

**The impact of standardized cigarette packaging among young women in Canada:
A discrete choice experiment**

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

Cigarette packaging is the most prominent form of tobacco promotion in Canada. Tobacco companies are increasingly selling cigarettes in innovative packaging, including the use of slim and super-slim “lipstick” sizes that are primarily marketed towards females. Australia is currently the only country that regulates the shape and size of cigarette packaging. The current study examined the relative importance of five cigarette packaging attributes—pack shape (e.g., “slims”), brand, plain packaging, warning label size, and price—on perceptions of product taste, harm, and interest in trying, among young women in Canada.

A discrete choice experiment was conducted online with smoking (n=211) and non-smoking (n=292) females, aged 16 to 24, recruited from a commercial sample. Respondents were shown 8 choice sets, each containing four packs displaying different combinations of the attributes: pack structure (slim, lipstick, booklet, standard); brand (‘Vogue’, ‘du Maurier’); branding (branded, plain); warning label size (50%, 75%); and price (\$8.45, \$10.45). For each choice set, respondents chose the brand that they: 1) would rather try, 2) would taste better, 3) would be less harmful, or “none”. For each outcome, the attributes’ impact on choices was analyzed using a multinomial logit model, and the relative importance (RI) of each attribute was calculated.

The results showed that pack structure significantly influenced interest in trying (RI = 16%) and perceptions of taste (RI = 8%), whereas perceptions of harm were driven by pack structure (RI = 46%). Branding was the most important contributor to trial intent decisions (RI = 39%) and perceptions of taste (RI = 48%). Interest in trying among females significantly increased for booklet ($p < 0.0001$) packs compared to the traditional design. As well, females

were significantly more interested in trying branded packs, female oriented 'Vogue' brand, and a 75% warning label size ($p < 0.0001$, for all). In terms of taste related perceptions, females believed that slim ($p=0.02$) and booklet packs ($p=0.006$) were significantly better tasting than traditional designs. Similarly, branded packs ($p < 0.0001$), 'Vogue' brand ($p < 0.0001$), 75% warning ($p < 0.0001$), and higher priced packs ($p=0.04$) significantly increased perceptions of taste among females. Among young females, booklet ($p=0.03$), lipstick ($p < 0.0001$) and slim ($p < 0.0001$) pack sizes were perceived as significantly less harmful compared to traditional designs. As well, women believed branded packs, 'Vogue' brand, and more expensive brands would be significantly less harmful ($p < 0.0001$, for all). Given that the discrete choice design did not include all pack profiles that could be generated with attribute-level combinations of branding, brand, and warning labels, and in particular, due to the absence of "branded *Vogue* packs with smaller warnings", the findings on warning label size should be interpreted with caution.

Overall, the findings suggest that "plain" packaging and prohibiting variations in pack shape and size may decrease interest in trying and reduce false perceptions of reduced product harm among young females.

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1.0 INTRODUCTION

1.1 Tobacco Consumption

1.1.1 Global Impact of Tobacco Use

Tobacco use causes approximately 6 million deaths each year, and is the leading global cause of preventable death (WHO, 2011). In 2010, the global prevalence of cigarette smoking was estimated to be 24% among adults (Mendez, Alshanteety, & Warner, 2013). Globally, there are more male than female smokers, however, data from global tobacco use monitoring surveys indicate that females are accounting for an increasing proportion of new smokers, especially in low and middle income countries within Eastern Europe and Asia-Pacific (WHO, 2010a).

1.1.2 Tobacco Use in Canada

Tobacco use remains a significant public health issue in Canada where declines in smoking rates have stalled since 2008 (Reid, Hammond, Burkhalter, Rynard & Ahmed, 2013). In 2011, 17% of Canadians 15 years of age and older were current smokers (Reid, et al., 2013). Young people account for a large proportion of Canadian smokers: in 2011, 12% of youth aged 15-19 were current smokers; while smoking prevalence was highest among young adults aged 20-24 at 21% (Reid, et al., 2013). Among all smokers over 15 years of age, there were significantly more male (20%) than female smokers (15%) (Reid, et al., 2013). However, the gender gap has narrowed among youth aged 15-19, where the number of female smokers was not significantly different from male smokers, 11% and 13% respectively (Reid et al., 2013).

1.2 Tobacco Control Regulations

1.2.1 Framework Convention on Tobacco Control

The World Health Organization Framework Convention on Tobacco Control (WHO FCTC) is a global treaty that commits signatory countries to implement a number of evidence based tobacco control policies (WHO, 2005). More than 175 countries, including Canada, have ratified the FCTC (WHO, 2012b). To reduce the demand for tobacco, WHO FCTC recommends a comprehensive set of policies that includes taxes on tobacco, protection from exposure to tobacco smoke, education and public awareness, offering tools to help smokers quit, and banning tobacco sponsorship, advertising and promotion (WHO, 2005). In addition, policy measures outlined under Article 11, *regulation of packaging and labelling of tobacco products*, are most relevant to the current study (WHO, 2005).

Packaging and labelling regulations are intended to warn consumers about the dangers of tobacco use, and prevent packaging that creates misleading impressions about its products health effects (WHO, 2005). To ensure that packaging does not mislead consumers about product harm and to reduce the promotional appeal of packaging, Article 11 recommends that countries implement “plain packaging” regulations (WHO, 2009). “Plain packaging” would remove branding, trade-marks, and promotional text from packaging, and standardize the pack colour, shape and size (WHO, 2009).

1.2.2 Tobacco control in Canada

Canada is an international leader for developing and implementing comprehensive tobacco control policies that follow WHO FCTC guidelines (Health Canada, 2011). The Canadian Federal Tobacco Control Strategy works towards reducing the demand for tobacco through measures such as tobacco taxation, smoke free public spaces, and tobacco cessation programs

like the national toll-free smoking “quit lines” (Health Canada, 2011). Canada has implemented restrictions on tobacco advertising and marketing through the Tobacco Products Control Act of 1988 and The Tobacco Act of 1997 (Reid, Hammond, Burkhalter, & Ahmed, 2012). Tobacco advertising restrictions include point of sale retail display bans, domestic bans of television, radio, magazine, and newspaper ads, as well as prohibition of promotional discounts and sponsored events (Henriksen, 2012).

1.2.3 Tobacco Packaging Regulations in Canada

Tobacco packaging is the most prominent form of tobacco marketing in Canada due to restrictions and bans on most advertising, promotion, and sponsorship (Henriksen, 2012).

Canadian cigarette packaging regulations require descriptive toxic constituent messages on the side of packages, pictorial warning labels that cover 75% of the pack display area, and prohibit the use of the descriptor terms “light” and “mild” (Tobacco Products Labelling Requirements, 2011). Otherwise, there are no restrictions on pack design features, such as brand imagery, or alterations to the pack shape, size, and opening method.

1.3 Market Trends in Cigarette Packaging Design

1.3.1 Global Packaging Trends

Emerging trends in packaging are visible in marketing restricted countries around the world. Industry documents reveal the growing importance that companies have placed on structural packaging innovations (Kotnowski & Hammond, 2013). A review of retail press journals revealed that changes to packaging for the premium *Silk Cut* brand in the U.K. occurred more frequently between 2008 and 2011 (Moodie, Angus, & Ford, 2012). Notably, frequent packaging alterations occurred in the U.K. after the introduction of the Tobacco Advertising and

Promotion Act, including *Silk Cut Graphite* in beveled packs (2007) and *Silk Cut Super Slims* in perfume packs (2008) (Moodie & Hastings, 2011). Other instances of “limited-edition” package designs have been sold in France, as well as introductions of slide and booklet packs within the U.K. (Gallopel-Morvan, et al., 2012).

1.3.2 Packaging trends in Canada

In Canada, cigarettes are increasingly being sold in redesigned packages that include changes to the pack colours, trademarks, and physical design (Non-Smokers Rights Association, 2009). Figure 1 illustrates Canadian market examples of cigarettes brands that have been sold in novel pack shapes, sizes and opening-styles, including the octagonal *Du Maurier* pack (2005), limited edition *Du Maurier* booklet pack (2006), *Players* slide-opening pack (2008), as well as new introductions of international slim and super-slim brands, such as *Vogue*, that are packaged in narrow and elongated packs (Non-Smokers Rights Association, 2009).

Figure 1. Canadian examples of innovative structural packaging.



From top left to bottom right: octagonal, booklet-opening, lipstick, slim, slide-opening

1.3.3 Packaging trends targeted towards women

The tobacco industry has marketed cigarettes towards women using themes associated with feminine attributes, such as “class”, “sophistication”, and “style” (U.S. Department of Health and Human Services, 2001). Female-orientated brands, such as *Virginia Slims*, *Capri*, and *Vogue* have been developed exclusively for females, often containing light pastel coloured branding elements, and packaged in slim or elongated shaped boxes, see Figure 2 (Toll & Ling, 2005). In addition to female-only brands, tobacco companies promote a growing number of “gender-neutral” brands that incorporate female brand style characteristics (Carpenter, Wayne, & Connolly, 2005).

There is a large presence of female-orientated packaging within low and middle income countries which are experiencing a growing number of female smokers (Euromonitor International, 2007). The slim market is rapidly growing in developing countries within Asia-Pacific (Euromonitor International, 2007). As well, in Eastern Europe a number of established brands have started to sell cigarette variants in novel sized packs and colours, and the slim and super-slim market continues to rise in countries like Russia (WHO, 2010b).

Figure 2. Examples of female-orientated packaging.



1.4 Review of research on cigarette packaging

1.4.1 Cigarette pack branding and perceptions among consumers

Internal Tobacco Company documents show that the industry uses all aspects of branding, including graphics, colours, symbols and fonts, to communicate positive brand imagery and position brands to appeal to young people (Wakefield, Morley, Horan, & Cummings, 2002). Often, tobacco companies redesign pack branding in efforts to revitalize their brand image, and ensure that branding remains relevant among target audiences (Wakefield, Morley, Horan, & Cummings, 2002). The use of feminine imagery, such as floral colours and female-oriented logos, have long been used to create packaging that appeals to young women (Wakefield, Morley, Horan, & Cummings, 2002; U.S. Department of Health and Human Services, 2012).

It is well established that the presence of branding on packaging is appealing among youth and young adults (Hammond, 2010; Gallopel-Morvan, et al., 2013), while female-oriented packaging particularly appeals to young women (Hammond, Doxey, Daniel & Bansal-Travers, 2011; White, Hammond, Thrasher, & Fong, 2012). Several studies have documented the effect of removing branding features on ratings of pack appeal. A cross-sectional study that examined the early impacts of plain packaging policy in Australia revealed that compared to smokers using branded packs, plain pack smokers were more likely to believe their cigarettes were lower in quality and satisfaction (Wakefield, Hayes, Durkin, & Borland, 2013). Other experimental studies from Australia and New Zealand have shown that as colours, branded fonts, and brand imagery were systematically removed from packs, ratings of positive pack characteristics progressively decreased among adults and youth (Germain, Wakefield, & Durkin, 2010; Hoek, Wong Gendall, Louviere, & Cong, 2011). Moreover, the complete removal of

branding has been shown to decrease the attractiveness of packaging among young people and women in the United States, Brazil, and United Kingdom (Hammond, et al., 2009; Hammond, Doxey, Daniel, & Bansal-Travers, 2011; White, Hammond, Thrasher, & Fong, 2012; Hammond, Daniel, & White, 2013). Specifically, compared to plain packs, women have associated branded packs, and especially female-orientated branded packs, with more positive image traits, such as “stylish” and “sophisticated” (Hammond, Doxey, Daniel, & Bansal-Travers, 2011; White, Hammond, Thrasher, & Fong, 2012; Hammond, Daniel, & White, 2013). The research suggests that the removal of pack branding has potential to decrease the promotional appeal of packaging among young people and women.

Elements of branding, such as pack descriptors and colours, have been shown to influence product perceptions among young people. Several studies have established that packages with brand descriptors such as “light”, “mild”, “smooth”, “silver” and “gold” are perceived as having a lower health risk and better taste than packages without such descriptors (Mutti, et al., 2011; Hammond, et al., 2009). Similarly, tobacco packaging colour has been shown to influence perceptions of product taste and harm, with lighter colours, such as gold, pink, white and pastels being perceived as better tasting and less harmful among young people (Hammond, et al., 2009; Hammond, Doxey, Daniel, & Bansal-Travers, 2011). On the contrary, when branding elements are removed from packages, impressions of taste and false beliefs of reduced harm are decreased among young people and women (Hammond, et al., 2009; Hammond, Doxey, Daniel, & Bansal-Travers, 2011; Hammond, Daniel, & White, 2013).

1.4.2 Physical packaging design and perceptions among consumers

Tobacco industry documents reveal that companies have long invested in consumer research to understand the brand image communicated by different pack shapes, sizes and opening methods (Kotnowski & Hammond, 2013). Industry directed consumer research illustrates that cigarette packs that deviated from the traditional flip-top box were effective at projecting impressions of “modern”, “elegant”, and “unique” brand imagery (Kotnowski & Hammond, 2013). Internal marketing documents reveal that tobacco companies have introduced novel packaging formats, in part, to make their brands more appealing to target audiences (Kotnowski & Hammond, 2013). In particular, slim and booklet-opening packs were shown in industry research to be especially appealing among young women (Kotnowski & Hammond, 2013).

Despite the increased number of physical pack alterations launched in markets, only a few “independent” studies have investigated the impact of pack shape, size, and openings among consumers and its implications for “plain” packaging. Qualitative research conducted in the United Kingdom has shown that branded packs with novel shape, such as slim, lipstick, slide and lighter-style openings were appealing and sparked interest among youth (Ford, Moodie, MacKintosh, & Hastings, 2013). In the absence of branding, alterations to the pack structure alone influenced ratings of pack attractiveness and product quality among young adults and youth (Borland, Sawas, Sharkie, & Moore, 2011; Moodie, Ford, Macintosh, & Hastings, 2012; Moodie & Ford, 2011). Specifically, in an Australian sample of young adults, “plain” rounded and beveled packs were rated more attractive than “plain” squared packs; and “plain” rounded, beveled, and slide-opening packs were thought to contain a higher quality product compared to a “plain” standard flip-top box (Borland, Sawas, Sharkie, & Moore, 2011). Similarly, among a

sample of U.K. youth, one in three preferred a “plain” slide-opening or perfume pack compared to a “plain” flip top box (Moodie, Ford, Macintosh, & Hastings, 2012).

A limited number of non-industry studies have observed that slim and super-slim “lipstick” packs are particularly appealing among females (Moodie & Ford, 2011; White, Hammond, Thrasher, & Fong, 2012; Hammond, Daniel, & White, 2013). In qualitative research, branded and “plain” perfume packs were perceived as most attractive among young adult women (Moodie & Ford, 2011). As well, experimental studies that tested female orientated packaging showed that packs with slim shapes received the highest ratings of appeal among young women, even when the branding was removed (White, Hammond, Thrasher, & Fong, 2012; Hammond, Daniel, & White, 2013). More research is needed to understand how in the absence of branding pack size and shape influences preferences among females.

The impact of physical packaging on product perceptions among consumers has been under-studied. Findings from internal company documents show that pack innovation, specifically, slim, rounded edges, octagonal, and slide-openings increased perceptions of “smooth” taste and “lightness” among consumers (Kotnowski & Hammond, 2013). “Independent” qualitative research has shown that young adult women and youth thought smaller shaped packs minimized health risk (Moodie & Ford, 2011; Ford, Moodie, MacKintosh, & Hastings, 2013); while among female-orientated brands, a plain version of a lipstick pack was rated highest among young women in terms of reduced health risk (Hammond, Daniel, & White, 2013). Considering that some pack formats, such as slim and lipstick, are dominantly targeted towards females, further research is needed to examine if variations in pack size and shape on non-branded packs influence young women’s judgment of product taste and harm.

1.4.3 Evidence on Warning Labels

Pictorial warnings are more effective than text-only warnings at communicating to smokers and non-smokers about the health effects of smoking (Hammond, 2011). On branded packs, warnings that cover a larger portion of the display area are more likely to be recalled by smokers than smaller warnings (Hammond, 2011). There is some evidence that plain packaging can enhance the salience of warning labels. Eye movement measurements have shown that compared to branded packs, youth pay more attention to health warnings that appear on plain packs (Maynard, Munafo, & Leonards, 2013). Furthermore, Wakefield and colleagues (2012) found that small 30% warnings on plain packs were more effective in reducing positive pack characteristics among adult smokers than larger 70% warnings on branded packs.

