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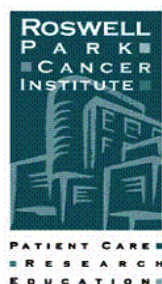
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**ABSTRACT**

**BACKGROUND:** This study examined the impact of cigarette pack design, product descriptors, and health warnings on risk perception and brand appeal.

**METHODS:** A mall-intercept study was conducted with 197 adult smokers and 200 nonsmokers in Buffalo, NY from June-July 2009. Participants were shown 12 sets of packs in random order; each set varied by a particular design feature (color, descriptor) and warning label style (text vs. graphic, size, attribution, message framing). Participants rated packs on various criteria including risk perceptions, quit motivation, and purchase interest.

**RESULTS:** Participants rated larger, pictorial, loss-framed warning labels as more likely to attract attention, encourage thoughts about health risks, motivate quitting, and overall most effective. Participants were more likely to rate packs with lighter color shading and descriptors that implied less risk (*light, silver, smooth*) as delivering less tar, smoother taste, and lower health risk, compared to darker shaded packs and those labeled *full flavor*. Additionally, participants were more likely to select the *branded* compared to *plain* white pack when asked which pack delivered the most tar, smoothest taste, was more attractive, appealed to youth under 18 years, and contained cigarettes of better quality.

**CONCLUSIONS:** The findings support evidence that larger, graphic health warnings that convey loss-framed messages would be the most effective in communicating health risks to U.S. adults. The results also indicate that color and product descriptors used in cigarette package design are associated with false beliefs about risks. Plain packaging may reduce many of the erroneous misperceptions of risk communicated through design features on cigarette packs.

## 1 INTRODUCTION

2 Cigarette packaging serves as a critical marketing tool for the tobacco industry<sup>1-4</sup>. In addition to  
3 promoting brand appeal and linking to other forms of marketing, packaging can also provide  
4 reassurance to health concerned smokers. In June 2009, the President signed the “Family  
5 Smoking Prevention and Tobacco Control Act” (FSPTCA), which gives the U.S. Food and Drug  
6 Administration (FDA) authority to regulate different aspects of tobacco products<sup>5</sup>. New  
7 regulations under the FDA will prohibit the tobacco companies from manufacturing cigarette  
8 packs labelled with terms such as “light,” “mild,” or “low” after June 2010--terms that are  
9 inherently deceptive according to US Federal Court rulings<sup>5, 6</sup>. However, there is growing  
10 evidence that other elements of package design also have the potential to deceive smokers. For  
11 example, consumers in the UK and Canada perceive cigarettes in lighter color packs as less  
12 harmful and easier to quit compared to cigarettes in darker packages<sup>3, 7</sup>. These studies also found  
13 that smokers in the UK and Canada associate “descriptors” in the name of brands, such as  
14 “smooth,” with reduced harm. In the US, while there is considerable evidence that brands  
15 labelled as “light” and “mild” are perceived as less harmful<sup>8-12</sup>, there is relatively little evidence  
16 on perceptions of other descriptors or the impact of colors and brand imagery. Given that several  
17 tobacco manufacturers in the US have begun to redesign their packages in anticipation of the ban  
18 on “light” and “mild” descriptors, it is imperative to understand how consumers perceive  
19 “replacement” words such as “smooth” and the use of colors (e.g., “gold”, “silver”, and “blue”).  
20  
21 Like the tobacco industry, governments are also using the cigarette package to communicate  
22 directly to consumers<sup>13</sup>. In response to the WHO FCTC treaty<sup>14</sup>, more than two dozen countries  
23 have implemented prominent health warnings on the front and back of packages that include

graphic pictures to communicate risk. Previous research suggests that the use of pictures and increases in the size of health warnings enhances their effectiveness with respect to perceptions of risk and cessation-related behaviours<sup>3, 7, 13, 15, 16</sup>. In the United States, the four text-based warnings that rotate and are printed on the side panel of a cigarette pack have not changed since 1985. The FSPTCA specifies that nine warning statements appear on cigarette packs, with an increase in warning label size to 50% of the pack face and the inclusion of graphic images alongside the text within 39 months of enactment<sup>5</sup>. The law also includes a mandate to prohibit potentially misleading information, including information that detracts from the warnings; although the law does not enumerate the specific misleading descriptors, nor does it specify what graphic images will be used when pictorial warnings are implemented.

