

# Designing cigarettes for women: new findings from the tobacco industry documents

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## ABSTRACT

**Aims** To examine internal tobacco industry research on female smoking patterns and product preferences, and how this research has informed the design of female-targeted cigarettes and impacted smoking behavior among this target population.

**Design** Research was conducted through a systematic web-based search of previously secret industry documents made publicly available through the 1998 Master Settlement Agreement.

**Findings** This study provides evidence that the tobacco industry has conducted extensive research on female smoking patterns, needs and product preferences, and has intentionally modified product design for promotion of cigarette smoking among women. Cigarette manufacturers responded to changing female trends by focusing on social and health concerns as well as promoting dual-sex brands that also featured traditional female style characteristics.

**Conclusions** Product features responsive to female-identified needs and preferences may contribute to differences in female smoking patterns. Assessment of female-targeted product differences should inform smoking cessation and prevention programs tailored to women. Overall, these findings underscore the need for further investigation of effects of targeting on smoking behavior, health outcomes and regulation of tobacco products by public health agencies.

**KEYWORDS** Cigarette product design, gender-based smoking behavior, tobacco industry, women targeting.

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## INTRODUCTION

Cigarette smoking is a global public health priority [1]. In developed countries, the World Health Organization (WHO) reported 80–90% higher total mortality rates among smoking women compared with non-smoking women [1]. Smoking significantly increases the risks of lung cancer and cardiovascular disease among women, as well as other female-specific health problems such as cervical and bladder cancer, menstrual irregularities, early onset of menopause and multiple pregnancy complications [1–5]. Despite the widely publicized health consequences of cigarette use, the WHO estimates that 15% of women in developed countries smoke [1]. Published research predicts rapid growth in smoking rates

and tobacco-related disease among women in developing countries [5,6].

Published gender-based differences in smoking behaviors include increased female smoking rates, slower declines in female quitting rates and differential product preferences among male and female smokers—for example, women are more likely than men to choose ‘light’ (low-tar), slimmer and longer-style cigarettes [3–5,7]. Studies reveal further gender differences in smoking behaviors and effects, including inhalation behaviors, patterns of nicotine delivery, addiction, cessation and physiological, biological and subjective effects of nicotine [4,8–16]. Women use nicotine to reduce stress, negative affect and body weight more than men, and the association between smoking and depression is stronger among

women [8,12,14,15]. Hence, research suggests that female smoking behavior may be more reinforced by non-nicotine factors such as hand–mouth activity, social pressure and comfort [12,14,15], and women may experience greater subjective pleasurable effects from tobacco smoke and less benefit from nicotine than their male counterparts [14].

Prior research describes how the tobacco industry has targeted women and girls with female cigarette brands, aggressive marketing, advertising and promotional campaigns [4,5,7,17–22]. These studies demonstrate that marketing strategies, especially for female brands, have contributed to the association of smoking with appealing attributes including female liberation, glamour, success and thinness [3,7,19,21]. They further establish that industry efforts to target women have resulted in elevated smoking rates among women and corresponding increases in smoking-related morbidity and mortality [8,17,20,23].

The role of product design in the targeting of cigarettes to women has received less attention than advertising and promotion, despite evidence that smoking behavior is highly determined by product design [24,25]. However, internal tobacco industry documents made publicly available through ongoing litigation provide important new insight into the industry's research and product design efforts, and the use of these efforts to target specific consumer groups. For example, recent studies examining internal documents have shown that the tobacco industry has altered product design to target groups based on age [26], psychological profile [27] and ethnicity [28]. Prior studies suggest that product design is an integral component of advertising and promotional campaigns directed to girls and women [4,5,19,20].

