

**Deadly in pink: The impact of female-oriented cigarette packaging on brand appeal, beliefs about smoking, and risk perceptions among young women**

by

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## **AUTHOR'S DECLARATION**

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

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## Abstract

Industry documents and anecdotal evidence suggest that cigarette packaging can target women by enhancing brand appeal and influencing important beliefs about smoking. Little research has been conducted on how cigarette pack design might contribute to young women's faulty beliefs about smoking. This study sought to identify package designs that promote misleading beliefs about the health effects of smoking and the relationship between smoking and weight control, and that increase brand appeal among young women; as well as the extent to which plain packaging reduces these beliefs.

A between-subjects experiment was conducted in which 512 participants between the ages of 18-25 years viewed cigarette packs using a computerized survey in one of four conditions: female-oriented (n = 141); female-oriented with descriptors (i.e., slims) removed (n = 125); female-oriented without brand imagery or descriptors (“plain”; n = 122); and standard non-female oriented (n = 124). Participants rated 8 cigarette packs on perceptions of appeal, taste, tar, and health risks; and answered questions about smoking and weight control and attitudes towards smoking.

Results of the study indicated that women found the female-oriented packs most appealing. Participants also believed that the female-oriented packs had fewer health risks than the same packs with descriptors removed. Women who viewed the plain packs were less likely to believe that smoking helps people control their appetites compared to women who viewed the female-oriented and non-female oriented packs. Women with more weight concerns were more likely to believe in a relationship between smoking and weight control.

Overall, this study demonstrates that as packages become “plainer” they become less appealing. Women viewing plain packs were less likely to endorse the belief that smoking can be used for appetite control, and that smoking helps people stay slim; and as descriptors were removed, packs were perceived to have more health risks. Results of the study extend the evidence base on the impact of cigarette packaging on women, and provide support for the implementation of plain packaging to reduce package appeal and faulty beliefs about smoking.

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## 1.0 INTRODUCTION

In the 1920s the face of tobacco advertising changed—from a man, to a sophisticated, glamorous, thin, and independent woman. At this time, tobacco marketing was primarily in the form of print advertisements;<sup>1</sup> however, in the face of recent advertising bans, cigarette packaging has become an increasingly dominant form of marketing by tobacco companies. Cigarette packages use colours, logos, names, and descriptors, all of which can affect a brand's perceived attractiveness and shape the social acceptability, positive attributes, and perceptions of risks of smoking.<sup>1</sup> These design techniques may be especially attractive to youth and young females in particular.<sup>1,2</sup> However, very little research has been conducted on the impact of packaging design to date.

Smoking remains a leading cause of death and disability for women. Lung cancer has now surpassed breast cancer as the leading cause of deaths due to cancer among women,<sup>3</sup> and women who smoke are also at risk for numerous other health problems such as infertility, low bone density, emphysema, heart disease, stroke, and several other types of cancer.<sup>3</sup> Although the rates of smoking have been decreasing overall and among young women in developed countries<sup>1</sup>, approximately 22% of young females in Canada smoke.<sup>4,5</sup> Since the vast majority of female smokers initiate smoking by the age of 18,<sup>6</sup> young females represent a critical population to be targeted by tobacco control efforts. Clearly, there is a need to develop more effective prevention strategies to reduce smoking initiation among women. Counteracting the tobacco industry's goal of reducing the perceived health risks of smoking, associating smoking with traits such as glamour and independence, as well as exploiting young women's concerns about body weight by associating smoking with thinness will be key strategies for curbing rates of smoking initiation among young girls.

The proposed project examined the impact of female-oriented packaging on the attitudes and perceptions of smoking among young women. In particular, the study examined how female-oriented packaging impacts young women's general attitudes towards smoking, beliefs about the relationship between smoking and weight control, perceptions of health risks, and general brand appeal. A "between-subjects" experiment was conducted, whereby participants viewed female-oriented cigarette packs, non-female oriented or "male" packs, or "plain" packages

with all images and descriptors removed, after which they completed a series of questionnaires regarding their attitudes towards, and beliefs about, smoking.

## **2.0 LITERATURE REVIEW**

### **2.1 Tobacco use in Canada**

Tobacco use is the leading preventable cause of death in the world,<sup>7,8</sup> and has been identified as a risk factor for six of the eight leading causes of death worldwide.<sup>8</sup> Between 1985 and 2006 smoking rates in Canada have fallen by approximately one-half (from 35% to 19%). At present, approximately 4.9 million Canadians remain smokers.<sup>4</sup> Thirteen percent of Canadians smoke daily (14.9 cigarettes per day on average), and 4% report smoking occasionally.<sup>4</sup>

Patterns of smoking among youth have followed a similar pattern as adults. Approximately 15% of young Canadians aged 15-19 years reported smoking in 2007, 9% of which reported daily smoking, and 6% reporting occasional smoking.<sup>4</sup> Among young adult Canadians aged 20-24 years, 27% reported smoking in 2008, 18% daily and 9% occasionally.<sup>4</sup> This is a significant decrease from 1999, when 28% of youth aged 15 to 19 and 35% of young adults aged 20-24 reported smoking.<sup>9</sup> Manufactured cigarettes remain the dominant form of tobacco use in Canada, as opposed to other forms of smoked tobacco and smokeless products.<sup>4,10</sup>

### **2.2 Women and Smoking**

#### ***2.2.1 Trends among women***

Cigarette smoking was relatively rare among men at the turn of the century, and increased dramatically following the First World War.<sup>6</sup> Between 1911 and 1949, the per capita consumption of cigarettes in the United States increased nearly twenty-fold.<sup>11</sup> The rates of smoking among women were considerably lower during this period, with US estimates of prevalence around 6% for women in the early 1920s.<sup>6</sup> It was about this time when tobacco marketing first began targeting women, most commonly by displaying images of women in tobacco advertisements on billboards and in print.<sup>1</sup> At this time, smoking was considered “audacious” for women, and thus ads began associating female smoking with rebelliousness and independence.<sup>1</sup> Advertisements continued to target women by boasting the mildness of cigarettes, going so far as to claim that cigarettes offered health benefits for one’s throat.<sup>1</sup> Soon after, advertisements began focusing on the association between smoking and thinness,

urging women to smoke instead of eat sweets.<sup>1</sup> Print advertisements showcased slim glamorous models juxtaposed against silhouettes of larger women.

Although most data from the first half the century comes from the US, trends in Canadian data appear to be similar. With increased advertising and acceptability of smoking, particularly among women, smoking among women continued to increase in the 1940s and 1950s and peaked in Canada around the 1970s, ten years following peak smoking rates among men.<sup>7</sup> Smoking among Canadian women decreased from 34% in 1965<sup>7</sup> to 18% in 2007<sup>4</sup>, with the majority of this decline occurring between 1974 and 1990.<sup>7</sup> In comparison, 52% of men were smokers in 1965<sup>7</sup>, and 20% were smokers in 2007.<sup>4</sup> Among young women aged 18 to 24 years, smoking declined from 37% in 1965-1966, to 25% in 1997-1998.<sup>7</sup> In 2008, this rate dropped to 13% among 15-19 year old females, and 22% among 20-24 year old females.<sup>4</sup>

By 1999, the gender difference in the prevalence of smoking had narrowed to only 4% among adult Canadian smokers aged 15 years and older, with more males reporting smoking than females.<sup>9</sup> A small increase to 6% was recorded in 2005, with the most recent data showing a difference of just 4% in 2008.<sup>4</sup> The trends among adult Canadians were opposite to the trends observed among young Canadians during this period. In 1999, more women than men between the ages of 15 and 17 years reported smoking (26% and 20%, respectively). For 18 and 19 year olds, however, the percentage of smoking changed to 36% and 32% for men and women, respectively.<sup>9</sup> Among young Canadians between the ages of 15 and 19 years, and between 20 and 24 years, more men than women continue to smoke (17% versus 13%, and 33% versus 22%, respectively).<sup>4</sup>

Notably, most smokers try their first cigarette before the age of 18 years,<sup>6</sup> making youth a particularly critical population to target with tobacco control strategies. In addition, individuals who initiate smoking at a young age have a greater chance of becoming regular smokers, and are less likely to be able to quit smoking.<sup>12</sup> If smoking has not been initiated by adolescence, it is unlikely to ever occur.<sup>13</sup>

In contrast to the narrowing gender differences observed among Western countries such as Canada, significant gender gaps persist in low- and middle-income countries. In China, for example, the percentages of male and female adult smokers are 57% and 3%, respectively.<sup>8</sup> There is concern that the prevalence of smoking among women in these countries will follow the historical increases seen among men in Western countries.<sup>14</sup> Although smoking rates

among men continue to decline worldwide, it has been suggested that female smoking rates could rise 20% by 2025,<sup>15</sup> largely due to the increase in female markets in developing countries.<sup>16</sup>

### ***2.2.2 Predictors of Smoking***

Smoking initiation is determined by a wide range of individual factors. Age is one important factor, as youth who begin smoking at a younger age are more likely to become regular smokers and less likely to quit smoking.<sup>12</sup> Socioeconomic status is another key predictor. Higher levels of parental socioeconomic status, as well as higher levels of disposable income among adolescents, tend to offer a protective effect against youth smoking.<sup>12</sup> For example, among Canadian youth in 2002, higher parental education was associated with lower levels of youth smoking.<sup>17</sup> The percentage of youth who reported ever smoking and whose parents reported having an education level less than secondary school was more than twice that of youth whose parents obtained a University degree. In addition, the proportion of Canadian youth reporting daily smoking and reporting a weekly income of \$20 or more were almost three times that of never smokers who had never seriously thought about smoking.<sup>17</sup>

Self-esteem is also an important predictor of smoking. Youth with high self-esteem are less likely to smoke than those with low self-esteem.<sup>12,18</sup> A higher proportion of Canadian youth who were never smokers or who had never seriously thought about smoking had higher self-esteem scores.<sup>17</sup> Interestingly, a higher proportion of Canadian females compared to males had low self-esteem scores.

The following sections will discuss three more key psychosocial predictors of youth smoking among females; perceived risk, concerns about body weight, and general attitudes towards smoking.

### ***2.2.3 Perceived health risks***

It is generally accepted that adolescents are unable to fully appreciate the risks associated with smoking.<sup>19</sup> In general, long-term health risks are typically less salient for youth.<sup>20,21</sup> Regarding long-term smoking risks, youth tend to hold a faulty belief that short-term or occasional smoking is safe, and that only long-term smoking can cause smoking related illnesses.<sup>19</sup> Data from the 2007 U.S.-based *Monitoring the Future Survey* demonstrated that only 39% of eighth

graders and 42% of tenth graders saw great risk in smoking one to five cigarettes per day, compared to seeing great risk in regular smoking at 61% and 68% respectively, for eighth and tenth graders. Among Canadian youth who have reported ever smoking, 24% believe that one must smoke for many years before any health damage occurs.<sup>17</sup> Conversely, youth who have never smoked were more likely than students who have smoked (beyond a puff) to believe that even occasional smoking can endanger one's health.<sup>17</sup> Adolescents may believe that they are at a decreased risk from smoking related health problems because they expect to be able to quit before any damage to their health occurs.<sup>19</sup> Contributing to this faulty belief may be that youth also tend to minimize the likelihood of becoming addicted to cigarettes, believing that they are less likely than their peers to become addicted to smoking.<sup>19,22,23</sup> Not surprisingly, smokers are more likely to endorse these beliefs than non smokers.<sup>19,22,23</sup>

#### ***2.2.4 Beliefs about smoking and weight control***

Beliefs about smoking and weight control have an important influence on the smoking behaviour of young women. In general, smokers weigh less than non-smokers, and weight gain is a consequence of smoking cessation,<sup>24</sup> particularly for women.<sup>25</sup> There is tremendous variation in the magnitude of this relationship, however. One estimate, summarizing across numerous studies, is that smokers weigh on average 7.13 lbs less than non-smokers (range of 2.36-14.99 lbs).<sup>24</sup> In addition, it was estimated that quitting smoking results in an average weight gain of 6.16 lbs (range of 1.76-18.07).<sup>24</sup> Regardless of the relationship between smoking and body weight, the potential exploitation of this idea by tobacco companies, particularly among young females, is an issue that demands attention.

Women and adolescent girls hold a common belief that smoking is an effective weight control strategy.<sup>26,27,28,29,30,31,32,33,34,35</sup> Not only are females more likely to endorse this belief than males<sup>34,35</sup> they are also more likely to report using cigarettes as a weight loss method.<sup>34</sup> Girls who are less satisfied with their bodies are theoretically more likely to initiate smoking for weight control purposes.<sup>28,36</sup> Indeed, research suggests that smoking initiation is higher among girls who highly value thinness, engage in dieting behaviours, express concern over body weight, or have negative views of their bodies.<sup>1,28,31,38</sup>

Several studies have linked smoking among female youth with weight concerns and dieting behaviours. In one study, young females were more likely to initiate smoking if they had a

Body Mass Index (BMI) that, according to the CDC, was “at risk of overweight”, or “overweight”, or, if they were attempting to lose weight.<sup>36</sup> In a 10-year cohort study of predictors of smoking among young women, Voorhees et al showed that adolescent girls (aged 18 and 19) were more likely to be daily smokers if they were currently trying to lose weight, or, if they were trying to lose weight when they were 9 and 10 years old.<sup>37</sup> In a longitudinal study conducted with middle-school girls, compared with girls who did not report any dieting behaviours at baseline, girls who dieted up to once per week had two times the adjusted odds of reporting smoking in the last month two years later.<sup>38</sup> Girls who reported dieting more often had four times the adjusted odds of reporting smoking in the last month. In a similar cross-sectional study, it was found that girls aged 9 to 14 years who reported daily dieting behaviours were almost two times more likely than girls who dieted less to have experimented with smoking.<sup>39</sup>

It is not only dieting behaviours that predict smoking, but also concerns and thoughts about weight and body appearance have been shown to predict smoking. In a cross-sectional and prospective study, girls who at baseline reported trying to lose weight, reported two or more eating disorder symptoms, or who reported having frequent thoughts concerning their weight were almost twice as likely as those not reporting these behaviours or concerns to initiate smoking.<sup>40</sup> Furthermore, girls reporting trying to lose weight over the past year, reporting two or more eating disorder symptoms, reporting a fear of gaining weight, or reporting a strong desire to be thin were about twice as likely to be current smokers compared to girls not reporting these behaviours or concerns. In another study, girls who highly valued thinness were more likely to initiate smoking than girls who did not.<sup>33</sup> Perceptions of weight have also been linked to smoking behaviour, with studies demonstrating that girls who perceive themselves as being either overweight or slightly underweight are more likely to smoke or be susceptible to smoking.<sup>41,42</sup> This finding might suggest that some youth see smoking as a method of maintaining a thin body weight, and not just as a method of weight loss.<sup>41</sup> Even contemplation of smoking has been positively related to weight concerns, such as misperception of being overweight, unhappiness with appearance, and a tendency to change eating patterns when around peers.<sup>39</sup>

Overall, it appears that dieting behaviours and concerns about weight and body image may increase the chances of smoking initiation in the young female population. Additionally,

females may be reluctant to quit smoking for fear of gaining weight.<sup>26</sup> Indeed, the tobacco industry has been aware of women's fear of weight gain following smoking cessation for decades, evidenced by a 1973 Lorillard industry quote noting that, "One [reason why women may be less likely to quit smoking than men] is the greater concern women have that if they stop smoking they will gain weight...this fear undoubtedly prevents many women from desiring to stop smoking".<sup>43</sup> In addition to the relationship between weight concerns and smoking initiation among female youth, research has also demonstrated that adult women smokers with weight concerns were more likely to believe that smoking suppresses weight gain.<sup>30</sup>

### ***2.2.5 General attitudes towards smoking***

A primary objective of tobacco marketing is to encourage positive attitudes towards smoking and those who engage in the behaviour. Previous research has documented the ability of tobacco marketing to associate smoking with such positive and appealing attributes as female liberation, independence, glamour, success, and thinness.<sup>26,44,45</sup> Industry documents have also indicated that female-oriented cigarettes have been designed and marketed with the goal of promoting the social acceptability of smoking, by including less tobacco in the product and claiming they have lower tar concentrations and sidestream smoke.<sup>46</sup> Furthermore, increases in smoking following mass female-oriented cigarette marketing have been identified. For example, among females aged 14 to 17 years, a sharp increase in smoking initiation between 1967 and 1973 has been identified; a time period that coincided with the introduction of three new cigarette brands targeting females (Virginia Slims, Silva Thins, and Eve).<sup>47</sup> No increase in smoking initiation was noted for youth younger than 14 years or for females over 17 years, or for males.

Overall, while the impact of tobacco marketing, advertising, and promotion on women's attitudes and beliefs about smoking has been well established, the role and impact of female-oriented product and package design has received less attention and is much less well known.<sup>26</sup>

## 2.3 Cigarette Packaging

### 2.3.1 *The pack as marketing*

Tobacco marketing is a multi-billion dollar a year industry.<sup>1</sup> This includes direct advertising, as well as tobacco sponsorship and promotions. Advertising can build a brand's image, raise the salience of a brand, and reduce health-related fears associated with using the product.<sup>1</sup> The cigarette pack has become a critical form of advertising in the face of recent and extensive tobacco advertising bans. Product packaging helps to establish brand identity and serves as an effective form of promotion, both at the point of purchase and while the product is being used.<sup>48</sup> This is particularly the case for cigarette packages due to their high degree of social visibility.<sup>49</sup> The cigarette pack is displayed each time the consumer uses the product, and is also visible to the public between uses.<sup>50</sup> As John Digianni, a former cigarette package designer noted: "A cigarette package is unique because the consumer carries it around with him all day...It's a part of a smoker's clothing, and when he saunters into a bar and plunks it down, he makes a statement about himself."<sup>51</sup>

Tobacco packaging, like other forms of marketing, seeks to establish brand identity and promote brand appeal. The package is designed to shape consumer's expectations about the brand, both in terms of quality and image.<sup>52</sup> Research suggests that even the name of the cigarette brand is enough to alter people's beliefs about the quality and attractiveness of cigarettes. When Friedman and Dipple had 200 men and women smoke identical cigarettes but told them the brand was called either "April" (a feminine name) or "Frontiersman" (a masculine name), women rated the cigarettes named "April" more favourably, whereas the men rated the cigarettes they believed were named "Frontiersman" more favourably. Furthermore, the effect was stronger for women, compared to men.<sup>53</sup>

Research consistently demonstrates that the effect of cigarette package brand imagery is stronger for adolescents than adults.<sup>49,54</sup> This is of particular importance given that adolescence is the period in which smoking behaviour and brand preferences develop.<sup>49</sup> Tobacco industry documents have revealed a marketing strategy of promoting the idea that smoking a particular brand can offer benefits in dealing with many of the emotional challenges associated with the period of adolescence.<sup>52</sup> Qualitative studies of brand preference among adolescents have also demonstrated that youth cite characteristics such as colour, illustrations, and letter font as

important elements of what makes one cigarette package more attractive than another.<sup>2</sup> When Canadian youth were asked how they think cigarette companies get teenagers to notice their brands, the most common answer was, “package design”.<sup>55</sup> As more extensive marketing bans are implemented, such as the ‘powerwall’ bans in Canada, the use of cigarette packages as marketing will become even more important, especially to new young smokers.