The current study sought to examine the impact of cigarette pack design and pictorial health warnings among US adults. Based upon the findings from Canadian and UK studies by Hammond et al.<sup>3, 7</sup>, we hypothesized finding that larger, graphic warning labels would be rated as more effective in deterring smoking as compared to smaller text-based warnings in samples of US adult smokers and nonsmokers. We also hypothesized that both smoker and nonsmoker perceptions about the strength of product and its health risks would be influenced by package color and descriptors.

## **METHODS**

### **Study Population and Methods**

The study population included 197 adult smokers and 200 adult nonsmokers recruited through a mall-intercept survey conducted in Buffalo, New York between June and July 2009; data were

analyzed in 2009. This study was approved by the Roswell Park Cancer Institute Institutional Review Board to safeguard the rights of all participants. Participants were 18 years of age or older who were currently U.S. residents, and were able to read and write in English. Eligible participants who consented were asked a series of questions about their tobacco use behaviors, knowledge and beliefs about smoking, and demographic characteristics. After completing the baseline survey, participants were asked to view a series of cigarette packages, one set at a time. Participants were allowed to pick up and review the packs if they wanted and they were asked four to eight questions about each set. Participants were asked to rate a total of 12 sets of cigarette packages, which were presented to them in randomized order. After completing all 12 pack ratings, participants were compensated with a \$10 USD gift card to use in the mall.

#### Cigarette Packages

Cigarette packages were designed specifically for this study with a fictitious brand name. The rationale for creating new packs was two-fold: 1) it allowed variation in individual elements of the design while keeping all other elements constant; and 2) it avoided using existing brand names of cigarettes sold in the U.S. market today, which could influence responses by participants who would feel a sense of brand loyalty when viewing the study packs. The packs created for this study were printed on high-quality white cardstock paper, folded in the same manner as a typical pack of cigarettes sold in the U.S.

Tables 2, 3, and 4 show the 12 sets of cigarette packs tested in this study. Each set of packs presented to participants were identical except for the single characteristic that was manipulated. Four specific features of the health warning label were varied in the study: two pairs presented a

health warning in *graphic* vs. *text format*; two pairs presented a health warning in *gain* vs. *loss-framing text style*; one set of three packs included labels that varied by *size* of graphic warning label (*30% on front of all packs; 30% vs. 50% vs. 100% on back of packs*); and one set of three packs included labels that varied by *source attribution* of the health warning message (*Surgeon General vs. FDA vs. none*). The *graphic* vs. *text* health warning messages were formatted to cover 30% of the pack face, front and back, using text included in the new FSPTCA law, with a graphic that is currently used to express a similar message on other health warning labels around the world.

Six pack design characteristics were manipulated in this study: *full flavor* vs. *light, full flavor* vs. *smooth, full flavor* vs. *silver, 10* vs. *6*, shading of pack color (dark blue vs. light blue), and a plain packaging version with one *branded* pack vs. a *plain* pack with no color or brand imagery. Each package displayed the same health warning—a current U.S. health warning that is text-based and printed on the side of the pack.

### Pack Ratings

#### *Health Warning Label Ratings*

For five of the six sets of packs that illustrated manipulations to the health warning label described above, participants were asked six questions: 1) “If you had to choose between these two packs, which one would you buy?”; 2) “If you had to choose between these two packs, which one would you buy if you were trying to reduce the risks to your health?”; 3) “Which health warning is most likely to attract your attention?”; 4) “Which warning is most likely to make people think about the health risks of smoking?”; 5) “Which warning is most likely to

motivate smokers to quit?"; and 6) "Overall, which warning is most effective?" Participants were also asked two additional questions about the set that illustrated different sizes for the health warning label: 7) Which pack would you expect to deliver the most tar if you were to smoke it?; and 8) Which pack would you expect to have the smoothest taste? Participants were encouraged to select one of the two packages as a response for each question, although a response of "neither" was also allowed.

