; externally peer-reviewed

Competing Interests

K. Michael Cummings has served in the past and continues to serve as a paid expert witness for plaintiffs in litigation against the tobacco industry. Richard J. O'Connor (RJO) has served as a consultant to the Tobacco Constituents Subcommittee of the Tobacco Products Scientific Advisory Committee (TPSAC) of the U.S. Food and Drug Administration. RJO, via a subcontract from Research Triangle Institute, reviewed confidential and trade secret documents on menthol cigarettes submitted by tobacco manufacturers pursuant to an FDA request, and presented this information in closed session to TPSAC (10 Feb 2011); this information was not used in any way in the current study. Otherwise, the authors have no competing interests to declare.

Methods—Data for this analysis are from the International Tobacco Control 2006–2011 US adult smoker cohort survey waves 5–8 (N=3248). A switch *between* brands was defined as reporting two different cigarette brand names for two successive waves, while switching *within* brand was defined as reporting the same brand name, but a different brand style. Repeated measures regression was used to determine factors associated with both switch types.

Results—A total of 1,475 participants reported at least two successive waves of data with complete information on brand name and style. Overall switching increased from 44.9% in 2007–8 to 58.4% in 2010–11. Switching between brand names increased from 16% to 29%, while switches within the same brand name to a different style ranged from 29% to 33%. Between-brand switching was associated with younger age, lower income, non-White racial group, and use of a discount brand, whereas, within-brand switching was associated with younger age and the use of a premium brand cigarette.

Conclusions—Nearly half of smokers in the US switched their cigarette brand or brand style within a year. Switching between brands may be more price-motivated, while switching within brands may be motivated by price and other brand characteristics such as product length.

Keywords

taxation; public policy; advertising and promotion

BACKGROUND

Cigarette brand line extensions were first introduced as a marketing strategy in the 1960s when manufacturers began offering king size cigarettes. As restrictions on tobacco marketing increased over time in the United States, manufacturers have increasingly relied on adding new brand styles in an effort to target specific consumer groups and expand sales. [1–4] It has long been assumed that brand loyalty is higher among cigarette smokers when compared with users of other products,[5] however brand switching does occur. Previous studies have suggested a wide range of motivations for cigarette brand switching such as perceived lower health risk for new products, improved product taste, and lower price.[2–8]

Research has shown that changes in the diameter of the cigarette and the color of the tipping paper can affect smokers' perceptions of different cigarette products and appeal to different subpopulations of tobacco users.[9,10] Additionally, cigarette filter size and longer length have been associated with deeper puffing and greater intake of nicotine.[11] Recently published studies by Land et al,[11] and Connolly et al[12] provide evidence that cigarette designs have changed over the years and that recent increases in nicotine yield may be attributable to changes in these design characteristics.

There are only a handful of published studies on cigarette brand switching, and these studies are limited since they only report on switching between different brand families.[13–15] A recent study found that 1 in 5 smokers switch brands in any given year, typically in response to lower prices.[13] However, within-brand switching may occur more often and may be motivated by a combination of brand attributes and pricing. The current study assesses this information and extends the previous research by presenting data on both between and

within brand switching and determining the correlates of between and within-brand switching behavior.

METHODS

Study Design and Sample

The data examined in this study are from the International Tobacco Control Policy Evaluation Project (ITC) US adult smoker cohort surveys. The ITC project is a nationally representative longitudinal cohort of current and former smokers surveyed from 2002 to 2011. Probability sampling methods using random digit dialing techniques and standardized telephone interviews were used to conduct the surveys approximately annually. The next-birthday method was used to select the respondent in cases where multiple adult smokers were present in the household. Participants lost to follow-up in subsequent waves were replenished using the same procedures as in the original recruitment to maintain a sample size of 1500–2000 per survey wave. Greater detail on the survey methodology can be found elsewhere.[16] The study was approved by the institutional review boards of the University of Waterloo (Canada), Roswell Park Cancer Institute, and the Medical University of South Carolina.