In this paper, we examine internal industry documents for evidence of whether tobacco manufacturers have sought to identify gender-based differences in smoking patterns and product preferences, and thereby intentionally modified cigarette design features for promotion of smoking among women. First, we examine industry research on gender-based differences in female product wants and needs, smoking patterns and related physiological effects. Secondly, we assess design changes and subsequent product development efforts corresponding to female product preferences and behaviors, highlight-

ing specific industry projects aimed at women. Finally, we consider the progression of female-targeted product design in the context of industry research and commercial product performance.

## METHODS

Research was conducted through a web-based search of more than 7 000 000 internal tobacco industry documents made publicly available through the 1998 Master Settlement Agreement between the state attorneys general and major US tobacco manufacturers [Philip Morris (PM), RJ Reynolds Tobacco Company (RJR), Brown & Williamson Tobacco Company (B&W) and Lorillard (LOR)]. Documents were retrieved from the archival databases maintained at Tobacco Documents Online (<http://www.tobaccodocuments.org>) and the British American Tobacco Document Archive (<http://bat.library.ucsf.edu>) through index- and text-based searches using a snowball sampling method. Documents were identified through an initial search of key terms (presented in Table 1) and combinations of these terms. The initial set of documents was reviewed and used to establish further search terms and related projects.

Relevancy was determined based on whether the documents described (1) research examining female specific behavior and product preferences, (2) product design features specifically conceptualized or developed for female smokers and (3) internal female-targeted research projects. The study resulted in a final set of approximately 320 relevant documents, ranging in date between 1969 and 2000, including 88 documents cited here. Most of these documents can be accessed at: [http://tobaccodocuments.org/product\\_design/list.php?field\\_id 9&resource\\_id=23181](http://tobaccodocuments.org/product_design/list.php?field_id 9&resource_id=23181)

We believe the collection of documents identified for this study is sufficient to draw general conclusions regarding industry discussion of these issues. It should be noted that the document collections are gathered from different manufacturers, spanning a number of distinct eras, and representing the conclusions and opinions of many different authors. Thus, our findings should not be understood as representative of the tobacco industry considered as a single body, but is none the less instructive

**Table 1** Search terms used to identify tobacco documents of interest.

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- Female, women, sex, gender differences
  - Smoking behavior, smoking topography, puffing behavior, inhalation, filter efficiency, metabolism, cessation
  - Female brands, cigarette market, body image, appetite suppressant, dieting, social acceptability, health concern
  - Product design, cigarette features, ultralight, light, feminine, slim, product benefits, product preference, consumer acceptance, female smoker satisfaction, taste benefit, tipping, packaging
  - Project Cosmo, Young Women (YW), Tomorrow's Female (TF), Virile Female (VF), Jade, Eastwind, Chelsea, Horizon
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regarding characteristics of internal product research targeting women, the use of this knowledge in product development and possible effects on female smoking behaviors and health outcomes.

## RESULTS

### Gender differences as identified within internal industry research

#### *Smoking motivation and product preferences*

Internal research beginning in the 1970s identified numerous psychological and behavioral factors contributing to female specific needs and motivations to smoke. A 1976 British-American Tobacco Company (BAT) review of gender differences (drawing on both internal and published studies) concluded that women were more motivated to smoke, smoked more for insecurity reasons and exhibited more neurotic traits [29]. The author further observed that higher neuroticism among women may intensify responses to smoking-related health pressures, and that female smokers found quitting more difficult and reported fewer successful cessation attempts [29]. BAT's internal research (1977), echoed in their later review of smoking behavior studies (1984), concluded that females were more likely to smoke under stressful situations and to relieve 'nervous irritation' [30,31] while men smoked more for relieving boredom and fatigue [31]. Similarly, a 1973 Lorillard study cited national survey data ( $n = 37\ 000$  households) to suggest that women, particularly working women, smoked to reduce tension more than their male counterparts [32]. Numerous internal studies identified a reliance on smoking for weight control and maintenance as being more important and prevalent among women than men [32–34].