Participant perceptions of source attribution of health warning label message were assessed by showing a sixth set of three packages that listed three different sources for the warning: the Surgeon General, the FDA, and none. Participants were asked to respond to seven questions regarding source attribution: 1) "Which pack do you think is the most truthful?"; 2) "How truthful is the message?" (Likert scale for responses ranging from one [not truthful at all] to seven [very truthful]; 3) "Which pack has a message that you believe?"; 4) "How believable is the message?" (Likert scale for responses ranging from one to seven); 5) "What is this message trying to say?" (open-ended); 6) "Who do you think is the source of this message?" (open-ended); and 7) "Which pack makes you think about quitting smoking?" Participants were encouraged to select one of the two packages as a response for questions 1, 3, and 7, although a response of "neither" was also recorded if provided.

### *Pack Design Ratings*

For the six pairs of packs that were manipulated by design characteristic (*full flavor* vs. *light*, *silver*, *smooth*; 10 vs. 6, pack color shading, and plain packaging), participants were asked four questions after viewing each pair of packages: 1) "Which pack would you expect to deliver the



most tar if you were to smoke it?"; 2) "Which pack would you expect to have the smoothest taste?"; 3) "If you had to choose between these two packs, which one would you buy?"; and 4) "If you had to choose between these two packs, which one would you buy if you were trying to reduce the risks to your health?" Participants were also asked three additional questions for the set of packs illustrating the concept of plain packaging: 5) "Between the two packs, which do you think is more attractive?"; 6) "Between the two packs, which do you think would most appeal to youth under 18 years old?"; and 7) "Between the two packs, which one do you think contains cigarettes of better quality?" Participants were encouraged to select one of the two packages as a response for each question, although a response of "neither" was also recorded if provided.

### Statistical Analysis

All analyses were conducted using SPSS statistical analysis software, version 14.0. Chi-square statistics were used to test for significant differences in pack ratings, as well as differences in ratings between smokers and nonsmokers and smokers of low tar vs. full flavor cigarettes. Logistic regression analysis was also conducted to test differences in pack ratings between smokers and nonsmokers, adjusting for age in years (18-24; 25-34; 35-44; 45-54; 55-64; 65+), gender (male; female), race/ethnicity (White, non-Hispanic; Black, non-Hispanic; Hispanic; Other, non-Hispanic) and education level (12 years or less; greater than 12 years). Logistic regression analyses adjusting for the same set of covariates were also conducted to detect potential differences between low tar vs. full flavor cigarette smokers, adjusting for the same covariates of age, gender, race/ethnicity, and education level, as well as cigarettes smoked per day.

139

140 **RESULTS**141 Sample Characteristics

142 Characteristics of the sample are shown in Table 1. Smokers who participated in this study were  
143 significantly more likely to be male, younger, and have fewer years of formal education  
144 compared to the nonsmokers ( $X^2$  statistic, p-value <0.05). Among nonsmokers, 68% reported  
145 having ever smoked even one cigarette in their lifetime and 22% reported currently living with a  
146 smoker.

147

148 When asked questions regarding awareness of the current warning labels on cigarette packs sold  
149 in the U.S., 60% of smokers said they never or rarely noticed the labels in the last month, 87% of  
150 smokers said they did not attempt to avoid looking at or thinking about the warning labels, and  
151 62% of smokers said that the labels made them think a little or not at all about the health risks of  
152 smoking.

153

154 Smokers were asked if their current brand choice decision was based on a number of factors,  
155 including tar and nicotine, health concerns, assistance in quitting, price, taste, or satisfaction.  
156 Based on self-reported type of cigarette currently smoked, a significantly greater percentage of  
157 low tar cigarette smokers compared to full flavor smokers stated that their current brand choice  
158 decision was based on health concerns (29% vs. 3% respectively;  $X^2=28$ , p-value<0.001) or as a  
159 way to help them quit (12% vs. 2% respectively;  $X^2=9.1$ , p-value=0.001). On the other hand,  
160 more full flavor cigarette smokers selected their current brand based on satisfaction (69% full  
161 flavor vs. 54% low tar cigarette smokers;  $X^2=6.5$ , p-value=0.04). A significantly greater

percentage of low tar smokers also considered their usual brand of cigarettes to be “a little less harmful compared to other cigarettes brands” (29% low tar vs. 7% full flavor cigarette smokers;  $X^2=21.7$ , p-value<0.001).