The analyses presented in this paper were restricted to data from the last four waves of the ITC Project collected between 2006 and 2011 so that identical questions were used to capture brand and brand variant use of factory-made cigarettes by respondents. A total 2034 smokers were surveyed between October 2006 and February 2007 (1289 retained; 745 replenished); 2002 were surveyed between September 2007 and February 2008 (1291 retained; 711 replenished); 1763 were surveyed between October 2008 and February 2009 (1381 retained; 382 replenished); and 1520 were surveyed between July 2010 and June 2011 (1144 retained; 376 replenished). Smokers aged 18 years and older who smoked at least 100 cigarettes in their lifetimes and at least one cigarette within the past 30 days were eligible for inclusion in the study. Cigarette brand information for the brand currently smoked most often was recorded for a total of 3,248 smokers in waves 5 through 8. Because the aim was to assess differences in brand variety, we restricted the sample to those smokers who provided enough detailed brand attribute information (i.e., brand family and style information in at least two successive waves). For waves 5–8, descriptive brand labels from packages were added to facilitate helping smokers to select the correct brand from a pre-specified list. A total of 1,475 participants reported brand family and style information in at least two successive waves.

Measures

Brand Switching Definitions—Changes between brand families and characteristics within brand families were coded between successive wave pairs. A switch *between* brands was defined as reporting two different cigarette brand names between successive waves. Switching *within* brands was defined as reporting the same brand name, but a different brand style (e.g. strength, flavor, size/length, width, tobacco blend, some other descriptor, etc.) between successive survey waves. The descriptors used to determine changes in styles were taken from cigarette labels.

Cigarette Size, Flavor, and Strength Assessment—Cigarettes sizes reported were categorized according to length. Sizes denoted as ‘shorts’ or ‘72’s’ were categorized as “68–72 mm.” Sizes denoted as “80’s,” “kings,” and “regular” were categorized as “79–88 mm.” The absence of a size descriptor was considered “79–88 mm” size (2–7% or 30–76 observations over the 4 waves). Sizes denoted as “99s,” “100’s,” “and “120’s” were categorized as “>=94 mm.”

Flavors were reported as “plain” (tobacco flavored), “menthol,” or “other.” The absence of a flavor descriptor was considered as “plain,” since it is rare for ‘plain’ or ‘tobacco flavor’ to be added explicitly used for ordinary, factory-made tobacco cigarettes. Approximately 72–74% were characterized as plain in this manner. Salem, Kool, Camel Crush, and menthol varieties of Newport were varieties that were categorized as “menthol.” Only ‘plain’ and ‘menthol’ flavors of factory-made cigarettes were reported over this time period.

Cigarettes strengths were categorized as “full flavor,” “light,” “ultralight,” or “other.” The Food and Drug Administration banned the use of the “light” and “ultralight” descriptors in 2009. Equivalent descriptors for “light” and “ultralight” were used for observations after this ban. Descriptors and brand variants categorized as full flavor included “full flavor,” “strong,” “Marlboro Red,” “Camel Turkish Royal,” “extra strength,” “straight,” “Pall Mall Filters Red,” and “305s Blue.” The absence of a strength descriptor was considered as “full flavor.” Approximately 21–29% of brands were categorized as full flavor in this manner. Note that low tar varieties are consistently indicated on packages, whereas “regular strength” cigarettes are not consistently printed on packages for all brands. Descriptors and brand variants categorized as “light” included “gold,” “Turkish gold,” “Pall Mall Blue,” “mild,” and “medium.” Descriptors and brand variants characterized as “ultralight” included “silver,” “ultima,” “Pall Mall Orange,” “Camel Turkish Silver Light,” and “ultra.”

Width was characterized as “slim,” “regular,” and “wide,” with no descriptor considered as “regular.” If no descriptor for filter was mentioned, cigarettes were considered filtered. Otherwise, only cigarettes described as “no filter” or “non-filtered” were categorized as non-filtered. Additional descriptors such as “Camel Crush” (indicating a micro bead of menthol) or special blends of tobacco (e.g., “Marlboro Special Blend”) were categorized as “other descriptor.” Differences in these categories from one wave to another were counted as a switch within the category. The assessment of switches by descriptor categories was only assessed for the size, flavor and strength switching categories because few smokers reported switches in the other categories.