More recently, internal studies have identified a heightened concern among women for a range of social and personal factors including social acceptability (i.e. how smoking is perceived socially); health and cosmetics; and perceptions of confidence, femininity and thinness [35–38]. For example, a 1987 RJR aroma screening study ( $n = 477$ ) found that female smokers, specifically females aged 25–35 who smoked 100 mm products, were the most sensitive to the issue of sidestream smoke [39]. Social concerns are reflected in differences in social behavioral patterns; for example, a BAT document (1993) noted that '[M]en talk to equal numbers of men and women while females talk to more females while smoking' [40].

Gender-specific concerns are also consistent with female smoker product preferences. For example, in 1985 PM researchers observed: 'because of women's nurturing

role in society, they are naturally more involved with low tar cigarettes than men...' [41]. A 1974 RJR report, based on several data sources, and B&W's 1982 Single Unit Marketing Model (SUMM) study ( $n = 1544$ ), separately concluded that females preferred longer, milder and menthol styles more than their male counterparts [35,42–44]. Other product preferences unique to female smokers included greater responsiveness to alternative cigarette taste and increased desire for ease of draw, smoothness and mildness. [35,36]. Taste (i.e. flavor, mildness) and 'real smoking enjoyment' remained the most important product attributes among women [38]. A 2000 internal BAT document contrasted 'sensory pleasure' (i.e. taste and enjoyment) as the major component of female preference, versus 'satisfaction' (i.e. presumably nicotine delivery) as the key factor among males [45].

Industry research efforts further divide female smokers by age [46,47] and ethnicity [48,49] to assess specific wants and product preferences [47–51]. For example, a 1982 RJR examination of young female smoking behavior suggested that peer pressure, acceptance among social groups and looking more mature were key behavioral determinants and provided insight into penetrating this smoker market [52]. Hence, visual (color), taste (via flavors) and aroma variations were proposed in an effort to capture this market (18–24-year-old females) [52]. Table 2 presents industry-identified female smoking motivation and preferences as highlighted by internal industry quotes.

#### *Smoking behaviors*

Consistent with published studies [9,15], internal industry research confirms gender differences in female smoking topography. Smoking topography refers to individual smoking behavior measures including puff volume, puff duration, puff flow, interpuff interval, the number of puffs per cigarette and the length of the unsmoked cigarette butt [58]. A sample of internal studies designed to examine differences in smoking topography and related effects is presented in Table 3.

Across a number of internal studies, female smokers smoked fewer cigarettes per day on average, exhibited smaller puff volume and shorter puff duration than male smokers [29,40,43,59,60,63,64]. Internal research also observed that women drew on the cigarette (i.e. inhaled) with less force than men [65], and as a result experienced lower draw resistance (effort) than men [59]. A 1993 BAT review of self-report and observational studies showed no gender differences in the amount of time individual cigarettes were lit or remained in a smoker's mouth [40].

Studies examining compensatory smoking behavior—that is, changes in smoking behavior in response to

**Table 2** Industry quotes highlighting female concerns and taste preferences.

| Concerns and preferences         | Industry quotes  |
|----------------------------------|--|
| Weight control                   | Lorillard 1973: 'greater concern women have that if they stop smoking they will gain weight . . . this fear undoubtedly prevents many women from desiring to stop smoking' [32]  |
| Femininity and thinness          | RJR 1981: '. . . I [female smoker] prefer to smoke a long, thin cigarette because it's a lot more feminine . . . it's sexy looking' [53]   |
| Peer pressure/popular acceptance | RJR 1982: 'Their [young females] current brand choice also is heavily influenced by peer acceptance' [52]  |
| Neuroticism                      | BAT 1982: '. . . we can safely conclude that the strength of cigarettes that are purchased by women is related to their degree of neuroticism . . . women buy cigarettes in order to help them cope with neuroticism' [54] |
| Health                           | PM 1985: '[women] do not want to stop smoking, yet they are guilt-ridden with concerns for their families if smoking should badly damage their own health . . . Thus they compromise by smoking low tar cigarettes' [41]   |
| Alternate flavors                | B&W 1985: 'Young women, much more so than men, would be likely to smoke a flavored cigarette' [55]   |
| Social acceptability             | PM 1991: '. . . women are more interested in social cigarette concepts . . . see more of a benefit in a social cigarette, and are less skeptical about product taste' [56]   |
| Cosmetics                        | PM 1991 Women reported concern about breath, house and hair odor, and a desire for 'cleanliness connected to a cigarette' [57]   |
| Smoking enjoyment                | B&W 1995: Female taste-related preference included: 'satisfying flavor, real smoking enjoyment, mild taste' [38]   |
| Confidence                       | B&W 1995: 'Confidence and appealing to friends (the 'emotional' attributes) comprise an area of opportunity and therefore are attributes which should be exploited' [38]   |
| Sensory perception               | BAT 2000: 'The research shows that the role of smoking for males concerns satisfaction, while for females it concerns sensory pleasure' [45]   |