The research to date examining warning label size in relation to “plain” packaging has been largely conducted holding pack size and shape constant. Package size dictates the subsequent size of warning labels: small or narrow packages carry smaller health warnings compared to the larger health warnings that appear on traditional sized packages. In an experimental “plain” pack study young adults rated a standard flip-top pack as less distracting to health warnings compared to packs with novel shapes and openings (Borland, Sawas, Sharkie, & Moore, 2011). However, it is not known how tobacco packages with different sizes impact warning label salience (Hammond, 2010). Evidence is also needed in regards to how physical pack construction, warning label size, and branding together impact consumer perceptions of product attributes and behavioural intentions.

1.4.4 Cigarette packaging and consumer demand

Industry research reveals that variations in cigarette pack design have potential to impact purchase interest and actual trial. According to company documents, purchase interest

increased among consumers when cigarettes were packaged in beveled, rounded, slide-opening, booklet and slim packs (Kotnowski & Hammond, 2013). As well, company tracking reports and presentations have attributed previous increases in market share to innovative launches in pack shape and opening-style (Kotnowski & Hammond, 2013).

Generally, young adults believe that “plain” packages would motivate existing smokers to quit and prevent new people from starting to smoke (Gallopel-Morvan, et al., 2012; Hoek, et al., 2011). A variety of methods, including observational, pack selection tasks and experimental bidding, have been used to measure consumer demand for “plain” packaging. In a naturalistic study that required adult participants from Scotland to smoke cigarettes contained in “plain packs” for two weeks, the results showed that “plain packaging” increased smoking cessation behaviours, such as smoking less around others and thinking about quitting (Moodie, Mackintosh, Hastings, & Ford, 2011). As well, in several pack selection tasks, which asked participants to choose which pack among a set they would “take home”, females were significantly more likely to choose fully branded female-orientated packs to be mailed to their household compared to “plain” packs (Hammond, Doxey, Daniel, & Bansal-Travers, 2011; White, Hammond, Thrasher, & Fong, 2012; Hammond, Daniel, & White, 2013). Similarly, the results from an experimental bidding experiment showed that young adults were less likely to bid for cigarettes contained in “plain” packages (Rousu & Thrasher, 2013).

To date, few studies have tested the impact of different packaging elements simultaneously. In 1995, a conjoint experiment was conducted among youth in Canada to measure the relative effects of brand, whether friends smoked the brand or not, package branding, and price on smoking uptake (Goldberg, Liefeld, Kindra, Madill-Marshall, et al., 1995).

The results showed that higher price and “plain” packaging were the most influential factors on discouraging youth to smoke (Goldberg, Liefeld, Kindra, Madill-Marshall, et al., 1995). More recently, a ‘best-worst’ experiment was conducted to measure preference levels for varying levels of pack branding and warning label sizes among young adult smokers (Hoek, Wong, Gendall, Louviere, & Cong, 2011). The study found that smokers were less likely to choose packs when branding elements progressively decreased and warning labels progressively increased in size (Hoek, Wong, Gendall, Louviere, & Cong, 2011). Further research is needed to examine consumer behavioural impacts due to variations in pack size, particularly when combined with other elements of packaging.

1.4.5 Product price on consumer perceptions and behaviour

Price is an important factor to consider when understanding consumer reactions to products. According to the Veblen effect, a theory in economics, consumers perceive higher-priced goods as more desirable, despite the availability of similar lower-priced goods (Veblen, 1899). The Veblen effect explains that consumers believe higher-priced goods are better quality, and that consumers desire to be seen purchasing prestigious goods (Veblen, 1899). To date, much of the research that has examined the impacts of “plain” packaging on behavioural intentions has been conducted in the absence of price. Further research is needed to understand the implications of “plain” packaging in the context of price.

1.5 Plain Packaging Policy

Despite the growing number of innovations in pack design, only one country, Australia, requires that cigarettes be sold in “plain” packages as of December, 2012 (Commonwealth of Australia, 2011). Under Australia’s Plain Packaging Act, branding, trademarks, and promotional

text has been removed from packaging, and all packs are sold in a drab brown colouring (Commonwealth of Australia, 2011). Restrictions on pack structure require that the pack surface be rectangular, all edges be straight – not beveled or rounded – and that only a flip-top opening be used (Commonwealth of Australia, 2011). As well, minimum pack dimensions effectively prohibit narrow packaging associated with slim cigarettes (Commonwealth of Australia, 2011). More specifically, all cigarette packs must meet the following dimensions: height (within 85mm – 125mm), width (within 55mm – 82mm), and depth (within 20mm – 42mm) (Commonwealth of Australia, 2011). An example of standardized packaging is shown in Figure 3.

A number of other countries are following Australia's lead and making moves towards plain-packaging. In 2013, the governments of Ireland and New Zealand announced plans to begin the process of introducing plain-packaging legislation (Ireland Department of Health, 2013; New Zealand Ministry of Health, 2013). However, other governments appear more hesitant towards "plain" packaging. For example, although plans for plain-packaging were announced in the United Kingdom since 2010, to date, plain-packaging has still not been incorporated into the Government's legislative program (Tobacco Tactics, 2013). As well, the revisions of the European Commission's Tobacco Products Directive does not include "plain" packaging requirements, and instead deflects responsibility to member states who are "free to introduce plain packaging in duly justified cases" (European Commission, 2012).

The tobacco industry strongly opposes plain-packaging regulations. There are ongoing litigations between tobacco companies and the Australian government, with companies arguing that plain-packaging legislation violates the World Trade Organizations trade and investments

agreements; specifically, Trade Related Aspects of Intellectual Property Rights (TRIPS), which offers protections for trademarks (Fooks & Gilmore, 2013). However, the TRIPS agreement also offers governments some flexibility in that it allows the adoption of measures that are necessary to protect public health (Fooks & Gilmore, 2013). Nonetheless, the tobacco industry continues to challenge plain-packaging laws on arguments that the requirements are more restrictive than necessary to protect public health interests (Mackey, Liang, & Novotny, 2013).

Figure 3. Example of standardized packaging.



1.6 Summary

Cigarette packaging is the most prominent form of tobacco promotion in Canada, and other high income countries, where comprehensive restrictions on tobacco marketing and sponsorship are otherwise enforced. Tobacco companies make use of the non-restricted features of cigarette packaging to promote their brands to consumers, including variations to branding and innovations to the pack shape, size and opening-method. Cigarette packaging

plays a critical role in establishing brand preference and influencing health related perceptions. Branding elements on cigarette packaging, such as colour and imagery, have been shown to communicate positive brand characteristics and create misleading impressions about its products associated health effects. There is less evidence regarding the potential impacts of packaging shape and size on consumer perceptions and behaviour. Given that a number of novel packages have been introduced to the market, including changes to the packaging structure, there is a need to investigate the potential impacts of new designs that are emerging. The evidence is critical to inform plain packaging policy and help regulators identify potentially misleading information associated with pack shape and size.

2.0 STUDY RATIONALE

There are many examples of alternative packaging designs in the global market, some of which are designed to appeal to young women. Despite the growing popularity of slim and super-slim “lipstick” pack sizes, which are mainly targeted towards females, few “independent” studies have examined how young women perceive variations in pack structure and if these impact their smoking intentions. Furthermore, few studies have tested the impact of different packaging elements simultaneously, such as pack structure, branding, and warning labels, in an effort to understand how a move to plain-packaging would impact consumer preferences for tobacco products.

The current study sought to identify the most important packaging features that women attend to when judging product characteristics related to taste and harm, and when making decisions to try cigarette products. The discrete choice design used in this study was appropriate for measuring product perceptions and intentions to try, as it has an established track-record for informing product development in marketing, and resembles how consumers evaluate products and make behavioural decisions. The findings from this study can be used to understand the implications of packaging design features, including pack size and shape, on perceptions and behavioural intentions among females, especially in the context of plain-packaging. The evidence will be needed to inform ongoing litigations related to plain-packaging in Australia, and will be useful for other countries that are interested in implementing plain-packaging regulations.

3.0 RESEARCH OBJECTIVES

The current study investigated the following questions:

1. What is the relative importance that young women place on cigarette packaging structure, brand, branding, warning label size, and price when deciding whether or not to try a cigarette product?
2. What is the relative importance that young women place on cigarette packaging structure, brand, branding, warning label size, and price when judging product taste and harm?
3. To what extent are young women's intentions to try and perceptions of product taste and harm moderated by smoking status and age?

4.0 METHODOLOGY

4.1 Discrete Choice Analysis Theory

Discrete choice is often used in marketing and healthcare research to inform product development and preferences for services (Haaijer & Wedel, 2007). In addition to estimating purchase intentions, discrete choice has been applied to understand risk perceptions, measured by the risk contribution individuals attached to different cardiovascular disease risk factors (Hamarneh, et al., 2012).

Discrete choice is used to understand the trade-offs that individuals make between various attributes when they are evaluating products or services (Ryan, Gerard, Amaya-Amaya, 2008). For this study, factors associated with cigarette packaging, and which are expected to influence individuals' preferences and values, are referred to as **attributes** (Kuhfeld, 2010). Each pack attribute consists of different **attribute-levels**; for example, price is an attribute, and different price values are attribute-levels.

Discrete choice has a foundation in Lancaster's Economic Theory of Value which explains how consumers evaluate the benefits and costs of competing products to form overall impressions and make final choices (Lancaster, 1966). Discrete Choice is based on Utility Theory which describes the trade-offs that individuals make when evaluating or forming preferences for products (McFadden, 1974). According to utility theory, an individual's total evaluation, or **utility**, of a cigarette package is determined by the sum of individual evaluations, or part-worths, placed on pack attributes (McFadden, 1974). A **Part-worth** refers to the contribution of an attribute level to the total utility. Following Utility Theory, it is expected that a consumer's choice and evaluation of cigarette products is based on a systematic component observed by

preferences for different combinations of attributes, and a random unexplainable error component (McFadden, 1974). Hypothetical **profiles** or alternatives, which represent potential cigarette packs, are generated by combining different levels of each attribute. Respondents are typically asked to evaluate hypothetical profiles by indicating their choice between a set of profiles. Consumer preferences and attitudes are reflected by the choice made among alternatives, and it is expected that individuals will choose the alternative that offers the greatest utility (McFadden, 1974). The results from discrete choice provide an estimation of which attributes and attribute levels are least and most important to respondents. Importantly, the results obtained from discrete choice can be used to model predictions about consumer behaviour and their perceptions of different pack designs.

4.2 Selection of Attributes and Attribute Levels

The selection of attributes depends on its relevance to the product or research question and if it is expected that ignoring a particular attribute would lead consumers to make unrealistic decisions (Bridges, et al., 2011). For example, since price is normally a factor when consumers make purchasing decisions, it would normally be included as a relevant attribute. As well, any two attributes should not be highly correlated with each other, as this will cause problems for model estimation (Hensher, et al., 2005). For example, since individuals make associations with price and product quality, including a mix of “premium” and “discount” brands as attribute levels should be avoided when a price attribute is included in a study.

The literature review informed the selection of pack attributes to be included in the discrete choice study: *structural packaging design, cigarette brand, branding, pictorial warning label size, and price*. Pack attribute levels most relevant to young women were chosen based on

evidence from research and market practice. Qualitative interviewing was conducted to inform the final selection of pack attribute levels that were used in this study.

4.2.1 Qualitative Interviews

Qualitative interviews were conducted in two parts in January 2013, with a total of seven smoking and non-smoking females (mean age = 22 years). The first part consisted of interviews to: 1) assess overall appeal for different packaging structures and cigarette brands, 2) to assess gender orientation attributed to cigarette brands, and 3) to assess warning label salience. The overall aim was to inform the appropriate inclusion of packaging structures, brands and pictorial warning label most relevant to young females. The second part consisted of cognitive interviewing to pilot test the survey, and is discussed in section 4.6: *pilot testing*. A copy of the qualitative interviewing script is located in Appendix A.

4.2.1.1 Evaluating structural packaging designs

Participants were shown five images depicting different pack shape, size and opening-styles. To assess appeal, participants were asked to rank the images from “most appealing” to “least appealing”, and were asked to explain what they found most and least appealing about each pack image. For each pack, the rank order was averaged, and comments were aggregated.

4.2.1.2 Evaluating cigarette brands

Participants were shown images of 11 premium cigarette brands that were sold in Canada in 2012. To assess brand appeal, participants were asked to rank the packs from “most appealing” to “least appealing”, and were asked to explain what they found most and least appealing about each pack image. For each pack, comments were aggregated and the mean rank was calculated.

To assess gender orientation attributed to each brand, participants were asked to describe the type of person who might smoke the brand of cigarettes. Responses were categorized as male, female, or both.

4.2.1.3 Evaluating warning labels

Warning label salience for each of the 16 Canadian warnings, in circulation since June 2012, were tested by asking respondents to rate the warning on a measure of unpleasantness and overall effectiveness. For each warning, the mean rating was calculated for unpleasantness and overall effectiveness, and the average of these two scores were calculated.

4.2.2 Attribute 1: Structural Packaging Design

Structural packaging design included four levels: **traditional pack**, **lipstick pack**, **slim pack**, and **booklet pack**. Following plain packaging requirements implemented in Australia, the traditional pack consisted of rectangular surfaces, a flip-top lid, and met the required dimensions (height = 85mm, width = 55mm, depth 20mm). Qualitative interviewing informed the final choice of the subsequent attribute levels based on the participants perceived appeal of booklet, slim, and lipstick packs.

4.2.3 Attribute 2: Cigarette Brand

Vogue and *du Maurier* were included as cigarette brand attribute levels. The results from qualitative interviewing showed that women perceived *Vogue* as the most female-orientated brand, and *du Maurier* as the most gender-neutral brand.

4.2.4 Attribute 3: Branding

Branding was included as a pack attribute given that it has an important influence on brand appeal and perceived risk. *Level one* consisted of a **branded** version, and included existing brand imagery, colours and logos that corresponded to the cigarette brand. *Level two*

represented a **plain** version, and was designed in accordance with plain packaging regulations required in Australia: pack surface colour was displayed in Pantone 448C (drab dark brown), and brand name and variant was displayed in Lucinda Sans font and followed the specified capitalization and font size rules (Commonwealth of Australia, 2011).

4.2.5 Attribute 4: Warning Label Size

For the warning label attribute, two levels were chosen: 1) a warning label covering 50% of the display area – the labelling size currently used in many countries, and 2) a warning label covering 75% of the display area, which is the labelling requirement used in Canada since June 2012.

The Canadian warning label shown in Figure 4 was used in this study, and was held constant across all pack profiles. The warning label was chosen since the results from qualitative interviews suggested that this warning label was perceived as most neutral among young females. A neutral warning label was chosen to minimize potential issues surrounding warning label salience and the interpretation of results.

Figure 4. Canadian warning label used across all pack profiles.



4.2.6 Attribute 5: Price

Price was included as an attribute since it is a relevant factor that consumers consider when evaluating products. Two attribute levels were chosen: 1) a lower price at \$8.45, and 2)

a higher price at \$10.45. The price values reflect the cost of “discount” and “premium” cigarettes sold in Canada, as of December 2012.

4.2.7 Summary of Pack Attributes and Levels

Pack Attribute	Pack Attribute Levels
Structural Packaging Design	Traditional Lipstick Slim Booklet
Cigarette Brand	Vogue du Maurier
Branding	Plain version Branded version
Warning Label Size	50 % of display area 75% of display area
Price	\$8.45 \$10.45

4.3 Experimental Design

A generic choice design was generated using SAS 9.3 macros. The generic design was chosen to understand choices independent of any particular attribute. Following the generic design, **utility balance** was assumed, meaning the cigarette products were treated as a bundle of attributes, with no greater importance placed on any particular attribute (Kuhfeld, 2010).

A full profile design would have generated 64 distinct profiles – representing hypothetical cigarette packages - that respondents would have been required to evaluate. Therefore, we created a **fractional factorial main effects design**, containing **eight choice sets**, with each choice set containing **four pack profiles** and the alternative “**none**”. We chose to

include eight choice sets after consulting the %MktRuns macro, which displays design sizes in which maximum balance and orthogonality can occur for a main effects model. A design is fully **balanced** when all levels of each attribute occur equally often across all choice sets; and a design is fully **orthogonal** when pack attributes are not correlated with one another, or in other words, when each pair of levels occurs equally often across all pairs of attributes. (Kuhfeld, 2010). In addition, we created one additional choice set that was used as a **hold-out**. A choice set marked as a *hold-out* is evaluated by subjects, but assigned zero weight and excluded from the analysis so that the responses do not contribute to utility computations (Kuhfeld, 2010).

Designing the discrete choice experiment involved: 1) creating a linear arrangement of the choice design, 2) designing the hold-out, and 3) using the linear arrangement to create a choice design.