Demographic Variables—Demographic variables of interest include age, sex, education, annual household income, nicotine addiction, race, geographic location, and brand type. Education was defined as low (high school), moderate (some college/tech/trade school, or no degree) or high (university degree or greater). Annual household income was categorized as low (\$29,999), moderate (\$30,000–\$59,999) and high \$60,000. Nicotine addiction was measured using the *heaviness of smoking index* (HSI)[17]which combines number of cigarettes smoked per day with time to smoking the first cigarette after waking. Race was categorized as White, Black and Other. Brand type refers to a designation of premium or

discount brand, and was classified by manufacturers' representations. Exact categorizations have been defined in previous work.[13]

Data Analysis

Binomial and multinomial regression using generalized estimating equations (GEE) were used to test for trends over survey waves and to model factors associated with outcomes of interest. Models were estimated using GEE in order to account for the repeated measures nature of the study. An exchangeable correlation structure was used. Note that individuals may report different types of switching over waves. Estimates were also weighted to reflect the US population of smokers.[16] Prevalence rates shown were adjusted for age, sex, income, time-in-sample, wave, nicotine addiction, and daily smoking. Outcomes of interest included between-brand and within-brand switching. Variables tested for associations with outcomes of interest included age, sex, income, time-in-sample, wave, nicotine addiction, race, geographic location, and brand type. Analyses were conducted using SAS version 9.3 with SAS-callable SUDAAN (version 11.0.1).[18]

RESULTS

Sample Characteristics

Table 1 displays the demographic characteristics of the sample. Slightly more than half of the participants were female, with over 70% aged 45+ years and over 80% self-identifying as White. Over 50% reported having at least some college, and nearly 60% reported having household incomes of \$30,000 per year.

Brand Switching

Figure 1 shows the rates of brand switching within and between brands. Between 2006–07 and 2010–11, overall brand and brand style switching increased from 44.9% to 58.4% ($p < 0.01$). Between 2006–07 and 2010–11, between-brand switching increased from 15.9% to 28.9% ($p < 0.001$). Within brand switching ranged from 29% to 33% with no statistically significant increase (29.0% in 2006–7 to 29.5% in 2010–11; $p = 0.17$).

Factors Associated with Between and Within Brand Switching

Table 2 examines factors associated with between and within brand switching. Smokers who reported using identified discount brand cigarettes were less likely to make within-brand switches compared with those who reported using an identified premium brand cigarette. Smokers aged 18–24 were more likely to report within-brand switching. Smokers aged 18–24 (compared with those aged 40–54), those of 'other' races (compared with White race), those with lower income, and those smoking premium brands were more also likely to report between-brand switching.

Between-brand Switching

Among those reporting between-brand switching, approximately 27–32% of the switches were related to changing between cigarette size/lengths between successive waves (not shown). Approximately 20–23% was related to changing the strength of the cigarettes.

About 3 to 8% of the switches were related to changing the flavor of the cigarettes between successive waves.

Within-brand Switching

Among those who reported within-brand switching, approximately 44–54% were in cigarette size/lengths between successive waves; 27–35% of switches were in regards to cigarette strengths (higher or lower tar levels); and 3–6% of switches were in cigarette flavor (not shown).

Trends in Cigarette Styles

Cigarette Size/Length—As shown in Figure 2, over half of the smokers at each wave reported smoking cigarettes ≥ 94 mm in length. About 39–42% of smokers at each wave reported smoking cigarettes 79–88 mm in length and less than 2% of smokers reported smoking the shortest length of cigarettes (68–72 mm) over the four survey waves. Characteristics associated with reporting the use of 79–88 mm length cigarettes included male gender, younger age (age 18–24), reporting ‘other’ race (compared with White race), higher income, and premium cigarette brand consumption (not shown). Characteristics associated with reporting ≥ 94 mm length cigarettes include female gender, older age, non-White race, lower income, and premium brand consumption (not shown).

Cigarette Flavors—Approximately 23–26% of smokers reported smoking menthol flavored cigarettes in the four survey waves from 2006 to 2011, while 72–76% reported consuming plain cigarettes (Figure 2). Older age, White race, and living in the western region of the US were factors associated with smoking plain cigarettes (not shown). Menthol cigarette consumption was associated with non-White race and being aged 18–24 (not shown).