### ***2.3.2 Targeting women: Package design***

Colours and brand imagery included on cigarette packages can influence smoking behaviour.<sup>26</sup> Packages with lighter colours, such as silver and white are associated with “healthier” brands, compared to colours such as red.<sup>50</sup> For example, a study of UK adult smokers demonstrated that almost half of participants believed that cigarettes contained in a light grey package would have lower associated health risks compared to cigarettes from an otherwise identical red package.<sup>56</sup>

Package colours—especially pink and other pastels—are increasingly being used to target young women.<sup>26,50</sup> However, there is surprisingly little empirical evidence concerning the impact of these design strategies on women. Several US and Canadian brands, such as *XS* and *Camel*, now offer cigarettes that come in female-oriented pink packages. Other colours commonly used include purples, white, and light yellow.<sup>1</sup> These colours have been shown to suggest positive qualities such as freshness, femininity, cleanliness, purity, health, and intelligence.<sup>1,50</sup> Such colours and the use of other feminine symbols and images are widely acknowledged to portray smoking as feminine and stylish, in an attempt to make cigarettes more appealing to women, as well as to reduce perceived health risks.<sup>26,50</sup> Most recently, Phillip Morris released its newest attempt at targeting young women with “purse packs”—*Virginia Slims “Superslims”* that are contained in slim pink packages that are much narrower in diameter than regular packages, and easier to carry in one’s purse.

### ***2.3.3 Targeting women: Package descriptors***

An important element of package marketing is the choice of brand descriptors—words and numbers—displayed on the package, such as “light”, “mild”, and “smooth”. Prior to a ban on select packaging labels by the World Health Organization’s Framework Convention on Tobacco Control (FCTC), misleading descriptors such as “light” and “mild” were used widely

in tobacco advertising. It has been shown that these terms can reinforce false beliefs that “light” cigarettes are less harmful than regular cigarettes.<sup>57</sup> While little research on the impact of misleading descriptors has been conducted with regards to youth, there is some evidence that suggests that youth, like adults, perceive “light” and “low-tar” cigarettes to be less harmful and less addictive than regular cigarettes.<sup>58</sup> Although such misleading terms are now banned in over 40 countries, including Canada and soon to be the United States, tobacco companies are now using alternate terms and descriptors to differentiate between brands within the same brand family. Though very little research has been conducted to date, preliminary evidence suggests that these terms and design changes may be interpreted in the same way as descriptors such as “light”—that is, as indicators of a product’s risk.<sup>59</sup> For example, in a recent study of Canadian adults, when presented with two packages identical in all ways except for a number descriptor (5 versus 9), participants were more likely to believe that the package with the number 5 descriptor was associated with less health risks than the package with the number 9 descriptor.<sup>59</sup> These new terms may prove especially appealing to young women, who typically select brands with lower tar and nicotine levels (previously labelled as “light” and “mild”).

Package design can also be used to target specific subgroups of youth and certain beliefs about smoking. Brand descriptors such as “*slims*” are used to exploit women’s concerns about body weight and the relationship between cigarette smoking and thinness.<sup>26</sup> Indeed, most cigarette brands that have traditionally targeted women include “*slims*”, “*super slims*”, or “*extra slims*” varieties. In addition, recent studies have shown that women tend to believe that “slim” cigarettes are less harmful due to a belief that lower levels of tobacco are consumed.<sup>36</sup>

It is also unclear how young females perceive flavour-related descriptors. For example, many female brand families, such as *Benson and Hedges*, include menthol varieties in their brand family. Menthol brands and those with other flavour-related descriptors, such as *vanilla*, *chocolate*, and *cherry*, are more common among youth and widely believed to be “starter brands”.<sup>60</sup> Flavoured brands may also be attractive to young women because they may counteract social pressures and cosmetic concerns that are specific to female smokers.<sup>26</sup> Indeed, a 1985 B&W memorandum discussing the potential for introducing flavoured cigarettes noted that, “Inexperience smokers, especially fad-conscious young people, would be interested in flavored cigarettes”, and that “Young women, much more so than men, would be likely to smoke a flavored cigarette”.<sup>61</sup>

#### ***2.3.4 Removal of colour and brand imagery; Plain packaging***

“Plain packaging” has recently emerged as a promising option for reducing such misleading information on packages.<sup>62</sup> Plain packaging would standardize the appearance of cigarette packages by removing all brand imagery, colour, and corporate logos from packs. This is a particularly attractive regulatory option for minimizing the impact of package marketing, as research suggests that plain packages are viewed as less attractive and engaging<sup>63</sup>, particularly for youth.<sup>64,65</sup>

In addition to the reduction in brand appeal, plain packaging may increase the effectiveness of health warnings and overall perceptions of risk.<sup>55,66</sup> Beede and Lawson, for example, demonstrated that youth more accurately recalled health warnings from plain cigarette packages compared to standard cigarette packs.<sup>66</sup> A very similar study with Canadian youth aged 14 to 17 years yielded similar findings; youth were better able to recall health warnings when viewed on plain, versus standard, packages.<sup>67</sup>

Finally, plain packaging reduces the false belief that some cigarette brands are less harmful than others.<sup>68</sup> For example, UK adult smokers were recently shown pairs of packs in normal branded packages and the same pairs in plain versions, without colours or brand imagery. Respondents were significantly less likely to perceive differences in the health risks of brands when rating the plain packages compared to the branded versions.<sup>56</sup> Given that consumers use colours and brand design elements to form judgements about the harmfulness of different brands, there is a need for additional research on the extent to which removing female-oriented colours and descriptors would alter beliefs about smoking among young women.

### **2.4 Summary**

Although cigarette smoking has been steadily declining in developed countries, the rates for young women have declined more slowly, and it is estimated that 22% of young women in Canada still smoke. Female smoking rates could increase significantly in developing countries, as tobacco marketing continues to focus on targeting women.

It has been clearly demonstrated that young women hold a belief that smoking can help with weight control and maintenance. Furthermore, evidence suggests that young women who have concerns about their weight, highly value thinness, or engage in dieting behaviours are at a

higher risk of initiating cigarette smoking. While the ability of cigarette advertising and promotion to send messages to girls regarding smoking and weight has been established, the role of cigarette packaging in sending these messages has yet to be documented. Similarly, while tobacco marketing and advertising has been effectively used to ease the concerns of health-conscious smokers and make associations between smoking and positive attributes such as glamour, independence, and overall social acceptability of smoking, the role of female-oriented cigarette packaging in reducing perceived risk and promoting more positive attitudes towards smoking are unknown.

## **3.0 STUDY RATIONALE**

### **3.1 Rationale**

Tobacco packaging is an important form of marketing that establishes brand identity and shapes consumers' perceptions and beliefs about smoking. Currently, there is little research that systematically evaluates the impact of tobacco packaging that uses colours, images, and descriptors that directly target women. Thus, there is a need for well-designed experimental studies that provide decision-makers with high quality evidence on the impact of current industry practices in package design.

### **3.2 Purpose and Research Questions**

The specific research questions to be addressed are:

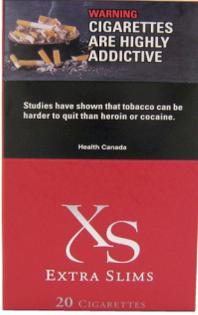
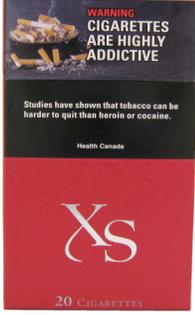
1. Do young females perceive packages using female-oriented colours and brand descriptors as more appealing?
2. Does viewing female-oriented cigarette packages increase positive attitudes towards smoking among young women?
3. Are packages with female-oriented colours and brand descriptors perceived as less harmful?
4. Are female-oriented cigarette packages associated with beliefs about smoking and weight control?
5. To what extent does "plain" packaging reduce perceptions of brand appeal, positive attitudes towards smoking, perceptions of health risk, and beliefs about smoking and weight control among young women ?

## 4.0 METHODS

### 4.1 Study design

A “between-subjects” experimental study was conducted. Participants were randomized to one of four conditions in which they were asked to rate a series of cigarette packages that were selected according to each of the four experimental conditions: 1) female-oriented packages; 2) female-oriented packages with brand imagery, including colours and graphics, but with descriptors (i.e., “super slims”) removed; 3) female-oriented packages without brand imagery and descriptors (i.e., “plain” packages); and 4) leading Canadian cigarette brands of “regular” or non-female oriented packages. See Figure 1 for an example of experimental conditions.

**Figure 1: Experimental Conditions**

Condition 1	Condition 2	Condition 3	Condition 4
Female “Standard”	Female “No Descriptors”	Female “Plain”	Non-female oriented (“Male”)
			

#### 4.1.1 Participants and recruitment

Participants consisted of 512 females between the ages of 18-25 from throughout Canada, including both smokers and non-smokers. This age group was chosen as this is a critical period for smoking initiation and when brand preferences develop.<sup>6</sup> Participants were recruited from a consumer panel through Global Market Institute, Inc. (GMI), a market research service. GMI maintains a panel of participants from over 200 countries, including a representative panel of over 400,000 Canadians. To register with GMI, participants first provide their contact information and agree to GMI’s privacy policy and user agreement. Next,

they are prompted to check their e-mail for a confirmation notice. Participants must click on a link contained in a registration e-mail to activate their membership. Respondents in GMI's participant pool are invited to participate in the online web surveys by e-mail. Participants who complete online surveys are reimbursed with "market points", which correspond to US dollars. The amount of "market points" given per survey depends on the survey length and the urgency of the online survey (more urgent surveys offer higher incentives). Each "market point" is worth approximately five US cents, and most average length surveys (approximately 15-20 minutes) offer between 5 and 10 market points each. Sample characteristics can be found in Table 1.

#### ***4.1.2 Protocol***

Participants were sent email invitations to complete the survey from GMI. Once participants opened the survey link, they were presented with the information and consent form, and had to indicate that they "agreed" with the terms before continuing with the rest of the survey.

Participants who agreed to the consent form were invited to complete the remainder of the survey. We defined smokers and non-smokers as respondents who answered "yes" and "no", respectively, to the question, "Have you smoked cigarettes in the past 12 months?". To ensure equal numbers of smokers and non-smokers in each experimental condition, participants were first characterized as smokers or non-smokers, and then randomized to each of the four experimental conditions separately, based on their smoking status. Following this, participants were asked to provide their opinions of different cigarette packages (description below), in addition to providing basic demographic information.

*Presentation and rating of packages*—Each participant was asked to view eight cigarette packages, one at a time, and instructed to rate each of the packages on various outcomes (see *brand ratings* below). After all eight packs were viewed and rated, participants were asked to complete a series of measures to assess outcomes related to their *beliefs and attitudes towards smoking*.

*Selection of packages*—The eight "female-oriented" brands were selected based on previous research and internal industry documents. These brands feature the descriptors *extra slims*, *slims*, *menthol*, *cherry*, and *vanilla*, as well as "traditional" female colour schemes, such as pink, white, and other pastels. The brand descriptors and brand imagery of each female-

oriented package was modified according to the experimental condition: in Condition 2 (Female No Descriptors condition), packs were shown with brand imagery but no descriptors, and in Condition 3 (Female Plain condition), packs were shown without either brand imagery or descriptors. The non-female oriented, “Male” packages featured in Condition 4 were selected to act as a control condition. These brands included “full flavour” or “regular” varieties of cigarette brands in Canada, the United States, and Europe. Figure 2 and Figure 3 display the female-oriented and “Male” packages chosen for the current study, respectively.

**Figure 2: Female-Oriented cigarette brands selected for the study**



**Figure 3: Male cigarette brands selected for the study**



All packages in the study displayed the same health warning (covering 50% of the principal display surface, in accordance with Canadian regulations), to control for any effect of the warnings across experimental conditions (see Figure 4).

**Figure 4: Health warning selected for study**



### ***4.1.3 Pilot Testing***

All aspects of the study were pilot tested with a sample of 10 participants between April and May 2009. The pilot test was used to evaluate the recruitment protocol, comprehension of survey measures, and online survey functionality. Based on the results of the pilot test, minor changes were made to the format of the online survey.

## **4.2 Analysis**

### ***4.2.1 Measures***

#### ***4.2.1.1 Socio-demographic variables and moderators***

A full version of the survey and all measure are included in the Appendix. Socio-demographic measures included **age**, **education** level, **income**, and **ethnicity**. **Education** level was determined by response to the survey item, “What is the highest level of formal education that you have completed?”. **Income** was determined by response to the survey item, “Which of the following categories best describes your annual household income, that is the total income before taxes, or gross income, of all persons in your household combined, for one year?”. Ethnicity was assessed by asking, “People in Canada come from many racial and cultural groups. Are you . . .”. Participants were presented with twelve ethnicity options to choose from, in addition to “other”.

Other moderator variables include **self-esteem**, **smoking status**, and **weight concerns**. **Self-esteem** was measured by administering five questions commonly used to assess self-esteem in surveys with young people.<sup>69</sup> Responses to each question were made on a 5-point false-to-true scale where higher scores indicate higher self-esteem. The overall self-esteem score is the sum of the individual scores for the five questions.

**Smoking behaviour** was measured according to previous research.<sup>70</sup> *Smokers* were defined as respondents who reported smoking either daily, weekly, or monthly. *Non-smokers* were defined as respondents who reported smoking less than monthly or not at all.

**Weight concerns** were determined by administering five questions assessing recent attempts to lose weight and concerns over body weight and shape, as used in previous research.<sup>40</sup> Questions were altered to follow a 5-point never-to-all the time scale. The overall

weight concern score was calculated as the sum of the individual scores for the five questions, with higher scores representing greater weight concerns.

#### **4.2.1.2 Brand ratings**

Participants were asked to rate each individual package on brand **appeal**, **perceived taste** and two health-related outcomes (**tar delivery** and **health risks**). Responses were recorded using scales ranging from 1 to 5. Brand **appeal** was determined by asking, “In your opinion, how appealing would this brand of cigarettes be to young women your age compared to other brands on the market?”, with responses ranging from “A lot less appealing than other brands” to “A lot more appealing than other brands”. **Appeal** ratings were recoded so that “A lot more appealing” and “A little more appealing” received a score of “1”, and “A lot less appealing”, “A little less appealing”, “No Difference” and “Don’t Know”, were scored a “0”. In addition, an overall **appeal** index score was made by summing the total appeal ratings to create an index score out of 8.

**Perceived taste** was assessed by asking, “How do you think these cigarettes would taste, compared to other cigarette brands?” with responses ranging from, “A lot worse than other brands”, to “A lot better than other brands”. **Taste** ratings were recoded so that “A lot better” and “A little better” received a score of “1”, and “A lot worse”, “A little worse”, “No Difference” and “Don’t Know” were scored as “0”. In addition, an overall **taste** index score was made by summing the total taste ratings to create an index score out of 8.

**Tar delivery** was assessed by asking, “How much tar do you think these cigarettes would have compared to other cigarette brands?”, with responses ranging from “A lot less tar than other brands” to “A lot more tar than other brands.” **Tar** ratings were recoded so that “A lot less tar” and “A little less tar” received a score of “1”, and “A lot more tar”, “A little more tar”, “No Difference” and “Don’t Know” were scored as “0”. In addition, an overall **tar** index score was made by summing the total tar ratings to create an index score out of 8.

Finally, **health risks** were assessed by asking, “How would the health risks of these cigarettes compare to other cigarette brands?”, with responses ranging from “A lot less risks than other brands” to “A lot more risks than other brands”. **Health risk** ratings were recoded so that “A lot less risk” and “A little less risk” received a score of “1”, and “A lot more risk”, “A little more risk”, “No Difference” and “Don’t Know” were scored as “0”. In addition, an

overall **health risk** index score was made by summing the total risk ratings to create an index score out of 8.

#### ***4.2.1.3 Smoker-image ratings***

In addition, for each package, respondents were asked to rate **smoker image** by describing a typical smoker of each pack by answering the question, “In your opinion, someone who chooses to smoke this brand is *more likely* to be..” for eight characteristics: female/male, glamorous/not glamorous, cool/not cool, popular/not popular, attractive/unattractive, slim/overweight, exciting/boring, sophisticated/not sophisticated. For each set of traits, respondents could choose either trait or “No Difference”. The female/male question was recoded so “Female” was scored a “1”, and “Male”, “No Difference”, and “Don’t Know” were scored a “0”. For the remaining traits, the more desirable trait was scored a “1”, and the less desirable trait, “No Difference”, and “Don’t Know” were scored a “0”. The female/male trait was analyzed separately for each package, whereas the remaining traits were combined and analyzed as a smoker trait index variable, where the scores for positive smoker traits were summed.

#### ***4.2.1.4 Beliefs and attitudes towards smoking***

Beliefs and attitudes towards smoking were measured following completion of all individual pack ratings. Measures included questions about the following:

**Smoking and weight control beliefs** were assessed to determine the degree to which young women believe that smoking helps control appetite, assists with weight maintenance, and that smoking cessation can lead to weight gain. Two novel questions were developed for the current project: “Please indicate how much you agree or disagree with the following statement: Smoking helps people control their appetites”, and “Please indicate how much you agree or disagree with the following statement: Quitting smoking causes weight gain”. To ensure the rating scales for the smoking and weight control belief questions were consistent, the third question commonly used in youth smoking surveys, “Does smoking help people stay slim”<sup>69</sup> was altered to match with the agree-to-disagree scale (“Please indicate how much you agree or disagree with the following statement: Smoking helps people stay slim”). For each question, response options ranged from “Strongly Agree” to “Strongly Disagree”. Each question was

analyzed on its own, reverse coded so that higher numbers indicate stronger beliefs in a relationship between smoking and weight control.