#### Health Warning Label Format

As shown in Tables 2 and 3, when asked which pack they thought had the smoothest taste or which pack they would buy, a significantly greater number of participants were likely to choose the pack with the health warning label presented in a *text* format or with a *gain-framed* warning message. However, when asked which health warning would attract their attention, made them think about the health risks of smoking, motivated smokers to quit, and which pack they would buy to try to reduce health risks, participants chose the *graphic, larger, loss-framed* warning label style and format. Smokers and nonsmokers also selected the *graphic, larger, loss-framed* warning label style when asked which warning they found to be the most effective (p-value<0.001).

When asked about perceptions regarding source attribution of message, a greater percentage of participants responded that they found the *Surgeon General's* message to be the “most truthful” ( $X^2=108.6$ , p-value<0.001) and the “most believable” ( $X^2=109.5$ , p-value<0.001) of the three packs presented. Fifty-four percent (54%) of smokers stated that the health warning attributed to the *Surgeon General* also made them think about quitting smoking ( $X^2=105.3$ , p-value<0.001).

#### Pack Design Characteristics

As illustrated in Table 4, results for pack ratings were fairly consistent across all six sets of pack design characteristics. Greater than 90% of participants selected the package labeled *full flavor*, *10*, *dark blue* shading, or *branded* packaging when asked which pack they perceive containing the most tar. A significantly greater number of participants were likely to choose the pack that had the lighter color shading or descriptors that implied less risk (i.e. a lower number [*6* vs. *10*], descriptors such as *light*, *smooth*, or *silver*, as compared to the pack labeled *full flavor*) ( $p$ -value $<0.001$ ). Additionally, participants selected the pack that had the lighter shading or descriptor that implied less risk when asked which of the two packs would have the smoothest taste or which pack they would buy if trying to reduce the risks to their health. Participants were more likely to select the *branded* pack when asked which pack they thought delivered the most tar, had the smoothest taste, was more attractive, appealed to youth under 18 years of age, and contained cigarettes of better quality. However, they selected the *plain* pack when asked which pack they would buy to reduce health risks ( $X^2=0.3$ ,  $p$ -value $=0.604$ ).

#### Smokers versus Nonsmokers

The responses of smokers and nonsmokers to the different sets of packs were similar with regards to ratings of expected delivery of tar, smoothest taste, or intentions to purchase if trying to reduce risks to their health. However, smokers were split as to which pack they might purchase, while nonsmokers consistently selected the packs that implied reduced risk. For example, when presented with two packs, one with a descriptor *full flavor* and the other with the descriptor *smooth*, nearly half of smokers selected each of the two packs (47% selected *full flavor* and 52% selected *smooth*) for purchase, while 71% of nonsmokers selected the pack labeled *smooth* ( $X^2=16.7$ ,  $p$ -value  $<0.001$ ). Smokers were also significantly more likely than

nonsmokers to select the pack with the graphic health warning when asked, compared to the pack with the text-based health warning, which health warning was more likely to attract their attention ( $X^2=6.3$ , p-value=0.04), which health warning was more likely to make people think about the health risks of smoking ( $X^2=10.1$ , p-value<0.01), was more likely to motivate smokers to quit ( $X^2=6.5$ , p-value=0.04), and is the most effective ( $X^2=8.3$ , p-value=0.02). No significant differences were detected between smokers and nonsmokers when examining ratings given to sets of packs manipulated with messages of framing or plain packaging. Results from these analyses remained consistent after logistic regression analyses were conducted, adjusting for age, gender, race/ethnicity, and education.

#### Current Smokers: Full Flavor versus “Light/Mild” Brands

Pack ratings were analyzed after stratifying for smokers who currently reported smoking a full flavor vs. any “light/mild” variety (light, ultra light, mild, or medium). Based on self-report, nearly 30% of smokers reported currently smoking a so-called low tar variety of their cigarette brand. When asked to rate sets of packs that vary by descriptor for perception of smoothest taste, current smokers of low tar brand cigarettes were significantly more likely to select the pack that included a descriptor that implied reduced risk: *light* ( $X^2=6.7$ , p-value=0.04), *smooth* ( $X^2=5.9$ , p-value=0.05), *6* ( $X^2=7.7$ , p-value=0.02), as compared to current smokers of full flavor cigarettes. Results from these analyses remained consistent after logistic regression analyses were conducted, adjusting for age, gender, race/ethnicity, education, and cigarettes per day.

