

Original Investigation

Impact of Female-Oriented Cigarette Packaging in the United States

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Abstract

Introduction: Cigarette packaging is among the most prominent forms of tobacco marketing. This study examined the impact of cigarette pack design among young women in the United States.

Method: A national sample of 18- to 19-year-old females in the United States completed an online survey in February 2010. Participants were randomized to view eight cigarette packs designed according to one of four experimental conditions: fully branded female packs, same packs without descriptors (e.g., "slims"), same packs without brand imagery or descriptors ("plain" packs), and branded non-female brands. Participants rated packs on measures of appeal and health risk and completed a behavioral pack selection task.

Results: Fully branded female packs were rated significantly more appealing than the same packs without descriptors, "plain" packs, and non-female-branded packs. Female-branded packs were associated with a greater number of positive attributes including glamour, slimness, and attractiveness and were more likely to be perceived as less harmful. Approximately 40% of smokers and nonsmokers requested a pack at the end of the study; female-branded packs were 3 times more likely to be selected than plain packs.

Conclusion: Plain packaging and removing descriptors such as "slims" from cigarette packs may reduce smoking susceptibility among young women.

Introduction

Tobacco marketing was instrumental to the rise of smoking among American women in the 20th century (Pierce, Lee, & Gilpin, 1994). In the early 1900s, few women smoked, and in states such as New York, it was illegal for women to smoke in public (USDHHS, 2001a). As the popularity of smoking grew among men, tobacco companies began to openly court women. By the late 1920s, cigarette ads began appearing in female-oriented magazines and featured women for the first time (Tilley, 1985). Perhaps the best-known advertising campaign of the

period was American Tobacco Company's *Reach for a Lucky Instead of a Sweet*. The Lucky Strike campaign cautioned women to "avoid that future shadow" and featured silhouettes of women with fat ankles, double chins, and excess weight—see Figure 1 (JAMA Bureau of investigation: Tobacco advertising gone mad, 1930; Tyler, 1964). The *Reach for a Lucky* campaign was highly effective and helped to establish Lucky Strike as the top brand in the country with sales of more than 40 billion cigarettes (Pierce et al., 1994).

The Lucky Strike campaign signaled the beginning of the tobacco industry's enduring campaign to sell cigarettes to women on the basis of slimness and weight control. The trend continued in the 1960s with the launch of niche brands such as Virginia Slims, which also exploited associations with smoking and weight control in combination with a highly effective theme of promoting smoking as a symbol of freedom and emancipation (Amos & Haglund, 2000). Currently, beliefs about smoking and weight control as well as positive beliefs about smoking and glamour are important predictors of smoking among girls and young women (Austin & Gortmaker, 2001; Kaufman & Auguston, 2008; Stice & Shaw, 2003; USDHHS, 2001a). Tobacco use also remains the leading cause of death among women, with almost twice as many women dying from lung cancer than breast cancer (American Cancer Society, 2009).

Female-oriented brands and advertising campaigns targeting young women continue to be an important element of the industry's marketing campaign. In Europe, for example, new and revamped brands targeted at females have been introduced to market, including so-called designer packs, with overt references to fashion and glamour (World Health Organization, 2010). "Slim" cigarettes and female-oriented brands are also critical to industry efforts to promote smoking among female populations in Asia and other low- and middle-income regions:

As more women enter the workplace and their purchasing power grows, more are emulating Western habits and becoming cigarette smokers. As a result more brands are being targeted directly at them, including slims, which have seen a large increase in sales over the last few years. New product developments targeting females also include packaging in

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Figure 1. Examples of advertisements from the American Tobacco Company.

pastel colors or small handbag-size packs of ten (where these are legal) and women, though they are statistically more likely to quit than men, will continue to be at the forefront of cigarette growth (Euromonitor International, 2007, p. 34).

Traditional forms of tobacco advertising have been restricted or prohibited altogether in most Western countries. In the face of greater restrictions, tobacco packages have become increasingly important as a medium for promoting tobacco use (Hammond, 2009; Wakefield, Morley, Horan, & Cummings, 2002). However, the promotional information on U.S. tobacco packages was recently restricted under the *Family Smoking Prevention and Tobacco Control Act*. As of June 2010, the terms "light," "mild," "low tar," and "similar" descriptors were prohibited on the grounds that they are deceptive to consumers (U.S. Food & Drug Administration, 2009). Although there is ample evidence on the misleading nature of brand descriptors such as light and mild (Hammond, Dockrell, Arnott, Lee, & McNeill, 2009; U.S. Department of Health and Human Services USDHHS, 2001b), there is relatively little research on the impact of other descriptors and packaging elements among young women. For example, several recent studies have indicated that removing color and brand design from packages—so-called plain packaging—reduces brand appeal among youth in the United Kingdom, Australia, and New Zealand (Germain, Wakefield, & Durkin, 2009; Hammond et al., 2009; Hoek, Wong, Gendall, Louviere, & Cong, 2010). However, we are unaware of published empirical research on the impact of brand descriptors such as slims or pink-colored packaging targeted at young women in the United States.