differences in machine-measured smoke delivery, especially from 'low yield' cigarettes—are of particular public health concern. Internal studies demonstrated conflicting findings with regards to compensatory behavior, in some cases showing no evidence of gender differences. However, in some studies compensation by women appeared to be more directly responsive to a threshold for nicotine delivery rather than to regulation of delivery [59,60,62]. A 1977 BAT study found that males compensated for both high and low delivery cigarettes, while females showed greater compensation for low delivery cigarettes than males, but showed almost no regulation of high delivery cigarettes [59]. When measurement of compensatory behavior was based on habitual brand, a more pronounced role of compensation among females was hypothesized to reflect the fact that women were more likely to be smokers of low-yield cigarettes [60].

#### *Physiological effects*

Industry documents offer some evidence of gender-based differences in physiological effects of smoking. For example, industry research suggests that while men have greater nicotine intake [60–63], women metabolize nicotine more slowly than men [29,62,63]. A 1977 BAT

document proposed that the number of cigarettes smoked may be controlled by factors such as rates of nicotine metabolism and/or excretion stating:

The faster the rate at which nicotine is deactivated pharmacologically, the more frequently the smoker must replenish his nicotine 'level' to provide stimulation or other rewards of nicotine [59].

Another 1977 BAT study on smoking dependence suggested that because female smokers inhale less and experience reduced nicotine intake, they may be less influenced by the pharmacological affects of nicotine but may 'use ritual of lighting and puffing on cigarettes to calm themselves under stressful situations' [30]. A 1974 study ( $n = 32$ ) of stress effects on smoking behavior supported this conclusion by observing that while males increased the number and volume of puffs during the stress condition, females only increased the number of puffs [66]. On the other hand, a 1982 study ( $n = 250$ ) described in a BAT review suggested a female-specific relationship between neuroticism and nicotine delivery; that is, more neurotic females smoked higher delivery cigarettes [54].

A 1990 RJR study of the effect of switching to lower yield cigarettes on tar retention and deposition found gender differences in tar deposition; men showed significantly