The final experimental design, including holdout choice set, can be found in Appendix B.

4.3.1 The linear model

First, the %MktEx macro was used to create a linear model containing 32 profiles. The design was fully balanced. The canonical correlation matrix, shown in Table 1, shows the extent to which attributes were correlated. The matrix shows that the design was nearly orthogonal, with the largest main-effects correlation listed as 0.0081 ($r=0.09$, $r^2 = 0.09^2 = 0.0081$).

Table 1. Discrete choice design: Canonical correlations between attributes

	Pack Structure	Brand	Branding	Warning	Price
Pack Structure	1	0	0.09	0.09	0
Brand	0	1	0	0	0
Branding	0.09	0	1	0	0.06
Warning Size	0.09	0	0	1	0.06
Price	0	0	0.06	0.06	1

4.3.2 Hold-out

The purpose of including a holdout choice set was to illustrate to respondents the structural differences between packs, and to introduce a trial run for responding to the outcome questions. More specifically, 2-D images can potentially underestimate the effect of different shapes and sizes. To mitigate this, the hold-out offered a means to illustrate each of the structures in a 3-D video format, including package depth and opening-style.

The SAS %MktEx macro was used to mark four additional profiles as hold-outs. The hold-outs were balanced, and were used to form a hold-out choice set.

The hold-out choice set was arranged exactly like the experimental choice sets, except that each hold-out was first presented to respondents as a video. Respondents clicked and viewed each video profile one at a time. Each video was between 25 to 28 seconds long, and consisted of two 360 degree rotations: one rotation with the pack closed, and one rotation with the pack opened. After viewing the videos, the profiles forming the hold-out choice set were presented as images.

4.3.3 Choice design

The %Choiceff macro was used to arrange the 32 profiles into 8 choice sets, each consisting of four pack profiles. Design efficiency is a measure of orthogonality and indicates with what precision the parameters can be estimated. The choice design was 100% efficient. Table 2 shows the characteristics of the choice design. Table 3 shows the variance covariance matrix, which displays the estimated variances for each parameter estimate. The standard errors for all parameters were minimized at 0.13, and all co-variances were estimated to be 0. The design properties indicated that the parameters could be estimated with maximum

precision. The choice design had no duplicate choice sets or duplicate profiles within each choice set. All choice sets included a constant fifth alternative, “none”.

Table 2. Discrete choice design properties

Number of choice sets	8
Profiles per choice set	4
Design Efficiency	100%
Smallest Parameter Variance possible (1 / # of choice sets)	1/8 = 0.125

Table 3. Estimated variances and co-variances for attributes in the choice design

	traditional	slim	lipstick	du Maurier	branded	50% warning	\$8.45
traditional	0.13	0	0	0	0	0	0
slim	0	0.13	0	0	0	0	0
lipstick	0	0	0.13	0	0	0	0
du Maurier	0	0	0	0.13	0	0	0
branded	0	0	0	0	0.13	0	0
50% warning	0	0	0	0	0	0.13	0
\$8.45	0	0	0	0	0	0	0.13

4.4 Data Collection

4.4.1 Participants

The study was conducted in Canada with a total of 503 smoking and non-smoking females, 16 to 24 years of age. Women were selected because the packaging formats included in this study – slim and lipstick – are mainly marketed towards women, and previous research has found that these pack formats are particularly appealing among young females (Moodie & Ford, 2011). Smoking and non-smoking participants were included based on previous evidence that smokers and non-smokers perceive packaging differently. For example, in a study that examined young adult's perceptions of different brands after viewing cigarette packs, non-smokers made more favourable brand attribute associations than smokers (Gendall, Hoek, Edwards, McCool, 2012).

4.4.2 Recruitment

Participants were recruited from Global Market Insite, Inc. (GMI), a commercial market research service (www.gmi-mr.com). GMI provides an online Canadian panel consisting of 219,000 participants living across all 10 provinces (Global Market Insite, 2012).

GMI recruits its members through a number of sources, including, web advertising, social networking, and internal and external affiliated groups (Global Market Insite, 2013). Individuals become members of GMI by completing an online registration form, and then activating their account through a link sent to their email account (Global Market Insite, 2013). GMI adheres to the Marketing Research and Intelligence Association Privacy Code which sets standards for protecting personal information of its panel members (Global Market Insite, 2013).

GMI offers its participants “MarketPoints” for each completed survey, which can be redeemed for a monetary reward (Global Market Insite, 2013).

During May 2013, females who were between 16-24 years old, and belonged to GMI’s Canadian participant pool, were sent an email invitation to participate in an online survey. The email invitation contained a secure link to the survey. After completing the survey, participants were awarded “MarketPoints”. The following quotas were used: 100 female smokers between 16 to 20 years old, 100 female smokers between 21 to 24 years old, 100 female non-smokers between 16 to 20 years old, and 100 female non-smokers between 20 to 24 years old.

4.4.3 Sample size calculation

In discrete choice experiments, the minimum sample size is determined by the desired level of precision for the estimated parameters, and is calculated with the formula:

$$n \geq (z^2 q) / (r p a^2)$$

The calculation considers the desired confidence interval (z), the choice share for a given option (p), the number of choice sets (r), and the allowable margin of error (a) (Hensher, et al., 2005).

For this study, the confidence interval was set at 95%, $z = 1.96$. The experimental design consisted of 8 choice sets, $r = 8$. Since each choice set had five options (four pack profiles and the constant alternative “none of the above”), $p = 1/5 = 0.2$; and “ q ” was defined as $1-p$, $q = 0.8$. The allowable margin of error was at 10%, a commonly used margin representing the allowable deviation between the estimated choice share “ p ” and the true choice share observed in the population, $a = 0.1$.

Using the sample size formula, $n \geq [(1.96^2) (0.8)] / [(8) (0.2) (0.1^2)]$, the minimum required sample size to detect main effects was estimated to be 192 individuals .

4.5 Protocol

4.5.1 Respondent screening and background survey

After respondents accessed the survey link, screening questions were used to assess age, gender, and the type of device respondents were using to complete the survey. Participants were required to be female and between 16-24 years of age. Screen size restrictions were enforced to ensure that pack images did not appear too small on the screen. The survey was programmed to only operate on browsers that were at least 550 pixels wide and 900 pixels long; in other words, the browser needed to be larger than a smart-phone device. If respondents were using a tablet device, the survey was programmed to only operate when in landscape orientation.

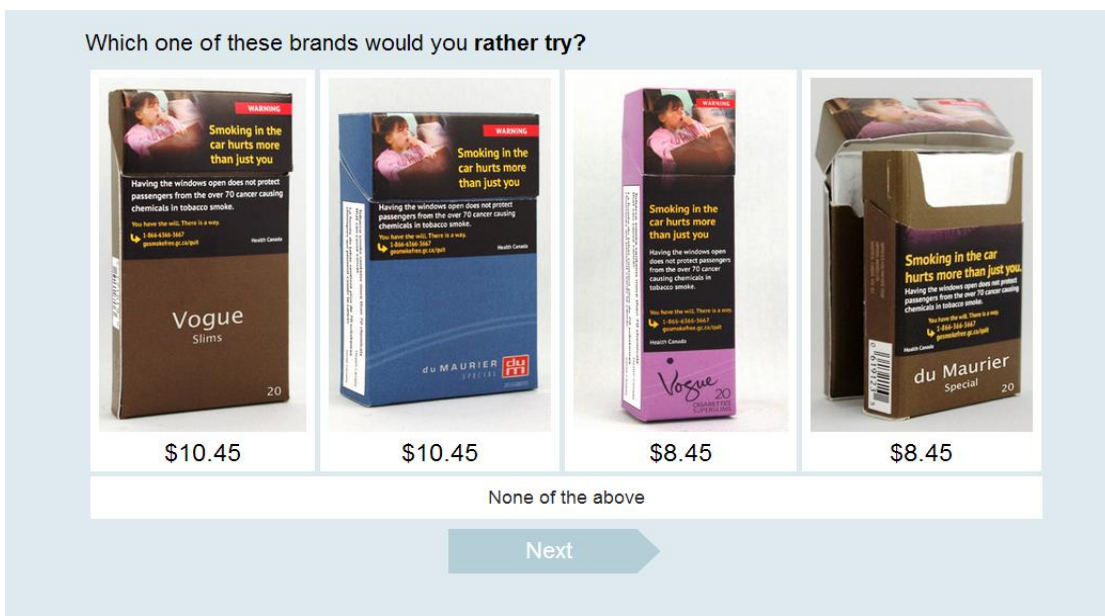
After providing consent, participants completed a background survey that collected information on socio-demographics, smoking behaviours, and measures on attitudes and beliefs about smoking, see below, section 4.7: *Measures*. Lastly, respondents completed the discrete choice experiment.

4.5.2 Discrete choice experimental procedure

First, respondents viewed an instruction screen informing them that they were going to be shown four videos of different cigarette products. On the next screen, respondents were required to click and watch each of the four videos before proceeding with the survey. After watching the videos, respondents were shown another instruction screen explaining that they look at the cigarette products shown on the following screens, and that they would be asked

three questions for each set of products. The hold-out choice set was always shown first and contained images depicting the packs portrayed in the videos. The remaining eight experimental choice sets were shown in a randomized order across participants. As well, the presentation of pack images within each choice set was randomized. For each choice set, respondents chose the brand that they: 1) would rather try, 2) would taste better, 3) would be less harmful, or “none” (see section 4.7: *Measures*). An example of how choice sets were presented to respondents is shown in Figure 5.

Figure 5. Example of one choice set as it was presented in the survey.



4.6 Pilot Testing

We chose to pilot test the survey since the outcome measures were developed specifically for this study, and were to be asked of smokers and non-smokers. As mentioned in section 4.2.1: *Qualitative Interviews*, cognitive interviewing was incorporated into the second

part of qualitative interviews for the purpose of pilot testing the survey. Cognitive interviewing is a method used to understand how respondents mentally process and respond to survey questions (Drennan, 2003). During pilot testing, cognitive interviewing was used to assess if smokers and non-smokers perceived the questions in similar ways, and to identify problems with understanding instructions, questions and response categories. As a result of cognitive interviewing, modifications to the wording of outcome measures were made to enhance clarity. A copy of the questions tested, and the cognitive interviewing script is located in Appendix A.

4.7 Measures

A copy of the final survey, including all measures, can be found in Appendix C.

4.7.1 Socio-Demographic Variables

Socio-demographic data on **age**, **gender**, **education**, **ethnicity** and **occupation** was collected. Participants specified their **age** in years, and their **gender** as male or female. **Education** and **ethnicity** were classified by two items adapted from the International Tobacco Control (ITC) 4-Country survey – Canada edition (International Tobacco Control Policy Evaluation Project, 2012). **Occupation** was assessed with the question: *Which of the following best describes your “main” work status over the past 12 months?*

4.7.2 Smoking Behaviours

Respondents were asked to indicate their **current smoking status**, **past smoking status**, **cigarette consumption**, **time to first cigarette**, and **quit intentions**. To assess these smoking behaviours, six items were adapted from the International Tobacco Control (ITC) Four Country Survey (International Tobacco Control, 2011). The ITC survey is used to monitor tobacco use

across countries, and has undergone systematic development and testing (Thompson, et al., 2006).

To assess current **smoking status**, respondents were asked: *In the last 30 days, how often did you smoke cigarettes?* Respondents were defined as smokers if they reported smoking “every day”, “at least once a week” or “at least once in the last 30 days”. Non-smokers were defined as respondents who reported smoking “not at all”.

Respondents who were defined as non-smokers were asked to indicate their **past smoking status** by answering: 1) ‘*Have you ever smoked a cigarette, even just a few puffs?*’, and 2) ‘*Have you smoked 100 cigarettes or more in your lifetime?*’. Those who indicated ‘no’ to smoking *just a few puffs* were classified as never smokers. Those who said ‘yes’ to smoking *just a few puffs* but not more than *100 cigarettes in their lifetime* were classified as experimental smokers. Former smokers were classified as those who had smoked more than *100 cigarettes in their lifetime*, but not in the last 30 days.

Respondents who were defined as current smokers were asked about their **cigarette consumption** which was assessed by the average number of cigarettes smoked per day, week, or month. Current smokers also indicated **time to first cigarette** and **quit intentions**.

4.7.3 Susceptibility to smoking

Never smokers were classified further as not susceptible and susceptible to future smoking. Smoking susceptibility is defined as “the absence of a firm decision not to smoke” (Pierce, Choi, Gilpin, Farkas, & Merritt, 1996). Never smokers were classified as not susceptible to future smoking if they answered *definitely not* to the following three validated items: (1) Do you think in the future you might try smoking cigarettes?; (2) If one of your best friends were to

offer you a cigarette, would you smoke it?; (3) At any time during the NEXT YEAR, do you think you will smoke a cigarette? Non-smokers were classified as susceptible to future smoking if they answered *probably not*, *probably yes*, or *definitely yes* to at least one of the three items mentioned above.

4.7.4 Attitudes and Beliefs about Smoking

Positive attitudes and beliefs about smoking have been associated with increased tobacco use among young people, and compared to non-smokers, smokers have been shown to underestimate the risks of smoking (WHO, 2010a). Six items were adapted from the ITC survey to measure women's general attitudes about smoking and beliefs about the negative consequences related to smoking (International Tobacco Control Evaluation Project, 2011). The frequencies of responses to each item are reported.

4.7.5 Discrete choice - outcome measures

The discrete choice experiment was used to measure outcomes. Respondents were shown 8 choice sets. For each choice set, respondents indicated: 1) intent to try, 2) perceived product taste, and 3) perceived product harm by choosing between four pack profiles and 'none'. For each outcome, a chosen pack received a score of '1' and packs that were not chosen received a score of '2'. The development of these measures is described in sections 4.7.6–4.7.8, below.

4.7.6 Intentions to try

The literature suggests that purchase intentions are most related to actual purchasing when measured as trial rates, since individuals are better at indicating whether they might 'try' a product (Morwitz, Steckel, Gupta, 2007). For each of the eight choice sets, respondents were

asked to answer: **Which one of these brands would you rather try?** The wording for this measure was adapted from a pack selection task used in previous research conducted among young Brazilian women (White, Hammond, Thrasher, Fong, 2012). As well, cognitive interviewing indicated that the wording of this measure would be appropriate for smokers and non-smokers.

4.7.7 Perceptions of Product Taste

Taste related perceptions were measured by asking respondents: **Which one of these brands do you think would taste better?** The wording for this measure was adapted from previous packaging research, and was tested during cognitive interviewing (White, Hammond, Thrasher, Fong, 2012).

4.7.8 Perceptions of Product Harm

Health related perceptions were measured by asking respondents: **Which one of these brands do you think would be less harmful?** Similar measures have been used in previous packaging research that was conducted among young people in the U.K., and young women in Brazil (Hammond, et al., 2009; White, Hammond, Thrasher, Fong, 2012). Cognitive interviewing informed the final wording of this measure.

5.0 HYPOTHESES

The primary hypotheses for this study were as follows:

1. Differences in pack attribute-levels will have a significant impact on part-worth utilities associated with trial intent, perceptions of product taste, and perceptions of product harm.

a) Compared to the standard traditional box, alternative packaging structures will increase utility, and therefore will increase trial intent, perceptions of “better taste”, and perceptions of reduced harm.

b) The presence of branding will increase utility, resulting in increased trial intent, perceptions of “better taste”, and perceptions of reduced harm.

c) Compared to the gender-neutral *du Maurier* brand, the female-orientated *Vogue* brand will receive higher utility, and therefore, increase trial intent, perceptions of “better taste”, and perceptions of reduced harm.

d) Compared to larger warning labels, smaller warning labels on packages will receive higher utility, resulting in increased trial intent, perceptions of “better taste”, and perceptions of reduced harm.

e) Higher priced packs will increase utility, and therefore, increase trial intent, perceptions of “better taste”, and perceptions of reduced product harm.

2. The pack attributes – structural design, branding, brand, warning label size, and price - will have a relative contribution on the decision to try a cigarette product, judgments of product taste, and judgments of product harm.

f) Women will place the highest importance on *price, pack branding, physical pack structure, brand, and warning label size*, respectively, when making a trial intent decision.

g) Women will place the highest importance on *pack branding, physical pack structure, brand, warning label size, and price*, respectively, when judging product taste.

h) Women will place the highest importance on *pack branding, physical pack structure, brand, warning label size, and price*, respectively, when judging product harm.