The current study examined the impact of female-oriented cigarette packaging on young women. More specifically, the study sought to examine the effects of brand descriptors (such as slims), brand color, and imagery, as well as the impact of removing these elements—so-called plain or standardized packaging—on young women's beliefs about smoking.

Methods

Participants and Recruitment

Participants consisted of 826 females between the ages of 18–19, including both smokers and nonsmokers. This age group was selected because early patterns of tobacco use among long-term smokers intensify during young adulthood in terms of increased consumption and frequency of use. Brand preferences also develop during this period (Ling, Neilands, & Glantz, 2009; USDHHS, 1994). Participants were recruited from a consumer panel through Global Market Insite, Inc. (GMI), with a panel reach of more than 2.8 million individuals in the United States. Additional information on the GMI panel is available online (<http://www.gmi-mr.com>). Participants in the GMI panel were invited to participate in the "cigarette packaging" survey by e-mail. The study was conducted in February 2010, and participants received approximately \$2USD for completing the survey. The study received ethics clearance from the Institutional Review Board at the University of Waterloo, and all participants provided consent before completing the survey.

Protocol

To ensure an equal proportion of smokers and nonsmokers in each of the four experimental conditions, participants were randomized to each condition after ascertaining smoking status. After answering a series of background questions, participants viewed eight cigarette packages, one at a time, displayed in a random order. Packages were displayed according to each of the four experimental conditions: (1) female-oriented packages; (2) female-oriented packages with brand imagery, including colors and graphics, but with descriptors (i.e., slims) removed; (3) female-oriented packages without brand imagery and descriptors (i.e., plain packages); and (4) popular U.S. brands of "regular" or non-female-oriented packages (see description below). Participants were asked to rate each

pack on four *brand ratings* and seven *smoker trait* questions (described below), followed by questions related to *beliefs and attitudes toward smoking*. Finally, participants completed a behavioral task in which they were asked to select which, if any, cigarette packs they would like to be sent upon conclusion of the study.

Selection of Packages

The eight “female-oriented” brands were selected based on market share or popularity among smokers, as well as previous research. Six of the eight brands are sold in the United States; the Vogue and Silk Cut brands are sold in the United Kingdom. These brands featured the descriptors superslims, slims, lights, menthol, blue, rose, cherry, and smooth, as well as “traditional” female color schemes, such as pink, white, and other pastels—see Figure 2. The brand descriptors and brand imagery of each female-oriented package was modified according to the experimental condition. As shown in Figure 2, Condition 1 packs featured all brand imagery and descriptors (female standard condition). Condition 2 packs featured brand imagery but no descriptors (female no descriptors condition). In Condition 3 (female plain condition), packs were shown without either brand imagery or descriptors. Condition 4 included non-female-oriented “male” packages as a control condition. These brands were also chosen based on market share and included popular “full-flavor” or “regular” varieties of American cigarette brands that lacked overtly female design elements.

Measures

Sociodemographic Variables and Moderators

Education level, income, and ethnicity were measured using previously validated measures (Thompson et al., 2006). Educa-

tion was categorized as “low” (grade school or some high school), “medium” (high school, technical school, or community college), and “high” (university). “Smokers” were defined as respondents who reported smoking daily, weekly, or monthly. “Nonsmokers” were defined as respondents who reported smoking less than monthly or not at all. Weight concerns were measured by summing four questions: (1) “In the past year, how often have you thought about your weight and body shape?”, (2) “In the past year, how often have you felt afraid of gaining weight?”, (3) “In the past year, how often have you thought about wanting to be thinner?”, and 4) “In the past year, how often have you tried to lose weight?” (French, Perry, Leon, & Fulkerson, 1994). A 5-point response scale was used, where 1 = *never* and 5 = *all the time*.