Cigarette Strength—Less than 12% of smokers reported smoking ‘ultralight’ cigarettes over the four survey waves, while 38–47% reported smoking ‘lights’, and 43–55% reported smoking ‘full flavor’ strength cigarettes (Figure 2). The proportion of smokers reporting the consumption of full flavor cigarettes increased from 43.3% in 2006–7 to 54.9% in 2010–11 ($p < 0.0001$), with the largest increase occurring between 2008–09 and 2010–11 (42.6% vs. 54.9%; $p < 0.0001$) corresponding to the ban on use of misleading brand descriptors (i.e. ‘light,’ ‘low tar,’ and ‘mild’). Characteristics associated with use of full flavor cigarettes include being male, younger age (age 18–24), Black race (compared with White race), lower income, lower educational attainment (compared with high educational attainment), and living in western regions of the US (not shown). Characteristics associated with consumption of ‘low tar’ cigarettes included older age, White race, high income, higher educational attainment, and living in the Midwestern or Southern regions (compared with living in the Western region) (not shown).

Size, Flavor and Strength Switching and Associated Characteristics

Size Switching—As shown in Figure 3, 17–22% of smokers reported switching the size of their cigarette from the previous survey. Among these, between 7% and 11% switched to ≥ 94 mm cigarettes, while 7%–8% switched to 79–88 mm cigarettes. Characteristics

associated with making any switch in size included younger age (18–24), being of ‘other’ race, non-daily smoking, and living in the West (compared with the Midwest) (not shown). Characteristics associated with switching to 79–88 mm cigarettes included younger age (18–24), while characteristics associated with switching to ≥ 94 mm cigarettes were Black race, greater nicotine addiction, nondaily smoking, and living in the western region of the United States.

Strength Switching—Approximately 12% to 15% of smokers reported switching cigarette strength. Among these, 7–10% switched to full flavor and 4–7% switched to lights. Those aged 40–54 and 55+ had lower odds of switching strengths than those aged 18–24 (not shown). Smokers identifying as Black race had a greater odds of switching strengths when compared with smokers identifying as White race, and those with middle income were more likely to switch than those who were high income (not shown). Switching to a full-flavor cigarette was associated with younger age, Black race, and middle income (compared with high income). No demographic factors were associated with switching to a light cigarette.

Flavor Switching—The prevalence of switching cigarette flavors ranged from 3.1% to 6.2% over the survey period. Less than 4% of smokers reported specifically switching to menthol or to plain cigarettes over the survey period. Demographic characteristics associated with switching to menthol included being aged 18–24, Black race, and living in the Midwest or southern regions of the US (compared to living in the West), and discount cigarette consumption (not shown). Characteristics associated with switching to plain included female gender, non-White race and less severe nicotine addiction (not shown). Note that the all above observations in this section are both *between* and *within* brands.

DISCUSSION

Brand switching is more common than previously reported [13–15] and appears to be increasing. Close to half of smokers in the US switched their cigarette brand or style within a 12 month follow-up period, with between-brand switching increasing over time. Report of premium brand consumption was associated with increased odds of within-brand switching, while consumption of discount brands was associated with increased between-brand switching, indicating that pricing may influence each type of switch. Between-brand switching appears to be strongly motivated by price marketing and is more common in those already smoking a discount cigarette brand.[13] However, switching within brand families may also be associated with price marketing since many premium brand styles have begun to offer different price options.

Switching within brand name to a different style of cigarette appears to be fairly common especially among those already smoking a premium brand cigarette. Increased brand style choices may be especially appealing to younger age groups, since rates of within-brand switching were highest among this age group. Most within brand switches were the result of changing size/length and cigarette strength. Between 2006–7 and 2010–11, Marlboro (a top US brand) introduced line extensions including Virginia Blend (Kings,100s)(2007),[19] Smooth (100s) (2007),[19] Blend No 54 (menthol) (2009),[20] Special Blend (2010;

available in gold, red, King and 100s),[21] Marlboro Black (menthol and non-menthol) (2011),[22] and Skyline Menthol (2010) [19] varieties. Newport Red (non-menthol) was a line extension of Newport introduced in 2010.[23] It is possible that the availability of new variants of popular brands have functioned as a novelty, appealing to younger smokers, and reflected in changes in brand characteristics.