3. On the basis of attribute-level predictions (i.e., hypotheses 1. a-e), cigarette packages will be attributed by young women with varying degrees of overall utility, driving intentions to try, expectations of taste, and expectations of product harm.

i) Cigarette packages that contain increasingly more pack attribute levels that are not consistent with “plain packaging” and “best practices” in labelling, such as *novel pack structure, presence of branding, and smaller warning labels*, will be associated with higher overall utilities, and therefore, increased intentions to try, increased perceptions of “better taste”, and increased perceptions of “reduced harm”.

4. The effect of the pack attributes - structural design, branding, brand, warning label size, and price - on trial intent, and perceptions of product taste and harm, will be moderated by smoking status and age.

j) Specific attributes may have a varying influence on the indicated outcomes depending on the participant’s smoking status and age. For example, non-smokers, who presumably have no experience with smoking cigarettes, may be more influenced by branding when judging product taste.

6.0 ANALYSIS

6.1 Model Specification

Multinomial logit models were used to analyze the main effects of each attribute on: 1) intentions to try, 2) perceptions of product taste, and 3) perceptions of product harm. The Multinomial logit model is based on Random Utility Theory, and models the utility attached to each pack profile (Train, 2003). Utility consists of a systematic component that is measured and a random error component (Train, 2003). For this study, the utility function was specified as:

$$U = (\beta_{\text{pack structure}} * X_i \text{ pack structure}) + (\beta_{\text{brand}} * X_i \text{ brand}) + (\beta_{\text{branding}} * X_i \text{ branding}) + (\beta_{\text{warning label size}} * X_i \text{ warning label size}) + (\beta_{\text{price}} * X_i \text{ price}) + e$$

where U is the overall utility that an individual derives from each alternative, the β coefficient attached to X_i is estimated by the multinomial logit model, and represents the part-worth utility attached to each attribute-level, and e represents the unmeasured random error component of the model.

The multinomial logit model is based on the independence of irrelevant alternatives property which assumes that each choice is independent of other available choices (Train, 2003).

All analyses were conducted using SAS (version 9.3).

6.2 Fitting the Multinomial logit model

The discrete choice data was merged with the discrete choice design using the SAS %MktMerge macro. For each choice set, a pack that was chosen was indicated by the value "1", and packs that were not chosen were indicated by the value "2". The final data set was

checked visually to confirm that the files were merged correctly and accurate coding was assigned.

Multinomial logit models were fit using the “phreg procedure”, which provided measures for attribute-level importance. For attribute-level importance, all attributes were coded using “binary” coding. For each attribute level, the estimated parameter coefficient, standard deviation, and significance is reported. The estimated parameter coefficients were used in subsequent analyses to measure attribute importance and overall pack utility. For measures of attribute importance and overall pack utilities, all attributes were coded using “effects” coding. When effects coding is used, the data is analyzed in relation to the grand mean, as opposed to in relation to a coded reference level. With effects coding, the estimated part-worth utility indicates the overall effect of that level.

Attribute importance indicates the individual contribution that each attribute has on each outcome. Each attribute’s relative importance was calculated by considering the attribute’s utility range, that is, the difference between each attribute’s highest and lowest estimated part-worth utility. The utility ranges were then summed across all attributes, and the contribution of each attribute to the total sum was calculated.

Pack utility scores for each outcome indicate the range of utility women attributed to each individual pack. Utility is expressed by the sum of part-worth utilities corresponding to attribute-levels appearing within each pack. The calculation is consistent with Random Utility Theory, that is, individuals derive utility from attributes that make up a package, and respondents will choose packs that contain combinations of attributes that offer the most utility (McFadden, 1974).

6.3 Fitting the adjusted multinomial logit model

Analyses of additional multinomial logit models were conducted to account for the effect of the demographic characteristics, smoking status and age, on intentions to try, perceptions of product taste, and perceptions of product harm. For each outcome, a single adjusted multinomial logit model was constructed by interacting smoking status and age with each attribute. All attributes were coded using “effects” coding. Smoking status was modelled as a categorical variable (smoker, non-smoker), and age was modelled as a continuous variable. The results of the full model are presented in Appendix D.

7.0 RESULTS

7.1 Participation and Sample

Overall, the analyses are based on a **final sample of 503 respondents**. A total of 750 respondents opened the survey; however, 247 of these respondents did not complete the survey, did not meet the eligibility requirements, or did not provide consent. Specifically, 157 respondents did not meet the age requirements (15 were under 15 years of age, 106 were 25 years of age or older, 15 refused to provide their age, 21 were screened out after the survey had met the quota for their age group); 7 respondents screened out at gender (5 were male, 2 did not disclose their gender); 55 respondents screened out at smoking status after the survey met the quota for their category; 3 respondents opened the survey on a smart-phone and were disqualified; 22 respondents did not provide consent; and 3 respondents were eligible, but did not complete the survey.

7.2 Descriptive Statistics

7.2.1 Sample Characteristics

Table 4 provides summary statistics on demographic characteristics and smoking behaviours for the overall sample.

Table 4. Sample characteristics (n=503)

Demographic Characteristic	% (n)
Age (years)	
Mean (SD)	20.1 (SD=2.5)
16-19	47.0% (236)
20-24	53.0% (267)
Education Level *	
Low	47.9% (241)

	Moderate	35.4%	(178)
	High	15.7%	(79)
	Not stated	0.9%	(5)
Main Work Status (past 12 months)			
	Employed full-time or part-time	33.2%	(167)
	Attending school, full time or part-time	52.5%	(264)
	Unemployed or homemaker	13.7%	(69)
	Not stated	0.6%	(3)
Race			
	White	65.2%	(328)
	Other	32.6%	(164)
	Not stated	2.2%	(11)

Smoking Behaviours

% (n)

Smoking Status

Never smoker	39.6%	(199)
Experimental smoker	15.1%	(76)
Former smoker	3.3%	(17)
Current smoker	41.9%	(211)

Smoking Frequency**

Daily	51.2%	(108)
Weekly	28.9%	(61)
Monthly	19.9%	(42)

Cigarette Consumption Mean **

All smokers	7.3 per day (SD=7.2; range=0.2-25)
Daily smokers	10.5 per day (SD=7.1; range= 1-25)
Weekly smokers	7.1 per week (SD=6.3; range= 1-26)
Monthly smokers	4.4 per month (SD=5.7; range= 1-30)

Quit Intentions**

Within the next month	21.8%	(46)
Within the next 6 months	24.2%	(51)
Sometime in the future	31.3%	(66)

	Not planning to quit	14.2%	(30)
	Not stated	8.5%	(18)
Time to first cigarette**			
	< 5 minutes	10.0%	(21)
	6-30 minutes	25.6%	(54)
	31-60 minutes	18.5%	(39)
	> 60 minutes	38.9%	(82)
	Not stated	7.1%	(15)
Susceptibility – try in the future***			
	Definitely not	83.4%	(166)
	Probably not	13.1%	(26)
	Probably yes	1.5%	(3)
	Definitely yes	0%	(0)
	Not stated	2.0%	(4)
Susceptibility – accept friend offer***			
	Definitely not	85.9%	(171)
	Probably not	10.1%	(20)
	Probably yes	2.5%	(5)
	Definitely yes	0%	(0)
	Not stated	1.5%	(3)
Susceptibility – smoke in the next year***			
	Definitely not	87.9%	(175)
	Probably not	9.0%	(18)
	Probably yes	1.0%	(2)
	Definitely yes	0%	(0)
	Not stated	2.0%	(4)
% Susceptible		18.6%	(37)

* For education level, 'low' refers to completing high school or less; 'moderate' refers to technical/trade school, community college, or some university; and 'high' refers to university or post-graduate degree.

**Among current smokers only (n=211).

***Among never smokers only (n=199). A never smoker was considered not susceptible to future smoking if they answered *definitely not* for all three susceptibility items.

7.2.2 Attitudes and Beliefs about smoking

Participants were asked to indicate their general attitudes about smoking and beliefs about the negative consequences due to smoking. Responses are shown in Table 5.

Table 5. Attitudes and beliefs about smoking (n=503)

	Positive % (n)	Neither Positive nor Negative % (n)	Negative % (n)
What is your overall opinion of smoking? Is it . . . ?	2.8% (14)	25.0% (125)	71.5% (360)
	Not at all worried % (n)	A little worried % (n)	Very worried % (n)
How worried are you, if at all, that smoking will damage your health in the future? *	6.6% (14)	59.7% (126)	32.7% (69)
Please indicate whether you agree, disagree, or neither agree nor disagree with each of the following statements.			
	Agree % (n)	Neither Agree nor Disagree % (n)	Disagree % (n)
Society disapproves of smoking.	55.5% (279)	34.2% (172)	8.9% (45)
Cigarette smoke is dangerous to non-smokers.	89.5% (450)	9.1% (46)	1.2% (6)
Smoking helps people stay slim.	19.6% (99)	27.8% (140)	46.7% (235)
Smoking a cigarette every once in a while does not damage your health.	12.7% (64)	18.5% (93)	65.6% (330)

* Among current smokers only (n=211).

7.3 Discrete choice experiment analysis

The discrete choice experiment was used to measure the relative importance of five cigarette packaging attributes - structure, brand, branding, warning label size and price – on the following outcomes: 1) intentions to try, 2) judgments of product taste, and 3) judgments of product harm. For each outcome, choices were analyzed using multinomial logit models. The multinomial logit model estimates the part-worth utilities attached to each attribute-level.

7.3.1 Intentions to try

For each choice set, participants were asked: *Which one of these brands would you rather try?* Each choice set contained 4 pack profiles and “none”. Participants chose one of the presented four packs in 60% of cases, whereas “none” was selected in 40% of the cases. Table 6 presents the results from the multinomial logit model.

The size and sign of the parameter coefficient indicates the degree and direction in which women preferred that attribute-level when stating their intentions to try the product, with positive and larger values indicating greater intent to try. Significant main effects were found for pack structure, branding, brand, and warning label size. Compared to the traditional pack structure, women derived higher utility from booklet, lipstick and slim packs; however, the lipstick and slim type was not statistically significant. As well, women derived significantly greater utility from branded packs vs. “plain” packs, female-orientated *Vogue brand* vs. *du Maurier*, and packs with a 75% warning label vs. 50% warning label size. Price was not a significant factor when deciding on intent to try the brand.

Table 6. Estimated parameters of the multinomial logit model predicting intentions to try (n=503)

Which one of these brands would you rather try?			
	Parameter Estimate	Standard Error	Significance
Pack Structure			
Traditional (ref) vs. Slim	0.10501	0.06991	p=0.1331
Traditional (ref) vs. Lipstick	0.01765	0.07103	p=0.8038
Traditional (ref) vs. Booklet	0.40571	0.06428	p < 0.0001
Booklet (ref) vs. Slim	-0.30071	0.06414	p < 0.0001
Booklet (ref) vs. Lipstick	-0.38807	0.06541	p < 0.0001
Lipstick (ref) vs. Slim	0.08736	0.06664	p=0.1899
Branding			
Plain (ref) vs. Branded	0.99498	0.04985	p < 0.0001
Brand			
du Maurier (ref) vs. Vogue	0.51632	0.04961	p < 0.0001
Warning Label Size			
75% (ref) vs. 50%	-0.59532	0.04964	p < 0.0001
Price			
\$8.45 (ref) vs. \$10.45	0.04607	0.04931	p=0.3502

Note: The parameter estimate represents the contribution of that attribute level to the final model.

7.3.2 Perceptions of product taste

For each choice set, participants were asked: *Which one of these brands do you think would taste better?* Among all choice sets, participants chose a pack in 55% of cases, and in 45% of cases participants chose “none”. The results of the multinomial logit model are shown in Table 7.

Significant main-effects were found for all attributes, with positive parameter estimates indicating higher taste utility. Overall, women perceived slim and booklet packs as significantly better tasting than traditional packs. As well, branded packs were attributed with significantly better taste than “plain” packs. Furthermore, the *Vogue* brand, packs with a 75% warning

label, and more expensive packs were judged as better tasting among women compared to the *du Maurier* brand, packs with a 50% warning label, and less expensive packs.

Table 7. Estimated parameters of the multinomial logit model predicting perceptions of product taste (n=503)

Which one of these brands do you think would taste better?			
	Parameter Estimate	Standard Error	Significance
Pack Structure			
Traditional (ref) vs. Slim	0.16681	0.07134	p=0.0194
Traditional (ref) vs. Lipstick	0.02701	0.07319	p=0.7121
Traditional (ref) vs. Booklet	0.18671	0.06820	p=0.0062
Booklet (ref) vs. Slim	-0.01990	0.06832	p=0.7709
Booklet (ref) vs. Lipstick	-0.15969	0.07031	p=0.0231
Lipstick (ref) vs. Slim	0.13979	0.06758	p=0.0386
Branding			
Plain (ref) vs. Branded	1.12682	0.05242	p < 0.0001
Brand			
du Maurier (ref) vs. Vogue	0.41496	0.05228	p < 0.0001
Warning Label Size			
75% (ref) vs. 50%	-0.52315	0.05237	p < 0.0001
Price			
\$8.45 (ref) vs. \$10.45	0.10601	0.05205	p=0.0417

Note: The parameter estimate represents the contribution of that attribute level to the final model.

7.3.3 Perception of product harm

For each choice set, participants were asked to answer: *Which one of these brands do you think would be less harmful?* Participants chose a pack in 40% of cases, and in 60% of cases participants chose “none”. The results of the multinomial logit model are shown in Table 8.

Significant main effects were found for the attributes pack structure, branding, brand, and price. The parameter estimates indicate the contribution of that attribute level to the overall judgment of harm among females. Attribute-levels with positive parameter coefficients

indicated that women attributed that level with reduced harm, whereas a negative parameter estimate indicated that women judged that level to be more harmful. Overall, women perceived lipstick, slim and booklet pack structures as less harmful compared to traditional designs. As well, packs with branding, female-orientated *Vogue* brand, and higher costing packs were attributed with less harm.

Table 8. Estimated parameters of the multinomial logit model predicting perceptions of product harm (n=503)

Which one of these brands do you think would be less harmful?			
	Parameter Estimate	Standard Error	Significance
Pack Structure			
Traditional (ref) vs. Slim	0.80418	0.08711	p < 0.0001
Traditional (ref) vs. Lipstick	1.20099	0.08286	p < 0.0001
Traditional (ref) vs. Booklet	0.20420	0.09391	p=0.0297
Booklet (ref) vs. Slim	0.59998	0.08179	p < 0.0001
Booklet (ref) vs. Lipstick	0.99679	0.07725	p < 0.0001
Lipstick (ref) vs. Slim	-0.39681	0.06224	p < 0.0001
Branding			
Plain (ref) vs. Branded	0.53957	0.06004	p < 0.0001
Brand			
du Maurier (ref) vs. Vogue	0.31503	0.05534	p < 0.0001
Warning Label Size			
75% (ref) vs. 50%	-0.10465	0.05433	p=0.0541
Price			
\$8.45 (ref) vs. \$10.45	0.46235	0.05986	p < 0.0001

Note: The parameter estimate represents the contribution of that attribute level to the final model.

7.4 Attribute Importance

The parameter estimates obtained by each multinomial logit model were used to calculate attribute importance. Attribute importance indicates the relative weight that women placed on independent pack attributes when deciding on intent to try the cigarette product and

when judging product taste and harm. An attribute has a larger relative importance when its attribute-levels are associated with a strong positive or negative impact on utility. Attribute importance is determined by the relative range of attribute part-worth utilities. To calculate each attributes utility range, the attributes highest part-worth utility value was subtracted from its lowest part-worth utility value. The importance weight was calculated by dividing each attributes utility range by the total sum of all attribute utility ranges.

Table 9 shows the relative importance of pack attributes when women decided on their intent to try a cigarette brand. Overall, branding was the most influential factor to motivate trial intent among women, accounting for 39% of the decision to try. Warning label size (23%), brand (20%) and pack structure (16%) were the next most influential factors to motivate trial intent among women. Price was not found to be a significant predictor of trial intent.

Table 9. Attribute importance: Intent to try

Which one of these brands would you rather try?		
Attribute	Importance Weight	Attribute relative importance (%)
Branding	0.99	39%
Warning Label Size	0.60	23%
Brand	0.52	20%
Pack Structure	0.41	16%
Price	0.05	2%
Total	2.57	100%

Note: The importance weight represents the range of utility values within each attribute.

Table 10 shows the relative importance that women placed on each pack attribute when judging product taste. Branding accounted for nearly half (48%) of women’s overall judgment of taste. To a lesser extent, taste perceptions were also driven by warning label size (22%), brand (18%), pack structure (8%), and price (4%).

Table 10. Attribute importance: Perceptions of product taste

Which one of these brands do you think would taste better?		
Attribute	Importance weight	Attribute relative importance (%)
Branding	1.13	48%
Warning Label Size	0.52	22%
Brand	0.41	18%
Pack Structure	0.19	8%
Price	0.11	4%
Total	2.36	100%

Note: The importance weight represents the range of utility values within each attribute.