Pack Ratings

Participants were asked to rate each package on four measures: (1) *Brand Appeal* (“How appealing is this brand of cigarettes compared to other brands on the market?”); (2) *Brand Taste* (“How do you think these cigarettes would taste compared to other brands?”); (3) *Tar Delivery* (“How much tar do you think these cigarettes would have compared to other brands?”); and (4) *Health Risks* (“Compared to other cigarette brands on the market, would these cigarettes be . . . less/more harmful?”). Responses were provided on a 5-point Likert scale (e.g., 1 = *a lot more appealing*, 2 = *a little more appealing*, 3 = *no difference*, 4 = *a little less appealing*, and 5 = *a lot less appealing*). Ratings were subsequently coded as either a 1 (*a little/a lot more appealing*) or 0 (*a little/a lot less appealing and no difference*). Note that all analyses reported in this paper were run with this binary variable, as well as with the “original” 5-point Likert ratings. We have presented data for the binary measure of appeal, taste, tar,



Figure 2. Cigarette packs by experimental condition.

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and health risk given that it provides a more intuitive metric in terms of the proportion of respondents who rated packs as more appealing, better taste, lower tar, and less harmful. However, the pattern of results was the same regardless of whether the binary outcome or the original 5-point rating was used. An overall index rating was created for each of the four ratings, by summing scores across the eight packages to yield a score between 0 and 8, where the number corresponds to the total number of packs rated as more appealing/better taste/lower tar/less harmful.

Smoker Image Ratings

For each cigarette package, respondents were asked to identify the typical smoker of each pack by answering the question, "In your opinion, someone who chooses to smoke this brand is *more likely* to be . . ." for seven characteristics: female/male, glamorous/not glamorous, cool/not cool, popular/not popular, attractive/unattractive, slim/overweight, and sophisticated/not sophisticated. These measures were modified from previous research as well as tobacco industry market research (Germain et al., 2009). For each set of traits, respondents could choose either trait or no difference. The female/male question was re-coded so female was scored a "1" and *male, no difference*, and *don't know* were scored a "0." For the remaining traits, the more desirable trait (e.g., *glamorous*) was scored a "1," and the less desirable trait (e.g., *not glamorous*, *no difference*, and *don't know*) were scored a "0."

Behavioral Task—Pack Selection

Prior to completion of the study, respondents were asked which, if any, packs they would like to be sent upon conclusion of the study. Respondents could select one of the four cigarette packs displayed on the screen. Images of the four packs were presented on the screen in random order and included the following: (1) a fully branded female pack, (2) a plain female pack, (3) a fully branded non-female pack, and (4) a plain non-female pack. Each of the packs was drawn at random from the packs used in each experimental condition. Participants could also select an "I do not want a pack of cigarettes" option, which was prominently displayed on the screen. Note that participants were informed after making their selection that no packs would actually be mailed and the study did not promote or endorse smoking in any way.

Beliefs About Smoking

Smoking and weight control beliefs were assessed using three measures: (1) "Smoking helps people stay slim," (2) "Quitting smoking causes weight gain," and (3) "Smoking helps people control their appetites." Responses were provided on a 5-point Likert scale ranging from *strongly agree* to *strongly disagree*.

Analysis

All analyses were conducted in SPSS version 18.0. Regression models were used to examine the effect of experimental condition for three primary outcomes: pack ratings, smoker image ratings, and beliefs about smoking. For each outcome, regression models were conducted in two steps. In Step 1, the model included only the "condition" variable. In Step 2 of the model, the following variables were entered as covariates: age, education, income, ethnicity, smoking status, and weight concerns. Unless indicated otherwise, results are from the "adjusted" models in Step 2 with all covariates present. In Step 3, all two-

way interactions with the "condition" variable were tested by entering each interaction term into the model one at a time. Significant interaction terms are noted in the Results section.

Results

Sample Characteristics

Table 1 shows sample characteristics. Education varied by condition, with the highest level of education in the standard condition ($\chi^2 = 18.0, p = .04$), and number of smoked cigarettes per day (CPD) was significantly higher in the plain condition ($M = 10.6$) compared with the standard condition ($M = 7.7, B = -0.14, p = .046$) among current smokers. There were no other statistically significant differences between the four conditions for sociodemographic variables, including age, ethnicity, income, smoking status, and plans to quit smoking.

Effect of Female Cigarette Packages on Perceptions of Appeal

Appeal Ratings

Table 2 shows brand appeal ratings for individual packs. Among standard packs, highest appeal ratings were given for the white and pink Capri Cherry pack and the Vogue Bleue pack. Statistical differences between conditions for individual packs are shown in Table 2: Compared with standard packs, plain packs were rated as significantly less appealing for all eight packages, whereas seven of the eight plain packs were rated as significantly less appealing compared with no descriptor packs. A linear regression was conducted using an index score for brand appeal across all eight packs to examine overall differences between experimental conditions, as well as sociodemographic predictors of brand appeal. A significant main effect of condition was found ($F = 36.8, p < .001$), such that packs in the standard condition ($M = 4.2$) were rated significantly more appealing than packs in the plain ($M = 2.0, B = -0.40, p < .001$) and male conditions ($M = 3.3, B = -0.18, p < .001$). The plain packs were also given significantly lower appeal ratings than the no descriptor ($M = 4.1, B = -0.41, p < .001$) and male conditions ($B = -.24, p < .001$), and male packs were given lower appeal ratings than the no descriptor packs ($B = -.16, p < .001$). In addition, women with greater weight concerns were more likely to rate packs as appealing than women with lesser weight concerns ($B = 0.08, p = .03$).