The observation that lower income was associated with reporting longer lengths may indicate that lower-income smokers choose longer cigarettes as a means of getting more value from each cigarette, since the price of ≥ 94 mm cigarettes is similar in price to that of regular and king sized cigarettes. Analyses of data from this study showed that 79–88 mm cigarettes cost \$4.18 per pack on average compared to \$4.21 for ≥ 94 mm cigarettes (controlling for wave, time-in-sample, age, sex, daily smoking, and geographic region). Evans and Farrelly [24] have previously reported little price difference between 85 mm and 100 mm cigarettes. Premium brand and non-White race were associated with longer length. This result is consistent with those reported by Agaku et al.[25] Choice of longer cigarettes may be related to both the availability of longer cigarette lengths among brands popular with these segments, in addition to a desire to obtain increased smoking duration per cigarette at the same price.

Switching to longer length cigarettes (≥ 94 mm) was associated with Black race, greater nicotine addiction, nondaily smoking, and living in Western regions of the US. The fact that greater nicotine addiction (as measured by HSI) and nondaily smoking were related to switching to longer cigarettes lengths in the multivariable model may be due to the limited ability for HSI to measure nicotine addiction in other smoked tobacco products, since it is only valid for cigarette smoking. Among smokers with lower HSI, a greater proportion of nondaily smokers reported switching to longer lengths when compared with daily smokers. No nondaily smokers had HSI values of ≥ 4 . In addition to this, crude analyses revealed that a greater proportion of nondaily smokers concurrently smoked other non-cigarette products, which may assist in explaining this result. The associations between non-White race and ≥ 94 mm cigarette length detected in this study, along with results from Agaku et al are consistent with Black race being associated with smoking longer cigarette lengths.[25] No differences in household income indicate that price may have been a factor in switching among Black smokers, although it is possible that preferred brands may be more frequently offered in longer lengths. The fact that Western geographic region was related to switching to longer cigarettes could be reflective of the higher pricing of cigarettes and relative price advantage of smoking longer cigarettes mentioned previously.

Switching to full flavor cigarettes was associated with younger age, Black race, and middle income, while no factors were associated with switches to light cigarettes. It is possible that the greater propensity for younger smokers to switch to full flavor cigarettes is reflective of greater price sensitivity relative to older smokers and heavy discounting of full flavored premium brands (e.g., Marlboro and Newport) during the study period. Also note that the proportion of smokers consuming light cigarettes at each wave decreased, particularly between 2008–9 and 2010–11. While the ban on light/mild descriptors could have assisted in this observation of decreased light cigarette use, it should still be acknowledged that the move from light/mild descriptors to color/package identification for low tar over this time

period could have contributed to observed differences, due to misclassification. The fact that Black and moderate income smokers were more likely to switch to full flavor cigarettes (and conversely, that, Whites and those with higher income were more likely to smoke light cigarettes) is consistent with literature citing that Black smokers often consume cigarettes with higher tar levels.[26]

While these data present a wealth of information on differences in cigarette styles, there are several limitations to the data presented in this paper. First, we have not fully captured all brand switching in this study since our measure of brand switching (both within and between brand families) is limited to comparing brand use at two points in time over a one year period. It is possible that we have missed brand switching among smokers who may have switched brands or brand styles during the year, but have returned to their starting brand by the time we re-interviewed them. Even with this limitation, this study shows that brand switching is more common than has previously been documented with about half of the switching occurring within a brand family.

Second, brand and brand style reporting in this paper are based upon self-report, so it is possible that we have misclassified some smokers who may not have accurately reported their brand and brand style. As well, omission of certain characteristics may have caused misclassification. In past studies, however, we have asked respondents to send us a pack of their cigarette brand and have found a high degree of concordance (93%) between the self-reported brand used and what was sent to us by the respondent after the phone interview. [27]

Third, the reported high levels of brand switching found in this study may be an anomaly of the environment at the timing of our surveys. It has been previously documented that an increase in the use of discount cigarette brands followed the \$0.61 increase in the FET on cigarettes in 2009.[13] In addition, increased price marketing by cigarette manufacturers both within and between premium and discount brands between 2006–07 and 2010–11, may have contributed to the higher levels of brand switching during this period we examined.