**Perceived risks** from smoking were assessed using two questions relating to general perceived risks of smoking. Questions included: “In your opinion, is there any danger to your health from smoking an occasional cigarette?”, and, “In your opinion, if a person quits smoking before the age of 30, can they avoid all of the health risks from smoking?” For each question, response options ranged from “Strongly Agree” to “Strongly Disagree”. Each question was analyzed separately, with higher numbers indicating greater risk.

**Attitudes** towards smoking were assessed by asking various questions relating to social norms and acceptability of smoking, including: “Please indicate how much you agree or disagree with the following statement: My friends approve of smoking”, and, “Please indicate how much you agree or disagree with the following statement: My friends would date a smoker”. General perceptions of smoking were assessed by asking, “Please indicate how much you agree or disagree with the following statement: Smoking can be glamorous”, and, “Please indicate how much you agree or disagree with the following statement: Tobacco companies target people my age”. Each question was analyzed separately, and reverse coded so higher scores indicated more agreement with the question.

#### ***4.2.2 Analyses***

All analyses were conducted in SPSS version 17.0. The general methods and analyses are outlined below.

For each hypothesis, univariate descriptive statistics were calculated and reported, including the mean and standard deviations where applicable. Each hypothesis was examined in two steps. In the first step, the “main effects” model was tested and included only the “condition” variable in a linear or logistic regression, depending on the whether the dependent variable was binary (logistic) or continuous (linear). In this step, the condition variable was entered as a categorical variable to examine comparisons between each of the 4 experimental conditions. In Step 2 of the model, the following variables were entered as predictors in the model to examine the influence of potential moderators: **age, education, income, self-esteem, smoking status** and **weight concerns**. **Self-esteem** was excluded from the list of moderators included in the

beliefs and attitudes towards smoking analyses (perceived risks, attitudes towards smoking, and smoking and weight control beliefs questions).

The male packs were not included in the pack-specific comparisons for appeal, taste, tar, and health risks, as they were not necessarily part of the same brand family as the female-oriented packs. Whereas the female-oriented packs in the *Standard*, *No Descriptors* and *Plain* pack conditions were variant forms of the same package, the packs in the *Male* conditions were chosen independently of the female-oriented packs. As such, direct pack comparisons of the female-oriented packs to the male packs would have little to no value in the current study, as it would be impossible to determine the specific elements that may have resulted in any differences seen when examining the individual package ratings. The male packs were included in the index comparisons for appeal, taste, tar, and health risks, as well as all other analyses where overall scores or ratings were used.

Seven participants were removed because they responded “Don’t Know” on the demographic questions relating to Income and Education, and would therefore have been excluded from the regression analyses. Twenty-three respondents were removed because they were under the minimum age of 18 years required to participate in the study.

## 5.0 RESULTS

### 5.1 Descriptive Statistics

#### 5.1.1 Sample characteristics

Table 1 presents the summary statistics for the study participants. There were no statistically significant differences between the four conditions on any variables.

**Table 1: Sample Characteristics (n = 512)**

	<b>Standard</b>	<b>No Descriptors</b>	<b>Plain</b>	<b>Male</b>	<b>Total</b>
<b>Condition</b>	n=141	n=125	n=122	n=124	n=512
<b>Age</b>	22.1 (2.1)	21.8 (2.2)	22.0 (2.2)	22.0 (2.2)	22 (2.2)
<b>Ethnicity:</b>					
White	70.2% (99)	73.6% (92)	72.1% (88)	74.2% (92)	72.5 (371)
Other	29.8% (42)	26.4% (33)	27.9% (34)	25.8% (32)	27.5 (141)
<b>Income:</b>					
Under \$10,000 to \$29,999	31.2% (44)	27.2% (34)	25.4% (31)	27.4% (34)	27.9% (143)
\$30,000 to \$59,999	29.8% (42)	32% (40)	33.6% (41)	26.6% (33)	30.5% (156)
\$60,000 and up	27.7% (39)	32% (40)	32.8% (40)	32.3% (40)	31.1% (159)
Not Stated	11.3% (16)	8.8% (11)	8.2% (10)	13.7% (17)	10.5% (54)
<b>Education:</b>					
Grade school to high school	22.7% (32)	24% (30)	30.3% (37)	28.2% (35)	26.2% (134)
Technical/trade/community college	22.7% (32)	17.6% (22)	18% (22)	21% (26)	19.9% (102)
University to post-grad degree	54.6% (77)	58.4% (73)	51.6% (63)	50.8% (63)	53.9% (276)
<b>Current Smokers</b>	45.4% (64)	43.2% (54)	45.9% (56)	48% (59)	45.6% (233)
% Daily smokers	40% (56)	33.1% (41)	36.9% (45)	36.1% (44)	36.6% (186)
% Weekly smokers	4.3% (6)	4.8% (6)	5.7% (7)	6.6% (8)	5.3% (27)
% Monthly/less than monthly smokers	5.7% (8)	15.3% (19)	10.7% (13)	9.8% (12)	10.2% (52)
<b>Amount smoked (cigarettes per day)</b>	11.2 (8.5)	10.4 (9.2)	9.4 (6.7)	8.3 (7.0)	9.8 (8.0)
<b>Plans to quit smoking (smokers only):</b>					
In next month	17.7% (11)	15.4% (8)	10.4% (5)	11.1% (6)	13.9% (30)
In next 6 months	22.6% (14)	32.7% (17)	33.3% (16)	27.8% (15)	28.7% (62)
Beyond 6 months	40.3% (25)	40.4% (21)	47.9% (23)	44.4% (24)	43.1% (93)
Not planning to quit	19.4% (12)	11.5% (6)	8.3% (4)	16.7% (9)	14.4% (31)

## 5.2 Effect of Cigarette packages on Perceptions of Appeal

### 5.2.1 Appeal ratings for individual packs

Participants were asked to rate how appealing they thought each of eight cigarette packages would be to other young women their age, compared to other cigarette brands on the market. Responses are given in Table 2.

**Table 2: % Agreeing that Pack is “a Little” or “a Lot” more Appealing (n=512)**

Condition								
	% Agreeing that pack is “a little” or “a lot” more appealing than other brands							
<b>Standard Female</b>	60.3%	27.7%	38.3%	55.3%	66.0%	60.3%	47.5%	66.7%
<b>No descriptors Female</b>	49.6%	29.6%	31.5%	46.0%	52.0%	56.8%	35.2%	64.0%
<b>Plain Female</b>	14.8%	21.3%	31.7%	19.7%	14.8%	44.3%	36.9%	16.5%

Table 3 displays the results of a logistic regression predicting pack appeal ratings for each cigarette pack. When examining the package ratings for each of the eight packs in the three female conditions, a main effect of condition was significant for packs 1 ( $p < .001$ ), 4 ( $p < .001$ ), 5 ( $p < .001$ ), 6 ( $p = .04$ ), and 8 ( $p < .001$ ). The ratings of pack appeal were higher in the *Standard* condition than the *No Descriptors* condition for packs 5 ( $p = 0.02$ ) and 7 ( $p = 0.04$ ). Similarly, the ratings of pack appeal were higher in the *Standard* condition than the *Plain* pack condition in packs 1, 4, 5, 6, and 8 (all  $p < .001$ ). Ratings of pack appeal were higher in the *No Descriptors* condition than the *Plain* pack condition for packs 1 ( $p < .001$ ), 4 ( $p < .001$ ), 5 ( $p < .001$ ), 6 ( $p = 0.05$ ), and 8 ( $p < .001$ ). The patterns remained the same in each of the eight models after adjusting for age, smoking status, income, education, ethnicity, weight concerns, and self-esteem, except for Pack 1. After adjusting for the moderators in Pack 1, the *Standard* pack was rated significantly more appealing than the *No Descriptors* pack ( $p = 0.05$ ).

**Table 3: Logistic regression predicting Individual Pack Appeal Ratings (n = 385)**

	$\chi^2$	Sig	Unadj Odds Ratio (95% CI)	Sig	$\chi^2$ Change	Sig	Adj Odds Ratio (95% CI)	Sig	Moderators (OR, 95% CI, Sig)
<b>Pack 1</b>	64.346	<i>p</i> < .001			20.116	<i>p</i> = 0.028			
<b>Standard Vs. No Descriptors</b>			0.648 (0.399, 1.055)	<i>p</i> = 0.081			0.598 (0.360, 0.993)	<i>p</i> = 0.047	<i>Smoking status: 1.530 (0.900, 2.601), p = 0.011</i>
<b>Standard Vs. Plain</b>			0.114 (0.062, 0.208)	<i>p</i> < .001			0.94 (0.050, 0.178)	<i>p</i> < .001	
<b>No Descriptors vs. Plain</b>			0.176 (0.095, 0.324)	<i>p</i> < .001			0.158 (0.084, 0.297)	<i>p</i> < .001	
<b>Pack 2</b>	2.456	<i>p</i> = 0.293			10.267	<i>p</i> = 0.417			
<b>Standard Vs. No Descriptors</b>			1.100 (0.646, 1.873)	<i>p</i> = 0.731			1.100 (0.638, 1.897)	<i>p</i> = .731	<i>Ethnicity: 1.858 (1.046, 3.300), p = 0.035</i>
<b>Standard Vs. Plain</b>			0.708 (0.401, 1.251)	<i>p</i> = 0.235			0.700 (0.392, 1.250)	<i>p</i> = 0.228	
<b>No Descriptors vs. Plain</b>			0.644 (0.361, 1.149)	<i>p</i> = 0.137			0.636 (0.353, 1.146)	<i>p</i> = 0.132	
<b>Pack 3</b>	1.797	<i>p</i> = 0.407			5.772	<i>p</i> = 0.834			
<b>Standard Vs. No Descriptors</b>			0.739 (0.444, 1.230)	<i>p</i> = 0.245			0.734 (0.438, 1.230)	<i>p</i> = 0.240	
<b>Standard Vs. Plain</b>			0.747 (0.447, 1.247)	<i>p</i> = 0.264			0.759 (0.450, 1.278)	<i>p</i> = 0.299	
<b>No Descriptors vs. Plain</b>			1.010 (0.589, 1.733)	<i>p</i> = 0.971			1.034 (0.598, 1.785)	<i>p</i> = 0.906	
<b>Pack 4</b>	38.185	<i>p</i> < .001			23.722	<i>p</i> = 0.008			
<b>Standard Vs. No Descriptors</b>			0.687 (0.423, 1.116)	<i>p</i> = 0.129			0.667 (0.403, 1.105)	<i>p</i> = 0.116	<i>Smoking Status: 2.108 (1.306, 3.401), p = 0.002</i>
<b>Standard Vs. Plain</b>			0.198 (0.113, 0.345)	<i>p</i> < .001			0.170 (0.095, 0.306)	<i>p</i> < .001	
<b>No Descriptors vs. Plain</b>			0.289 (0.164, 0.510)	<i>p</i> < .001			0.255 (0.142, 0.463)	<i>p</i> < .001	
<b>Pack 5</b>	78.505	<i>p</i> < .001			8.776	<i>p</i> = 0.554			
<b>Standard Vs. No Descriptors</b>			0.559 (0.341, 0.917)	<i>p</i> = 0.021			0.538 (0.324, 0.892)	<i>p</i> = 0.016	
<b>Standard Vs. Plain</b>			0.89 (0.049, 0.164)	<i>p</i> < .001			0.082 (0.044, 0.154)	<i>p</i> < .001	
<b>No Descriptors vs. Plain</b>			0.160 (0.087, 0.294)	<i>p</i> < .001			0.153 (0.082, 0.285)	<i>p</i> < .001	
<b>Pack 6</b>	7.294	<i>p</i> = 0.026			222.009	<i>p</i> = 0.015			
<b>Standard Vs. No Descriptors</b>			0.866 (0.531, 1.412)	<i>p</i> = 0.565			0.802 (0.482, 1.332)	<i>p</i> = 0.393	<i>Income3vs.1: 1.976 (1.130, 3.454), p = 0.017 Education3vs.1: 1.947 (1.141, 3.322), p = 0.015</i>
<b>Standard Vs. Plain</b>			0.523 (0.320, 0.855)	<i>p</i> = 0.010			0.487 (0.292, 0.811)	<i>p</i> = .006	
<b>No Descriptors vs. Plain</b>			0.604 (0.365, 0.999)	<i>p</i> = 0.049			0.607 (0.361, 1.021)	<i>p</i> = 0.60	

<b>Pack 7</b>	4.975	p = 0.083		15.482	p = 0.115		
<b>Standard Vs. No Descriptors</b>			0.600 (0.366, 0.983)			0.572 (0.344, 0.951)	p = 0.031
<b>Standard Vs. Plain</b>			0.645 (0.394, 1.058)			0.631 (0.379, 1.049)	p = 0.076
<b>No Descriptors vs. Plain</b>			1.076 (0.640, 1.809)			1.102 (0.647, 1.876)	p = 0.720
<b>Pack 8</b>	85.144	p < .001		8.438	p = 0.586		
<b>Standard Vs. No Descriptors</b>			0.889 (0.536, 1.474)			0.835 (0.498, 1.399)	p = 0.493
<b>Standard Vs. Plain</b>			0.099 (0.055, 0.179)			0.090 (0.049, 0.165)	p < .001
<b>No Descriptors vs. Plain</b>			0.111 (0.061, 0.204)			0.107 (0.058, 0.199)	p < .001

*Ethnicity: 0.587 (0.364, 0.946), p = 0.029*

\*Adjusted model includes the variables Income, Education, Ethnicity, Smoking Status, Age, Weight Concerns, and SelfEsteem

Several moderators were significant in the adjusted model predicting pack appeal. Smoking Status was significant for Packs 1 ( $p = 0.01$ ) and 4 ( $p = 0.002$ ). In both cases, smokers were more likely than non-smokers to find the packs more appealing. For Pack 6, those in the highest category of Education (university or post-graduate;  $p = 0.02$ ) and Income ( $p = 0.02$ ) were more likely to find the packs appealing compared to those in the lowest education and income categories, respectively. In Pack 7, Non-White respondents were more likely to rate the packs more appealing compared to White respondents ( $p = 0.03$ ), whereas in Pack 2, Non-White respondents were less likely to rate the packs more appealing ( $p = 0.04$ ).

### 5.2.2 Pack appeal score: Index measure

An index score for brand appeal was created. Responses for each package were scored as either 1 (“a little” or “a lot” more appealing) or 0 (“a little” or “a lot” less appealing, and No Difference/Don’t Know). Ratings for each participant were summed across the eight package ratings for a total score between 0 and 8. The mean index scores and standard deviations for each condition are displayed in Table 4.

**Table 4: Index Pack Appeal Scores (n = 506)**

Condition	Mean (S.D)
Standard	4.2 (2.1)
No Descriptors	3.7 (2.1)
Plain	2.0 (1.7)
Male	2.4 (1.7)

Table 5 shows the results of a linear regression predicting pack appeal scores for the index measure. A significant main effect of condition was found ( $p < .001$ ), such that packs in the *Standard* condition were rated significantly more appealing than packs in the *No Descriptors* ( $p = 0.02$ ), *Plain* ( $p < .001$ ), and *Male* conditions ( $p < .001$ ). The *No Descriptors* packs were also given higher appeal ratings than packs in the *Plain* and *Male* conditions (both  $p < .001$ ). In a model adjusting for age, smoking status, income, education, ethnicity, weight concerns, and self-esteem, the effect of condition remained the same, except that packs in the *Plain* condition were rated significantly less appealing than packs in the *Male* condition ( $p = 0.04$ ).

In addition, the moderators Income and Smoking Status were significant, such that higher income individuals ( $p = 0.04$ ) and smokers ( $p = 0.002$ ) were more likely to rate the packs more appealing than lower income individuals and non-smokers.

**Table 5: Linear regression predicting Index Appeal Scores (n = 506)**

	Model (F)	Sig	Unadj Beta	Sig	Model (F)	Sig	Adj Beta	Sig	Moderators (B, sig)
	$F = 37.81$	$p < .001$			$F = 10.55$	$p < .001$			
Standard vs. No Descriptors			-0.109	$p = 0.024$			-0.116	$p = 0.015$	<i>Income3vs1: 0.099, <math>p = 0.043</math> Smoking Status: 0.131, <math>p = 0.002</math></i>
Standard vs. Plain			-0.449	$p < .001$			-0.457	$p < .001$	
Standard vs. Male			-0.357	$p < .001$			-0.362	$p < .001$	
Plain vs. No Descriptors			0.345	$p < .001$			0.346	$p < .001$	
Plain vs. Male			0.097	$p = 0.053$			0.103	$p = 0.039$	
Male vs No Descriptors			0.248	$p < .001$			0.243	$p < .001$	

\*Adjusted model includes the variables Income, Education, Ethnicity, Smoking Status, Age, Weight Concerns, and Self-Esteem

### 5.3 Effect of Female Cigarette Packages on Perceptions of Taste

#### 5.3.1 Taste ratings for individual packs

Participants were asked to rate how they thought each of the eight cigarette packages they viewed would taste, compared to other cigarette brands on the market. Responses are given in Table 6.

**Table 6: % Agreeing that Pack would taste “a Little” or “a Lot” better (n=512)**

Condition	% Agreeing that pack would taste “a little” or “a lot” better than other brands							
Standard Female	17.0%	10.0%	9.9%	31.9%	58.9%	22.7%	24.8%	58.2%
No descriptors Female	20.8%	17.7%	12.9%	23.4%	28%	31.2%	25.8%	26.4%
Plain Female	12.3%	14.5%	9.0%	15.6%	5.7%	19.4%	23.4%	8.2%

Table 7 displays the results of a logistic regression predicting individual taste ratings. When examining the package ratings for each of the eight packs in the three female conditions, a main effect of condition was significant for packs 4 ( $p = 0.01$ ), 5 ( $p < .001$ ) and 8 ( $p < .001$ ). The ratings of taste were higher in the *Standard* condition than the *Plain* condition for Packs 4 ( $p = 0.002$ ), 5 ( $p < .001$ ), and 8 ( $p < .001$ ). Taste ratings were also higher in the *Standard* condition than the *No Descriptors* condition, and in the *No Descriptors* condition compared to the *Plain* pack condition for packs 5 and 8 ( $p < .001$  for all). In each of the eight models, the patterns remained the same after adjusting for age, smoking status, income, education, ethnicity, weight concerns, and self-esteem.