Pack Taste Ratings

Table 2 shows taste ratings for individual packs. Statistical differences between conditions for individual packs are shown in Table 2: Compared with standard packs, plain packs received significantly worse taste ratings for six of the eight individual packs, whereas two of the eight plain packs were rated as worse taste compared with no descriptor packs. A linear regression model was conducted using the taste index variable across all eight packs to examine differences across experimental conditions and sociodemographic predictors. A significant main effect of condition was found ($F = 15.1, p < .001$), such that the standard packs ($M = 3.4$) were given higher taste ratings than the no descriptor packs ($M = 2.7, B = -0.12, p = .004$) and the plain packs ($M = 1.9, B = -0.30, p < .001$). Packs in the plain condition were given lower taste ratings than packs in the male ($M = 3.0, B = -0.23, p < .001$) and no descriptor conditions

Table 1. Sample Characteristics (n = 826)

	Experimental condition				
	Standard	No descriptors	Plain	Male	Total
Condition	n = 217	n = 206	n = 203	n = 200	n = 826
Age	18.5 (0.5)	18.5 (0.5)	18.5 (0.5)	18.5 (0.5)	18.5 (0.5)
Ethnicity					
White	67.9% (144)	69.0% (140)	71.9% (146)	67.5% (133)	69.1% (563)
Other	32.1% (68)	31.1% (63)	28.1% (57)	32.4% (64)	30.9% (252)
Income					
Under \$10,000–\$29,999	36.4% (79)	40.3% (83)	33.0% (67)	33.5% (67)	36.6% (302)
\$30,000–\$59,999	18.4% (40)	21.8% (45)	23.2% (47)	24.0% (48)	21.8% (180)
\$60,000 and up	29.0% (63)	24.3% (50)	24.6% (50)	27.5% (55)	26.4% (218)
Not stated	16.1% (35)	13.6% (28)	16.3% (33)	15.0% (30)	15.3% (126)
Education					
Low	7.8% (17)	13.6% (28)	7.9% (16)	11.5% (23)	10.2% (84)
Medium	33.6% (73)	39.3% (81)	48.8% (99)	43.0% (86)	41.0% (339)
High	58.1% (126)	46.6% (96)	42.9% (87)	45.5% (91)	48.4% (400)
Smoking status					
Nonsmoker	63.1% (137)	60.2% (124)	59.6% (121)	60.5% (121)	60.9% (503)
Daily smoker	22.1% (47)	26.8% (55)	27.2% (55)	21.1% (42)	24.3% (199)
Weekly smoker	9.4% (20)	8.3% (17)	8.4% (17)	13.1% (26)	9.8% (80)
Monthly smoker	6.1% (13)	4.9% (10)	5.0% (10)	5.5% (11)	5.4% (44)
Cigarettes per day ^a	7.7 (6.1)	9.7 (11.3)	10.6 (9.1)	10.3 (8.5)	9.6 (9.0)
Plans to quit smoking ^a					
In next month	20.8% (15)	17.9% (14)	13.2% (10)	22.9% (16)	18.6% (55)
In next 6 months	20.8% (15)	14.1% (11)	15.8% (12)	11.4% (8)	15.5% (46)
Beyond 6 months	26.4% (19)	32.1% (25)	40.8% (31)	34.3% (24)	33.4% (99)
Not planning to quit	31.9% (23)	35.9% (28)	30.3% (23)	31.4% (22)	32.4% (96)

Note. ^aAmong current smokers only.

($B = 0.18$, $p < .001$). Ethnicity, Weight Concerns, and Smoking Status were also significant. Respondents who were non-White ($B = 0.10$, $p = .009$) and expressed greater Weight Concerns ($B = 0.08$, $p = .047$) were more likely to believe that the packs would taste better compared with White respondents and those with less weight concerns. Smokers were more likely than non smokers to believe that the packs would taste better ($B = 0.08$, $p = .06$). Finally, a two-way interaction was significant between condition and weight concerns: Respondents with greater weight concerns in the no descriptor condition provided higher ratings of taste ($B = 0.53$, $p < .001$).