The relative importance that women placed on each pack attribute when judging product harm is shown in Table 11. Pack structure was the most influential predictor of whether women believed a pack to be *less harmful*, accounting for 46% of the overall judgment. As well, branding (20%), Price (18%), and brand (12%) had a moderate contribution to women’s overall judgment of product harm. Warning label size was not a significant predictor on perceptions of product harm among women.

Table 11. Attribute importance: Perceptions of product harm

Which one of these brands do you think would be less harmful?

Attribute	Importance weight	Attribute relative importance (%)
Pack Structure	1.20	46%
Branding	0.54	20%
Price	0.46	18%
Brand	0.32	12%
Warning Label Size	0.10	4%
Total	2.62	100%

Note: The importance weight represents the range of utility values within each attribute.

7.5 Estimated pack utilities

The overall utility for each pack tested in the discrete choice experiment was calculated. Overall utility offers an aggregated measure of how women valued the different packages. Packs estimated to have higher utility contain features that respondents prefer most, whereas packs with the lowest utility contain less preferred features. For each individual pack, utility was calculated by summing the attribute-level coefficients estimated by the multinomial logit model.

Table 12 displays the utilities that women attributed to different packs as a whole when answering: *Which one of these brands would you rather try?* The general trend shows that women preferred to try branded packs compared to plain packs. Furthermore, women had a greater preference to try *Vogue* branded packs compared to *du Maurier* branded packs.

















Table 12. Overall pack utilities: Intent to try

Which one of these brands would you rather try?								
\$10.45	\$8.45	\$10.45	\$8.45	\$10.45	\$8.45	\$10.45	\$8.45	\$8.45
Utility	1.35	1.00	0.94	0.92	0.24	-0.11	-0.17	-0.20
\$8.45	\$8.45	\$10.45	\$10.45	\$10.45	\$8.45	\$10.45	\$8.45	\$8.45
Utility	-0.21	-0.29	-0.46	-0.54	-0.55	-0.61	-0.63	-0.69

Note: higher utility indicates greater preference to try

Table 13 displays pack utilities reflecting women’s relative judgment of product taste. Packs with higher utility contained combinations of features that were perceived as better tasting compared to packs with lower utilities. Noticeably, all branded packs were perceived as “better tasting” compared to “plain” packs. In particular, women believed branded *Vogue* packs were “better tasting” than branded *du Maurier* packs.

Table 13. Overall pack utilities. Perceptions of product taste

Which one of these brands do you think would taste better?								
								
	\$10.45	\$8.45	\$10.45	\$8.45	\$10.45	\$8.45	\$10.45	\$8.45
Utility	1.18	1.05	0.99	0.91	0.24	0.22	0.05	-0.03
								
	\$10.45	\$8.45	\$10.45	\$10.45	\$8.45	\$10.45	\$8.45	\$8.45
Utility	-0.38	-0.47	-0.49	-0.52	-0.58	-0.63	-0.66	-0.77

Note: higher utility indicates increased perception of "better taste"

Table 14 displays individual pack utilities reflecting women’s judgment of product harm. Packs with higher utilities contained combinations of features that women perceived as “less harmful”. The general trend illustrates the relative importance of packaging structure on perceptions of harm; specifically, “lipstick” and “slim” packs were dominantly perceived as “less harmful” among women.

Table 14. Overall pack utilities: Perceptions of product harm

Which one of these brands do you think would be less harmful?								
								
\$8.45	\$10.45	\$10.45	\$8.45	\$8.45	\$10.45	\$10.45	\$10.45	
Utility	0.90	0.72	0.505	0.500	0.48	0.36	0.32	0.16
								
\$10.45	\$8.45	\$10.45	\$10.45	\$8.45	\$8.45	\$8.45	\$8.45	
Utility	0.11	0.08	-0.06	-0.26	-0.74	-0.948	-0.954	-1.16
Note: higher utility indicates increased perception of "less harmful"								

7.6 Demographic correlates

The multinomial logit models were adjusted to model the effect of smoking status and age on 1) trial intent, 2) perceptions of product taste, and 3) perceptions of product harm. The demographic variables were modelled by interacting smoking status and age with each attribute. Tables 15-17 displays the results of significant attribute by demographic effects only. The results from the full model for each outcome are presented in Appendix D.

Table 15 displays significant results of the multinomial logit model moderating the effects of smoking status and age on intentions to try a cigarette product. Significant effects were found between smoking status and pack structure. Specifically, smokers indicated a greater preference to try booklet packs compared to non-smokers, while non-smokers indicated a stronger preference to try slim and lipstick packs compared to smokers. As well,

age significantly moderated the effect of branding in that older females had a greater preference to try branded packs compared to younger females.

Table 15. Adjusted multinomial logit model predicting intent to try (n=503)

Which one of these brands would you rather try?			
	Parameter Estimate	Standard Error	Significance
Smoker * Pack Structure			
Slim	-0.08753	0.04241	p=0.0390
Lipstick	-0.09246	0.04344	p=0.0333
Booklet	0.09848	0.04041	p=0.0148
Traditional	0.08151	0.04539	p=0.0725
Age * Branding			
Branded	0.02862	0.01060	p=0.0069
Plain	-0.02862	0.01060	p=0.0069

Note: The parameter estimate represents the contribution of that attribute level to the final model. Model adjusted for smoking status and age. Only attributes with significant effects are presented in this table.

Table 16 displays significant moderating effects of smoking status and age on perceptions of product taste. Smoking status and age significantly moderated the impact of branding and brand on taste perceptions. In particular, non-smokers were more likely to attribute branded packs with “better taste” than smokers; whereas smokers were more likely to attribute plain packs with “better taste” compared to non-smokers. As well, non-smokers were more likely to attribute *Vogue* with “better taste” than smokers, while smokers were more likely to attribute *du Maurier* with “better taste” than non-smokers. With increasing age, branded packs were perceived as “better tasting” compared to plain packs. As well, with increasing age, *du Maurier* was perceived as better tasting compared to *Vogue*.

Table 16. Adjusted multinomial logit model predicting perceptions of product taste (n=503)

Which one of these brands do you think would taste better?			
	Parameter Estimate	Standard Error	Significance
Smoker * Branding			
Branded	-0.10101	0.02893	p=0.0005
Plain	0.10101	0.02893	p=0.0005
Smoker * Brand			
Vogue	-0.06996	0.02869	p=0.0148
du Maurier	0.06996	0.02869	p=0.0148
Age * Branding			
Branded	0.04351	0.01150	p=0.0002
Plain	-0.04351	0.01150	p=0.0002
Age * Brand			
Vogue	-0.03283	0.01144	p=0.0041
du Maurier	0.03283	0.01144	p=0.0041

Note: The parameter estimate represents the contribution of that attribute level to the final model. Model adjusted for smoking status and age. Only attributes with significant effects are presented in this table.

Table 17 displays significant moderating effects of age on perceptions of product harm. Age significantly moderated the effect of brand on perceptions of harm, in that older females were more likely to believe *du Maurier* was less harmful than younger females, and compared to older females, younger females were more likely to attribute *Vogue* with “less harm”. Smoking status did not significantly moderate perceptions of product harm.

Table 17. Adjusted multinomial logit model predicting perceptions of product harm (n=503)

Which one of these brands do you think would be less harmful?			
	Parameter Estimate	Standard Error	Significance
Age * Brand			
Vogue	-0.02861	0.01238	p=0.0208
du Maurier	0.02861	0.01238	p=0.0208

Note: The parameter estimate represents the contribution of that attribute level to the final model. Model adjusted for smoking status and age. Only attributes with significant effects are presented in this table.

8.0 DISCUSSION

To my knowledge, this is the first study to apply discrete choice methods to examine the relative impact of individual packaging features, including, structural packaging, branding, and warning labels. In addition, few studies have experimentally manipulated structural packaging in efforts to understand the impact of “slim” and “lipstick” designs on behaviour and perceptions among young women.

8.1 Packaging attributes on intentions to try

The study provides evidence that young women make tradeoffs between different cigarette packaging elements, resulting in a range of preferences for cigarette products, with greater preferences to try products that contain more preferred packaging features. Above all, branding was the single most influential feature, accounting for 39% of the decision to try a cigarette product, with greater intentions to try packs with branding, compared to packs that were “plain”. Packaging structure accounted for a significant, although smaller proportion, 16%, of the decision to try a cigarette product. Women placed similar importance on warning label size and brand, which accounted for 23% and 20%, respectively, of trial intent decisions. Price was not found to be a reliable predictor of trial intent.

Consistent with our hypotheses, packaging structure was significant in trial intent decisions among women, with significantly higher preferences to try booklet packs, compared to traditional designs. The findings add to previous qualitative research that found women perceived novel packaging shapes, such as slim and lipstick designs, as more appealing (Moodie & Ford, 2011; Ford, Moodie, MacKintosh, & Hastings, 2013). The findings indicate that there were important differences by smoking status, with smokers showing greater preference for

booklet packs, and non-smokers indicating greater preference to try slim and lipstick packs.

The above trend has been observed in other research conducted with youth, in which smoking youth were more likely to prefer slide and flip-top packs, whereas non-smoking youth had greater preference for lipstick packs (Moodie, Ford, Macintosh, & Hastings, 2012). The findings suggest that changes in pack structure can be effective at dictating preferences for cigarette products among females, even in the absence of branding.

The findings expand on previous packaging research, adding that among the five key packaging attributes included within the study – brand, branding, pack structure, warning label size, and price - branding was found to be the single most important factor of trial intent decisions among women. In fact, the distribution of pack utilities showed that women had the lowest intentions to try any one of the “plain” packs included in this study, compared to a branded pack. Previous research has shown that branding on cigarette packages conveys positive image attributes such as “style”, “glamour” and “sophistication” (Hammond, Doxey, Daniel & Bansal-Travers, 2011; White, Hammond, Thrasher, & Fong, 2012). It is possible that implied image traits associated with brand imagery contributed to the utility that respondents attributed to branding.

Women indicated a greater preference to try the female-orientated *Vogue* brand, compared to the gender neutral *du Maurier* brand. Previous research incorporating behavioural measures have found that women are more likely to request for female-orientated brands compared to male dominated brands (Hammond, Doxey, Daniel & Bansal-Travers, 2011; White, Hammond, Thrasher, & Fong, 2012).

Contrary to our hypotheses, the findings indicate that women preferred to try packs with larger warning labels compared to packs with smaller warnings. These findings are not consistent with previous research which has found that large pictorial labels reduce the appeal of packaging (Wakefield, et al., 2012; Hoek et al., 2011). The results of the current study should be interpreted within the context of branding and brand name. The results from the multinomial logit model show that women attributed higher utility to “branded” compared to “plain” packs, and *Vogue* compared to *du Maurier* brands. Upon closer inspection of the discrete choice design, it was found that *Vogue* and branded attribute-levels only appeared in combination with 75% warnings. The reverse was true for *du Maurier* and branded attribute-levels, which only appeared in combination with 50% warnings. Given that women preferred to try branded packs the most, and reported stronger preferences for *Vogue*, the experimental design may have caused higher utilities to be attached to larger warnings because of the pairing with branded *Vogue* packs. This interpretation can be demonstrated by the frequency of choices observed from the hold-out choice-set, shown in Appendix E. Responses to the hold-out choice set were not analyzed, and packs indicated as hold-outs did not appear in the experimental design. However, the frequency of choices shows that 42% of respondents chose the branded *Vogue* pack which appeared with a smaller warning, versus 8% of respondents choosing the branded *du Maurier* pack that appeared with a larger warning. Therefore, the findings on warning label size should be interpreted with caution. To better distinguish the effect on warning label size, future discrete choice studies could be conducted in which all branding, brand, and warning label size attribute-level combinations are represented in the study.

In the context of this study, price was not a significant factor for women when deciding on their intent to try a cigarette product. Participants may have attributed little utility to price, as the question asked, “Which one of these brands would you *rather try*” versus “*rather buy*”. It is possible that participants would have placed greater importance on price in their decision if the question was worded in the context of “buying”. Nonetheless, for this study, it was appropriate to ask about “intentions to try” considering the study sample included youth and non-smokers. *Trial* closely follows the behavioural model that operates in the real market, that is, young people in Canada are more likely to obtain cigarettes from social sources, such as friends, as opposed to “buying” an entire pack from retail (Reid, Hammond, Burkhalter, Rynard & Ahmed, 2013). Furthermore, the question wording was also appropriate for participants who identified themselves as smokers. Asking about “intentions to try” on non-durable products, like cigarettes, has been found to be a better predictor of future purchases, since individuals are better at indicating whether they might *try* a product as opposed to *buy* (Morwitz, Steckel, & Gupta, 2007).

8.2 Packaging attributes on perceptions of product taste

All packaging attributes – physical structure, branding, brand, warning label size, and price – significantly contributed to expectations of product taste among females. Branding alone accounted for nearly half (48%) of women’s overall judgment of taste. Pack structure had a significant, but smaller contribution, accounting for 8% of taste perceptions among females. As well, a significant proportion of taste perceptions were driven by warning label size (22%), brand (18%), and price (4%).

The findings indicate that packaging structure was a significant factor that women considered when judging taste, although structural design was less influential on perceived taste in comparison to branding. Consistent with our hypotheses, slim and booklet packs were perceived as significantly better tasting among women in comparison to traditional packs. Although the lipstick pack was attributed with higher taste utility compared to the traditional design, this result was not significant. The findings add to previous research that found young people perceived alternative packaging shapes as “higher quality” (Borland, Sawas, Sharkie, & Moore, 2011). The findings suggest that standardizing the structural design of packaging may reduce positive impressions of taste among females.

The findings illustrate that branding was the most important driver of taste perceptions among women. Overall, expectations of “better taste” were lowest for “plain” packages, findings that are consistent with other packaging research conducted among females (Hammond, Doxey, Daniel & Bansal-Travers, 2011; White, Hammond, Thrasher, & Fong, 2012). Compared to smokers and younger females, non-smokers and older females were more likely to perceive branded packs as “better tasting” than “plain” packs, suggesting that these demographic groups were more strongly affected by the presence of branding when making a judgment on taste. Considering that branding accounted for the majority of taste perceptions among women, the findings suggest that “plain” packaging could reduce positive perceptions of taste.

The pack attributes, brand and warning label size, accounted for a similar proportion of taste perceptions. Women were more likely to attribute the female-orientated *Vogue* brand with “better taste” compared to *du Maurier*, findings that are consistent with previous research

(Hammond, Doxey, Daniel & Bansal-Travers, 2011; White, Hammond, Thrasher, & Fong, 2012). However, contrary to our hypotheses, the findings indicate that women attributed larger warnings with “better taste”. As discussed in *section 8.1: Packaging attributes on intentions to try*, these findings should be interpreted within the context of branding and brand. Responses to the hold-out task, shown in Appendix E, indicate that 36% of respondents chose the branded *Vogue* pack that had a smaller warning label as “better tasting” compared to 13% of respondents that chose the branded *du Maurier* pack shown with a larger warning label. In other words, warning labels need to be examined further in a future discrete choice study, to be able to draw conclusions regarding which size would effectively reduce taste perceptions.

The findings indicate that price was significant, but found to be the least influential factor on judgments of product taste. Consistent with our hypotheses, more expensive packs were perceived as significantly better tasting among women compared to cheaper packs. Price is closely related to perceptions of product quality (Veben, 1899), which may have influenced women to associate higher costing packs with better quality and taste.

Overall, the findings suggest that differences in packaging attributes can effectively dictate perceptions of product taste among women, with branding accounting for the strongest influencer among the other attributes tested. The findings have policy implications since perceptions of taste are closely associated with perceptions of risk among smokers (Pollay & Dewhirst, 2001).

8.3 Packaging attributes on perceptions of product harm

In 40% of cases, young women incorrectly reported that some of the cigarette brands were less harmful than others, based on differences in packaging attributes. Above all, pack

structure was the most influential driver of false beliefs among females, contributing to nearly half (46%) of the overall perception of product harm. Females also considered branding, price and brand in their judgments, which accounted for 20%, 18%, and 12%, respectively, of overall judgments on product harm. Warning label size was not a reliable predictor of harm related perceptions among women.

Packaging structure was the most important factor that women considered when judging product harm. The findings indicate that young females expected that “lipstick”, “slim” and “booklet” packs contained a less harmful product, compared to “traditional” packs. In fact, in combination with other attributes, “lipstick” packs were perceived as the least harmful among all other packs in the study, even when branding elements were removed. The findings are consistent with results from qualitative research that found young people associated smaller shaped packs with less harm (Moodie & Ford, 2011; Ford, Moodie, MacKintosh, & Hastings, 2013). The findings provide evidence that standardizing the physical structure of cigarette packaging would be effective at reducing false beliefs about the relative risk of cigarette brands.