Finally, the study may be limited due to the inherent bias resulting from attrition of the sample over time. Attrition rates were higher among younger, low income respondents which might have caused us to underestimate the actual amount of brand switching since age younger age and lower income were correlated with greater propensity to switch between and within brands. The average attrition rate over the survey waves was 35%, and no differences in attrition rates were detected for the between and within-brand family switching outcomes. Participants lost to follow-up were replenished at each subsequent survey, and we have adjusted for time-in-sample-variations across the different survey waves.[28] The characteristics of participants with and without brand family and style information were also consistent with those from population based surveys, since they tended to be younger, nonwhite, male, and have lower household incomes.

Despite these limitations, this study illustrates that brand switching is commonplace, especially among younger adult smokers who seem to be willing to experiment with new brand styles. Given the serious health risks associated with smoking, curtailing cigarette

brand line extensions may promote or help efforts made towards smoking cessation. Unless brand extensions can be demonstrated to reduce the addictiveness and toxicity of the product, governments should consider adopting regulations that would standardize all cigarettes so as not to allow manufacturers to vary products by weight, length, circumference, flavor, and color of the tipping paper used around the filter. Standardizing products in this way would help minimize consumer misperceptions about the risks of different brands and brand styles.

Acknowledgments

Funding

This work was supported the National Cancer Institute of the United States, grant numbers R01 CA 100362, P50 CA111236, P01 CA138389, and R25 CA113951, and the Canadian Institutes of Health Research, grant numbers 57897, 79551, and 115016. Geoffrey T. Fong was supported by a Senior Investigator Award from the Ontario Institute for Cancer Research (OICR) and a Prevention Scientist Award from the Canadian Cancer Society Research Institute.

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WHAT THIS PAPER ADDS

The current study estimated the prevalence of brand switching both between and within brand families and also examined correlates of brand switching. The main finding from this study is that brand switching is increasing and appears to be more common than previously reported. Close to half of smokers in the US switched their cigarette brand or style within a 12 month follow-up period. Temporal analyses show that between-brand switching has increased over the past decade and appears to be linked to higher cigarette prices associated with both state and federal tax increases. Within brand switching was more common in those using identified premium brand cigarettes. It is unclear if price is also motivating switching between brand styles, since many premium brands have offered price promotions to attract and retain customers. Regardless, this study illustrates that brand switching is commonplace, especially among younger adult smokers who seems to be willing to experiment with new brand styles. Product regulations which curtail the opportunity for manufacturers to introduce cigarette brand line extensions may aid efforts to reduce the appeal of smoking especially among younger smokers.

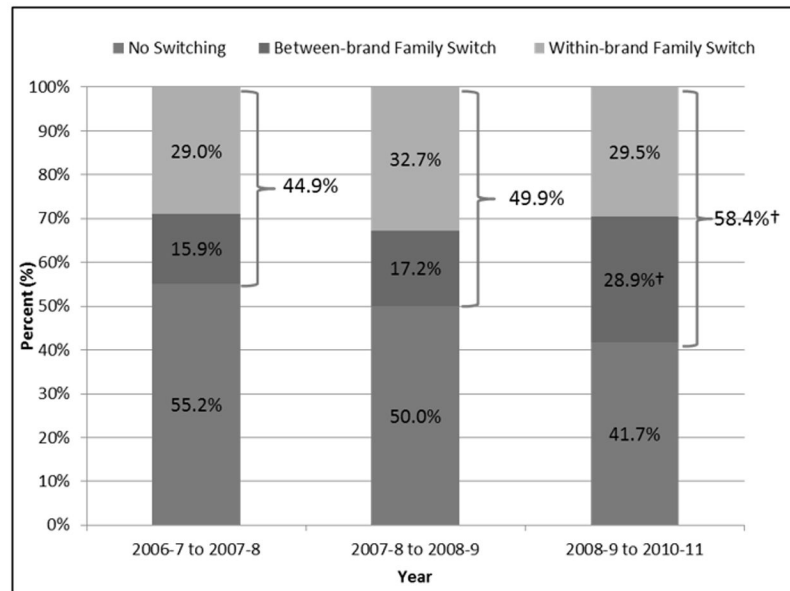


Figure 1.