## **DISCUSSION**

Consistent with the findings recently reported in both Canada and the UK<sup>3, 7</sup>, the results from this study confirm our hypothesis that consumers in the United States rate larger, graphic health warnings that convey a loss-framed message as most effective in communicating health risk information about smoking. Also consistent with previous studies, our results did not vary with respect to smoking status.

This study also tested the potential effect of source attribution of the message. Significant differences were not detected between the three manipulations presented to participants, although a significantly greater percentage chose the *Surgeon General's Warning* when asked which of the three packs presented a message that was "more truthful" or "more believable." This result is likely due to the greater familiarity that people have with the current Surgeon General's message that appears on cigarette packs. This variable may be more important now that the FDA has authority to regulate tobacco products and further research should be conducted to evaluate how smokers perceive the FDA's new authority with relation to tobacco.

The results from this study also confirm our predictions, based on earlier studies, that characteristics of package design such as colors and product descriptors convey information to consumers about product characteristics and health risks<sup>3, 7, 13, 15, 17, 18</sup>. Pack colors and descriptors such as *smooth*, *silver* and lower numbers, such as 6, do in fact communicate relative risk messages to smokers and nonsmokers. We also found that smokers of so-called low tar brands were more likely than smokers of full-flavor cigarettes to rate the packs with lighter colors and misleading brand descriptors as lower in tar delivery and posing less risk to health, indicating that at least for some smokers, these package features influence purchasing choices.

The findings also indicate that nonsmokers were more likely than smokers to select the pack that implied reduced risk through the inclusion of a descriptor when asked which of the two packs they would purchase. This finding indicates that perceptions of packaging are not necessarily based on “taste” or other sensory perceptions from smoking these brands. The results imply that nonsmokers will base their purchasing decisions and implicit health claims on packaging and labeling alone.

These findings have implications for implementation the FSPTCA. Although the FSPTCA does include a provision in Section 911 for the removal of the terms “light”, “mild”, or “low” from labels, labeling, or advertising, it also gives the FDA authority to mandate the prohibition of any other terms or pack elements that are found to imply differences in risk between brands<sup>5</sup>. Additionally, Section 202 of the FSPTCA gives the FDA authority to revise the warning label statements that will be required on cigarette packages, as well as issue regulations on which color graphics will be required to accompany these statements<sup>5</sup>. Additional research is critical to evaluate the nine statements that are currently outlined in the legislation and select the most effective graphics to illustrate each message.

An important finding from this study with respect to future government regulation of packaging is that participants were more likely to select the *branded* compared to *plain* white pack when asked which pack delivered the most tar, smoothest taste, was more attractive, appealed to youth under 18 years, and contained cigarettes of better quality. These results suggest that plain packaging may reduce many of the erroneous perceptions of risk communicated through design features on cigarette packs. This finding is supported by research by Wakefield et al.<sup>18, 19</sup> as

well, which found that compared with branded packs, smokers inferred that cigarettes from plain packs would be less rich in tobacco, less satisfying, and of lower quality tobacco. Additionally, the more recent study by Wakefield et al.<sup>19</sup> found that plain packs were rated as significantly less stylish, less sociable, and less attractive. In the present study, the use of a white background color for the plain packaging condition may offer a potential explanation for the finding that 46% of participants selecting the *branded pack* and 48% of participants selecting the *plain pack* when asked “Which one would you buy if you were trying to reduce the risks to your health?” Previous research has shown that plain packs are not perceived as less harmful when other colors, such as brown, are used as the standard background color<sup>7</sup>.

A limitation of this study is that participants were recruited using a convenient sampling method. Therefore, the results are not necessarily representative of smokers and nonsmokers in the U.S. However, the sample represents a heterogeneous group of adults with respect to age, ethnicity, and education categories, with nearly equal representation between men and women. Additionally, we would not expect significant differences in the results if conducted in different states in the United States as packaging and labeling regulations are currently federally mandated. Another limitation of this study, as noted in a similar study by Hammond and Parkinson<sup>3</sup>, is the “forced choice” nature of the pack ratings. Participants were asked to choose between two packs for each question posed; this method could potentially result in endorsement of a package design that might not have been chosen otherwise. However, a response of “neither” was also recorded if provided by participants, although this response was infrequently given.