**Table 3** Gender differences in smoking topography and related effects: selected industry studies.

| <i>Study name<br/>(company and year)</i>   | <i>Design</i>   | <i>Methodology</i>   | <i>Results for female subjects</i>   |
|--|---|--|--|
| The Effects of Changing Brands on Smoking Behaviour (BAT, Creighton & Lewis, 1977) [59]  | <i>n</i> = 16<br>8 males, 8 females;<br>Phase 1: smoked medium (1 month);<br>Phase 2: half changed to high, half changed to low-delivery (1 month)<br>Phase 3: both return to medium delivery           | Ten measures of smoking behavior for each phase using smoking behavior analyzer  | Smaller volume but more puffs per cigarette<br>Lower draw pressure and less lit draw resistance<br>Better nicotine regulation for low delivery but no compensation for high delivery   |
| Smoke Yield of Cigarettes and Puffing Behavior in Men and Women (RJR, 1978) [60]   | <i>n</i> = 110<br>43 females, 67 males<br>ages 16–78  | Puffing behavior (number, interval, duration, peak pressure, latency to peak pressure, volume) measured while smoking 2 personal brand cigarettes/ Questionnaire with personality, demographic, and caffeine/alcohol intake measures | Fewer number cigarettes, lower puff volume; lower nicotine intake; shorter puff duration; smoked lower yield cigarettes<br>More pronounced volumetric compensation<br>Nicotine may be more important for female puffing behavior<br>Greater pre–post smoking change in CO for first cigarette than for second cigarette;<br>Nicotine and CO delivery not only affected by puffing behavior |
| Smoking Behavior Studies at Cambridge: A Comparison of Two Low-Tar Experimental Cigarettes (BAT, 1981) [61]  | <i>n</i> = 40<br>9 male medium tar<br>9 male low tar<br>10 female medium tar<br>10 female low tar<br>Smoked usual brands for 4 weeks; then smoked (low tar/low nicotine, low tar/high nicotine)         | Investigated the effect of changes in cigarette design on smoking behavior, delivery and intake of smoke constituents, and on satisfaction using laboratory, non-laboratory, and questionnaire measures                              | Fewer number cigarettes, lower mean volume; shorter puff duration; more puffs but not significant<br>Obtained lower total particulate matter (TPM); lower nicotine and CO deliveries; lower presmoking expired air CO levels; less nicotine plus cotinine in the urine excreted  |
| Nicotine: satisfaction: FFLT Studies (RJR, 1981) [62]  | <i>n</i> = 3000<br>FFLT smokers using Camel Lights 85 cigarettes  | Examine nicotine delivery and optimum T/N which maximize consumer acceptance through examination of smoked butts and questionnaire results   | Fewer number cigarettes<br>Show no compensation until maximum T/N is reached; lower max T/N 13<br>Males compensate immediately as T/N is raised and show higher nicotine intake and higher max T/N of 15.<br>Nicotine intake very close to standard FTC values, while intake for males was slightly higher   |
| Tar retention and regional lung deposition in male and female cigarette smokers switching to products with lower tar yields (RJR, McAughey, 1990) [63] | <i>n</i> = 26<br>13 males, 13 females<br>Middle tar smokers who switched to low tar in which nicotine delivery was maintained<br>Weeks 1–9 middle-tar; weeks 10–33 switch to low tar, enhanced nicotine | Measured and compared the regional tar deposition material to standard markers of cigarette yield (butt nicotine) and uptake (exhaled CO, cotinine in urine and saliva samples)  | Fewer number cigarettes; smaller puff volume<br>No differences in tar deposition per cigarette; implies more efficient mechanism of smoke deposition<br>Lower nicotine intake but cumulative (1 week) salivary cotinine not significantly lower; higher urinary cotinine excretion; implies differential nicotine metabolism   |
| 1986 Human Smoking Behavior DFC Study (RJR, Kay <i>et al.</i> 1994) [64]   | <i>n</i> = 64<br>32 males, 32 females,<br>RJR and PM smokers smoked usual brand and switch to control cigarettes  | Monitored smoking behavior through Human Smoking Behavior (HSB) Equipment, Desire for Cigarette (DFC) and Satisfaction surveys   | Smaller puffs; smaller puff volume<br>No differences in brand-effect (PM smokers larger puffs, longer puff) duration and intervals, and fewer puffs<br>No differences in compensatory behavior   |

FF = full flavor; FFLT = full flavor low tar; ULT = Ultralight; BAT = British American Tobacco; RJR = RJ Reynolds; PM = Philip Morris; CO = carbon monoxide; TPM = total particulate matter; FTC = Federal Trade Commission; T/N = tar/nicotine.

larger puff volumes, yet measured regional tar deposition in the respiratory tract per cigarette was similar for men and women, suggesting that a higher proportion of inhaled smoke was retained in women [63]. Based on these results, the authors hypothesized a more efficient means of smoke deposition in women possibly as a result of longer breath hold [63]. The study also indicated differential routes of elimination in men and women suggesting that urinary cotinine excretion may be a more significant route of nicotine elimination in women [63].