Types of Brand Family Switching, 2006–2011

†Statistically significant linear trend ($p < 0.01$) in category from 2006–2011.

Adjusted for sex, age, wave, time-in-sample, nicotine addiction, daily smoking and income.

Restricted to observations with sufficient brand variety/style information.

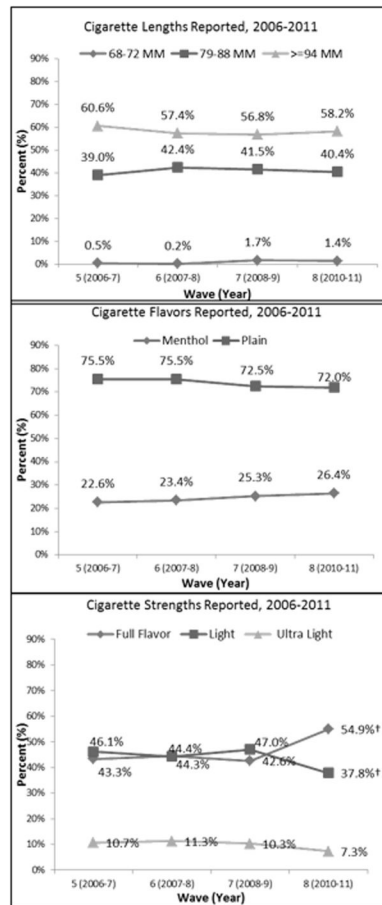


Figure 2. Cigarette flavors, sizes, and strengths reported by smokers between 2006–7 & 2010–11 †Statistically significant linear trend ($p < 0.01$) in category from 2006–2011. Percentages are adjusted for sex, age, wave, income, nicotine addiction, time-in-sample, daily smoking status, race, education, region, brand type.

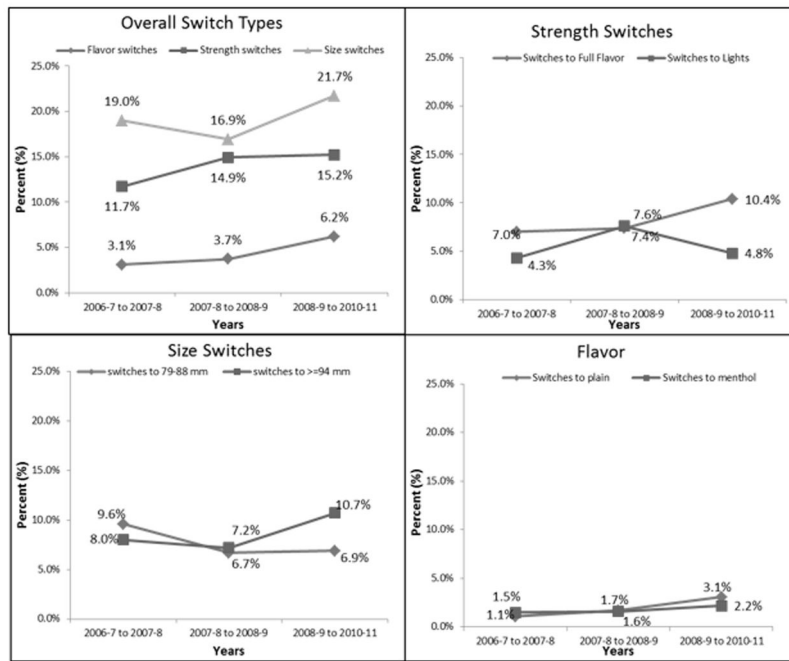


Figure 3. Trends in Cigarette Switches in Cigarette Characteristics, 2006–2011
 *Adjusted for sex, age, wave, income, nicotine addiction, time-in-sample, daily smoking status, race, education, region, brand type