The findings of this study coincide with widespread changes in U.S. tobacco packages as tobacco companies prepare for the ban on “light” and “mild” descriptors under the FSPTCA. Reynolds American Incorporated (RAI, formerly R.J. Reynolds Tobacco Company) has already responded to the court order with several brands of their cigarettes (including “Salem”, “Misty”, “Capri”, “Pall Mall”, “Monarch”, and “Gold Coast”) by changing both the descriptor labeling and, in some cases, the color shading of their Full Flavor, Light, and Ultra Light cigarette packs sold in the U.S. Beginning in early 2009, “Salem” cigarette packs were all printed in the same shade of green with their descriptor printed across the top of the box. However, as shown in Figure 1, RAI recently changed the packaging for Salem to include shading from green to silver and have changed the descriptor on their packs to “Box” (formerly “Full Flavor”), “Gold Box” (formerly “Light”), and “Silver Box” (formerly “Ultra Light”). These packs are being sold in the U.S. market today and anecdotally, it has been noted that both retailers and consumers continue to equate the new descriptors with previous terms. Therefore, the findings suggest that removal of descriptor terms, but not the associated colors, will be insufficient in eliminating deceptions about the risks from smoking that are communicated to smokers through packaging, and that plain packaging should be considered to eliminate this type of subtle communication.

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## **LIST OF FIGURES**



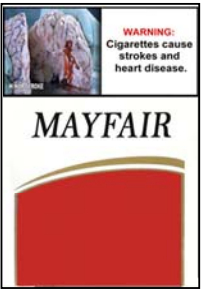

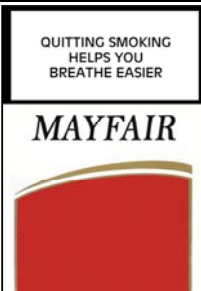



Figure 1. Example of Changes in Descriptor and Color Shading on packs of “Salem” cigarettes from 2006 to 2009.

**Table 1. Demographics and Tobacco Use Characteristics of Sample of Adult Smokers from Western New York, n=397.**

| Demographic Characteristic                      | Smokers<br>n=197 |     | Nonsmokers<br>n=200 |     | Total<br>n=397 |     |
|---|------------------|-----|---------------------|-----|----------------|-----|
|   | n                | %   | n                   | %   | n              | %   |
| <b>Age (years)*</b>                             |                  |     |                     |     |                |     |
| 18-24   | 80               | 41% | 73                  | 37% | 153            | 39% |
| 25-34   | 54               | 27% | 39                  | 20% | 93             | 23% |
| 35-44   | 31               | 16% | 32                  | 16% | 63             | 16% |
| 45-54   | 20               | 10% | 20                  | 10% | 40             | 10% |
| 55 and older                                    | 12               | 7%  | 36                  | 19% | 48             | 12% |
| <b>Sex*</b>                                     |                  |     |                     |     |                |     |
| Male  | 118              | 60% | 85                  | 43% | 203            | 51% |
| Female  | 79               | 40% | 115                 | 58% | 194            | 49% |
| <b>Race/Ethnicity</b>                           |                  |     |                     |     |                |     |
| White, non-Hispanic                             | 134              | 68% | 149                 | 75% | 283            | 71% |
| Black, non-Hispanic                             | 35               | 18% | 27                  | 14% | 62             | 16% |
| Hispanic  | 14               | 7%  | 13                  | 7%  | 27             | 7%  |
| Other, non-Hispanic                             | 13               | 7%  | 10                  | 5%  | 23             | 6%  |
| Refused   | 1                | 1%  | 1                   | 1%  | 2              | 1%  |
| <b>Highest level of Education*</b>              |                  |     |                     |     |                |     |
| Grade school or some high school                | 6                | 0%  | 4                   | 2%  | 10             | 3%  |
| Completed high school                           | 67               | 34% | 47                  | 24% | 114            | 29% |
| Technical or trade school                       | 46               | 23% | 29                  | 15% | 75             | 19% |
| Some university                                 | 48               | 24% | 43                  | 22% | 91             | 23% |
| Completed university degree                     | 28               | 14% | 60                  | 30% | 88             | 22% |
| Post-graduate degree                            | 2                | 1%  | 17                  | 9%  | 19             | 5%  |
| <b>Current tobacco use (Among Smokers only)</b> |                  |     |                     |     |                |     |
| Some days (even a puff in last 30 days)         | 55               | 28% | --                  | --  | --             | --  |
| Every day                                       | 142              | 72% | --                  | --  | --             | --  |
| <b>Cigarettes per day (median=17)</b>           |                  |     |                     |     |                |     |
| 0-10  | 77               | 39% | --                  | --  | --             | --  |
| 11-20   | 51               | 26% | --                  | --  | --             | --  |
| 21 or more                                      | 69               | 35% | --                  | --  | --             | --  |
| <b>Ever tried to quit</b>                       |                  |     |                     |     |                |     |
| No  | 47               | 24% | --                  | --  | --             | --  |
| Yes   | 150              | 76% | --                  | --  | --             | --  |
| <b>Planning to quit</b>                         |                  |     |                     |     |                |     |
| <1 month  | 48               | 24% | --                  | --  | --             | --  |
| 1-6 months                                      | 49               | 25% | --                  | --  | --             | --  |
| >6 months                                       | 59               | 30% | --                  | --  | --             | --  |
| Not planning to quit                            | 41               | 21% | --                  | --  | --             | --  |
| <b>Time to first cigarette</b>                  |                  |     |                     |     |                |     |
| <5 minutes                                      | 41               | 21% | --                  | --  | --             | --  |
| 6-30 minutes                                    | 35               | 18% | --                  | --  | --             | --  |
| 31-60 minutes                                   | 37               | 19% | --                  | --  | --             | --  |
| >60 minutes                                     | 84               | 43% | --                  | --  | --             | --  |