**Table 7: Logistic regression predicting Individual Taste Ratings (n = 386)**

	$\chi^2$	Sig	Unadj Odds Ratio (95% CI)	Sig	$\chi^2$ Change	Sig	Adj Odds Ratio (95% CI)	Sig	Moderators (OR, 95% CI, sig)
<b>Pack 1</b>	3.273	p = 0.195			20.760	p = 0.023			
<b>Standard Vs. No Descriptors</b>			1.280 (0.691, 2.370)	p = 0.432			1.314 (0.693, 2.489)	p = 0.403	<i>Income3 vs 1: 0.469 (0.223, 0.987), p = 0.046 Income4 vs 1: 0.177 (0.039, 0.809), p = 0.026</i>
<b>Standard Vs. Plain</b>			0.683 (0.284, 0.683)	p = 0.284			0.652 (0.318, 1.336)	p = 0.243	
<b>No Descriptors vs. Plain</b>			0.534 (0.267, 1.066)	p = 0.075			0.496 (0.243, 1.015)	p = 0.055	
<b>Pack 2</b>	3.373	p = 0.185			8.769	p = 0.554			
<b>Standard Vs. No Descriptors</b>			1.941 (0.946, 3.985)	p = 0.071			1.992 (0.962, 4.124)	p = 0.063	
<b>Standard Vs. Plain</b>			1.358 (0.634, 2.912)	p = 0.431			1.392 (0.643, 3.014)	p = 0.401	
<b>No Descriptors vs. Plain</b>			0.7 (0.348, 1.408)	p = 0.317			0.699 (0.244, 1.418)	p = 0.321	
<b>Pack 3</b>	1.061	p = 0.588			6.746	p = 0.749			
<b>Standard Vs. No Descriptors</b>			1.344 (0.627, 2.879)	p = 0.447			1.359 (0.626, 2.951)	p = 0.438	
<b>Standard Vs. Plain</b>			0.899 (0.392, 2.061)	p = 0.801			0.885 (0.381, 2.054)	p = 0.776	
<b>No Descriptors vs. Plain</b>			0.699 (0.297, 1.507)	p = 0.332			0.651 (0.286, 1.484)	p = 0.307	
<b>Pack 4</b>	9.788	p = 0.007			18.828	p = 0.043			
<b>Standard Vs. No Descriptors</b>			0.651 (0.377, 1.124)	p = 0.124			0.641 (0.364, 1.129)	p = 0.124	<i>Education 2vs1: 2.271 (1.066, 4.845), p = 0.034 Smoking Status: 1.932 (1.142, 3.271), p = 0.014 Age: 0.858 (0.759, 0.969), p = 0.014 Ethnicity: 0.547 (0.317, 0.943) p = 0.030</i>
<b>Standard Vs. Plain</b>			0.394 (0.215, 0.720)	p = 0.002			0.387 (0.207, 0.721)	p = 0.003	
<b>No Descriptors vs. Plain</b>			0.604 (0.318, 1.149)	p = 0.124			0.603 (0.312, 1.167)	p = 0.133	
<b>Pack 5</b>	94.855	p < .001			31.141	p = 0.001			
<b>Standard Vs. No Descriptors</b>			0.272 (0.162, 0.455)	p < .001			0.233 (0.134, 0.406)	p < .001	<i>Education 3vs1: 2.006 (1.029, 3.909), p = 0.041 Smoking Status: 2.029 (1.169, 3.521), p = 0.012</i>
<b>Standard Vs. Plain</b>			0.043 (0.018, 0.098)	p < .001			0.032 (0.013, 0.076)	p < .001	
<b>No Descriptors vs. Plain</b>			0.157 (0.066, 0.369)	p < .001			4.297 (2.466, 7.490)	p < .001	
<b>Pack 6</b>	3.384	p = 0.184			16.328	p = 0.091			
<b>Standard Vs. No Descriptors</b>			1.545 (0.895, 2.667)	p = 0.119			1.531 (0.872, 2.686)	p = 0.138	<i>Smoking Status: 2.040 (1.224, 3.400), p = 0.006</i>
<b>Standard Vs. Plain</b>			0.968 (0.541, 1.731)	p = 0.913			0.925 (0.509, 1.680)	p = 0.798	
<b>No Descriptors vs. Plain</b>			0.627 (0.354, 1.109)	p = 0.119			0.653 (0.355, 1.088)	p = 0.093	

<b>Pack 7</b>	0.281	p = 0.869		23.938	p = 0.008		
<b>Standard Vs. No Descriptors</b>			1.053 (0.605, 1.835)		p = 0.854	1.016 (0.572, 1.805)	p = 0.958
<b>Standard Vs. Plain</b>			0.902 (0.511, 1.594)		p = 0.723	0.867 (0.480, 1.565),	p = 0.636
<b>No Descriptors vs. Plain</b>			0.856 (0.478, 1.534)		p = 0.602	0.854 (0.468, 1.558)	p = 0.606
<b>Pack 8</b>	82.524	p < .001		11.116	p = 0.349		
<b>Standard Vs. No Descriptors</b>			0.258 (0.153, 0.434)		p < .001	0.288 (0.133, 0.392)	p < .001
<b>Standard Vs. Plain</b>			0.064 (0.031, 0.133)		p < .001	0.056 (0.027, 0.119)	p < .001
<b>No Descriptors vs. Plain</b>			0.249 (0.116, 0.523)		p < .001	0.246 (0.114, 0.530)	p < .001

*Income4vs1: 0.156, 0.034, 0.713),  
p = 0.017  
Ethnicity: 0.511 (0.301, 0.876),  
p = 0.013*

\*Adjusted model includes the variables Income, Education, Ethnicity, Smoking Status, Age, Weight Concerns, and Self-Esteem

Several moderators were significantly associated with ratings of taste. Income was significant for Pack 1 and Pack 7. Those in the highest income category ( $p = 0.05$ ) and those who did not state their income ( $p = 0.03$ ) were less likely to rate Pack 1 as tasting better than those in the lowest income category. Those not stating their income were also less likely to rate Pack 7 as tasting better ( $p = 0.02$ ). Education was significant for Pack 4 and Pack 5. Those completing trade, community, or technical college were more likely to rate Pack 4 as tasting better ( $p = 0.03$ ) compared to lower educated individuals, whereas participants in the highest education category were more likely to rate Pack 5 as tasting better ( $p = 0.04$ ) than those in the lowest education category. Ethnicity was significant for Pack 4 ( $p = 0.03$ ) and Pack 7 ( $p = 0.01$ ), such that White respondents were less likely than non-White respondents to rate the packs as tasting better. Smoking status was significant for Packs 4, 5, and 6 (all  $p = 0.01$ ), such that smokers were more likely than non-smokers to rate the packs as tasting better. Age was significant for Pack 4, such that older participants were less likely rate packs as tasting better than younger participants ( $p = 0.01$ ).

### 5.3.2 Pack taste scores: Index measures

An index score for perceived taste was created. Responses for each package were scored as either 1 (would taste “a little” or “a lot” better) or 0 (would taste “a little” or “a lot” worse, and No Difference/Don’t Know). Ratings for each participant were summed across the eight package ratings for a total score between 0 and 8. The mean index scores and standard deviations for each condition are shown in Table 8.

**Table 8: Index Taste Scores (n = 509)**

Condition	Mean (S.D)
Standard	2.4 (2.1)
No Descriptors	1.9 (2.1)
Plain	1.1 (1.4)
Male	1.9 (1.8)

Table 9 shows the results of a linear regression predicting taste ratings for the index measure. A significant main effect of condition was found in the unadjusted model ( $p < .001$ ),

such that the *Standard* packs were given higher taste ratings than the *No Descriptors* ( $p = 0.02$ ), *Plain* ( $p < .001$ ), and *Male* ( $p = 0.05$ ) packs, and packs in the *Male* condition were given higher taste ratings than packs in the *Plain* condition ( $p < .001$ ). In addition, the *No Descriptors* condition was given higher taste ratings than the *Plain* condition ( $p < .001$ ). The pattern of results was the same after adjusting for age, smoking status, income, education, ethnicity, weight concerns, and self-esteem. In addition, the moderators Income, Education, Ethnicity, and Smoking Status were significant. Those respondents who were White, ( $p = 0.004$ ) did not state their income ( $p = 0.03$ ), or who had completed trade, community, or technical college ( $p = 0.04$ ) were less likely to believe the packs would taste better compared to non-White, and lower educated respondents. Smokers were more likely than non-smokers to believe that the packs would taste better ( $p < .001$ ).

**Table 9: Linear regression predicting Index Taste Scores (n = 509)**

	Model (F)	Sig	Unadj Beta	Sig	Model (F)	Sig	Adj Beta	Sig	Moderators (B, sig)
	$F = 11.89$	$p < .001$			$F = 6.04$	$p < .001$			
Standard vs. No Descriptors			-0.122	$p = 0.018$			-0.129	$p = 0.010$	Income4vs1: -0.107 ( $p = 0.025$ ) Education2vs1: -0.105 ( $p = 0.043$ ) Ethnicity:-0.125 ( $p = 0.004$ ) Smoking Status: 0.160 ( $p < .001$ )
Standard vs. Plain			-0.303	$p < .001$			-0.318	$p < .001$	
Standard vs. Male			-0.102	$p < .0047$			-0.103	$p < .0040$	
Plain vs. No Descriptors			0.183	$p < .001$			0.191	$p < .001$	
Plain vs. Male			0.202	$p = 0.01$			0.216	$p < 0.01$	
Male vs No Descriptors			0.19	$p < 0.715$			0.026	$p = 0.618$	

\*Adjusted model includes the variables Income, Education, Ethnicity, Smoking Status, Age, Weight Concerns, and Self-Esteem

## 5.4 Effect of Female Cigarette Packages on Perceptions of Tar

### 5.4.1 Tar ratings for individual packs

Participants were asked to rate the amount of tar they believed was present in each of the eight cigarette packages, compared to other cigarette brands on the market. Responses are given in Table 10.

**Table 10: % Agreeing that Pack would have “a Little” or “a Lot” Less Tar (n=512)**

Condition								
	% Agreeing that pack would have “a little” or “a lot” less tar than other brands							
<b>Standard Female</b>	3.5%	3.6%	14.9%	16.3%	9.9%	14.9%	14.9%	9.2%
<b>No descriptors Female</b>	8.0%	7.2%	8.8%	18.4%	12.1%	20.0%	16.8%	17.6%
<b>Plain Female</b>	9.0%	5.7%	13.1%	12.4%	9.9%	10.7%	13.9%	7.4%

Table 11 shows the results of a logistic regression predicting individual tar ratings. When examining the package ratings for each of the eight packs in the three female conditions, a main effect of condition was significant for Pack 8 ( $p < 0.03$ ). The *No Descriptors* condition was rated having less tar than the *Standard* ( $p = 0.05$ ) and *Plain* pack ( $p = 0.02$ ) conditions. In addition, the *No Descriptors* condition was rated having less tar than the *Plain* pack condition in Pack 6 ( $p = 0.05$ ). In each of the eight models, the patterns remained the same after adjusting for age, smoking status, income, education, ethnicity, weight concerns, and self-esteem.

**Table 11: Logistic regression predicting Individual Tar Ratings (n = 386)**

	$\chi^2$	Sig	Unadj Odds Ratio (95% CI)	Sig	$\chi^2$ Change	Sig	Adj Odds Ratio (95% CI)	Sig	Moderators (OR, CI, sig)
<b>Pack 1</b>	3.951	p = 0.139			16.722	p = 0.081			
<b>Standard Vs. No Descriptors</b>			2.365 (0.786, 7.119)	p = 0.126			2.258 (0.728, 7.008)	p = 0.159	
<b>Standard Vs. Plain</b>			2.695 (0.909, 7.989)	p = 0.074			2.509 (0.823, 7.653)	p = 0.106	
<b>No Descriptors vs. Plain</b>			1.140 (0.466, 2.790)	p = 0.775			1.111 (0.437, 2.828)	p = 0.825	
<b>Pack 2</b>	1.782	p = 0.410			11.011	p = 0.357			
<b>Standard Vs. No Descriptors</b>			2.095 (0.683, 6.427)	p = 0.196			1.899 (0.606, 5.946)	p = 0.271	
<b>Standard Vs. Plain</b>			1.643 (0.508, 5.318)	p = 0.407			1.508 (0.456, 4.989)	p = 0.501	
<b>No Descriptors vs. Plain</b>			0.785 (0.283, 2.178)	p = 0.641			0.794 (0.168, 2.267)	p = 0.667	
<b>Pack 3</b>	2.459	p = 0.292			12.769	p = 0.237			
<b>Standard Vs. No Descriptors</b>			0.551 (0.254, 1.195)	p = 0.131			0.535 (0.243, 1.181)	p = 0.122	
<b>Standard Vs. Plain</b>			0.863 (0.428, 1.739)	p = 0.679			0.796 (0.387, 1.639)	p = 0.536	
<b>No Descriptors vs. Plain</b>			1.564 (0.695, 3.523)	p = 0.280			1.487 (0.648, 3.413)	p = 0.349	
<b>Pack 4</b>	1.838	p = 0.399			7.803	p = 0.648			
<b>Standard Vs. No Descriptors</b>			1.157 (0.613, 2.185)	p = 0.653			1.121 (0.587, 2.142)	p = 0.729	
<b>Standard Vs. Plain</b>			0.719 (0.357, 1.450)	p = 0.357			0.666 (0.326, 1.363)	p = 0.266	
<b>No Descriptors vs. Plain</b>			0.622 (0.307, 1.258)	p = 0.186			0.594 (0.290, 1.219)	p = 0.155	
<b>Pack 5</b>	0.411	p = 0.814			20.783	p = 0.023			<i>Smoking Status: 2.078 (1.016, 4.249), p = 0.045</i>
<b>Standard Vs. No Descriptors</b>			1.248 (0.577, 2.702)	p = 0.573			1.228 (0.553, 2.727)	p = 0.614	
<b>Standard Vs. Plain</b>			0.999 (0.443, 2.250)	p = 0.997			0.959 (0.416, 2.213)	p = 0.922	
<b>No Descriptors vs. Plain</b>			0.8 (0.358, 1.788)	p = 0.587			0.781 (0.339, 1.798)	p = 0.561	
<b>Pack 6</b>	4.223	p = 0.121			10.277	p = 0.417			<i>Smoking Status: 1.951 (1.064, 3.577), p = 0.031</i>
<b>Standard Vs. No Descriptors</b>			1.429 (0.755, 2.704)	p = 0.273			1.396 (0.727, 2.681)	p = 0.316	
<b>Standard Vs. Plain</b>			0.682 (0.326, 1.427)	p = 0.309			0.653 (0.307, 1.386)	p = 0.266	
<b>No Descriptors vs. Plain</b>			0.477 (0.232, 0.983)	p = 0.045			0.467 (0.224, 0.977)	p = 0.043	

<b>Pack 7</b>	0.407	p = 0.816		11.253	p = 0.338		
<b>Standard Vs. No Descriptors</b>			1.154 (0.597, 2.231)	p = 0.671		1.105 (0.562, 2.170)	p = 0.773
<b>Standard Vs. Plain</b>			0.925 (0.464, 1.846)	p = 0.825		0.89 (0.438, 1.809)	p = 0.748
<b>No Descriptors vs. Plain</b>			0.802 (0.400, 1.606)	p = 0.533		0.806 (0.396, 1.641)	p = 0.552
<b>Pack 8</b>	6.981	p = 0.030		19.869	p = 0.031		
<b>Standard Vs. No Descriptors</b>			2.103 (1.010, 4.378)	p = 0.047		2.137 (0.999, 4.572)	p = 0.05
<b>Standard Vs. Plain</b>			0.791 (0.326, 1.921)	p = 0.605		0.737 (0.296, 1.831)	p = 0.511
<b>No Descriptors vs. Plain</b>			0.376 (0.166, 0.855)	p = 0.02		0.345 (0.148, 0.806)	p = 0.014

*Age: 0.850 (0.738, 0.979),  
p = 0.024*

\*Adjusted model includes the variables Income, Education, Ethnicity, Smoking Status, Age, Weight Concerns, and Self-Esteem

In the adjusted model, several moderators were significantly associated with ratings of tar. Smoking Status was significant in Pack 5 ( $p = 0.05$ ) and Pack 6 ( $p = 0.03$ ), such that smokers were more likely than non-smokers to believe the packs would have less tar. Age was significant for Pack 7 ( $p = 0.02$ ), such that older respondents were less likely to believe the packs would have less tar than younger respondents.

#### 5.4.2 Pack tar scores: Index measure

An index score for perceived tar levels was created. Responses for each package were scored as either 1 (“a little” or “a lot” less tar) or 0 (“a little” or “a lot” more tar, and No Difference/Don’t Know). Ratings for each participant were summed across the eight package ratings for a total score between 0 and 8. The mean index scores and standard deviations for each condition are shown in Table 12.

**Table 12: Index Tar Scores (n = 507)**

Condition	Mean (S.D)
Standard	0.87 (1.3)
No Descriptors	1.1 (1.6)
Plain	0.83 (1.4)
Male	0.6 (1.0)

Table 13 shows the results of a linear regression predicting tar ratings for the index measure. A significant main effect of condition was found in the unadjusted model ( $p = 0.05$ ). The *No Descriptors* packs were rated as having significantly less tar than packs in the *Male* condition ( $p = 0.01$ ). The pattern of results was the same after adjusting for age, smoking status, income, education, ethnicity, weight concerns, and self-esteem. In addition, the moderators Income, Education, and Smoking Status were significant. Those respondents who did not state their income ( $p = 0.001$ ), or who had completed trade, community, or technical college ( $p = 0.02$ ) were less likely to believe the packs would have less tar than lower income and lower educated respondents, respectively. Smokers were more likely than non-smokers to believe that the packs would have less tar ( $p = 0.01$ ).