Branding significantly contributed to health related perceptions among females, although to a smaller degree in relation to the effect of packaging structure. Overall, women attributed branded packages with less harm compared to “plain” packages. In other packaging research, the removal of branding has been shown to reduce false beliefs about health risk among young people (Hammond, et al., 2009; Hammond, Daniel, & White, 2012).

Consistent with our hypotheses, the findings demonstrate that women attributed more expensive packs with less harm, compared to cheaper packs. Price is closely associated with

perceptions of product quality among consumers (Veblen, 1899). Perhaps price influenced perceptions that products contained differences in tobacco quality, which may have encouraged perceptions that such cigarettes were “safer”.

Brand had a significant, but smaller influence on health related perceptions, in comparison to the effects observed by structural design, branding and price. As expected, women believed the female-orientated *Vogue* brand was less harmful in comparison to the gender-neutral *du Maurier* brand, findings that are consistent with previous research conducted among females (Hammond, Doxey, Daniels, & Bansal-Travers, 2011). Furthermore, compared to older females, younger females held stronger beliefs that *Vogue* was less harmful than *du Maurier*. The findings suggest that in the absence of branding, female-orientated brand names have potential to influence false perceptions of product harm, particularly among younger females.

Warning label size was not found to be a reliable predictor of health risk. This finding was surprising considering that warning label size dictates the amount of branding that appears on packages and since previous research has shown that larger warnings are more noticeable and particularly more salient on “plain” packages (Hammond, 2011; Maynard, Munafò, & Leonards, 2013). One interpretation that can be drawn from the findings is that differences in pack structure, branding, brand and price were the main contributors to misconceptions about risk, and relative to the impact of those attributes, warning label size did not significantly change false beliefs about perceived risk. As well, it is possible that in this study participants did not consider warning label size when judging product harm since all pack profiles contained the same “neutral” health warning. Perhaps consumers might consider warning label size more

closely in risk related decisions within situations where the warning label content differs.

However, as discussed earlier, the experimental design did not test all pack profiles that could be generated by warning label, brand and branding attribute-level combinations, and therefore, the findings on warning label size should be interpreted with caution. These interpretations can be tested further in future discrete choice studies by allowing for more information to be collected on warning labels, for example, by ensuring that all warning label, brand, and branding combinations are represented in the study.

Article 11 of the FCTC requires that countries prohibit misleading information on packages, stipulating that:

“tobacco product packaging and labelling [shall] not promote a tobacco product by any means that are false, misleading, deceptive or likely to create an erroneous impression, including any term, descriptor, trademark, figurative or any other sign that directly or indirectly creates the false impression that a particular tobacco product is less harmful than other tobacco products” (WHO, 2009, pg 47).

The findings from the current discrete choice study indicated that innovations to pack structure, especially the use of slim and lipstick packs, were the single largest contributor to misconceptions about product harm among young females. Furthermore, “plain” packaging on lipstick and slim packs was only marginally effective at decreasing false beliefs about health risk. The findings demonstrate that both the removal of branding and standardization of pack structure are necessary to reduce misconceptions among females about the relative risk of cigarette brands.

8.4 Strengths and Limitations

The study had a number of strengths and limitations. First, the study sample is not representative of the larger population of females in Canada, as the study did not use a

probabilistic sample. Individuals without internet access were not eligible for inclusion in the study; however, this would only account for a small proportion of excluded individuals as the internet penetration rate in Canada was estimated to be 83% as of 2012 (Internet World Stats, 2012), and internet use is likely higher among the younger age group of the current sample. Furthermore, only respondents belonging to GMI's consumer panel were recruited for this study, which may have introduced self selection bias. Nevertheless, respondents were unaware of the study purpose when asked to participate, and the demographic characteristics of the sample indicate that the study provides data from individuals with characteristics reflective of females in the larger Canadian population.

Second, not all attributes that may potentially influence packaging-related decisions among consumers were tested in this study. If a person's preferred attribute-level was not represented in the study, such as a specific brand, it is possible that person would not have responded to that attribute as closely as they normally would in the real market. Exclusion of potentially important attributes could have resulted in lower estimates of part-worth utilities, and hence, lower estimates of attribute importance. Nonetheless, through conducting the literature review and qualitative interviews, efforts were made to include attributes and attribute-levels that were most relevant among women.

Third, since packages were shown as images to respondents, differences in packaging structure may have been less salient, which could have caused an underestimation of pack structure utility. However, efforts were made to convey pack structures to the highest degree possible by including video clips that demonstrated the different package types.

Fourth, due to the inclusion of the SAS generated hold-out choice set, the study did not include all pack profiles that could be generated by warning label size, branding, and brand attribute-level combinations. Although the main effects for branding, brand, and warning label attributes were orthogonal, these attribute-levels only appeared on specific packs. That is, across the study, branded *Vogue* packs only appeared with a 75% warning label, whereas branded *du Maurier* packs only appeared with a 50% warning label. Conversely, plain *Vogue* packs only appeared with a 50% warning label, and plain *du Maurier* packs only appeared with a 75% warning label. This was a limitation considering that the results indicate that branding, brand, and warning label size attributes contributed largely to decisions on trial intentions and product taste. As a result, although participants may have preferred branded *Vogue* packs with smaller warnings compared to the larger warnings, the study design did not allow respondents to reveal those preferences. This interpretation was demonstrated by the frequency of responding to the hold-out choice set, shown in Appendix E, which illustrated that women were more likely to choose the *Vogue* branded pack that appeared with the 50% warning label compared to the *Du Maurier* branded pack that appeared with the 75% warning label. It is possible that with a more complete representation of brand, branding and warning label attributes in the study, the degree to which the results approximate real market behaviour may potentially increase.

Fifth, the discrete choice experiment measured behavioural intentions and not actual behaviour. Although discrete choice designs can only offer an approximation of the decision-making model that operates in the real market, it does provide a model of the decision making process that consumers would likely use in the real environment.

The findings from the current study are an important addition to the evidence base on packaging. The discrete choice design included several unique design elements, such as the use of orthogonal and balanced choice-sets, and the presentation of packages in a comparative fashion as opposed to “one-at-a-time”, allowing for respondents to make trade-offs, and hence, modelling the cognitive process that occurs in the real market. It is noteworthy that the results of the current discrete choice study are consistent with results found in previous packaging research that examined behavioural intentions and perceptions among consumers through methods such as focus groups, rating scales, and experimental bidding (eg., Ford, Moodie, MacKintosh, & Hastings, 2013; Hammond, Doxey, Daniel, & Bansal-Travers, 2011; Rousu & Thrasher, 2013). Cross validation of findings across study designs is an important strength of the research.

8.5 Future Research

It would be informative to conduct a follow-up discrete choice study that tests a different combination of pack profiles and choice sets, while still maintaining the same attributes and attribute-levels that were used within the current study. In particular, the follow-up study should include all warning label size, branding, and brand attribute-level combinations, given that the current study found that those attributes were important in decisions related to trial intent and taste. Testing participant responses to another combination of pack profiles and choice sets that were not used within the current discrete choice study would provide more confidence in the precision of estimated part-worth utilities.

It would be valuable to conduct a discrete choice study on cigarette packaging with a sample of young males. Some packaging attributes are particularly relevant among males, such

as male-orientated imagery and slide-opening structural designs. A discrete choice study could examine the trade-offs that are made between pack attributes that are most relevant among males, and would inform how a move to “plain” packaging would influence behavioural intentions and perceptions among the male consumer group.

Finally, some countries, like Ireland and New Zealand, are planning to implement a plain-packaging policy in the near future. This offers a unique opportunity to test the performance of a discrete choice model against actual behaviour. Presumably, a discrete choice study could be conducted before the policy is implemented to estimate what changes in behaviour and perceptions could be expected among consumers. After the implementation of plain-packaging, consumer behaviours could be tracked and compared against the discrete choice model. The findings could increase confidence in the use of discrete choice models for predicting consumer behaviours related to tobacco use, especially in countries that do not have immediate plans to introduce plain-packaging policies.

9.0 CONCLUSIONS

Globally, the slim and super-slim market is increasing, with females accounting for the largest consumers of these products. The findings of the current discrete choice study reinforces that packaging in general can dictate consumer perceptions and interest in trying. Moreover, the findings add that different packaging attributes can have a relative impact on consumers. In particular, packaging structure was found to be the most misleading feature driving misconceptions about perceived risk. The findings demonstrate that females incorrectly associate “slim” and super-slim “lipstick” brands with less harm. Eliminating misleading information from packaging about the harms of tobacco use is required by FCTC guidelines under Article 11. The findings of the current study suggest that standardized packaging is needed to reduce false beliefs among females about the relative risk of different types of cigarettes.

The findings of the current discrete choice study have potentially important policy implications related to the regulation of cigarette packaging. The findings suggest that standardized packaging has potential to decrease the demand for cigarettes. More specifically, packs containing features consistent with Plain Packaging, such as standardized structure and removed branding, were attributed by females with low utility. In other words, the findings demonstrate that females derive less value from packages that contain standardized features. Provided that the discrete choice model projected by this study approximates the decision model that operates in the real market, it is probable that females will be less likely to try cigarette brands sold in standardized packaging.

In December 2012, Australia became the first country to standardize the appearance of cigarette packaging by implementing a Plain Packaging policy. Legal challenges between tobacco companies and the Australian government are ongoing, as the tobacco industry continues to oppose Plain Packaging on grounds that there is no sound evidence that such measures will reduce consumption or pose a public health benefit. It is possible that subsequent countries that plan to implement Plain Packaging policies will be faced with similar opposition from the tobacco industry. The use of discrete choice designs for modelling consumer decision making has been endorsed by the tobacco industry in court cases (Devinney, 2012). The findings of the current discrete choice study support the regulation of tobacco packaging as an important addition to the evidence base on tobacco packaging.

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APPENDICES

APPENDIX A: Qualitative Interviewing Materials

Part 1. Protocol for testing pack attributes

Participants will be shown different images of packs and warning labels. Respondents will be asked to discuss their reactions to the images.

Attribute: Brand

Cigarette brands tested (11):



From top left to bottom right: Benson & Hedges superslims blue pack, Benson & Hedges superslims green pack, Belmont Edge, Belmont, du Maurier distinct, du Maurier smooth, Export 'A', Matinee mellow, Players smooth, Vogue Superslim, Vogue 100mm

Concept: GENDER ORIENTATION / SMOKER IMAGE

Instructions:

I'm going to show you a few cigarette products. I'd like you to take a moment and look at the pack, after which I'll ask you several questions.

[show each pack image one at a time]

Questions:

1. Please describe the type of person who might smoke this brand of cigarettes?

[if gender is not mentioned]

Probe: In your opinion, would you say that someone who chooses to smoke this brand is more likely to be a female or a male?

Concept: OVERALL APPEAL

[show all pack images together]

Instructions: Can you please arrange these packs from "**most appealing**" to "**least appealing**"

[probe for each pack]

Probe: What do you find most appealing about this pack?
What do you find least appealing about this pack?

Attribute: Pack Structure

Pack structures tested (5):





From left to right: slim, lipstick, booklet, slide-opening, lighter opening

Concept: PACK APPEAL

Instructions:

I'm going to show you a few more cigarette products. I'd like you to take a moment and look at the pack, after which I'll ask you several questions.

[show pack images together]

1. a) Based on the pack shape and opening alone, can you please arrange these packs from "**most appealing**" to "**least appealing**"?

[probe for each pack]

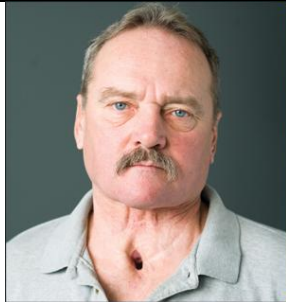
Probe: What do you find most appealing about this pack?
What do you find least appealing about this pack?

*[*If shape or opening is not mentioned above*]*

Probe: What is most appealing and least appealing in terms of the pack shape or opening?

Attribute: Warning Label

Warning labels tested (16)



"I wish I had never started smoking."

"I was diagnosed with cancer of the larynx when I was 48. I had to have my vocal cords removed, and now I breathe through a hole in my throat."
- Leroy

Need help to quit?
1-866-366-3667
gsmokefree.gc.ca/quit

Health Canada



WARNING

RISK OF BLINDNESS

Smoking may increase your risk of age-related macular degeneration, a condition that can cause permanent vision loss. There is no effective treatment in most cases.

Need help to quit?
1-866-366-3667
gsmokefree.gc.ca/quit

Health Canada



WARNING

This is what dying of lung cancer looks like.

Barb Tarbox died at 42 of lung cancer caused by cigarettes.

You can quit. We can help.
1-866-366-3667
gsmokefree.gc.ca/quit

Health Canada



WARNING

Tobacco Smoke: No thanks.

Second-hand smoke contains many toxic chemicals that can harm an unborn baby.

You can quit. We can help.
1-866-366-3667
gsmokefree.gc.ca/quit

Health Canada



WARNING

Cigarette addiction affects generations.

Mother and daughter are both addicted to tobacco. Nicotine is the drug in tobacco that causes addiction.

You can quit. We can help.
1-866-366-3667
gsmokefree.gc.ca/quit

Health Canada



WARNING

When you smoke it shows.

Cigarettes are addictive and harmful.

You have the will. There is a way.
1-866-366-3667
gsmokefree.gc.ca/quit

Health Canada



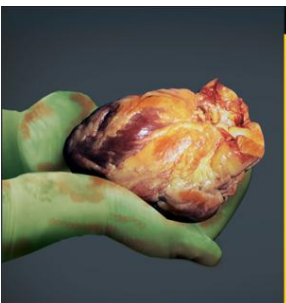
WARNING

Cigarettes cause bladder cancer.

Toxic chemicals in tobacco smoke damage the lining of the bladder causing cancer. The most common sign is blood in the urine.

You have the will. There is a way.
1-866-366-3667
gsmokefree.gc.ca/quit

Health Canada



WARNING

Cigarettes are a major cause of heart disease.

Smokers are up to 4 times more likely to develop heart disease than non-smokers.

You can quit. We can help.
1-866-366-3667
gsmokefree.gc.ca/quit

Health Canada



WARNING

ORAL CANCER

These white spots are a form of oral cancer caused primarily by smoking. Even if you survive, you may lose part or all of your tongue.

Need help to quit?
1-866-366-3667
gsmokefree.gc.ca/quit

Health Canada



WARNING

A single stroke can leave you helpless.

Cigarettes are a major cause of stroke.

You can quit. We can help.
1-866-366-3667
gsmokefree.gc.ca/quit

Health Canada

The posters are as follows:

- Top Left:** A woman with an oxygen mask. Text: "Just breathing is torture." "Smoking caused my lungs to collapse four times before I was diagnosed with emphysema at 42. Without my oxygen tank, it feels like I'm breathing through a straw." - Lena. Need help to quit? 1-866-366-3667 gosmokefree.gc.ca/quit Health Canada.
- Top Right:** A white crib in a room. Text: WARNING Tobacco smoke hurts everyone. Infants who are exposed to tobacco smoke are at greater risk of dying from Sudden Infant Death Syndrome (SIDS). Need help to quit? 1-866-366-3667 gosmokefree.gc.ca/quit Health Canada.
- Middle Left:** A woman in a hospital bed. Text: "Look at the power of the cigarette... Remember this face and that smoking killed me." Barb Tarbox died at 42 of lung cancer caused by cigarettes. You can quit. We can help. 1-866-366-3667 gosmokefree.gc.ca/quit Health Canada.
- Middle Right:** A man in a suit looking at a document. Text: WARNING Another premature death... Smoking is the leading preventable cause of premature death in Canada. About 100 people die from tobacco use each day. You can quit. We can help. 1-866-366-3667 gosmokefree.gc.ca/quit Health Canada.
- Bottom Left:** A young girl in a car seat. Text: WARNING Smoking in the car hurts more than just you. Having the windows open does not protect passengers from the over 70 cancer causing chemicals in tobacco smoke. You have the will. There is a way. 1-866-366-3667 gosmokefree.gc.ca/quit Health Canada.
- Bottom Right:** A young boy with an oxygen mask. Text: WARNING Your kids are sick of your smoking. Second-hand smoke causes more frequent and severe asthmatic attacks in children. You can quit. We can help. 1-866-366-3667 gosmokefree.gc.ca/quit Health Canada.