Internal studies demonstrate that gender differences in physiological effects of smoking may have significant implications for differential smoking behavior. For example, slower nicotine metabolism may reduce the need for nicotine reinforcement of smoking and explain why women tend to smoke fewer cigarettes per day [60–63]. Industry researchers suggested differential pulmonary function or nicotine dependence among men and women as possible explanations for some gender differences in compensatory behavior [60]. Elsewhere, industry researchers proposed that biochemical differences may be an important determinant of smoking behavior [29,62,63], and suggested that gender differences in metabolic pathways should be evaluated to understand the relationship between these differences on brand switching [61,63].

#### Women-targeted product differences

A number of cigarette features have been linked by industry research internally to female-specific product wants and concerns. These features range from overt product features, many of which are characteristic of traditional female-only brands, to attributes much less evident to consumers [32,67–73]. A description of female-targeted design features categorized along a continuum progressing from overt features to less evident features is presented in Table 4.

#### *Product differences targeting personal and social concerns*

Certain product attributes suggest benefits consistent with female-specific personal concerns. For example, longer, slender cigarettes, and feminine packaging and color are widely acknowledged to portray smoking as feminine and stylish [4,35,81,82]. In 1990, PM observed that fashion-conscious female smokers who are insecure about the femininity of smoking associated slim, long and light-tasting cigarettes with increased femininity [67]. Lorillard's exploratory consumer research revealed that 100 mm female smokers selected this style to look more feminine and graceful while also perceiving 'long-length' as milder and longer lasting [69].

Simultaneously, these 'feminine' design features enabled the industry to target greater health and social

concerns among this population [68]. PM researchers, evaluating consumer reaction to Capri, a B&W ultra-thin product, observed: 'Overriding the perception of its stylishness is an impression that this cigarette has potential health advantages because there is so much less tobacco being consumed' [83]. This same point was recognized by BAT in their effort to position a Slim product:

There is little question that a slimmer product, by its physical dimensions, clearly communicates style–fashion–distinctive–female imagery . . . because they contain a little less tobacco, slim cigarettes deliver lower tar but provide both taste and ease of draw comparable to brands of relatively higher deliveries . . . Slim products will, in essence, be positioned against 'lights' as an innovative means of achieving lower tar smoking [84].

Internal research observed that 100 mm smokers were more health conscious than smokers of shorter cigarettes, and believed that they had smoked fewer cigarettes since they had switched to the 100 mm style [69]. RJR also noted that female smokers 'intentionally switch to ultra low tar brands to obtain a very low level of tar and nicotine' [85]. Further, female preferences for light and ultra-light products corresponded with their desire for mild tasting tobacco smoke, as 'increased tobacco taste is a signal of increased tar; something they are avoiding' [85].

Thus, a critical function of the design differences of women targeted cigarettes is to maintain the health 'illusion' portrayed by longer, slimmer brands. As concluded in a PM document: 'Most smokers have little real notion of their own brand's tar and nicotine numbers . . . Perception is more important than reality, and in this case the perception is of reduced tobacco consumption' [50].

Additional cigarette features such as improved aftertaste and odor and reduced sidestream smoke were aimed to counteract social pressures and cosmetic concerns specific to female smokers. For example, various flavors including menthol, spearmint, peppermint, chocolate, apricot, coconut and marshmallow were used to address fresh aftertaste and aroma benefits among women [80,86]. RJR consumer testing demonstrated that a 'Colgate-type' (toothpaste) flavored pellet inserted into the filter positively effected fresh/pleasant aftertaste among females [76]. RJR also examined fresh aftertaste as a means of addressing cosmetic concerns and concluded that females found spearmint and ethyl vanillin glucoside (EVG) prototypes to be 'very pleasant and refreshing [76]. A 1987 PM consumer research study noted:

The reduced circumference, 97 mm length, white tip, and stylish package . . . appeals to many women on grounds of appearance alone . . . If such a slim circum-

**Table 4** Examples of female-targeted design features.

|                           | <i>Design feature</i>   | <i>Description</i>  | <i>Function</i>  | <i>Evaluation</i>  |
|---------------------------|---|---|--|--|
| Overt<br>↑<br>↓<br>Hidden | Packaging   | Feminine packaging, colorful graphics, attractive packs   | Portray attractiveness and femininity  | Positive, attractive; does not look like a cigarette pack, easy to carry in purse [67]                                 |
|                           | Filter paper  | White tipping   | Reinforce low tar and femininity   | Appropriate for feminine cigarettes, associated with 'Light' [71,72]   |
|                           | Length  | Longer lengths (100 mm, 120 mm)   | Reinforce femininity and thinness with extra puffs                               | Portray style, femininity, glamour, attractiveness [32,68–70] Milder and longer lasting [68]                           |
|                           | Circumference   | Slim, ultra-slim cigarettes   | Reduce tobacco; increase perceptions of style, femininity, less sidestream smoke | Thinness associates smoking with weight control, implies less sidestream smoke, less tar [73]                          |
|                           | Puff count/burn   | Slower burn rate by 1–2 puffs   | Increase puff count  | Compromised taste/aftertaste; not important point of difference [74,75]  |
|                           | Flavors   | Spearmint (6%)/ethyl vanillin glucoside (EVG) in cigarette paper  | Reduce and/or improve aftertaste   | Spearmint improved product acceptance/fresh aftertaste delivery/H-19 negative impact on acceptance and aftertaste [76] |
|                           | Paper   | Ecusta (CC) Low sidestream paper with magnesium oxide   | Mask secondhand smoke  | Effective in reducing visible sidestream smoke but not odor or irritation; unacceptable smoke taste [39]               |
|                           | Tobacco blend   | Heat treatment burley (HTK) cased and uncased<br>Flue-cured with burley extract<br>Oriental blend                   | Reduce bitter aftertaste and increase smoothness                                 | Improved harshness perception [77]<br>Milder inhalation [77]<br>More distinct taste and aroma [78]                     |
|                           | Tobacco density<br>Increase weight,<br>decrease low-density,<br>processed (G13, G7) | Provide desired attributes of smoothness and improved aftertaste  | Slower burn rate, better taste/aftertaste, mildness                              | Provided desired attributes of smoothness and improved aftertaste [78] less strength and tobacco taste [80]            |
|                           | Other additives   | Diammonium phosphate (DAP) treated G7 (reconstituted tobacco)<br>WS-III Compound (a cooling flavor without menthol) | Increase smoothness<br>Increase smoothness and improve aftertaste                | Too light/less rich tasting [79]<br>Strong, not smooth, bad aftertaste; unacceptable [51]                              |

ference cigarette could also have a reduced side-stream, as some thought it might, then it would work on another one of the major social problems [83].

A number of internal studies have explored the use of appetite suppressants in cigarettes to promote smoking related weight control [87–90]. Although no documents in this study provided direct evidence of incorporating appetite suppressants into commercial cigarettes, numerous documents conceptualize products of this nature [91–93]. For example, RJR (1980) proposed to create a cigarette with 'a unique flavor that decreases a smoker's appetite including brandy, chocolate, chocolate mint, cinnamon, spearmint, and honey' [90].

#### *Product differences targeting wants and perception*

Internal market analyses examining demographic variables clearly show that gender is a determinant of product preferences [29,42,43,47,94]. Indeed, the female dominance of longer, lighter, and menthol style cigarettes had been noted by the industry as early as 1969 [41–43,48,95–97]. Table 5 outlines selected research projects conducted by cigarette manufacturers to assess consumer reactions to prototypes incorporating product features targeting women.