**Table 13: Linear regression predicting Index Tar Scores (n = 507)**

	Model (F)	Sig	Unadj Beta	Sig	Model (F)	Sig	Adj Beta	Sig	Moderators (B, sig)
	<i>F = 2.66</i>	<i>p = 0.047</i>			<i>F = 2.81</i>	<i>p = 0.001</i>			
Standard vs. No Descriptors			0.070	p = 0.118			0.0058	p = 0.270	<i>Income4vs1: -0.126 (p = 0.011)</i> <i>Education2vs1: -0.125 (p = 0.021)</i> <i>Smoking Status: 0.129 (p = 0.005)</i>
Standard vs. Plain			-0.012	p = 0.819			-0.0029	p = 0.581	
Standard vs. Male			-0.84	p = 0.114			-0.084	p = 0.106	
Plain vs. No Descriptors			0.082	p = 0.136			0.87	p = 0.109	
Plain vs. Male			-0.071	p = 0.193			-0.055	p = 0.307	
Male vs No Descriptors			-0.153	p = 0.005			-0.142	p < 0.009	

\*Adjusted model includes the variables Income, Education, Ethnicity, Smoking Status, Age, Weight Concerns, and Self-Esteem

## 5.5 Effect of Female Cigarette Packages on Perceptions of Health Risks

### 5.5.1 Health risk ratings for individual packs

Participants were asked to rate the degree of health risks for each of the eight cigarette packages they viewed, compared to other cigarette brands on the market. Responses are given in Table 14.

**Table 14: % Agreeing that Pack would have “a Little” or “a Lot” Less Health Risks (n=512)**

Condition	% Agreeing that pack would have “a little” or “a lot” less health risks than other brands							
Standard Female	2.1%	0.7%	7.1%	7.8%	5.0%	5.0%	7.1%	5.7%
No descriptors Female	5.6%	7.2%	5.6%	9.6%	8.8%	14.4%	9.6%	12.8%
Plain Female	6.6%	4.1%	8.2%	4.1%	4.1%	6.6%	8.2%	3.3%

Table 15 shows the results of a logistic regression predicting individual health risk ratings. When examining the package ratings for each of the eight packs in the three female conditions, a main effect of condition was significant for Packs 2 ( $p = 0.01$ ), 6 ( $p = 0.02$ ), and 8 ( $p = 0.01$ ).

Health ratings in the *No Descriptors* condition were higher (meaning fewer health risks) than the *Standard* condition for packs 2 ( $p = 0.03$ ), 6 ( $p = 0.01$ ), and 8 ( $p = 0.05$ ). Health ratings in the *No Descriptors* condition were also higher than the *Plain* pack condition in packs 6 and 8 (both  $p = 0.01$ ). In each of the eight models, the patterns remained the same after adjusting for age, smoking status, income, education, ethnicity, weight concerns, and self-esteem, except for Pack 8, where the *Standard* versus *No Descriptors* comparison was no longer significant in the adjusted model ( $p = 0.07$ ).

**Table 15: Logistic regression predicting Individual Health Risk Ratings (n = 387)**

	$\chi^2$	Sig	Unadj Odds Ratio (95% CI)	Sig	$\chi^2$ Change	Sig	Adj Odds Ratio (95% CI)	Sig	Moderators (OR, 95% CI, sig)
<b>Pack 1</b>	3.647	p = 0.161			14.631	p = 0.146			
<b>Standard Vs. No Descriptors</b>			2.729 (0.690, 10.789)	p = 0.152			2.563 (0.631, 10.413)	p = 0.188	
<b>Standard Vs. Plain</b>			3.228 (0.837, 12.451)	p = 0.089			3.109 (0.783, 12.354)	p = 0.107	
<b>No Descriptors vs. Plain</b>			1.183 (0.415, 3.369)	p = 0.753			<i>1.213 (0.407, 3.614)</i>	<i>p = 0.729</i>	
<b>Pack 2</b>	8.677	p = 0.013			10.948	p = 0.362			
<b>Standard Vs. No Descriptors</b>			<i>10.86 (1.356, 86.996)</i>	<i>p = 0.025</i>			<i>11.565 (1.401, 95.455)</i>	<i>p = 0.023</i>	
<b>Standard Vs. Plain</b>			5.983 (0.689, 51.932)	p = 0.105			5.846 (0.659, 51.902)	p = 0.113	
<b>No Descriptors vs. Plain</b>			0.551 (0.179, 1.693)	p = 0.298			0.506 (0.156, 1.638)	p = 0.255	
<b>Pack 3</b>	0.658	p = 0.720			15.391	p = 0.118			<i>Weight concerns: 0.657 (0.440, 0.982), p = 0.041</i>
<b>Standard Vs. No Descriptors</b>			0.777 (0.287, 2.107)	p = 0.620			0.744 (0.268, 2.065)	p = 0.570	
<b>Standard Vs. Plain</b>			1.17 (0.470, 2.912)	p = 0.736			1.175 (0.459, 3.003)	p = 0.737	
<b>No Descriptors vs. Plain</b>			1.505 (0.554, 4.091)	p = 0.423			1.579 (0.657, 4.400)	P = 0.382	
<b>Pack 4</b>	3.115	p = 0.211			8.638	p = 0.567			
<b>Standard Vs. No Descriptors</b>			1.255 (0.533, 2.954)	p = 0.603			1.231 (0.512, 2.956)	p = 0.643	
<b>Standard Vs. Plain</b>			0.505 (0.170, 1.497)	p = 0.218			0.494 (0.164, 1.489)	p = 0.210	
<b>No Descriptors vs. Plain</b>			0.402 (0.137, 1.179)	p = 0.097			0.401 (0.135, 1.194)	p = 0.101	
<b>Pack 5</b>	2.648	p = 0.266			19.759	p = 0.032			
<b>Standard Vs. No Descriptors</b>			1.847 (0.693, 4.921)	p = .220			1.996 (0.716, 5.556)	p = 0.187	
<b>Standard Vs. Plain</b>			0.825 (0.255, 2.670)	p = 0.748			0.738 (0.216, 2.521)	p = 0.628	
<b>No Descriptors vs. Plain</b>			0.447 (0.150, 1.326)	p = 0.147			0.37 (0.117, 1.166)	p = 0.089	
<b>Pack 6</b>	7.984	p = 0.018			5.032	p = 0.889			
<b>Standard Vs. No Descriptors</b>			<i>3.22 (1.297, 7.994)</i>	<i>p = 0.012</i>			<i>3.108 (1.237, 7.807)</i>	<i>p = 0.016</i>	
<b>Standard Vs. Plain</b>			1.343 (0.473, 3.818)	p = 0.580			1.266 (0.440, 3.645)	p = 0.662	
<b>No Descriptors vs. Plain</b>			<i>0.417 (0.174, 0.999)</i>	<i>p = 0.012</i>			<i>0.407 (0.168, 0.989)</i>	<i>p = 0.047</i>	

<b>Pack 7</b>	0.549	p = 0.195		16.068	p = 0.098		
<b>Standard Vs. No Descriptors</b>			1.391 (0.579, 3.341)		p = 0.460	1.292 (0.522, 3.196)	p = 0.580
<b>Standard Vs. Plain</b>			1.17 (0.470, 2.912)		p = 0.736	1.09 (0.424, 2.800)	p = 0.858
<b>No Descriptors vs. Plain</b>			0.841 (0.349, 2.025)		p = 0.699	0.844 (0.340, 2.098)	p = 0.715
<b>Pack 8</b>	8.844	p = 0.012		28.485	p = 0.002		
<b>Standard Vs. No Descriptors</b>			2.44 (1.007, 5.917)		p = 0.048	2.366 (0.930, 6.020)	p = 0.071
<b>Standard Vs. Plain</b>			0.564 (0.165, 1.920)		p = 0.359	0.479 (0.135, 1.699)	p = 0.255
<b>No Descriptors vs. Plain</b>			0.231 (0.075, 0.712)		p = 0.011	0.202 (0.063, 0.655)	p = 0.008

*Age: 0.795 (0.658, 0.962) p = 0.018*

\*Adjusted model includes the variables Income, Education, Ethnicity, Smoking Status, Age, Weight Concerns, and Self-Esteem

Several moderators were significant in the adjusted model. Weight Concerns were significant in Pack 3, such that those with greater weight concerns were less likely to believe the packs had fewer health risks than those with fewer weight concerns ( $p = 0.04$ ). Age was significant in Pack 7, such that older respondents were less likely than younger respondents to believe the packs had fewer health risks ( $p = 0.02$ ).

### 5.5.2 Health risk scores: Index measure

An index score for perceived health risks was created. Responses for each package were scored as either 1 (“a little” or “a lot” less risk) or 0 (“a little” or “a lot” more risk, and No Difference/Don’t Know). Ratings for each participant were summed across the eight package ratings for a total score between 0 and 8. The mean index scores and standard deviations for each condition are displayed in Table 16.

**Table 16: Index Health Risk Scores (n = 510)**

Condition	Mean (S.D)
Standard	0.4 (1.1)
No Descriptors	0.74 (1.6)
Plain	0.45 (1.1)
Male	0.35 (1.2)

Table 17 shows the results of a linear regression predicting health risk ratings for the index measure. A significant main effect of condition was found in the unadjusted model ( $p = 0.04$ ), such that packs in the *No Descriptors* condition were given higher health ratings (meaning fewer health risks) than packs in the *Standard* condition ( $p = 0.02$ ). Health ratings for the *No Descriptors* condition were also higher compared to the *Male* condition ( $p = 0.01$ ). The pattern of results was the same after adjusting for age, smoking status, income, education, ethnicity, weight concerns, and self-esteem. In addition, the moderator Education was significant, such that those respondents who had completed trade, community, or technical college were less likely than those with less education to believe the packs would have fewer health risks ( $p = 0.03$ ).

**Table 17: Linear regression predicting Index Health Risk Scores (n = 510)**

	Model (F)	Sig	Unadj Beta	Sig	Model (F)	Sig	Adj Beta	Sig	Moderators (B, sig)
	<i>F = 2.75</i>	<i>p = 0.042</i>			<i>F = 2.24</i>	<i>p = 0.007</i>			<i>Education2vs1: -0.120 (p = 0.027)</i>
Standard vs. No Descriptors			<i>0.121</i>	<i>p = 0.022</i>			<i>0.113</i>	<i>P = 0.032</i>	
Standard vs. Plain			<i>0.018</i>	<i>p = 0.731</i>			<i>0.008</i>	<i>P = 0.874</i>	
Standard vs. Male			<i>-0.023</i>	<i>p = 0.666</i>			<i>-0.018</i>	<i>P = 0.733</i>	
Plain vs. No Descriptors			<i>0.102</i>	<i>p = 0.062</i>			<i>0.104</i>	<i>P = 0.055</i>	
Plain vs. Male			<i>-0.041</i>	<i>p = 0.454</i>			<i>-0.026</i>	<i>P = 0.629</i>	
Male vs No Descriptors			<i>0.143</i>	<i>p = 0.009</i>			<i>0.131</i>	<i>P = 0.016</i>	

\*Adjusted model includes the variables Income, Education, Ethnicity, Smoking Status, Age, Weight Concerns, and Self-Esteem

## 5.6 Effect of Cigarette Packages on Smoker Trait Ratings

### 5.6.1 Male versus female ratings

For each of the eight packs viewed during the study, participants were asked to rate whether someone who chooses to smoke each brand would be more likely to be male or female. Responses for each package were scored as either 1 (“Female”) or 0 (“Male”, and No Difference/Don’t Know). Ratings for each participant were summed across the eight package ratings for a total score between 0 and 8. Table 14 shows the means and standard deviations for the female ratings index for each of the four conditions.

**Table 18: Someone who chooses to Smoke this Brand is more likely to be Female (n = 510)**

Condition	Mean (S.D)
Standard	5.26 (2.0)
No Descriptors	4.34 (2.1)
Plain	2.94 (1.9)
Male	1.28 (1.4)

Table 19 shows the percentage agreeing that someone who chooses to smoke this brand is more likely to be female for each of the female conditions.

**Table 19: % Agreeing that someone who chooses to smoke this brand is more likely to be female**

Condition	% Agreeing that someone who chooses to smoke this brand is more likely to be female							
<b>Standard Female</b>	89.3%	22.7%	53.9%	58.9%	63.8%	78.0%	72.3%	87.2%
<b>No descriptors Female</b>	67.2%	31.2%	30.4%	37.6%	51.2%	76.8%	57.6%	81.6%
<b>Plain Female</b>	5.7%	15.6%	45.9%	32.0%	36.1%	59.0%	58.2%	41.8%

Table 20 displays the results of a linear regression predicting whether people believed that the smoker of each pack was more likely to be female. A main effect of condition was significant ( $p < .001$ ), such that the packs in the *Standard* condition were more likely to be rated “female” compared to the *No Descriptors*, *Plain*, and *Male* conditions (all  $p < .001$ ). Packs in the *No Descriptors* condition also received higher female ratings than packs in the *Plain* and *Male* conditions (both  $p < .001$ ). Female ratings were also higher in the *Plain* pack condition than in the *Male* condition ( $p < .001$ ). The pattern of results remained the same after adjusting for age, smoking status, income, education, ethnicity, weight concerns, and self-esteem. Respondents in the highest education category ( $p = 0.02$ ), White respondents ( $p = 0.02$ ), and smokers ( $p = 0.002$ ) were more likely to rate smokers of the packs as female than lower educated respondents, non-White respondents, and non-smokers, respectively.

**Table 20: Linear regression predicting belief that “Someone who chooses to smoke this brand is more likely to be female” (n = 510)**

	Model (F)	Sig	Unadj Beta	Sig	Model (F)	Sig	Adj Beta	Sig	Moderators (B, sig)
	<i>F = 113.4</i>	<i>p &lt; .001</i>			<i>F = 29.59</i>	<i>p &lt; .001</i>			
Standard vs. No Descriptors			-0.168	<i>p &lt; .001</i>			-0.171	<i>p &lt; .001</i>	<i>Education3vs1: 0.095 (p = 0.023)</i> <i>Ethnicity: 0.082 (p = 0.018)</i> <i>Smoking Status: 0.112 (p = 0.002)</i>
Standard vs. Plain			-0.416	<i>p &lt; .001</i>			-0.417	<i>p &lt; .001</i>	
Standard vs. Male			-0.714	<i>p &lt; .001</i>			-0.719	<i>p &lt; .001</i>	
Plain vs. No Descriptors			0.252	<i>p &lt; .001</i>			0.25	<i>p &lt; .001</i>	
Plain vs. Male			-0.297	<i>p &lt; .001</i>			-0.301	<i>p &lt; .001</i>	
Male vs No Descriptors			0.550	<i>p &lt; .001</i>			0.553	<i>p &lt; .001</i>	

\*Adjusted model includes the variables Income, Education, Ethnicity, Smoking Status, Age, Weight Concerns, and Self-Esteem

### 5.6.2 Other smoker traits

Participants were also asked to rate whether they thought someone who chooses to smoke each of the eight packs they viewed would be: slim versus overweight, glamorous versus not glamorous, cool versus not cool, popular versus unpopular, attractive versus unattractive, exciting versus boring, and sophisticated versus not sophisticated. Each positive trait was scored a ‘1’ (slim, glamorous, cool, popular, attractive, exciting, sophisticated), and the negative traits (overweight, not glamorous, not cool, unpopular, unattractive, boring, not sophisticated), responses of “No Difference” and “Don’t Know” were scored a ‘0’. An index score of these 7 traits was created by summing endorsements of the positive traits for each person. Table 21 displays the mean and standard deviations for the index smoker trait scores.

**Table 21: Positive Smoker Trait Characteristics (n = 510)**

Condition	Mean (S.D)
Standard	13.24 (12.02)
No Descriptors	12.09 (11.07)
Plain	8.65 (8.57)
Male	7.52 (8.04)

Table 22 shows the results of a linear regression predicting whether people believed that the smokers of the packs were more likely to possess positive characteristics. A main effect of condition was significant ( $p < .001$ ), such that the packs in the *Standard* condition were given higher positive trait scores than packs in the *Plain* and *Male* conditions (both  $p < .001$ ). In addition, packs in the *No Descriptors* condition were give higher positive ratings than packs in the *Male* ( $p < .001$ ) and *Plain Pack* ( $p = 0.01$ ) conditions. The pattern of results was the same after adjusting for age, smoking status, income, education, ethnicity, weight concerns, and self-esteem. Participants in the middle ( $p = 0.01$ ) and highest ( $p = 0.04$ ) income categories were more likely to endorse positive smoker traits than those in the lowest income category. Similarly, participants in the middle education category were more likely than lower educated respondents to endorse positive traits ( $p = 0.04$ ). Non-White ( $p = 0.02$ ) and younger respondents ( $p = 0.01$ ) were also more likely to endorse positive traits than White and older respondents, and smokers were more likely than non-smokers to endorse positive traits ( $p = 0.004$ )

**Table 22: Linear regression predicting positive Smoker Trait Scores (n = 510)**

	Model (F)	Sig	Unadj Beta	Sig	Model (F)	Sig	Adj Beta	Sig	Moderators (B, sig)
	$F = 9.18$	$p < .001$			$F = 5.08$	$p < .001$			
<b>Standard vs. No Descriptors</b>			-0.048	$p = 0.357$			-0.064	$p = 0.210$	<i>Income2vs1: 0.129</i> ( $p = 0.013$ )
<b>Standard vs. Plain</b>			-0.189	$p < .001$			-0.200	$p < .001$	<i>Income3vs.1: 0.109</i> ( $p = 0.036$ )
<b>Standard vs. Male</b>			-0.235	$p < .001$			-0.235	$p < .001$	<i>Education3vs1: 0.110</i> ( $p = 0.038$ )
<b>Plain vs. No Descriptors</b>			0.142	$p = 0.006$			0.138	$p = 0.009$	Ethnicity: -0.106 ( $p = 0.015$ )
<b>Plain vs. Male</b>			-0.045	$p = 0.401$			-0.034	$p = 0.524$	<i>Smoking Status: 0.130</i> ( $p = 0.004$ )
<b>Male vs No Descriptors</b>			0.188	$p < .001$			0.172	$p = .001$	<i>Age: -0.124</i> ( $p = 0.007$ )

\*Adjusted model includes the variables Income, Education, Ethnicity, Smoking Status, Age, Weight Concerns, and Self-Esteem

### 5.7 Effect of Cigarette Packages on Attitudes about Smoking and Weight Control

After viewing and rating each of the eight packages, participants were asked a set of questions relating to attitudes and beliefs about smoking. First, participants were asked to indicate how much they agree with three statements about the link between smoking and weight control/weight maintenance, including, “Smoking helps people stay slim”, “Smoking helps

people control their appetites”, and “Quitting smoking causes weight gain”. Table 23 displays the means and standard deviations for the three questions, where higher scores represent stronger beliefs in a positive association between smoking and weight control.