Pack Tar Ratings

Table 2 shows tar ratings for individual packs. Compared with standard packs, plain packs received significantly lower tar ratings for two of the eight individual packages (see Table 2). In a linear regression analysis using the index variable across all eight packs, a significant main effect of condition was found ($F = 6.4$, $p < .001$), such that standard packs ($M = 2.2$) were more likely to be rated as having significantly less tar than packs in the male ($M = 1.3$, $B = -0.21$, $p < .001$) and plain conditions ($M = 1.5$, $B = -0.14$, $p = .004$). As well, no descriptor packs were more likely to be rated as having less tar than packs in the male condition ($M = 1.9$, $B = 0.15$, $p = .003$). No other significant associations were observed for perceived tar levels, with the exception of a two-way interaction between smoking status and condition in which smokers in the standard condition were more likely to rate packs as lower tar ($B = 1.2$, $p < .001$).

Health Risk Ratings

Table 2 shows health risk ratings for individual packs. Overall, 45.3% of respondents reported that at least one of the eight brands would be “less harmful” than the other brands. Compared with standard packs, plain packs received significantly lower ratings of harmfulness for two of the eight individual packages (see Table 2). In a linear regression model using the index score across all eight packs, a significant main effect of condition was observed ($F = 4.0$, $p = .007$): packs in the standard ($M = 1.6$) condition were more likely to be rated as lower health risk than male ($M = 0.9$, $B = -0.17$, $p < .001$) and plain packs ($M = 1.3$, $B = -0.08$, $p = .08$). Packs in the no descriptors ($M = 1.4$) condition were also more likely to be rated as lower health risk than those in the male condition ($B = -0.11$, $p = .03$). In addition, smokers were more likely to believe that packs would be lower health risk than nonsmokers ($M = 1.4$ vs. 1.2, $B = 0.08$, $p = .05$). When a regression was conducted among smokers only, respondents in the standard condition ($M = 2.2$) were more likely to rate packs as less harmful compared with those in the plain condition ($M = 1.3$, $B = 0.20$, $p = .008$). Finally, a two-way interaction was observed in which smokers in the standard condition were more likely to rate packs as lower health risk ($B = 0.99$, $p < .001$).

Smoker Traits

Participants were asked to rate each pack along seven smoker “traits.” Table 3 shows the number of packs endorsed for each

Table 2. Brand Ratings for Individual Cigarette Packages by Experimental Condition (*n* = 826)

		“A little” or “A lot” MORE APPEALING than other brands (% agree)			“A little” or “A lot” better TASTE than other brands (% agree)			“A little” or “A lot” LESS TAR than other brands (% agree)			“A little” or “A lot” LESS HEALTH RISK than other brands (% agree)		
Standard	68.7 ^a	61.8 ^a	55.4 ^a	50.9 ^a	49.8 ^a	49.0 ^b	42.4	39.3	37.1 ^a	31.5 ^a	17.2	28.2	35.7 ^a
No descriptors	60.4 ^b	54.3 ^b	56.9 ^b	49.0 ^b	40.8 ^b	42.2 ^b	40.8 ^b	34.6 ^a	18.6 ^b	24.1 ^{ab}	19.9	20.8	38.0 ^b
Plain	20.6 ^{ab}	37.2 ^{ab}	14.7 ^{ab}	27.5 ^{ab}	34.6 ^a	34.6 ^a	34.6 ^a	36.0	18.6 ^b	21.5 ^a	14.3	25.1	24.4 ^{ab}
		“A little” or “A lot” better TASTE than other brands (% agree)			“A little” or “A lot” LESS TAR than other brands (% agree)			“A little” or “A lot” LESS TAR than other brands (% agree)			“A little” or “A lot” LESS HEALTH RISK than other brands (% agree)		
Standard	64.0 ^a	41.9 ^{ab}	42.5 ^a	41.2 ^a	39.3	37.1 ^a	31.5 ^a	32.4	38.6	26.0 ^a	25.3	27.6	27.6
No descriptors	41.7 ^a	28.9 ^a	32.5 ^b	22.1 ^a	29.2	26.0 ^a	25.3	14.1 ^{ab}	36.0	18.6 ^b	21.5 ^a	28.8	28.8
Plain	18.2 ^a	30.9 ^b	14.1 ^{ab}	23.0 ^a	31.7	9.9	25.3	19.4	36.0	18.6 ^b	19.9	28.7	25.0
		“A little” or “A lot” LESS TAR than other brands (% agree)			“A little” or “A lot” LESS TAR than other brands (% agree)			“A little” or “A lot” LESS TAR than other brands (% agree)			“A little” or “A lot” LESS HEALTH RISK than other brands (% agree)		
Standard	32.7 ^a	19.8	30.7 ^{ab}	29.1	14.2	22.9	34.7	19.4	22.4	25.9	30.7	26.6	26.6
No descriptors	24.4	19.4	22.1 ^a	29.2	8.5	25.9	30.7	19.4	31.7	9.9	19.9	26.3	26.3
Plain	16.5 ^a	19.4	14.6 ^b	14.6 ^b	31.7	9.9	28.7	14.7	31.7	14.3	14.3	25.1	25.6
		“A little” or “A lot” LESS HEALTH RISK than other brands (% agree)			“A little” or “A lot” LESS HEALTH RISK than other brands (% agree)			“A little” or “A lot” LESS HEALTH RISK than other brands (% agree)			“A little” or “A lot” LESS HEALTH RISK than other brands (% agree)		
Standard	23.6 ^a	14.7	16.9	27.5	10.9 ^a	17.2	28.2	13.8	23.1	6.1	19.9	20.8	23.1
No descriptors	18.2 ^b	13.8	18.0	24.7	24.7	5.3 ^a	18.2	9.0 ^{ab}	11.5	14.3	14.3	17.3	18.2
Plain	9.0 ^{ab}	12.8											