Table 1

Baseline Demographic Characteristics of ITC United States Sample, 2006–2011 (N=3248)*

| Characteristic | N | % |
|------------------------|------|------|
| Sex | | |
| Male | 1447 | 44.6 |
| Female | 1801 | 55.5 |
| Age | | |
| 18–24 | 181 | 5.6 |
| 25–44 | 621 | 19.1 |
| 45–54 | 1307 | 40.2 |
| 55+ | 1139 | 35.1 |
| Race | | |
| Black | 290 | 9.0 |
| Other | 326 | 10.1 |
| White | 2619 | 81.0 |
| Education ^a | | |
| Low | 1412 | 43.5 |
| Moderate | 1193 | 36.7 |
| High | 637 | 19.6 |
| No Answer | 6 | 0.2 |
| Income ^b | | |
| Low | 1080 | 33.3 |
| Moderate | 1076 | 33.1 |
| High | 848 | 26.1 |
| No Answer | 244 | 7.5 |

* Among current smokers with data on cigarette brand

^a Education defined as low= high school; moderate=some college/tech/trade school, no degree; high= university degree or greater.

^b Annual household income defined as low: \$29,999; moderate:\$30,000–\$59,999; high: \$60,000

Table 2

Factors Associated with Within or Between Brand Family Switching

| Covariates | Within-brand vs. no switch or between brand switch (N=1435) | | Between brand vs. no switch or within-brand switch (N=1435) | |
|---------------------------------|--|-------------|--|-------------|
| | OR | 95% CI | OR | 95% CI |
| Sex | | | | |
| Female | 1.02 | (0.81–1.30) | 1.02 | (0.78–1.34) |
| Male (reference) | 1.00 | ----- | ----- | ----- |
| Age Group | | | | |
| 55–max | 0.43 | (0.24–0.75) | 0.55 | (0.27–1.12) |
| 40–54 | 0.46 | (0.26–0.81) | 0.43 | (0.21–0.87) |
| 25–39 | 0.50 | (0.27–0.90) | 0.67 | (0.32–1.39) |
| 18–24 (reference) | 1.00 | ----- | ----- | ----- |
| Race | | | | |
| Black | 1.34 | (0.87–2.08) | 1.34 | (0.77–2.33) |
| Other | 1.31 | (0.86–1.99) | 1.61 | (1.03–2.53) |
| White (reference) | 1.00 | ----- | ----- | ----- |
| Income ^a | | | | |
| Low | 0.95 | (0.67–1.34) | 1.73 | (1.20–2.51) |
| Middle | 1.28 | (0.94–1.74) | 1.33 | (0.93–1.92) |
| No answer | 1.22 | (0.70–2.13) | 1.20 | (0.62–2.32) |
| High (reference) | 1.00 | ----- | ----- | ----- |
| Nicotine Addiction ^b | | | | |
| ≥4 | 0.79 | (0.61–1.02) | 1.11 | (0.85–1.45) |
| <4 (reference) | 1.00 | ----- | ----- | ----- |
| Daily smoking | | | | |
| Daily | 0.75 | (0.48–1.17) | 1.03 | (0.55–1.93) |
| Non-daily (reference) | 1.00 | ----- | ----- | ----- |
| Education ^c | | | | |
| Low | 1.08 | (0.76–1.53) | 1.05 | (0.70–1.56) |
| Middle | 1.09 | (0.78–1.53) | 0.90 | (0.60–1.35) |
| High (reference) | 1.00 | ----- | ----- | ----- |
| Geographic Region | | | | |
| Midwest | 1.00 | (0.69–1.47) | 0.82 | (0.54–1.22) |
| Northeast | 0.96 | (0.64–1.44) | 0.87 | (0.58–1.31) |
| South | 1.16 | (0.82–1.65) | 0.74 | (0.51–1.08) |
| West (reference) | 1.00 | ----- | ----- | ----- |
| Brand Type | | | | |
| Discount | 0.57 | (0.45–0.72) | 5.58 | (4.16–7.48) |
| Premium (reference) | 1.00 | ----- | ----- | ----- |

* Models also contain wave and time-in-sample.

^a Income defined as low: \$29,999; medium:\$30,000–\$59,999; and high: \$60,000.

^b Nicotine dependence is measured by the heaviness of smoking index (scored 0–6) and categorized as either low (<4) or high (≥4).

^c Education defined as: low= high school; moderate=some college/tech/trade school, no degree; high= university degree or greater

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