**Table 23: Smoking and Weight Control Questions**

	Standard (Mean, SD)	No Descriptors (Mean, SD)	Plain (Mean, SD)	Male (Mean, SD)
<b>Q1: Smoking helps people stay slim (n = 495)</b>	2.55 (1.17)	2.78 (1.11)	2.48 (1.15)	2.71 (1.12)
<b>Q2: Smoking helps people control their appetites (n = 493)</b>	2.96 (1.25)	2.86 (1.19)	2.66 (1.2)	3.04 (1.13)
<b>Q3: Quitting smoking causes weight gain (n = 498)</b>	3.24 (1.13)	3.07 (1.10)	3.07 (1.1)	3.29 (1.01)

Table 24 shows the results of a linear regression predicting belief in the statement, “Smoking helps people stay slim”. There was no effect of condition ( $p = 0.16$ ); however, respondents in the *Plain* pack condition were significant less likely to believe that smoking helps people stay slim compared to participants in the *No Descriptors* condition ( $p = 0.04$ ). In a model adjusting for age, smoking status, income, education, ethnicity, and weight concerns, there was a significant effect of Income, Smoking Status, and Weight Concerns. Those who did not state their income level were more likely to believe that smoking helps people stay slim ( $p = 0.01$ ) compared to lower income respondents. Smokers were more likely to believe that smoking helps people stay slim compared to non-smokers ( $p < .001$ ), and individuals who expressed more weight concerns were more likely than those who expressed fewer weight concerns to believe this ( $p = 0.03$ ).

**Table 24: Linear Regression predicting belief that “Smoking helps people stay slim” (n = 494)**

	Model (F)	Sig	Unadj Beta	Sig	Model (F)	Sig	Adj Beta	Sig	Moderators (B, sig)
	F =1.74	p =0.159			F =5.765	p <.001			
Standard vs. No Descriptors			0.088	p =0.105			0.079	p =0.126	<i>Income4vs1: -0.123 (p = 0.012)</i> <i>Smoking Status: 0.253 (p &lt; .001)</i> <i>Weight Concerns: 0.097 (p = 0.025)</i>
Standard vs. Plain			-0.026	p =0.630			-0.038	p =0.462	
Standard vs. Male			0.053	p =0.320			0.048	p =0.351	
Plain vs. No Descriptors			0.114	p =0.041			0.117	p =0.027	
Plain vs. Male			0.079	p =0.153			0.086	p =0.106	
Male vs No Descriptors			0.033	p =0.550			0.03	p =0.569	

\*Adjusted model includes the variables Income, Education, Ethnicity, Smoking Status, Age, and Weight Concerns

Table 25 displays the results of a linear regression predicting belief in the statement “Smoking helps people control their appetites”. There was no main effect of condition ( $p = 0.06$ ); however, respondents in the *Plain* Pack condition were significantly less likely to believe that smoking helps people control their appetites compared to participants in the *Standard* ( $p = 0.04$ ) and *Male* ( $p = 0.01$ ) conditions. The pattern of results was the same after adjusting for age, smoking status, income, education, ethnicity, and weight concerns. There was also a significant effect of Education, Smoking Status, and Weight Concerns. Participants in the highest education category ( $p = 0.05$ ), smokers ( $p < .001$ ), and those who expressed more weight concerns ( $p = 0.02$ ) were more likely to believe that smoking helps people control their appetites compared to those with the lowest education, non-smokers, and those with fewer weight concerns, respectively.

**Table 25: Linear regression predicting belief that “Smoking helps people control their appetites” (n = 492)**

	Model (F)	Sig	Unadj Beta	Sig	Model (F)	Sig	Adj Beta	Sig	Moderators (B, sig)
	F =2.44	p =0.064			F =6.0	p <.001			
Standard vs. No Descriptors			-0.037	p =0.485			-0.042	p =0.414	<i>Education3vs1: 0.104 (p = 0.050)</i> <i>Smoking Status: 0.280 (p &lt; .001)</i> <i>Weight Concerns: 0.104 (p = 0.016)</i>
Standard vs. Plain			-0.110	p =0.041			-0.113	p =0.027	
Standard vs. Male			0.031	p =0.560			0.025	p =0.627	
Plain vs. No Descriptors			0.073	p =0.190			0.072	p =0.175	
Plain vs. Male			0.141	p =0.011			0.138	p =0.009	
Male vs No Descriptors			-0.069	p =0.214			-0.067	p =0.207	

\*Adjusted model includes the variables Income, Education, Ethnicity, Smoking Status, Age, and Weight Concerns

Table 26 shows results for the linear regression predicting belief that, “Quitting smoking causes weight gain”. There was no effect of condition (p = 0.41), and the pattern of results was the same after adjusting for age, smoking status, income, education, ethnicity, and weight concerns. The moderators Ethnicity, Smoking Status, and Weight Concerns were significant. White respondents (p = 0.01), smokers (p < .001), and those who expressed higher weight concerns (p = 0.01) were more likely to believe that quitting smoking causes weight gain than non-White respondents, non-smokers, and those who expressed fewer weight concerns, respectively.

**Table 26: Linear regression predicting belief that “Quitting smoking causes weight gain” (n = 488)**

	Model (F)	Sig	Unadj Beta	Sig	Model (F)	Sig	Adj Beta	Sig	Moderators (B, sig)
	F =0.96	p =0.412			F =4.52	p <.001			
Standard vs. No Descriptors			-0.032	p =0.553			-0.037	p =0.484	<i>Ethnicity: 0.118 (p = 0.008)</i> <i>Smoking Status: 0.203 (p &lt; .001)</i> <i>Weight Concerns: 0.119 (p = 0.007)</i>
Standard vs. Plain			-0.069	p =0.206			-0.074	p =0.155	
Standard vs. Male			0.019	p =0.728			0.014	p =0.786	
Plain vs. No Descriptors			0.037	p =0.513			0.038	p =0.408	
Plain vs. Male			0.088	p =0.118			0.089	p =0.100	
Male vs No Descriptors			-0.051	p =0.360			-0.051	p =0.347	

\*Adjusted model includes the variables Income, Education, Ethnicity, Smoking Status, Age, and Weight Concerns

### 5.8 Effect of Cigarette Packages on Perceptions of Risk

Participants were asked to indicate their level of agreement with two questions assessing perceptions of health risks of smoking, including “There’s no danger to one’s health from smoking an occasional cigarette”, and “If a person quits smoking before the age of 30, they can avoid all of the health risks from smoking”. Table 27 displays the means and standard deviations of the two questions, where higher scores indicate higher perceptions of risk.

**Table 27: Perceptions of Risk Questions**

	<b>Standard (Mean, SD)</b>	<b>No Descriptors (Mean, SD)</b>	<b>Plain (Mean, SD)</b>	<b>Male (Mean, SD)</b>
<b>Q1: There's no danger to one's health from an occasional cigarette (n = 510)</b>	4.23 (0.92)	4.20 (0.99)	4.19 (0.853)	4.12 (0.98)
<b>Q2: If a person quits smoking before the age of 30, they can avoid all the health risks from smoking (n = 499)</b>	4.10 (0.97)	4.07 (0.98)	4.23 (0.828)	4.03 (0.93)

Table 28 displays results of the linear regression predicting belief in the statement, “There’s no danger to one’s health from smoking an occasional cigarette”. There was no effect of condition ( $p = 0.865$ ), and the pattern of result remained the same after adjusting for age, smoking status, income, education, ethnicity, and weight concerns. There was a significant effect of Education, Ethnicity, and Smoking Status. Participants with higher education ( $p = 0.02$ ) and smokers ( $p < .001$ ) were less likely to believe that there is no danger to one’s health from smoking an occasional cigarette than those with lower education and non-smokers, whereas White respondents were more likely than non-White respondents to believe this ( $p = 0.05$ ).

**Table 28: Linear regression predicting belief that “There’s no danger to one’s health from smoking an occasional cigarette” (n = 509)**

	Model (F)	Sig	Unadj Beta	Sig	Model (F)	Sig	Adj Beta	Sig	Moderators (B, sig)
	F=0.245	p=0.865			F=6.432	p<.001			
Standard vs. No Descriptors			-0.012	p=0.815			-0.016	p=0.742	Education3vs1: -0.120 (p = 0.021) Ethnicity: 0.085 (p = 0.046) Smoking Status: -0.350 (p < .001)
Standard vs. Plain			-0.016	p=0.762			-0.018	p=0.717	
Standard vs. Male			-0.044	p=0.402			-0.046	p=0.362	
Plain vs. No Descriptors			0.004	p=0.945			0.002	p=0.971	
Plain vs. Male			-0.028	p=0.609			-0.027	p=0.599	
Male vs No Descriptors			0.032	p=0.557			0.029	p=0.571	

\*Adjusted model includes the variables Income, Education, Ethnicity, Smoking Status, Age, and Weight Concerns

Table 29 shows results from the linear regression predicting belief that, “If a person quits smoking before the age of 30, they can avoid all of the health risks of smoking”. There was no effect of condition (p = 0.44); however, in a model adjusting for age, smoking status, income, education, ethnicity, and weight concerns, there was a significant effect of Smoking Status. Smokers were less likely than non-smokers to believe that if a person quits smoking before the age of 30 they can avoid all of the health risks from smoking (p < .001).

**Table 29: Linear regression predicting belief that “If a person quite smoking before the age of 30 they can avoid all of the health risks of smoking” (n = 498)**

	Model (F)	Sig	Unadj Beta	Sig	Model (F)	Sig	Adj Beta	Sig	Moderators (B, sig)
	F=0.906	p=0.438			F=3.4248	p<.001			
Standard vs. No Descriptors			-0.013	p=0.811			-0.025	p=0.636	Smoking Status: -0.228 (p < .001)
Standard vs. Plain			0.058	p=0.281			0.054	p=0.304	
Standard vs. Male			-0.027	p=0.609			-0.027	p=0.611	
Plain vs. No Descriptors			-0.071	p=0.202			-0.079	p=0.146	
Plain vs. Male			-0.085	p=0.126			-0.080	p=0.139	
Male vs No Descriptors			0.015	p=0.791			0.002	p=0.971	

\*Adjusted model includes the variables Income, Education, Ethnicity, Smoking Status, Age, and Weight Concerns

## 5.9 Effect of Cigarette Packages on General Attitudes Towards Smoking

Participants were asked to indicate their level of agreement on a scale from strongly agree to strongly disagree with four questions assessing general attitudes towards smoking, including “My friends approve of smoking”, “Tobacco companies target people my age”, “My friends would date a smoker”, and “Smoking can be glamorous”. Questions were reverse coded so that higher scores indicate more agreement with the questions. Table 30 displays the means and standard deviations of the four questions.

**Table 30: General Attitudes Towards Smoking**

	Standard (Mean, SD)	No Descriptors (Mean, SD)	Plain (Mean, SD)	Male (Mean, SD)
<b>Q1: My friends approve of smoking (n = 505)</b>	2.56 (1.14)	2.50 (1.1)	2.5 (1.1)	2.42 (1.01)
<b>Q2: Tobacco companies target people my age (n = 504)</b>	4.06 (0.85)	3.85 (0.93)	3.91 (0.84)	3.99 (0.82)
<b>Q3: My friends would date a smoker (n = 494)</b>	3.16 (2.29)	3.02 (1.1)	3.11 (1.1)	2.97 (1.07)
<b>Q4: Smoking can be glamorous (n = 510)</b>	2.29 (1.13)	2.1 (1.1)	2.17 (1.18)	2.23 (1.17)

Table 31 displays results of a linear regression predicting belief in the statement, “My friends approve of smoking”. There was no effect of condition ( $p = 0.83$ ), and the pattern of results remained the same after adjusting for age, smoking status, income, education, ethnicity, and weight concerns. There was, however, a significant effect of Smoking Status. Smokers were more likely to agree that their friends approve of smoking than non-smokers ( $p < .001$ ).

**Table 31: Linear regression predicting “My Friends approve of smoking” (n = 504)**

	Model (F)	Sig	Unadj Beta	Sig	Model (F)	Sig	Adj Beta	Sig	Moderators (B, sig)
	F =0.294	p =0.831			F =8.727	p <.001			Smoking Status: 0.406 (p < .001)
Standard vs. No Descriptors			-0.022	p =0.674			-0.016	p =0.740	
Standard vs. Plain			-0.027	p =0.611			-0.023	p =0.635	
Standard vs. Male			-0.050	p =0.352			-0.053	p =0.282	
Plain vs. No Descriptors			0.005	p =0.930			0.007	p =0.887	
Plain vs. Male			-0.022	p =0.685			-0.029	p =0.564	
Male vs No Descriptors			0.027	p =0.619			0.037	p =0.471	

\*Adjusted model includes the variables Income, Education, Ethnicity, Smoking Status, Age, and Weight Concerns

Table 32 displays the results of a linear regression predicting belief in the statement, “Tobacco companies target people my age”. There was no significant main effect of condition ( $p = 0.22$ ); however, participants in the *No Descriptors* condition were significantly less likely to agree that tobacco companies target people their age compared to those in the *Standard* condition ( $p = 0.05$ ). The pattern of results remained the same after adjusting for age, smoking status, income, education, ethnicity, and weight concerns. There was, however, a significant effect of Smoking Status. Smokers were less likely than non-smokers to agree that tobacco companies target people their age ( $p < .001$ )

**Table 32: Linear regression predicting belief that “Tobacco companies target people my age” (n = 503)**

	Model (F)	Sig	Unadj Beta	Sig	Model (F)	Sig	Adj Beta	Sig	Moderators (B, sig)
	F=1.490	p=0.216			F=2.361	p=0.006			<i>Smoking Status:0.175 (p &lt; .001)</i>
<b>Standard vs. No Descriptors</b>			-0.105	p=0.049			-0.111	p=0.036	
<b>Standard vs. Plain</b>			-0.074	p=0.164			-0.075	p=0.154	
<b>Standard vs. Male</b>			-0.033	p=0.536			-0.031	p=0.552	
<b>Plain vs. No Descriptors</b>			0.030	p=0.584			0.034	p=0.552	
<b>Plain vs. Male</b>			-0.041	p=0.453			-0.044	p=0.418	
<b>Male vs No Descriptors</b>			0.071	p=0.192			0.079	p=0.145	

\*Adjusted model includes the variables Income, Education, Ethnicity, Smoking Status, Age, and Weight Concerns

Table 33 displays the results of a linear regression predicting belief in the statement, “My friends would date a smoker”. There was no effect of condition ( $p = 0.49$ ); however, in a model adjusting for age, smoking status, income, education, ethnicity, and weight concerns, there was a significant effect of Smoking Status and no change in the effect of condition. Smokers were more likely to agree that their friends would date a smoker than non-smokers ( $p < .001$ ).

**Table 33: Linear regression predicting “My Friends Would Date a Smoker” (n = 493)**

	Model (F)	Sig	Unadj Beta	Sig	Model (F)	Sig	Adj Beta	Sig	Moderators (B, sig)
	F=0.811	p=0.488			F=6.286	p<.001			<i>Smoking Status: -0.341 (p &lt; .001)</i>
<b>Standard vs. No Descriptors</b>			-0.055	p=0.310			-0.046	p=0.372	
<b>Standard vs. Plain</b>			-0.021	p=0.694			-0.016	p=0.758	
<b>Standard vs. Male</b>			-0.077	p=0.151			-0.088	p=0.086	
<b>Plain vs. No Descriptors</b>			-0.034	p=0.547			-0.03	p=0.572	
<b>Plain vs. Male</b>			-0.056	p=0.311			-0.072	p=0.171	
<b>Male vs No Descriptors</b>			0.023	p=0.676			0.043	p=0.418	

\*Adjusted model includes the variables Income, Education, Ethnicity, Smoking Status, Age, and Weight Concerns

Table 34 displays the results of a linear regression predicting belief in the statement, “Smoking can be glamorous”. There was no effect of condition ( $p = 0.47$ ), and the pattern of results remained the same after adjusting for age, smoking status, income, education, ethnicity, and weight concerns. There was, however, a significant effect of Income, Education, Age, and Smoking Status. Older respondents ( $p = 0.01$ ), those refusing to state their income ( $p = 0.02$ ), and those whose highest level of education was trade, community, or technical college ( $p = 0.03$ ) were less likely to agree that smoking can be glamorous than younger respondents, and than those with lower levels of income and education, respectively. Smokers were more likely than non-smokers to agree that smoking can be glamorous ( $p < .001$ ).

**Table 34: Linear regression predicting belief that “Smoking can be glamorous” (n = 509)**

	Model (F)	Sig	Unadj Beta	Sig	Model (F)	Sig	Adj Beta	Sig	Moderators (B, sig)
	F=0.840	p=0.472			F=8.198	p<.001			
Standard vs. No Descriptors			-0.068	p=0.203			-0.082	p=0.096	<i>Income4vs1: -0.113</i> <i>(p = 0.016)</i> <i>Education2vs1: -0.113</i> <i>(p = 0.026)</i> <i>Smoking Status: 0.353</i> <i>(p &lt; .001)</i> <i>Age: -0.106</i> <i>(p = 0.016)</i>
Standard vs. Plain			-0.042	p=0.425			-0.059	p=0.235	
Standard vs. Male			0.006	p=0.915			-0.001	p=0.0978	
Plain vs. No Descriptors			-0.025	p=0.646			-0.023	p=0.647	
Plain vs. Male			0.048	p=0.381			0.057	p=0.259	
Male vs No Descriptors			-0.073	p=0.181			-0.081	p=0.113	

\*Adjusted model includes the variables Income, Education, Ethnicity, Smoking Status, Age, and Weight Concerns

## 6.0 DISCUSSION

This study is among the first to examine the impact of cigarette packaging designed for young women on beliefs and attitudes towards smoking. More specifically, the study experimentally examined how marketing and package designs—including colour, brand imagery, and descriptors—promote misleading beliefs about the health effects of smoking and the relationship between smoking and weight control, and that increase brand appeal among young women. The results of the study are the first to quantitatively demonstrate a link between cigarette packaging and a potent predictor of smoking among females (smoking and weight control beliefs). In addition, the study provides strong empirical evidence for the appeal of female-oriented cigarette packaging that is becoming more popular in Western markets.