Note. Letters are used to indicate statistical significance between values based on results of logistic regression models adjusting for age, education, income, ethnicity, smoking status, and weight concerns. Values in each column with the same letter are significantly different at the $p < .05$ level. Note that results are not shown for the “male” condition. Unlike the three “female” conditions shown in the table, for which the same brand was systematically altered across conditions, different brands were used in the “male” condition, and no brand-specific comparisons can be made across conditions.

Table 3. Index Scores of Perceived Smoker Traits by Experimental Condition (*n* = 678)

	Female	Slim	Glamorous	Cool	Popular	Attractive	Sophisticated
Standard female	5.58 ^{ab} (1.83)	2.99 ^{ab} (2.21)	2.99 ^{ab} (2.11)	2.26 ^{ab} (2.25)	2.25 ^{ab} (2.27)	2.52 ^{ab} (2.37)	2.72 ^{ab} (2.30)
No descriptors female	5.37 ^{ce} (1.88)	2.79 ^c (2.29)	2.82 ^{ce} (2.23)	2.15 ^{cd} (2.21)	2.08 ^{cd} (2.29)	2.16 ^{cd} (2.30)	2.42 ^{ce} (2.38)
Plain female	3.66 ^{aed} (2.02)	2.38 ^{ad} (1.96)	1.94 ^{aed} (1.67)	1.70 ^{ad} (1.83)	1.61 ^{ad} (1.78)	1.61 ^{ad} (1.74)	1.83 ^{aed} (1.84)
Male packs	1.46 ^{bcd} (1.19)	1.85 ^{bcd} (1.77)	1.29 ^{bcd} (1.45)	1.75 ^{bc} (1.81)	1.42 ^{bc} (1.57)	1.41 ^{bc} (1.70)	1.33 ^{bcd} (1.60)

Note. Letters are used to indicate statistical significance between values based on results of logistic regression models adjusting for age, education, income, ethnicity, smoking status, and weight concerns. Values in each column with the same letter are significantly different at the $p < .05$ level.

smoker trait across the eight packs viewed by each participant. As Table 3 shows, plain packages received significantly fewer positive ratings for every smoker trait.

In a linear regression in which all the different smoker traits across all packs were combined in a single index where higher scores indicated more positive smoker traits, a main effect of condition was significant ($F = 27.8$, $p < .001$), such that the packs in the standard condition ($M = 2.7$) were given higher positive trait scores than those in the plain ($M = 1.9$, $B = -0.22$, $p < .001$) and male ($M = 1.4$, $B = -0.39$, $p < 0.001$) conditions. Packs in the male condition were given lower positive trait scores than the no descriptors ($M = 2.5$, $B = 0.34$, $p < .001$) and plain conditions ($B = 0.15$, $p = .001$). In addition, plain packs were given lower positive trait scores than packs in the no descriptors condition ($B = 0.17$, $p < .001$). Participants in the high-income ($B = 0.11$, $p = .004$) and high education ($B = 0.08$, $p = .05$) categories endorsed a greater number of positive smoker traits than those in the low-income and low education categories. Similarly, non-White ($B = 0.10$, $p = .008$) respondents and smokers ($B = 0.13$, $p = .001$) were more likely than White respondents and nonsmokers to endorse positive smoker traits, respectively.