Concept: SALIENCE

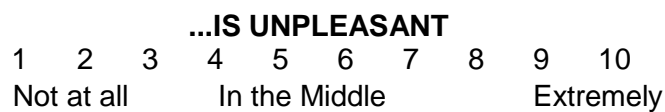
Instructions:

I'm going to show you a few tobacco health warnings. I'd like you to take a moment and look at the warning, after which I'll ask you several questions.

[Show each warning one at a time]

Questions

1. On a scale of 1 to 10, where 1 is 'not at all' and 10 is 'extremely', please tell me whether this warning message



[Show each warning one at a time]

2. Overall, on a scale of 1 to 10, how effective is this health warning?

1	2	3	4	5	6	7	8	9	10
Not at all			In the Middle				Extremely		

Part 2. Cognitive Interviewing Materials

SECTION 1 - INTRODUCTION

“In the questions that follow, we want to find out more about what you think about cigarette products. We are NOT interested in finding out if you are correct or incorrect. We want to make sure that we are asking the questions in ways that you and other people clearly understand. Sometimes, it will seem like we are asking the same question over and over again. Please be patient with us. We do not doubt what you tell us. We just need to double-check that the questions are working like we think they are.

For some of the questions, I will ask you how you arrived at your answer. Again, this is not because we do not believe you. It will be like my asking you to tell me how many windows you have in your house by closing your eyes, visualizing your house, and your telling me how you go from room to room of your house in order to count the windows there. As an exercise, let’s try that now. Please close your eyes, and tell me how many windows are in your house, by taking me from room to room.”

[response]

“Thanks. Now, when I ask you a question and give you some possible responses from which to choose your response, I would like you to do the same thing. You can tell me your understanding of the question and take me through your thoughts as you decide on the response that is best for you.”

SECTION 2: BACKGROUND INFORMATION

ID#
ENTER DATE (dd/mm/yy) __ __ / __ __ / __ __
What is your gender? <input type="checkbox"/> Female <input type="checkbox"/> Male
A. Before we begin, how old are you? __ __
B. What was the last year of school that you completed? <input type="checkbox"/> Grade school / some high school <input type="checkbox"/> Completed high school <input type="checkbox"/> Technical/trade school or community college <input type="checkbox"/> Some university, no degree <input type="checkbox"/> Completed university degree <input type="checkbox"/> Post-graduate degree <input type="checkbox"/> Don't know <input type="checkbox"/> Refused
C. In the last 30 days, how often did you smoke cigarettes? <input type="checkbox"/> Every day <input type="checkbox"/> At least once a week <input type="checkbox"/> At least once in the last month <input type="checkbox"/> Not at all

SECTION 3 – SURVEY

Instructions

You will now be shown a number of cigarette products, two at a time. Please take a moment to look at each product as it is shown. You will be asked several questions about each product set.

Probe: Before I get to the actual question, tell me what this introduction is telling you?

If you were to smoke one of these brands, which would you rather try?



\$9.50



\$10.45

NEITHER

- Don't Know
- Refused

Participant Initial comments:

PROBE: Does this question make sense to you?

PROBE: Can you tell me in your own words what that question was asking?

PROBE: Did you have trouble answering this question?

Please explain.

Was the question relevant to you?

PROBE: What does the word “Neither” mean to you as it’s used in this question?

ie. I would try either brand or I would not try either brand

PROBE: Did you factor in the price of the cigarettes when making your decision? Please explain.

PROBE: Tell me what you thought when I asked about “trying”?

Did you think of this question as a purchasing decision?

PROBE: Would it make more sense to ask “if you were to smoke one of these brands, which would you rather **buy**?”

Would you have answered this question differently?

PROBE: *Would it make more sense to ask “If you were to **try** one of these brands, which would you rather try?”*

If you were to smoke one of these brands, which would taste better?



\$9.50



\$10.45

NEITHER

Don't Know

Refused

Participant Initial comments:

PROBE: Does this question make sense to you?

PROBE: Can you tell me in your own words what that question was asking?

PROBE: Did you have trouble answering this question?
Please explain

PROBE: What does the word “Neither” mean to you as it’s used in this question?

PROBE: Did you factor in the price of the cigarettes when making your decision? Please explain.

PROBE: Does it make more sense to ask “If you were to **try** one of these brands, which would taste better?” instead?

If you were to smoke one of these brands, which would be less harmful?



\$9.50



\$10.45

NEITHER

- Don't Know
- Refused

Participant initial comments:

PROBE: Does this question make sense to you?

PROBE: Can you tell me in your own words what that question was asking?

PROBE: Did you have trouble answering this question?
Please explain.

PROBE: What does the word “Neither” mean to you as it’s used in this question?

Probe: *Would it make more sense to ask “If you were to try one of these brands, which would be less harmful?”*

APPENDIX B: Discrete Choice Experimental Design

Summary of choice sets

Hold-out (video) choice set				
 <p>Smoking in the car hurts more than just you</p> <p>Having the windows open does not protect passengers from the over 70 cancer causing chemicals in tobacco smoke.</p> <p>You have the will. There is a way. 1-866-366-3667 gosmokefree.gc.ca/quit</p> <p>Health Canada</p> <p>du MAURIER SPECIALS SUPER SLIMS</p>	 <p>Smoking in the car hurts more than just you.</p> <p>Having the windows open does not protect passengers from the over 70 cancer causing chemicals in tobacco smoke.</p> <p>You have the will. There is a way. 1-866-366-3667 gosmokefree.gc.ca/quit</p> <p>Health Canada</p> <p>Vogue 20</p>	 <p>chemicals in tobacco smoke.</p> <p>You have the will. There is a way. 1-866-366-3667 gosmokefree.gc.ca/quit</p> <p>Health Canada</p> <p>Vogue 20</p>	 <p>Smoking in the car hurts more than just you</p> <p>Having the windows open does not protect passengers from the over 70 cancer causing chemicals in tobacco smoke.</p> <p>You have the will. There is a way. 1-866-366-3667 gosmokefree.gc.ca/quit</p> <p>Health Canada</p> <p>du Maurier Slim 20</p>	<p>\$8.45</p>
<p>\$8.45</p>	<p>\$10.45</p>	<p>\$10.45</p>	<p>\$10.45</p>	<p>None of the above</p>

Choice Set 1				
 <p>Smoking in the car hurts more than just you</p> <p>Having the windows open does not protect passengers from the over 70 cancer causing chemicals in tobacco smoke.</p> <p>You have the will. There is a way. 1-866-366-3667 gosmokefree.gc.ca/quit</p> <p>Health Canada</p> <p>du MAURIER SPECIALS SUPER SLIMS</p>	 <p>chemicals in tobacco smoke.</p> <p>You have the will. There is a way. 1-866-366-3667 gosmokefree.gc.ca/quit</p> <p>Health Canada</p> <p>Vogue 20</p>	 <p>Smoking in the car hurts more than just you.</p> <p>Having the windows open does not protect passengers from the over 70 cancer causing chemicals in tobacco smoke.</p> <p>You have the will. There is a way. 1-866-366-3667 gosmokefree.gc.ca/quit</p> <p>Health Canada</p> <p>du Maurier Special Slims 20</p>	 <p>Smoking in the car hurts more than just you.</p> <p>Having the windows open does not protect passengers from the over 70 cancer causing chemicals in tobacco smoke.</p> <p>You have the will. There is a way. 1-866-366-3667 gosmokefree.gc.ca/quit</p> <p>Health Canada</p> <p>Vogue 20 CIGARETTES</p>	<p>\$8.45</p>
<p>\$8.45</p>	<p>\$10.45</p>	<p>\$10.45</p>	<p>\$10.45</p>	<p>None of the above</p>

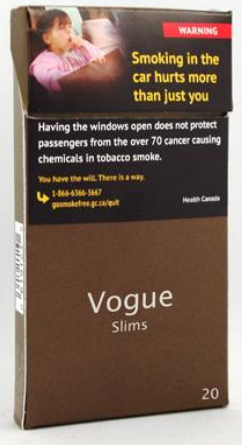
Choice Set 2



\$8.45



\$8.45



\$10.45



\$10.45

None of the above

Choice Set 3



\$8.45



\$8.45



\$10.45



\$10.45

None of the above

Choice Set 4



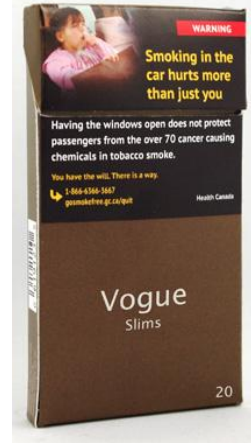
\$8.45



\$8.45



\$10.45



\$10.45

None of the above

Choice Set 5



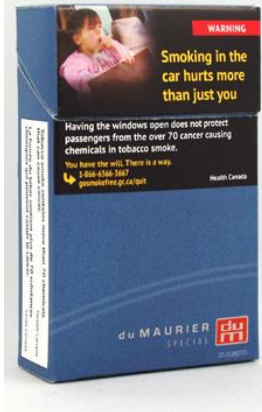
\$8.45



\$8.45



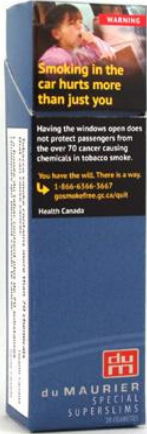
\$10.45



\$10.45

None of the above

Choice Set 6



\$8.45



\$8.45



\$10.45



\$10.45

None of the above

Choice Set 7



\$8.45



\$8.45



\$10.45



\$10.45

None of the above

Choice Set 8

 <p>A pack of du Maurier Special 20 cigarettes. The pack is brown and white. The warning text on the pack reads: "Smoking in the car hurts more than just you. Having the windows open does not protect passengers from the over 70 cancer causing chemicals in tobacco smoke. You have the will. There is a way. 1-866-566-5667 gosmokefree.gc.ca/quit Health Canada".</p>	 <p>A pack of du Maurier Special Slims 20 cigarettes. The pack is blue and white. The warning text on the pack reads: "Smoking in the car hurts more than just you. Having the windows open does not protect passengers from the over 70 cancer causing chemicals in tobacco smoke. You have the will. There is a way. 1-866-566-5667 gosmokefree.gc.ca/quit Health Canada".</p>	 <p>A pack of Vogue Superslims 20 cigarettes. The pack is brown and white. The warning text on the pack reads: "Smoking in the car hurts more than just you. Having the windows open does not protect passengers from the over 70 cancer causing chemicals in tobacco smoke. You have the will. There is a way. 1-866-566-5667 gosmokefree.gc.ca/quit Health Canada".</p>	 <p>A pack of Vogue 20 Cigarettes. The pack is purple and white. The warning text on the pack reads: "Smoking in the car hurts more than just you. Having the windows open does not protect passengers from the over 70 cancer causing chemicals in tobacco smoke. You have the will. There is a way. 1-866-566-5667 gosmokefree.gc.ca/quit Health Canada".</p>
<p>\$8.45</p>	<p>\$8.45</p>	<p>\$10.45</p>	<p>\$10.45</p>
<p>None of the above</p>			

APPENDIX C: Cigarette Packaging Survey

INTRODUCTION & SCREENING SCRIPT	
<p>Introduction:</p> <p>Welcome, and thank you for your interest in our cigarette packaging study!</p> <p>Screening Script:</p> <p>Before we begin, how old are you?</p> <ol style="list-style-type: none"> 1. 15 or under 2. Between 16 to 24 3. 25 or older 4. Prefer not to answer <p style="padding-left: 20px;">If 16 to 24 years → [Proceed to Gender question]</p> <p style="padding-left: 20px;">If under age 16 or over 24 → “Unfortunately, we can only include people age 16 to 24 in this study. Sorry, you are not eligible to participate, but thank you for your time.”</p> <p style="padding-left: 20px;">[TERMINATE]</p> <p>→IF PREFER NOT TO ANSWER: Unfortunately, we need to know your age to determine your eligibility for the study.</p> <hr/> <p>What is your gender?</p> <ol style="list-style-type: none"> 1. Female 2. Male <p>If Male → “Unfortunately, we can only include females in this study. Sorry, you are not eligible to participate, but thank you for your time.” [TERMINATE]</p> <p>→IF PREFER NOT TO ANSWER: Unfortunately, we need to know your gender to determine your eligibility for the study.</p>	
	<p>QUOTA (determined by status question below)</p> <p>200 smokers (status=1-3)</p> <p>200 non-smokers (status=4)</p>
status	<p>In the last 30 days, how often did you smoke cigarettes?</p> <ol style="list-style-type: none"> 1. Every day 2. At least once a week 3. At least once in the last 30 days 4. Not at all <p style="background-color: yellow;">Programmer Note: Use this question to derive Smoking status:</p>

	1=Daily Smokers 2=Weekly smoker 3=Monthly Smoker; 4=non-smoker
Device	<p>Are you completing this survey with a . . . (Select one)</p> <p>1 Desktop computer 2 Laptop computer 3 Smartphone 4 Tablet (e.g., iPad) 5 Other -88 Don't know -99 Refused</p> <p>If Smartphone → Unfortunately, you are not eligible to take this survey.</p>

INTRODUCTION

Please read the following information carefully, and once you have read the study details and agree to them, you can begin the survey.

- You are being asked to participate in a research study that asks for people’s opinions about cigarette product packaging. The Cigarette Packaging Survey is being conducted by Professor David Hammond of the University of Waterloo, Canada.
- You will be asked questions about smoking behaviour, demographics, beliefs about smoking, and you will be asked to view and evaluate a series of cigarette products.
- The survey takes approximately 15 minutes to complete.
- You must be female and 16 to 24 years of age to participate in this study.
- Participation is voluntary and you may decline to answer particular questions if you wish.
- In appreciation of your time, you will receive remuneration from GMI in accordance with their usual rate.
- All of the information you provide in this study will be kept strictly confidential - only the investigators directly associated with the study will have access to this information. Study data, with no personal information, will be retained indefinitely on a secured University of Waterloo server.
- You are free to choose whether or not to participate in this study, and you can choose to stop being a part of it at any time without penalty. If you choose to discontinue the survey, you may receive remuneration by declining all further questions until you reach the end of the survey. Any data already collected may be used in the study, unless you contact the researcher to have it deleted.
- This study has been reviewed by and received ethics clearance through the Office of Research Ethics at the University of Waterloo. If you have any comments or concerns resulting from your involvement in this study, please contact Dr. Maureen Nummelin, the Director, Office of Research Ethics, at 1-519-888-4567, Ext. 36005 or

maureen.nummelin@uwaterloo.ca.

- If you have any questions about the study you can contact Dr. David Hammond of the University of Waterloo at 519-888-4567 ext. 36462 or dhammond@uwaterloo.ca.

CONSENT FORM

Based on the information you received, do you agree to take part in this research study being conducted by Dr. David Hammond of the University of Waterloo?

Yes → **IF YES**, Thank you! Please be assured that all your responses will be kept entirely confidential. **Continue to survey**

No → **IF NO**, Thank you for your time. **TERMINATE**

Age	May we have your age, please? _____ [1-99 limit]
SMOKING BEHAVIOUR AND DEMOGRAPHICS	
Y.S.puff	Programmer Note: Ask only if smoking status =4 Have you ever smoked a cigarette, even just a few puffs? 1 No 2 Yes
S.100cig	Programmer Note: Ask if smoking status =1,2, and 3, and smoking status=4 if yes to y.s.puff Have you smoked 100 cigarettes or more in your lifetime? 1. Yes 2. No
S.consume (Smokers)	Programmer Note: Ask only if Smoker status=1-3. You mentioned that you currently smoke [daily/weekly/monthly]. IF Smoking status =1: On average, how many cigarettes do you smoke each day? [enter number] -88 Don't know -99 Refused IF Smoking status =2: On average, how many cigarettes do you smoke each week? [enter number] -88 Don't know -99 Refused IF Smoking status =3: On average, how many cigarettes do you smoke each month? [enter number] -88 Don't know -99 Refused

<p>S.tffc (Smokers)</p>	<p>Programmer Note: Ask only if Smoker status=1-3.</p> <p>How soon after waking do you usually have your first cigarette?</p> <p>1 Within the first 5 minutes 2 6-30 minutes 3 31-60 minutes 4 More than 60 minutes -88 Don't know -99 Refused</p>
<p>S.quitplan (Smokers)</p>	<p>Programmer Note: Ask only if Smoker status=1-3.</p> <p>Are you planning to quit smoking cigarettes. . .</p> <p>1 Within the next month? 2 Within the next 6 months? 3 Sometime in the future, beyond 6 months? 4 or are you not planning to quit? -88 Don't know -99 Refused</p>
<p>D.Educ (All)</p>	<p>What is the highest level of formal education that you have completed?</p> <p>1 Grade school / some high school 2 Completed high school 3 Technical/trade school or community college 4 Some university, no degree 5 Completed university degree 6 Post-graduate degree -88 Don't know -99 Refused</p>
<p>Occup</p>	<p>Which of the following best describes your "main" work status over the past 12 months?</p> <p>1 Employed, full-time job 2 Employed, part-time job 3 Attending school, full-time student 4 Attending school, part-time student 5 Homemaker 6 Unemployed, able to work 7 Unemployed, unable to work 8 Other (specify)" You indicated "Other". Please specify: _____ -88 Don't Know -99 Refused</p>

Race	<p>People in Canada come from many racial and cultural groups. Are you . . .</p> <p>(Check all that apply)</p> <ol style="list-style-type: none"> 1. White 2. South Asian (e.g., East Indian, Pakistani, Sri Lankan) 3. Chinese 4. Black 5. Filipino 6. Latin American 7. Arab 8. Southeast Asian (e.g., Vietnamese, Cambodian, Malaysian, Laotian) 9. West Asian (e.g., Iranian, Afghan) 10. Korean 11. Japanese 12. Aboriginal (e.g., First Nations, Métis, Inuk/Inuit) 13. Other (please specify): ____ [open-ended text] <p>-88 Don't know</p> <p>-99 Refused</p>
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ATTITUDES AND BELIEFS

For the next few questions, we'd like to ask for your opinion. There is no right or wrong answer—we are most interested in your thoughts.