The female-oriented packages selected for this study were identified by participants as being predominantly female brands. When asked to rate packs on whether they were more likely to be smoked by a male or female, packs in the *Standard* female-oriented condition were given the highest female ratings than all other conditions. Furthermore, the female packs without descriptors were also given higher female ratings compared to the plain and male packs, and the plain packs were given higher female ratings compared to the male packs. This finding suggests that colour, brand imagery, and descriptors are important in shaping female-oriented cigarette packages.

### 6.1 Package Appeal

Female-oriented packs with branding and descriptors were more appealing to young women than male packs. For example, the highest rated female pack, the Capri Cherry, was rated more appealing than other brands by almost 67% of participants. In addition, removing descriptors and colours from packs reduced the appeal of brands. Furthermore, the male packs were rated as more appealing than the plain packs, however the difference was not statistically significant. As expected, smokers were more likely to rate the packs as more appealing. Nevertheless, a surprising number of non-smokers also rated packs as appealing. For example, almost 45% of non-smokers rated some packs as more appealing than other brands on the

market. This suggests that the appeal of female-oriented cigarette packaging can be generalized to include non-smokers.

When examining the appeal ratings for individual packages, it is of note that three of the four highest rated standard female packs (Capri Vanilla, Capri Cherry, Vogue Bleue) were predominantly white in colour and featured small abstract pink or blue designs. The fourth highly rated standard female pack (JSP Pink) was predominantly pink in colour, with the word 'Pink' written in large letters. The pack with the lowest appeal ratings (Camel no. 9) was predominantly black with a small amount of fuschia. This finding is consistent with other research that suggests that the colour pink, as well as other lighter colours such as purple, white, and light yellow, convey positive qualities that women find appealing, such as freshness, femininity, purity, and cleanliness.<sup>1,50</sup> Interestingly, the other predominantly pink pack, XS Slims, did not show a significant change in appeal when descriptors or colour was removed, and it was given the second lowest appeal rating after Camel no. 9. One potential explanation for this is that when viewed on a computer screen, the pink on this package appeared more like a dark red, which as a darker colour, young women may have found less appealing.

## **6.2 Perceived Taste**

In addition to assessing how appealing young women found the packs, women were also asked to determine whether the packs would taste better or worse than others on the market. Similar to the results for appeal, women thought that the female-oriented packs would taste better than the same packs with descriptors removed, and than the male and plain packs. The male packs, however, were given higher taste ratings than the plain packs. Overall, this suggests that young women perceive that plain packs without any colours or descriptors would taste worse than packs with colours and/or descriptors, even if they are not female-oriented.

As predicted, the packs with flavour descriptors (Menthol, Vanilla, and Cherry) were given the highest taste ratings, and the Vanilla and Cherry packs received higher taste ratings than the Menthol pack. The Vanilla pack was also rated as significantly more appealing in the standard version compared to the no descriptors version, indicating the impact of removing the word

“Vanilla”. As expected, smokers were more likely than non-smokers to believe that the packs would taste better.

The finding that young women believed the flavored cigarettes would taste better than regular cigarettes is consistent with previous research.<sup>26</sup> Although it was expected that younger participants would rate flavoured packs higher in taste or find them more appealing than older participants, this was only the case for the Menthol pack, where younger participants were more likely than older participants to believe that the Menthol pack would taste better. It is possible that the narrow age range of participants (7 years) explains the modest effect of age. This is still a important finding, however, since Menthol is the most common flavour for cigarettes, and young smokers are more likely to smoke Menthol cigarettes than older smokers.<sup>60</sup> Interestingly, new regulations under Bill C-32 propose to ban flavours and other additives from cigarettes sold in Canada, however, Menthol has been exempted from the proposed ban.<sup>71</sup> Similarly, Menthol has also been excluded from the banned list of flavours in the US’ recent Family Smoking Prevention and Tobacco Control Act, whereas Cherry and Vanilla are included in this list.<sup>76</sup>

### **6.3 Beliefs about Smoking and Weight Control**

Another major aim of this study was to determine the impact of female-oriented cigarette packaging on young women’s beliefs about the association between smoking and weight control. There is a vast amount of literature to suggest that young women who express concern over body weight are more likely to smoke than women who do not have such concerns.<sup>1,28,30,31,38</sup> It is important to acknowledge that there is an established link between smoking and appetite,<sup>24,25,72</sup> which is thought to be mediated by the chemical nicotine, an appetite suppressant. There is tremendous variation in the actual effect of nicotine on appetite and weight, however, which can vary based on the smoker’s age and amount of smoking.<sup>24</sup> In addition to this, there is also evidence to suggest that people, particularly women with higher weight concerns, exaggerate the usefulness of smoking for weight control purposes.<sup>30</sup>

We found that both weight concerns and smoking were significant predictors of whether young women believed in an association between smoking and weight control. Although the direction of causality for this relationship is not possible to determine, it is reasonable to

postulate that young women who are highly concerned about their body weight may take up smoking in the belief that it may assist them with losing or maintaining weight. We also found an association between package manipulation and the belief that “Smoking helps people control their appetites”, as well as an association between package manipulation and the belief that “Smoking helps people stay slim”. Women who viewed the plain packages were less likely to believe that smoking helps people control their appetites than the women who viewed the female-oriented and male packs. In addition, women who viewed the plain packages were less likely to believe that smoking helps people stay slim compared to women who viewed the female-oriented packs without descriptors. Although we did not find a significant association between package manipulation and the belief that quitting smoking causes weight gain, participants in the plain pack condition were less likely to endorse this belief than in other conditions, suggesting that with increased statistical power a significant difference may have been detected. Overall, these results demonstrate that viewing female-oriented cigarette packs, for even a brief period of time, was sufficient to manipulate a key predictor of smoking for young women.

It is alarming how cigarette packaging design appears to be exaggerating and perpetuating a relationship between appetite suppression and smoking, regardless of the degree to which an actual relationship exists. In the face of increasing advertising and marketing bans, cigarette packaging is being designed in such a way that promotes the idea that smoking may be able to assist young women in losing or maintaining their weight. Despite everything that is known to be unhealthy about smoking cigarettes, cigarette packaging is targetting one of the largest, if not the largest, insecurity in women, that being weight concerns. Certain pack descriptors and imagery (e.g., ‘Slims’, skinny packages, and female-oriented colouring), may suggest to young women that there is some good to smoking.

#### **6.4 Perceived Tar and Health Risks**

When the brand descriptors were removed from the female-oriented packs, women believed the packs would contain less tar, and have fewer health risks, than the male packs. They also believed that the female-oriented packs with descriptors removed would have fewer health risks (but not less tar) than the standard female-oriented packs. This is a puzzling finding with

no obvious explanation. One suggestion is that brand descriptors are the major determinants of whether women perceive cigarette packs to be more or less harmful than other brands. That is, packs with descriptors, whether on female-oriented coloured packages or non-female oriented packages, are seen to have more health risks associated with them. This is contrary to our original expectation that packs with female-oriented descriptors such as “slims”, and flavour-descriptors such as “cherry”, would be perceived by women to be less harmful; and that plain packages would be associated with the most health risks. Another explanation for this finding relates to the methodological challenge of not presenting packages side-by-side for direct comparisons. That is, it may have been difficult for participants to make comparisons of one package with the broad statement, “other brands on the market”, as opposed to having an actual package to make comparisons against. In studies where participants were presented with two packages and asked to compare the relative harmfulness of the brands, substantial numbers of both youth and adults reported that some brands were less harmful than others based on words and colour differences.<sup>73</sup> It is also possible that we did not see an increase in perceived health risks for the plain packages due to the white background of the packs. Recent research has suggested that people perceive plain packs with a brown background as less appealing than white plain packs.<sup>73</sup> Thus, it is possible that an effect of plain packaging on perceived health risks would have been detected if a darker background colour had been used. This is a particular issue in the current study, where young women found the female-oriented packs that were predominantly white the most appealing.

Participants were also asked about their beliefs regarding risks associated with occasional smoking, and quitting smoking by the age of 30. Although perceived risks did not differ based on what packages participants viewed, we did find that smokers were more accurate in their risk perceptions than were non-smokers. That is, smokers were more likely to believe that there is risk associated with occasional smoking, and that one cannot avoid all health risks of smoking by quitting by the age of 30 years. This finding is consistent with literature that suggests adolescent and young adult smokers can accurately identify various risks associated with smoking,<sup>20,22</sup> but is contradictory to other evidence that smokers are less likely to acknowledge harm from short-term smoking.<sup>19</sup> It is important to note that the way in which risk questions are asked can have a significant impact on how they are answered.<sup>19</sup> In the current study, participants were not asked whether *they* were at risk specifically, compared to

non-smokers or other smokers, but rather in general the risks associated with short-term smoking. There is evidence to suggest that when smokers are asked to judge their risk relative to other smokers, they are more likely to underestimate their personal risk of smoking.<sup>19,20,22</sup>

## **6.5 Attitudes towards Smoking**

With increasing smoking, advertising, and marketing bans, tobacco companies are focusing more heavily on the use of cigarette packaging to convey positive images about smoking. In the current study, we did not find any effect of the types of packs viewed on attitudes towards smoking. Consistent with what we predicted, however, smokers reported more positive attitudes towards smoking, and were less likely to believe that tobacco companies target people their age. In addition, younger participants were more likely to believe that smoking can be glamorous than older participants.

We also found that viewing female-oriented packs was a strong predictor for whether participants believed that smokers of that particular brand were more likely to possess the following positive characteristics: slim, glamorous, cool, popular, attractive, exciting, and sophisticated. Women thought that smokers who chose female-oriented brands (both the standard and descriptors removed version) would possess overall more positive qualities than smokers who chose plain or male packs. It is of concern that young women associate brands that are designed to target women with positive personality and physical trait characteristics, such as being attractive, glamorous, and slim. In addition, younger women were more likely to endorse positive smoker traits than the older women in the study. This is consistent with the earlier finding that younger participants were more likely to believe that smoking can be glamorous. Given that smoking initiation tends to occur by or around the age of 18 years, this means that the younger segment of our study sample (who are therefore most at risk of smoking initiation) were also more likely to believe that smoking cigarettes from female-oriented packages is associated with more positive physical and personality traits. This suggests that female-oriented cigarette packaging could be an influential factor in attracting younger women to smoking, and supports the implementation of policies that limit the degree to which cigarette packaging can include designs, descriptors, and colours that directly target young women.

## 6.6 Strengths and Limitations

This study is subject to some general limitations which are common to experimental research, such as sampling and selection biases.

Participants in the study were not recruited using random sampling, and are therefore not necessarily representative of the Canadian population. However, our sample was drawn from a sampling frame of heterogeneous smokers and non-smokers from throughout Canada, representing different socio-economic levels that are broadly similar to the general Canadian population of youth and young adults. Although the study sample was not representative, there is no compelling reason to believe that the results of the study would have been different if a representative sample of participants had been used.

The other issue raised by the sampling methods used in the current study is that of self-selection bias. The participants in the study have volunteered to participate in a survey panel for a commercial marketing company, which involves completing surveys for monetary reimbursement. Because participants came from a consumer panel, it could be argued that they are more motivated, or in some other way different from the general population of Canadians. Nevertheless, it could be argued that our study sample is more “survey-savvy” than the average Canadian, thus making it more likely that participants would be more critical of the survey and less susceptible to various biases that less experienced participants might be more likely to succumb to, such as social desirability bias. Social desirability bias is a particularly important bias to consider when conducting smoking studies, as participants (especially youth and young adults) have almost certainly been exposed to anti-smoking information, whether at school or via other types of mass media. It is possible that participants may have answered certain questions, particularly those relating to health risks of smoking, in a way that reflects how they think they *should* answer the questions, as opposed to what they might actually believe. We believe that our study sample was less likely to be impacted by this type of bias, however, due to their previous and extensive experience with surveys. Furthermore, because the current study used random assignment to the experimental conditions, any effect of social desirability should be equal across the four groups. Therefore, any differences between conditions cannot be attributed to an effect of social desirability.

An additional limitation of the study is that participants rated images of packages, rather than actual cigarette packs. Previous research has demonstrated greater perceived differences in tar levels and relative health risks between brands when actual packages are viewed and rated.<sup>77</sup>

Finally, results of the current study cannot be generalized to youth under the age of 18. It is expected, however, that youth under the age of 18 years would be more likely to be impacted by female-oriented cigarette packaging, as current research suggests that youth are more vulnerable to the influence of cigarette packaging.<sup>49,54</sup>

## **6.7 Implications**

Smoking remains a leading cause of death and disability among women, and tobacco companies continue to target young women. The use of cigarette packaging as marketing is becoming more important as other more traditional forms of tobacco marketing and advertising continue to be restricted. The current research contributes to a better understanding of the design and marketing elements of cigarette packaging that young women find appealing, as well as the ways in which female-oriented tobacco packaging impacts young women's beliefs and attitudes towards smoking. Such an understanding is necessary for the development of policies and interventions that aim to limit the extent to which tobacco packaging and marketing target young women.

In Canada, Section 22 of the 1997 Tobacco Act prohibits tobacco promotion through "lifestyle advertising", defined as: "...advertising that associates a product with, or evokes a positive or negative emotion about or image of, a way of life such as one that includes glamour, recreation, excitement, vitality, risk or daring".<sup>74</sup> Results of the current study clearly demonstrate that young women find cigarette packaging that has female-oriented colours, designs, and descriptors more appealing than regular, non-female oriented and plain cigarette packaging. Furthermore, viewing female-oriented cigarette packaging was demonstrated to evoke more positive images of smokers compared to viewing non-female oriented and plain packaging, including images of glamour and excitement, two of the characteristics listed in Section 22 of the Tobacco Act. Thus, it could be argued that female-oriented cigarette

packages, such as those that were included in the current study, contravene the current advertising and tobacco promotion regulations as outlined in the Act.

In addition, Section 20 of the Tobacco Act<sup>74</sup>, and Article 11 and Article 13 of the WHO FCTC<sup>75</sup> prohibits promotion of a tobacco product by any means, including by means of advertising (Article 13) or packaging (Section 20 and Article 11), that are false, misleading or deceptive or that are likely to create an erroneous impression about the characteristics, health effects or health hazards of the tobacco product or its emissions. Misleading descriptors such as “light” and “mild” have been banned in countries such as Canada and the UK, and will soon be banned in the US following enactment of the US Family Smoking Prevention and Tobacco Control Act<sup>76</sup>. However, recent evidence suggests that people continue to perceive many of the new brand descriptors being used on cigarette packages, including colours and number descriptors, as indicating differences in the levels of harm or risk associated with smoking those brands.<sup>73,77</sup> The current study adds to this evidence, suggesting that cigarette packages in female-oriented colours (without brand descriptors) can lead to erroneous impressions about the health effects or health hazards of these packs compared to regular, non-female oriented packs.

Overall, we found that plain packaging reduced brand appeal and perceived taste, beliefs about an association between smoking and weight control, and beliefs that smokers possess more positive personality and physical traits. This is consistent with previous research demonstrating that plain packages are viewed as less attractive and engaging, particularly for youth.<sup>63,64,65,73</sup> While previous research has also demonstrated that plain packs reduce false beliefs about the health risks of smoking<sup>73,77</sup>, we did not replicate this finding in the current study. This could be the result of the methodological limitation of not having side-by-side comparison packs, or, the choice of white background for the plain packs.

Currently, there are no countries or jurisdictions that have plain package legislation, though several are considering it. For example, the UK government is considering plain packaging as a next step in their tobacco control efforts<sup>78</sup>, and Australia recently released a National Preventative Health Strategy, which recommends plain packaging as a method of increasing the saliency of health warnings.<sup>79</sup> In response to proposed plain package legislation, the Tobacco Manufacturers Association and other tobacco representatives have stated that plain packaging would prevent adults from being able to easily identify and choose brands without

confusion.<sup>80</sup> In addition, the chief executive of Imperial Tobacco, Group Gareth Davis, stated that while they will support measures to reduce youth smoking, they will continue to oppose regulations that limit adults' freedom to choose.<sup>81</sup> In response to increasing evidence on the ability of plain packaging to reduce misleading beliefs about the health risks of smoking, tobacco executives are simply stating that the evidence is not compelling, and still speculative in nature.<sup>80</sup>

### *Future Work*

Given that smoking remains a leading cause of death and disability among women, and that high numbers of young Canadian females continue to initiate cigarette smoking, the impact of package design on brand appeal and on young women's beliefs and attitudes towards smoking demands continued attention. As tobacco control policies continue to target cigarette packaging, more research is needed to determine what will be most effective to limit the impact of cigarette packaging on brand appeal and beliefs and attitudes towards smoking.

Since the current study surveyed youth and young adults between the ages of 18 and 25 years, it would be interesting to determine if tobacco packaging has a similar impact on younger populations. This would be an important research question to examine, particularly as youth under the age of 18 years are at particular risk of smoking initiation. Additionally, future studies could examine whether female-oriented cigarette packaging has an impact on smoking susceptibility and actual smoking initiation among young female adolescents and children.

While the current study surveyed Canadian youth and young adults, an interesting area for future research would be to conduct the study in other countries such as the US, where there are currently fewer limitations in cigarette packaging. This research would have the potential to guide new regulations being developed under the labelling guidelines of the US Family Smoking Prevention and Tobacco Control Act.

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**Appendix A**  
**Survey**

Computer script: Welcome, and thank you for your interest in our cigarette packaging study! Please press “continue” to begin the study.

Before we begin, how old are you? \_\_\_\_\_ [1-99 limit]

What is your gender?

1. Female
2. Male

Thank you! You are now going to be provided with some information about the study. Please read the following information carefully, and once you understand the details of the study and agree to them, you can begin the survey.

**Title of Project:**                      **Cigarette Packaging Study**

**Student Investigator:**            Juliana Doxey, Dept. of Health Studies & Gerontology  
University of Waterloo  
(519) 888-4567, ext. 36786

**Faculty Supervisor:**            David Hammond, Dept. of Health Studies & Gerontology  
University of Waterloo  
(519) 888-4567, 36462

**1. PURPOSE OF THIS RESEARCH STUDY**

You are being asked to be part of a research study that examines people’s opinions about cigarette packaging. We are interested in people’s opinions about different versions of package designs and how they may affect their perceptions of health, appeal, taste, as well as beliefs and attitudes towards smoking.

**2. PROCEDURES**

In total, approximately 1200 people will take part in the study. Participation involves completing a 20-minute online survey. The computer survey will be split up into three parts.

During the first portion, you will be asked some general questions about you and your smoking history, such as how much money you have to spend every week, how happy you are with how you look, and the number of cigarettes you have smoked in your lifetime.