\*Significant differences detected between smokers and nonsmokers, Chi-square statistic, p-value&lt;0.05.

**Table 2. Frequencies of ratings given to pack sets illustrating style and message framing of health warning labels (n=397).**

| <b>WARNING LABEL FORMAT</b>  |  |   |  |  |
|--|--|---|--|--|
|  | <b>Graphic vs. Text</b>  |   | <b>Graphic vs. Text</b>  |  |
|  |   |   |   |   |
| <b>MEASURES</b>  |  |   |  |  |
| Attract attention  | <b>86%</b>   | 14%   | <b>86%</b>   | 14%  |
| Which one would you buy?   | 16%  | <b>83%</b>  | 16%  | <b>83%</b>   |
| Which one would you buy if you were trying to reduce the risks to your health? | <b>55%</b>   | 43%   | <b>58%</b>   | 40%  |
| Think about the health risks of smoking  | <b>91%</b>   | 8%  | <b>91%</b>   | 9%   |
| Motivate smokers to quit   | <b>89%</b>   | 10%   | <b>89%</b>   | 10%  |
| Most effective   | <b>90%</b>   | 10%   | <b>89%</b>   | 11%  |
|  | <b>Gain vs. Loss Framing</b>   |   | <b>Gain vs. Loss Framing</b>   |  |
|  |  |  |  |  |
| <b>MEASURES</b>  |  |   |  |  |
| Attract attention  | 35%  | <b>65%</b>  | 25%  | <b>75%</b>   |
| Which one would you buy?   | <b>83%</b>   | 15%   | <b>72%</b>   | 25%  |
| Which one would you buy if you were trying to reduce the risks to your health? | <b>68%</b>   | 32%   | <b>63%</b>   | 34%  |
| Think about the health risks of smoking  | 15%  | <b>84%</b>  | 16%  | <b>83%</b>   |
| Motivate smokers to quit   | 41%  | <b>59%</b>  | 40%  | <b>60%</b>   |
| Most effective   | 32%  | <b>68%</b>  | 24%  | <b>76%</b>   |

\*Bold entries indicate statistically significant difference (p-value<0.001) between responses based on Chi-square statistic.