Effect of Cigarette Packages on Attitudes About Smoking and Weight Control

After viewing and rating each of the eight packages, participants were asked to report their beliefs about smoking and weight control. Overall, 28.6% agreed that "smoking helps people stay slim" (nonsmokers = 22.9% vs. smokers = 37.1%, $p < .001$), 41.3% agreed that "smoking helps people control their appetite" (nonsmokers = 31.5% vs. smokers = 55.6%, $p < .001$), and 42.6% agreed that "quitting smoking causes weight gain" (non smokers = 35.8% vs. smokers = 52.4%, $p < .001$).

An index variable was created, where 1 = agreement with at least one weight control belief (62.2% of sample) and 0 = disagreement with all three beliefs (37.8% of sample). A logistic regression model was conducted to examine potential differences across experimental conditions and sociodemographic predictors for the weight control index. No significant differences were observed by condition; however, smokers were significantly more likely to endorse beliefs about smoking and weight control than nonsmokers ($OR = 2.81$, 95% CI = 1.99–3.97), as were older respondents ($OR = 1.52$, 95% CI = 1.10–2.10) and those reporting greater weight concern ($OR = 1.22$, 95% CI = 1.05–1.41). In addition, high-income respondents were more likely

to endorse smoking and weight control beliefs compared with respondents reporting low ($OR = 1.70$, 95% CI = 1.12–2.60) and medium income ($OR = 1.73$, 95% CI = 1.09–2.73) and those who did not state their income ($OR = 2.17$, 95% CI = 1.29–3.65).

Pack Selection Task

Participants were offered a pack of cigarettes that would be sent to them upon conclusion of the study. Participants either chose not to receive a pack or selected a pack from four options presented on the screen: a standard female pack, a plain female pack, a standard male pack, or a plain male pack. Overall, 38.5% ($n = 318$) of the participants accepted the offer and selected a pack, including 67.5% ($n = 218$) of smokers and 24.8% of non smokers ($n = 100$).

Of the 10 most frequently selected brands, standard female packs accounted for 8 of the top 9 selections. The Marlboro pack from the non-female condition was selected as the 8th most popular and the Winston non-female pack was selected 10th. No plain packs were selected among the top 10 selections. Overall, significantly fewer respondents selected a plain versus standard pack ($\chi^2 = 29.0$, $p < .001$), including among both smokers ($\chi^2 = 16.5$, $p < .001$) and nonsmokers ($\chi^2 = 13.0$, $p < .001$). When excluding the male packs from the analysis, standard female-branded packs were 2.7 times more likely to be selected than the plain female packs (43.4% vs. 16.4%; $\chi^2 = 38.9$, $p < .001$). No significant differences in pack selection were observed for smoking status, age, income, education, ethnicity, or weight concerns.

Discussion

To our knowledge, this is the first experimental study to examine the impact of female-oriented tobacco packaging in the United States and the first study of "plain packaging." Female-oriented cigarette packs were rated as appealing by a high number of female smokers and nonsmokers. Packs with overtly female designs—the Capri pack with pink color and the Vogue pack—received the highest ratings of appeal, including among nonsmokers. In contrast, plain packs featuring a standardized brown background color significantly reduced the appeal of packs. For example, brand appeal fell from 69% among young women who viewed the standard Capri pink pack to 21% among those who viewed the plain Capri pack.

Branded female packs were also significantly more likely than plain and male packs to be associated with glamour, attractiveness, popularity, and slimness. The association with slimness

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is particularly notable, given the industry's longstanding efforts to associate smoking and female brands with thinness and weight control (U.S. Surgeon General, 2001). Although no differences between experimental conditions were observed for weight beliefs assessed after viewing cigarette packs, women with greater weight concerns were more likely to endorse beliefs about smoking and weight control and rated female packs as more appealing. More generally, the findings underscore the importance of the pack in terms of creating positive brand associations and imagery, particularly among young people (Germain et al., 2009; Hoek et al., 2010; Wakefield et al., 2002). The findings also demonstrate that plain packaging effectively reduces these positive associations, consistent with previous research (Germain et al., 2009; Hammond et al., 2009; Wakefield, Germain, & Durkin, 2008).