A.opinion	<p>What is your overall opinion of smoking? Is it . . . ?</p> <ol style="list-style-type: none"> 1 Positive 2 Neither positive nor negative 3 Negative <p>-88 Don't know</p> <p>-99 Refused</p>
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A.future (Smokers)	<p>Programmer Note: Ask only if Smoker status=1-3.</p> <p>How worried are you, if at all, that smoking will damage your health in the future?</p> <ol style="list-style-type: none"> 1 Not at all worried 2 A little worried 3 Very worried <p>-88 Don't know</p> <p>-99 Refused</p>
------------------------------	--

Please indicate whether you agree, disagree, or neither agree nor disagree with each of the following statements.

A.society	<p>Society disapproves of smoking.</p> <ol style="list-style-type: none"> 1 Agree 2 Disagree 3 Neither Agree nor Disagree <p>-88 Don't know</p> <p>-99 Refused</p>
-----------	---

A.cigsmoke	Cigarette smoke is dangerous to non-smokers.
------------	--

	1 Agree 2 Disagree 3 Neither Agree nor Disagree -88 Don't know -99 Refused
A.slim	Smoking helps people stay slim. 1 Agree 2 Disagree 3 Neither Agree nor Disagree 88 Don't know -99 Refused
B.nodamage	Smoking a cigarette every once in a while does not damage your health. 1 Agree 2 Disagree 3 Neither Agree nor Disagree -88 Don't know -99 Refused

SMOKING SUSCEPTIBILITY

Sus. Future	Programmer Note: Ask only if Smoker status=4. Do you think in the future you might try smoking cigarettes? 1 Definitely not 2 Probably not 3 Probably yes 4 Definitely yes 77 Not applicable 88 Refused 99 Don't know
Sus. Friend	Programmer Note: Ask only if Smoker status=4. If one of your best friends were to offer you a cigarette, would you smoke it? 1 Definitely not 2 Probably not 3 Probably yes 4 Definitely yes 77 Not applicable 88 Refused 99 Don't know
Sus.year	Programmer Note: Ask only if Smoker status=4. At any time during the NEXT YEAR, do you think you will smoke a cigarette? 1 Definitely not 2 Probably not 3 Probably yes

	4 Definitely yes 77 Not applicable 88 Refused 99 Don't know
--	--

HOLD-OUT CHOICE SET (videos)

You will now be shown four videos of different cigarette products.
Please click and watch each of the four videos.

Video screen	Click and watch each video before proceeding to the next screen. To play the video, click on "Watch Next Video"
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DISCRETE CHOICE EXPERIMENT

Please look at each cigarette product on the screen.
The price before tax for each product is shown beneath each picture.
Please answer the question at the top of each screen by clicking on one of the products or selecting "none of the above".
You will be asked three different questions for each set of products.

P.try hold out	Which one of these brands would you <u>rather try</u>? 1 Pack A 2 Pack B 3 Pack C 4 Pack D 5 None of the above
----------------	--

P.taste hold out	Which one of these brands do you think would <u>taste better</u>? 1 Pack A 2 Pack B 3 Pack C 4 Pack D 5 None of the above
------------------	---

P.harm hold out	Which one of these brands do you think would be <u>less harmful</u>? 1 Pack A 2 Pack B 3 Pack C 4 Pack D 5 None of the above
-----------------	--

P.try .exp erim ent (8 choi ce sets)	Which one of these brands would you <u>rather try</u>? 1 Pack A 2 Pack B 3 Pack C 4 Pack D 5 None of the above
P.ta ste. expe rime nt (8 choi ce sets)	Which one of these brands do you think would <u>taste better</u>? 1 Pack A 2 Pack B 3 Pack C 4 Pack D 5 None of the above
P.ha rm. expe rime nt (8 choi ce sets)	Which one of these brands do you think would be <u>less harmful</u>? 1 Pack A 2 Pack B 3 Pack C 4 Pack D 5 None of the above

FEEDBACK

That's all the questions we have for you today. Please take a moment to go over the following information.

Thank you for participating in our study – we appreciate your help.

- As mentioned earlier, we are interested in people's opinions about tobacco product packaging.
- We were also interested in the impact of different cigarette packaging designs, including different types of brands and pack shapes and sizes, and how these affect health-related perceptions, such as potential health risk, as well as interest in trying different cigarette products.
- Participants were shown different types of cigarette packages: some packages were branded, and others were plain, so that we can see whether cigarette packaging design affects people's opinions of the products.
- Participants were also shown packages with different shapes, sizes and ways of opening so that we can see if different packaging structures affect opinions of the products.

- As a reminder, this study has been reviewed by and received ethics clearance through the

Office of Research Ethics at the University of Waterloo. If you have any comments or concerns resulting from your involvement please contact either Dr. Maureen Nummelin, the Director, Office of Research Ethics, at 1-519-888-4567, Ext. 36005 or maureen.nummelin@uwaterloo.ca, or Professor David Hammond at 519-888-4567 ext. 36462 or dhammond@uwaterloo.ca.

- If you would like any further information about the study, including a copy of our findings when they become available, please contact Dr. David Hammond at 519-888-4567 ext. 36462 or dhammond@uwaterloo.ca. Also, we would be happy to provide you with a list of smoking cessation resources, should you wish.
- We really appreciate your participation, and hope that this has been an interesting experience for you.

APPENDIX D: Adjusted Multinomial Logit Model Results

Table 1: Adjusted multinomial logit model predicting intent to try (n=503)

Which one of these brands would you rather try?				
		Parameter Estimate	Standard Error	Significance
Pack Structure				
	Slim	-0.33913	0.35106	p=0.3340
	Lipstick	-0.10035	0.36010	p=0.7805
	Booklet	0.37848	0.32655	p=0.2465
	Traditional	-0.61726	0.36845	p=0.0939
Branding				
	Branded	-0.06482	0.21429	p=0.7623
	Plain	0.06482	0.21429	p=0.7623
Brand				
	Vogue	0.55489	0.21316	p=0.0092
	du Maurier	-0.55489	0.21316	p=0.0092
Warning Label Size				
	50%	-0.52832	0.21309	p=0.0132
	75%	0.52832	0.21309	p=0.0132
Price				
	\$8.45	-0.17251	0.21141	p=0.4142
	\$10.45	0.17251	0.21141	p=0.4142
Smoker * Pack Structure				
	Slim	-0.08753	0.04241	p=0.0390
	Lipstick	-0.09246	0.04344	p=0.0333
	Booklet	0.09848	0.04041	p=0.0148
	Traditional	0.08151	0.04539	p=0.0725
Smoker * Branding				
	Branded	-0.04773	0.02626	p=0.0691
	Plain	0.04773	0.02626	p=0.0691
Smoker * Brand				
	Vogue	-0.03743	0.02606	p=0.1509
	du Maurier	0.03743	0.02606	p=0.1509
Smoker * Warning label size				

	50%	0.00392	0.02607	p=0.8804
	75%	-0.00392	0.02607	p=0.8804
Smoker * Price				
	\$8.45	0.01300	0.02594	p=0.6163
	\$10.45	-0.01300	0.02594	p=0.6163
Age * Pack structure				
	Slim	-0.01704	0.01740	p=0.3274
	Lipstick	0.00055	0.01779	p=0.9750
	Booklet	-0.00651	0.01614	p=0.6866
	Traditional	0.02299	0.01813	p=0.2047
Age * Branding				
	Branded	0.02862	0.01060	p=0.0069
	Plain	-0.02862	0.01060	p=0.0069
Age * Brand				
	Vogue	-0.01414	0.01054	p=0.1797
	du Maurier	0.01414	0.01054	p=0.1797
Age * Warning label size				
	50%	0.01135	0.01054	p=0.2814
	75%	-0.01135	0.01054	p=0.2814
Age * Price				
	\$8.45	0.00712	0.01047	p=0.4960
	\$10.45	-0.00712	0.01047	p=0.4960

Note: The parameter estimate represents the contribution of that attribute level to the final model. Model adjusted for smoking status and age.

Table 2: Adjusted multinomial logit model predicting perceptions of product taste (n=503)

Which one of these brands do you think would taste better?				
	Parameter Estimate	Standard Error	Significance	
Pack structure				
Slim	0.01171	0.36770	p=0.9746	
Lipstick	0.27437	0.38225	p=0.4729	
Booklet	-0.15408	0.36715	p=0.6747	
Traditional	-0.13200	0.38839	p=0.7340	
Branding				
Branded	-0.27798	0.23201	p=0.2309	
Plain	0.27798	0.23201	p=0.2309	
Brand				
Vogue	0.88861	0.23092	p=0.0001	
du Maurier	-0.88861	0.03092	p=0.0001	
Warning label size				
50%	-0.40817	0.23065	p=0.0768	
75%	0.40817	0.23065	p=0.0768	
Price				
\$8.45	-0.22116	0.22903	p=0.3342	
\$10.45	0.22116	0.22903	p=0.3342	
Smoker * Pack structure				
Slim	-0.08748	0.04482	p=0.0509	
Lipstick	0.00202	0.04730	p=0.9660	
Booklet	0.04217	0.04563	p=0.3554	
Traditional	0.04329	0.04827	p=0.3698	
Smoker * Branding				
Branded	-0.10101	0.02893	p=0.0005	
Plain	0.10101	0.02893	p=0.0005	
Smoker * Brand				
Vogue	-0.06996	0.02869	p=0.0148	
du Maurier	0.06996	0.02869	p=0.0148	
Smoker * Warning label size				
50%	0.04517	0.02874	p=0.1160	

	75%	-0.04517	0.02874	p=0.1160
Smoker * Price				
	\$8.45	0.01798	0.02868	p=0.5306
	\$10.45	-0.01798	0.02868	p=0.5306
Age * Pack structure				
	Slim	0.00440	0.01818	p=0.8087
	Lipstick	-0.01712	0.01894	p=0.3660
	Booklet	0.01163	0.01810	p=0.5205
	Traditional	0.00108	0.01918	p=0.9549
Age * Branding				
	Branded	0.04351	0.01150	p=0.0002
	Plain	-0.04351	0.01150	p=0.0002
Age * Brand				
	Vogue	-0.03283	0.01144	p=0.0041
	du Maurier	0.03283	0.01144	p=0.0041
Age * Warning label size				
	50%	0.00642	0.01143	p=0.5744
	75%	-0.00642	0.01143	p=0.5744
Age * Price				
	\$8.45	0.00791	0.01136	p=0.4858
	\$10.45	-0.00791	0.01136	p=0.4858

Note: The parameter estimate represents the contribution of that attribute level to the final model. Model adjusted for smoking status and age.

Table 3: Adjusted multinomial logit model predicting perceptions of product harm (n=503)

Which one of these brands do you think would be less harmful?				
	Parameter Estimate	Standard Error	Significance	
Pack structure				
Slim	0.21522	0.40878	p=0.5985	
Lipstick	0.57619	0.37258	p=0.1220	
Booklet	-0.75054	0.48555	p=0.1222	
Traditional	-0.04087	0.52140	p=0.9375	
Branding				
Branded	0.28161	0.27127	p=0.2992	
Plain	-0.28161	0.27127	p=0.2992	
Brand				
Vogue	0.72342	0.25064	p=0.0039	
du Maurier	-0.72342	0.25064	p=0.0039	
Warning label size				
50%	-0.40457	0.24586	p=0.0999	
75%	0.40457	0.24586	p=0.0999	
Price				
\$8.45	0.04623	0.27091	p=0.8645	
\$10.45	-0.04623	0.27091	p=0.8645	
Smoker * Pack structure				
Slim	-0.06083	0.04703	p=0.1958	
Lipstick	-0.01044	0.04296	p=0.8079	
Booklet	0.06249	0.05662	p=0.2698	
Traditional	0.00879	0.06030	p=0.8841	
Smoker * Branding				
Branded	-0.03915	0.03156	p=0.2148	
Plain	0.03915	0.03156	p=0.2148	
Smoker * Brand				
Vogue	0.03347	0.02880	p=0.2451	
du Maurier	-0.03347	0.02880	p=0.2451	
Smoker * Warning label size				
50%	-0.02386	0.02828	p=0.3987	

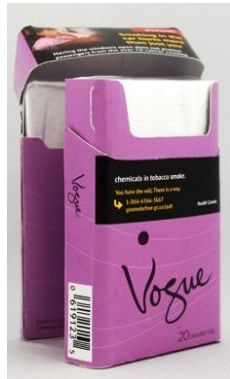
	75%	0.02386	0.02828	p=0.3987
Smoker * Price				
	\$8.45	0.01300	0.03151	p=0.6800
	\$10.45	-0.01300	0.03151	p=0.6800
Age * Pack structure				
	Slim	0.00264	0.02022	p=0.8962
	Lipstick	0.00401	0.01842	p=0.8276
	Booklet	0.01908	0.02394	p=0.4253
	Traditional	-0.02573	0.02591	p=0.3206
Age * Branding				
	Branded	-0.00022	0.01342	p=0.9868
	Plain	0.00022	0.01342	p=0.9868
Age * Brand				
	Vogue	-0.02861	0.01238	p=0.0208
	du Maurier	0.02861	0.01238	p=0.0208
Age * Warning label size				
	50%	0.01777	0.01213	p=0.1429
	75%	-0.01777	0.01213	p=0.1429
Age * Price				
	\$8.45	-0.01402	0.01341	p=0.2956
	\$10.45	0.01402	0.01341	p=0.2956

Note: The parameter estimate represents the contribution of that attribute level to the final model. Model adjusted for smoking status and age.

APPENDIX E: Frequency of Responses to Hold-Out Choice Set

Frequency of responses for each alternative in the hold-out choice set for the outcomes: intent to try, perceptions of product taste, and perceptions of product harm (n=503)

Which one of these brands would you rather try?



\$10.45



\$8.45



\$10.45



\$8.45

None

42% (213)

8% (39)

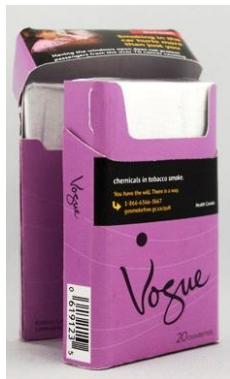
5% (27)

6% (30)

39% (194)

Note: Responses to the hold-out choice set were not analyzed, and packs indicated as hold-outs did not appear in the experimental design.

Which one of these brands do you think would taste better?



\$10.45



\$8.45



\$10.45



\$8.45

None

36% (183)

13% (63)

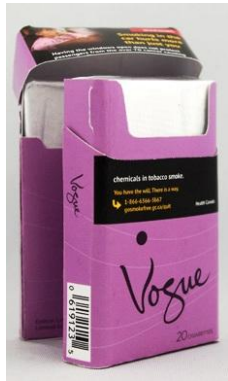
8% (40)

4% (22)

39% (195)

Note: Responses to the hold-out choice set were not analyzed, and packs indicated as hold-outs did not appear in the experimental design.

Which one of these brands do you think would be less harmful?



\$10.45



\$8.45



\$10.45



\$8.45

None

14% (68)

13% (66)

12% (61)

2% (12)

59% (296)

Note: Responses to the hold-out choice set were not analyzed, and packs indicated as hold-outs did not appear in the experimental design.