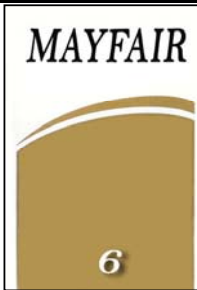


**Table 3. Frequencies of ratings given to pack sets illustrating size and attribution of health warning labels (n=397).**

| <b>WARNING LABEL FORMAT</b>  |  |   |  |
|--|--|---|--|
|  | <b>Size: 30% vs. 50% vs. 100%</b>  |   |  |
|  |   |   |   |
| <b>MEASURES</b>  |  |   |  |
| Attract attention  | 3%   | 3%  | <b>93%</b>   |
| Which one would you buy?   | <b>73%</b>   | 11%   | 14%  |
| Which one would you buy if you were trying to reduce the risks to your health? | 34%  | 11%   | <b>53%</b>   |
| Think about the health risks of smoking  | 1%   | 3%  | <b>95%</b>   |
| Motivate smokers to quit   | 2%   | 2%  | <b>96%</b>   |
| Most effective   | 2%   | 5%  | 92%  |
|  | <b>Attribution (Surgeon General vs. FDA vs. None)</b>                              |   |  |
|  |  |  |  |
| <b>MEASURES</b>  |  |   |  |
| Most truthful  | 28%  | <b>55%</b>  | 14%  |
| How truthful (Mean: 1 (not)-7 (very))  | <b>6.72</b>  | 6.5   | 6.48   |
| Message you believe  | 25%  | <b>54%</b>  | 14%  |
| How believable (Mean: 1 (not)-7 (very))  | <b>6.74</b>  | 6.52  | 6.46   |
| Which pack makes you think about quitting smoking?                             | 22%  | <b>51%</b>  | 14%  |

\*Bold entries indicate statistically significant difference (p-value<0.001) between responses based on Chi-square statistic.



**Table 4. Frequencies of ratings given to pack sets illustrating pack design characteristics (n=397).**

| <b>PACK DESIGN CHARACTERISTICS</b>   |   |  |   |   |
|--|---|--|---|---|
| <b>MEASURES</b>  | <b>Full flavor vs. Light</b>  |  | <b>Full flavor vs. Smooth</b>   |   |
|  |    |    |    |    |
| Most tar   | <b>92%</b>  | 4%   | <b>91%</b>  | 5%  |
| Smoothest taste  | 22%   | <b>77%</b>   | 5%  | <b>94%</b>  |
| Which one would you buy?   | 38%   | <b>62%</b>   | 37%   | <b>62%</b>  |
| Which one would you buy if you were trying to reduce the risks to your health? | 4%  | <b>94%</b>   | 9%  | <b>88%</b>  |
| <b>MEASURES</b>  | <b>Full flavor vs. Silver</b>   |  | <b>Dark vs. Light Shading</b>   |   |
|  |   |   |   |   |
| Most tar   | <b>81%</b>  | 14%  | <b>87%</b>  | 5%  |
| Smoothest taste  | 25%   | <b>72%</b>   | 20%   | <b>76%</b>  |
| Which one would you buy?   | 46%   | 52%  | 37%   | <b>61%</b>  |
| Which one would you buy if you were trying to reduce the risks to your health? | 18%   | <b>78%</b>   | 8%  | <b>87%</b>  |
| <b>MEASURES</b>  | <b>Number: 10 vs. 6</b>   |  | <b>Plain Packaging</b>  |   |
|  |  |  |  |  |
| Most tar   | <b>88%</b>  | 8%   | <b>54%</b>  | 37%   |
| Smoothest taste  | 22%   | <b>71%</b>   | <b>69%</b>  | 25%   |
| Which one would you buy?   | 42%   | <b>56%</b>   | <b>81%</b>  | 18%   |
| Which one would you buy if you were trying to reduce the risks to your health? | 8%  | <b>89%</b>   | 46%   | 48%   |
| More attractive  | N/A   | N/A  | <b>97%</b>  | 3%  |
| Appeal to youth under 18 years old   | N/A   | N/A  | <b>91%</b>  | 9%  |
| Contains cigarettes of better quality  | N/A   | N/A  | <b>92%</b>  | 6%  |

\*Bold entries indicate statistically significant difference (p-value<0.001) between responses based on Chi-square statistic.

**Figure 1. Example of Changes in Descriptor and Color Shading on packs of "Salem" cigarettes from 2006 to 2009.**