Findings on perceived taste were generally similar to ratings of brand appeal. In the standard pack condition, brands with flavor descriptors received three of the top four taste ratings among the eight brands: Capri Cherry, Capri Smooth, and Virginia Slims Menthol Superslims. In addition, the most notable decreases in perceived taste between the "standard" condition and the "No Descriptor" were associated with the removal of "cherry," "smooth," and "menthol" descriptors from packs. New provisions under the *Family Smoking Prevention and Tobacco Control Act* prohibit pack references to "characterizing flavors," including cherry; however, "smooth" is still allowed. In addition, menthol has been excluded from the banned list of flavors and is subject to a special review (U.S. Food & Drug Administration, 2009). There is an urgent need for research assessing consumer perceptions of "non-characterizing" flavors that are still permitted to appear on packs, including descriptors such as "smooth," "fresh," and "cool," which currently appear on U.S. packs.

The findings add to the growing evidence base that color and brand descriptors contribute to the false belief that some brands are less harmful than others (Germain et al., 2009; Wakefield et al., 2008). Almost half of the young women in the current study erroneously believed that at least one of the packs they viewed would be less harmful than other cigarette brands. In addition, smokers were significantly more likely to endorse this false belief. With respect to the individual packages tested in the current study, standardizing the color of packs was associated with the largest changes in health beliefs for the white Capri pack and the Black Camel No. 9 pack, whereas the removal of the word "smooth" was associated with changes in beliefs about tar level. Previous research suggests that the term "smooth" is becoming more prevalent on Western brands following prohibitions on "light" and "mild" terms (Muti et al., 2011). New regulations in the United States prohibit any packaging elements that represent explicitly or implicitly that a tobacco product is less harmful than other products (U.S. Food & Drug Administration, 2009). To date, the only packaging elements to be prohibited are the words "light," "mild," and "low tar." More than 50 other countries have also prohibited "light" and "mild" brand descriptors; however, evidence from these jurisdictions indicates that false beliefs about the relative risk between cigarette brands persist after these terms are removed from the packs (Borland et al., 2008; Hammond, 2009). In other words, more comprehensive packaging regulations are required to significantly reduce the misleading nature of cigarette packaging.

Plain packaging was associated with fewer false beliefs about the health risks of brands compared with branded female packs in the current study, consistent with previous research (Hammond & Parkinson, 2009; Hammond et al., 2009). Notably, packs with the "slimmest" shape—the two Virginia Slims packs, commonly referred to as "lipstick" or "purse" packs (Koch, 2008)—were most likely to be rated as less harmful. These findings suggest that pack size may influence perceptions of risk in addition to promoting brand appeal. Indeed, the skinny Virginia Slims packs continued to be rated as "less harmful" in the Plain pack condition, even with color and brand descriptors removed.

The findings also indicate that the design of packs influences the likelihood that young women will accept the offer of cigarettes. Smokers and nonsmokers were approximately three times more likely to select standard fully branded packs compared with plain packs.

Strengths and Limitations

Participants in the study were not recruited using probability-based sampling and are therefore not representative of the U.S. population. However, the sample was drawn from a heterogeneous sampling frame of smokers and nonsmokers in the United States, representing different socioeconomic levels. As well, participants were not asked about previous smoking history, so some participants classified as "nonsmokers" may in fact be "former smokers." Self-reported evaluations of cigarette packs may also be subject to social desirability bias. In the current study, the socially desirable response may have been to provide lower ratings of appeal and other positive attributes of cigarette brands, thereby underestimating positive pack and trait ratings. In addition, the study did not measure familiarity with cigarette brands or previous experience using brands examined in the study, which may be related to perceptions of appeal and perceived risk. However, the between-subjects experimental design and randomization of participants to experimental conditions are considerable strengths of the study, which ensure that any biases are equal across groups. Finally, participants based their evaluations on images of cigarette packages, rather than observing packs directly. This may have attenuated responses to cigarette packs in some cases, particularly with respect to the shape and size of "slim" packs, which are difficult to convey in a two-dimensional image.

Conclusions

Cigarette packaging promotes smoking to young women at a critical age for smoking initiation (USDHHS, 1994). These findings have implications for regulations on deceptive packaging included in the *Family Smoking Prevention and Tobacco Control Act*. As of July 2010, manufacturers are prohibited from selling any tobacco products labeled or advertised as "light," "low tar," or "mild" in the United States. The current findings suggest that packaging elements other than "light" and "mild" are associated with false beliefs about the risks of cigarette brands. The findings also provide evidence that plain packaging regulations—removing color and brand imagery from packs—may help to reduce levels of false beliefs about health risks, as well as reduce the appeal of packaging more generally. Finally, the findings highlight the need to monitor the use of cigarette flavors and how they are perceived among youth and young adults. Perceptions of "menthol" and "non-characterizing" flavor descriptors such as "ice" and "fresh" are particularly important given their increasing use in the U.S. market.

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Declaration of Interests

None declared.

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