During the second portion of the survey, you will be shown pictures of different cigarette packages and asked to give ratings for each pack, such as whether you think the package is more appealing than other cigarette packages on the market.

In the third portion of the survey, you will be asked questions about your attitudes and opinions about smoking, such as whether you think smoking should be banned in public places. You will also rate the importance of a number of traits and characteristics, such as the importance of being thin or of being smart.

All questions will appear on the computer screen and you will enter all responses on the computer.

You must be between the ages of 16 and 25 years of age to participate in this study. Smokers and non-smokers can participate. Participation is voluntary and you may decline to answer particular questions if you wish.

### **3. POSSIBLE RISKS OR DISCOMFORT**

You may feel uncomfortable answering some of the questions in the survey. For example, when answering questions about whether you like the way you look or are concerned about your body weight.

### **4. POSSIBLE BENEFITS**

Participation in the study is not expected to benefit you directly but you are taking part in a study that we think you will find interesting. This study has the potential to inform packaging regulations in Canada and other countries. At the end of the study, we will be happy to answer any questions you may have. If you smoke and are interested in information on smoking cessation resources, information about how to quit and a list of local organizations that provide services to help you quit will be available from the researcher, whose contact information is available above and will be provided again at the completion of the study.

You will also have the option of receiving the final results of the study, if you're interested. If you desire this information, we will keep your contact address in a separate file and mail out the results when the study is completed.

### **5. FINANCIAL CONSIDERATIONS**

In appreciation for your time and any inconvenience, you will receive financial remuneration worth a minimum of \$2.50, according to the offer you received by e-mail as a registered member of GMI (<http://www.globaltestmarket.com/>).

### **6. CONFIDENTIALITY**

There is always a concern about keeping your privacy when you provide information about yourself such as your smoking history. All information obtained will be kept confidential. For your protection, we will assign you a number that will be used to label all information. Any personal information, such as your name and contact information, will be kept in a separate file that will be locked away in our lab at the University of Waterloo and will be destroyed after the study is completed in approximately 2 years. Electronic copies of your data will not contain any personal identifiers and will be stored indefinitely on a password-protected computer at the University of Waterloo. The online

survey will be administered through the *Survey Research Centre* at the University of Waterloo and hosted on a secure site.

The results of the study may be published for scientific purposes but will not give your name or include information that will identify you.

## **7. TERMINATION OF RESEARCH STUDY**

You are free to choose whether or not to take part in this study. You can choose to stop being a part of the study at any time. If during the study you decide to withdraw, you will still receive partial compensation from GMI for your time.

## **8. ETHICS REVIEW**

This study has been reviewed and received ethics clearance through the Office of Research Ethics at the University of Waterloo. However, the final decision about participation is yours. Should you have any comments or concerns resulting from your involvement in this study, please contact Dr. Susan Sykes in the Office of Research Ethics at (519) 888-4567, x36005.

## **8. AVAILABLE SOURCES OF INFORMATION**

If you have any questions later, or if you require additional information about the study, please feel free to contact the researcher listed below.

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I agree to take part in this research study being conducted by Juliana Doxey, an M.Sc student in the Department of Health Studies at the University of Waterloo, under the supervision of Professor David Hammond.

I have made this decision based on the information I have read in the information letter. All the procedures and any risks and benefits relating to my participation have been explained. If I have questions about the study, I can ask the following researcher:

Juliana Doxey: (519) 888-4567, ext 36786 (office)  
(Student Investigator) email: [jrparker@uwaterloo.ca](mailto:jrparker@uwaterloo.ca)

I understand that I may withdraw from the study at any time without penalty.

This project has been reviewed by, and received ethics clearance, through the Office of Research Ethics at the University of Waterloo. I am aware that I may contact Dr. Susan Sykes at this office (519-888-4567, x 36005) if I have any concerns or questions from my involvement in this study.

I agree to participate in this study:

Accept  
Decline

Thank you! You are now ready to begin the survey. You will be given instructions as to how to complete each section of the survey. First we are going to ask you some

<p>questions about your smoking behaviour. Please be assured that all your responses will be kept entirely confidential. Please press “next” when you are ready to proceed.</p>	
Smoker	<p>Do you currently smoke any tobacco products, including cigarettes, cigars, or pipes?</p> <p>1. Yes 2. No</p>
Smoke_100	<p>Have you ever smoked 100 or more cigarettes in your life?</p> <p>1. Yes 2. No 99. Not stated</p>
Smoke_often	<p>How often do you smoke?</p> <p>1. Daily 2. Weekly 3. Monthly 4. Less than monthly 5. Not at all</p> <p>Don't Know Refuse</p>
Smoke_self	<p>Do you think of yourself as a:</p> <p>1. Non-smoker 2. Former smoker 3. Occasional smoker 4. Regular smoker 99. Not stated</p>
Amount_cigs	<p><b>If daily smoker:</b> On average, how many cigarettes do you smoke each day, including both factory-made and roll-your own cigarettes? _____ <b>Number</b> [enter number]</p> <p><b>If weekly smoker:</b> On average, how many cigarettes do you smoke each week, including both factory-made and roll-your own cigarettes? _____ <b>Number</b> [enter number]</p> <p><b>If monthly smoker:</b> On average, how many cigarettes do you smoke each month, including both factory-made and roll-your own cigarettes?</p>

	_____ <b>Number</b> [enter number]
Intentions	<p>Are you planning to quit smoking:</p> <ol style="list-style-type: none"> <li>1. Within the next month?</li> <li>2. Within the next 6 months?</li> <li>3. Sometime in the future, beyond 6 months</li> <li>4. Not planning to quit</li> </ol> <p>Don't Know Refuse</p>
	Thank you! Now we are going to ask you some general questions about you. Please press the "next" button when you are ready to start.
se_like	<p>Choose the answer that best describes how you feel: In general, I like the way I am. (Choose one)</p> <ol style="list-style-type: none"> <li>1. False</li> <li>2. Mostly False</li> <li>3. Sometimes False/Sometimes True</li> <li>4. Mostly True</li> <li>5. True</li> <li>99. Not stated</li> </ol>
se_proud	<p>Choose the answer that best describes how you feel: Overall, I have a lot to be proud of. (Choose one)</p> <ol style="list-style-type: none"> <li>1. False</li> <li>2. Mostly False</li> <li>3. Sometimes False/Sometimes True</li> <li>4. Mostly True</li> <li>5. True</li> <li>99. Not stated</li> </ol>
se_good	<p>Choose the answer that best describes how you feel: A lot of things about me are good. (Choose one)</p> <ol style="list-style-type: none"> <li>1. False</li> <li>2. Mostly False</li> <li>3. Sometimes False/Sometimes True</li> <li>4. Mostly True</li> <li>5. True</li> <li>99. Not stated</li> </ol>
se_well	<p>Choose the answer that best describes how you feel: When I do something, I do it well. (Choose one)</p> <ol style="list-style-type: none"> <li>1. False</li> </ol>

	<ul style="list-style-type: none"> <li>2. Mostly False</li> <li>3. Sometimes False/Sometimes True</li> <li>4. Mostly True</li> <li>5. True</li> <li>99. Not stated</li> </ul>
se_look	<p>Choose the answer that best describes how you feel: I like the way I look. (Choose one)</p> <ul style="list-style-type: none"> <li>1. False</li> <li>2. Mostly False</li> <li>3. Sometimes False/Sometimes True</li> <li>4. Mostly True</li> <li>5. True</li> <li>99. Not stated</li> </ul>
weight_shape	<p>In the past year, how often have you thought about your weight and body shape? (Choose one)</p> <ul style="list-style-type: none"> <li>1. Never</li> <li>2. Not very often</li> <li>3. Sometimes</li> <li>4. Often</li> <li>5. All the time</li> <li>99. Not stated</li> </ul>
weight_afraid	<p>In the past year, how often have you felt afraid of gaining weight? (Choose one)</p> <ul style="list-style-type: none"> <li>1. Never</li> <li>2. Not very often</li> <li>3. Sometimes</li> <li>4. Often</li> <li>5. All the time</li> <li>99. Not stated</li> </ul>
weight_thinner	<p>In the past year, how often have you thought about wanting to be thinner? (Choose one)</p> <ul style="list-style-type: none"> <li>1. Never</li> <li>2. Not very often</li> <li>3. Sometimes</li> <li>4. Often</li> <li>5. All the time</li> <li>99. Not stated</li> </ul>
weight_tried	<p>In the past year, how often have you tried to lose weight? (Choose one)</p> <ul style="list-style-type: none"> <li>1. Never</li> <li>2. Not very often</li> <li>3. Sometimes</li> </ul>

	<p>4. Often</p> <p>5. All the time</p> <p>99. Not stated</p>
	<p>Thank you! You are now going to be shown a series of eight cigarette packages. For each package you see, please take a moment to look at the pack, and then you will be asked several questions for each. After you have answered each question, please press “next” to continue.</p>

Appealing	<p>How appealing would this brand of cigarettes be to young women your age?</p> <ol style="list-style-type: none"> <li>1. A <u>lot less</u> appealing than other brands</li> <li>2. A <u>little less</u> appealing than other brands</li> <li>3. No difference</li> <li>4. A <u>little more</u> appealing than other brands</li> <li>5. A <u>lot more</u> appealing than other brands</li> </ol>
Taste	<p>How do you think these cigarettes would taste, compared to other cigarette brands?</p> <ol style="list-style-type: none"> <li>1. A lot worse than other brands</li> <li>2. A little worse than other brands</li> <li>3. No difference</li> <li>4. A little better than other brands</li> <li>5. A lot better than other brands</li> </ol>
Tar	<p>How much tar do you think these cigarettes would have compared to other cigarette brands?</p> <ol style="list-style-type: none"> <li>1. A <u>lot less</u> tar than other brands</li> <li>2. A <u>little less</u> tar than other brands</li> <li>3. No difference</li> <li>4. A <u>little more</u> tar than other brands</li> <li>5. A <u>lot more</u> tar than other brands.</li> </ol>
Health	<p>How would the health risks of these cigarettes compare to other cigarette brands?</p> <ol style="list-style-type: none"> <li>1. A <u>lot less</u> risk than other brands</li> <li>2. A <u>little less</u> risk than other brands</li> <li>3. No difference</li> <li>4. A <u>little more</u> risk than other brands</li> <li>5. A <u>lot more</u> risk than other brands</li> </ol>
<p>In your opinion, someone who chooses to smoke this brand is <b>more likely</b> to be (choose one):</p>	

Female      Male      No Difference	
In your opinion, someone who chooses to smoke this brand is <b>more likely</b> to be (choose one):	
Slim      Overweight      No Difference	
In your opinion, someone who chooses to smoke this brand is <b>more likely</b> to be (choose one):	
Glamorous      Not Glamorous      No Difference	
In your opinion, someone who chooses to smoke this brand is <b>more likely</b> to be (choose one):	
Cool      Not Cool      No Difference	
In your opinion, someone who chooses to smoke this brand is <b>more likely</b> to be (choose one):	
Popular      Not Popular      No Difference	
In your opinion, someone who chooses to smoke this brand is <b>more likely</b> to be (choose one) :	
Attractive      Not Attractive      No Difference	
In your opinion, someone who chooses to smoke this brand is <b>more likely</b> to be (choose one):	
Exciting      Boring      No Difference	
In your opinion, someone who chooses to smoke this brand is <b>more likely</b> to be (choose one):	
Sophisticated      Not Sophisticated      No Difference	
Thank you, you are almost finished! We are now going to ask you some final questions about smoking. Please press 'next' when you are ready.	
slim_1	<b>Please indicate how much you agree or disagree with the following statement:</b> Smoking helps people stay slim. (Choose one)  1. Strongly Agree 2. Agree 3. Neither Agree nor Disagree 4. Disagree 5. Strongly Disagree 99. Not stated
slim_2	<b>Please indicate how much you agree or disagree with the following statement:</b> Smoking helps people control their appetites. (Choose one)

	<ul style="list-style-type: none"> <li>1. Strongly Agree</li> <li>2. Agree</li> <li>3. Neither Agree nor Disagree</li> <li>4. Disagree</li> <li>5. Strongly Disagree</li> <li>99. Not stated</li> </ul>
slim_3	<p><b>Please indicate how much you agree or disagree with the following statement:</b> Quitting smoking causes weight gain. (Choose one)</p> <ul style="list-style-type: none"> <li>1. Strongly Agree</li> <li>2. Agree</li> <li>3. Neither Agree nor Disagree</li> <li>4. Disagree</li> <li>5. Strongly Disagree</li> <li>99. Not stated</li> </ul>
risk_1	<p><b>Please indicate how much you agree or disagree with the following statement:</b> There's no danger to one's health from smoking an occasional cigarette.</p> <ul style="list-style-type: none"> <li>1. Strongly Agree</li> <li>2. Agree</li> <li>3. Neither Agree nor Disagree</li> <li>4. Disagree</li> <li>5. Strongly Disagree</li> <li>99. Not stated</li> </ul>
risk_2	<p><b>Please indicate how much you agree or disagree with the following statement:</b> If a person quits smoking before the age of 30, they can avoid all of the health risks from smoking.</p> <ul style="list-style-type: none"> <li>1. Strongly Agree</li> <li>2. Agree</li> <li>3. Neither Agree nor Disagree</li> <li>4. Disagree</li> <li>5. Strongly Disagree</li> <li>99. Not stated</li> </ul>
attitudes_1	<p><b>Please indicate how much you agree or disagree with the following statement:</b> My friends approve of smoking.</p> <ul style="list-style-type: none"> <li>1. Strongly Agree</li> <li>2. Agree</li> <li>3. Neither Agree nor Disagree</li> <li>4. Disagree</li> <li>5. Strongly Disagree</li> </ul>

	99. Not stated
attitudes_2	<p><b>Please indicate how much you agree or disagree with the following statement:</b> Tobacco companies target people my age.</p> <ol style="list-style-type: none"> <li>1. Strongly Agree</li> <li>2. Agree</li> <li>3. Neither Agree nor Disagree</li> <li>4. Disagree</li> <li>5. Strongly Disagree</li> <li>99. Not stated</li> </ol>
attitudes_3	<p><b>Please indicate how much you agree or disagree with the following statement:</b> My friends would date a smoker.</p> <ol style="list-style-type: none"> <li>1. Strongly Agree</li> <li>2. Agree</li> <li>3. Neither Agree nor Disagree</li> <li>4. Disagree</li> <li>5. Strongly Disagree</li> <li>99. Not stated</li> </ol>
attitudes_4	<p><b>Please indicate how much you agree or disagree with the following statement:</b> Smoking can be glamorous.</p> <ol style="list-style-type: none"> <li>1. Strongly Agree</li> <li>2. Agree</li> <li>3. Neither Agree nor Disagree</li> <li>4. Disagree</li> <li>5. Strongly Disagree</li> <li>99. Not stated</li> </ol>
	Just to wrap up, we have a few more questions for statistical purposes. Please be assured that your responses will be kept completely confidential.
Income	<p>Which of the following categories best describes your annual household income, that is the total income before taxes, or gross income, of all persons in your household combined, for one year?</p> <ol style="list-style-type: none"> <li>1. Under \$10,000</li> <li>2. \$10,000 to \$29,999</li> <li>3. \$30,000 to \$44,999</li> <li>4. \$45,000 to \$59,999</li> <li>5. \$60,000-74,999</li> <li>6. \$75,000-99,999</li> <li>7. \$100,000-149,999</li> <li>8. \$150,000 and over</li> </ol> <p>Don't know</p>

	Refuse
Education	<p>What is the highest level of formal education that you have completed?</p> <ol style="list-style-type: none"> <li>1. Grade school or some high school</li> <li>2. Completed high school</li> <li>3. Technical or trade school or community college (some or completed)</li> <li>4. Some university (no degree)</li> <li>5. Completed university degree</li> <li>6. Post-graduate degree</li> </ol> <p>Don't Know Refuse</p>
Employment	<p>Are you currently employed outside the home?</p> <ol style="list-style-type: none"> <li>1. Yes</li> <li>2. No</li> </ol> <p>Don't Know Refuse</p>
Ethnicity	<p>People in Canada come from many racial and cultural groups. Are you . . .</p> <ol style="list-style-type: none"> <li>1. White</li> <li>2. Chinese</li> <li>3. South Asian (for example, East Indian, Pakistani, Sri Lankan, etc.)</li> <li>4. Black</li> <li>5. Filipino</li> <li>6. Latin American</li> <li>7. Southeast Asian (for example, Cambodian, Indonesian, Laotian, Vietnamese, etc.)</li> <li>8. Arab</li> <li>9. West Asian (for example, Afghan, Iranian, etc.)</li> <li>10. Japanese</li> <li>11. Korean</li> <li>12. Aboriginal (that is, North American Indian, Métis, or Inuit), or</li> <li>13. Another group?</li> </ol>
<p>You are finished! We appreciate your participation in our study, and thank you for spending the time helping us with our research.</p> <p>As we mentioned earlier, we are interested in people's opinions about cigarette packaging. For the current study, we were particularly interested in the impact of colour, graphics, and descriptive wording on packages and how they affect health-related perceptions, such as taste and potential health risk, as well as perceptions of appeal. We were also interested in the impact of descriptors and imagery that are used to specifically target females – such as the word “slim” or the colour pink - on beliefs about the risks of smoking, beliefs about smoking and weight control, future susceptibility to smoking, and general attitudes towards smoking. Different groups of participants were shown different types of cigarette packages: whereas some participants were shown “normal” or “standard” cigarette packages, others were shown packages that specifically</p>	

target women through the use of certain colours, graphics, and descriptors. We will compare responses from the different groups to see whether the colour and words affect their opinions of packages and attitudes towards smoking.

As a reminder, all the information you provided during the survey will be kept strictly confidential. This project has been reviewed by, and received ethics clearance through the Office of Research Ethics at the University of Waterloo. Should you have any questions or concerns about your participation in this study, please contact myself or Dr. Susan Sykes, Director, Office of Research Ethics at the University of Waterloo, at 519-888-4567, Ext. 36005 or by e-mail at [ssykes@uwaterloo.ca](mailto:ssykes@uwaterloo.ca).

If you would like any further information about the study, including a copy of our findings when they become available, please contact us at the contact information below. Also, we would be happy to provide you with a list of smoking cessation resources by contacting us, should you wish.

Thank you again for your help.

Sincerely,

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[END SURVEY]