Internal studies, specifically in the 1980s, highlighted the importance of product taste in the recruitment of female smokers. Manufacturers manipulated

**Table 5** Industry projects targeting women.

| <i>Project/brand name</i> | <i>Company, year</i>     | <i>Goal</i>  | <i>Product research</i>  |
|---------------------------|--------------------------|--|--|
| Young Female (YF)         | RJ Reynolds, 1985 [98]   | Address wants of young female Marlboro Lights smokers  | Increased smoothness, pleasant aroma to mask secondhand smoke presence   |
| Young women (YW)          | RJ Reynolds, 1986 [99]   | Meet needs of less educated, middle class with pink collar jobs YAFS   | Increased smoothness, pleasant aroma, pleasant aftertaste  |
| Tomorrow's Female (TF)    | RJ Reynolds, 1987 [49]   | Address desire for a fresher, more pleasant smoking experience both for female smoker and those around her                           | Smoothness, lighter aftertaste, pleasant aroma, mask sidestream smoke  |
| Cosmo                     | Philip Morris, 1987 [73] | Target young females with a stylish and sophisticated product with emphasis on perceived social acceptability                        | Less tobacco, low tar, low sidestream smoke  |
| 'Slimmer Marlboro'        | RJ Reynolds, 1988 [100]  | Create an updated Marlboro that is more attractive to females  | Proposed improved taste and aftertaste, low levels of menthol, high tar/nicotine ratio, light aroma, appetite suppressant, candy or salt tipping for a slim oval-shaped cigarette with white tipping |
| Virile Female (VF)        | RJ Reynolds, 1989 [51]   | Target YAFS with 'little education, limited aspirations, and value for masculine type traits and perceptions'                        | Smoothness, slow burn, improved aftertaste   |
| Spring Lemon Lights       | Lorillard, 1992 [101]    | Provide a fresh change to smoking via a hint of lemon, offer a superior refreshing smoking experience/primary emphasis against women | Lemon-flavored enhanced low-tar menthol brand  |

\*YAFS: young adult female smokers.

product features—including tobacco blends, paper porosity, tobacco density, filters and burn rate—to create mild-tasting cigarettes with less sidestream smoke, pleasant aromas and pleasant or reduced aftertaste. RJR's research for Project Young Women (YW) focused on 'easy to smoke' product goals, indicating that product improvement should target less harshness, more smoothness and less lasting, strong, dry and sour aftertaste [102–104]. In an effort to improve the taste of mild products, RJR research demonstrated that heat treatment of tobacco (explored under Project VF) offered taste improvement for low tar products, particularly for female smokers [77,105]. Products such as RJR's vanilla-scented cigarette [39] and Lorillard's lemon-flavored menthol brand were targeted primarily to women [101], to address female sensitivity to unpleasant odor and aftertaste, while capitalizing on their greater willingness to experiment with flavored cigarettes [106].

#### *Product differences targeting smoking behaviors and physiological effects*

Internal studies of smoking behavior have consistently demonstrated that nicotine and tar delivery are products both of the smoker and the cigarette [61], and that smoking behavior and product preferences are driven by ciga-

rette design but moderated by the specific characteristics, smoking patterns, and product 'wants' of a given smoker group [24,25]. Thus, as concluded by a 1987 RJR examination of brand-specific smoking behavior:

Products which 'appeal' to smokers of one population are not smoked with the same strategies by smokers of another population. Thus, product acceptance may be improved by tailoring cigarettes to populations which use similar smoking strategies [25].

Gender differences in smoking behaviors and effects were a critical factor in the successful development of female-targeted cigarettes. For example, a BAT market planning document (undated) emphasized that slim cigarettes provided greater ease of draw compared to other low-tar cigarettes [84], matching females' lighter draw tendencies [59,65]. Female-targeted cigarette development at RJR similarly sought to maximize ease of draw [51,107]. Internal product research also manipulated tar and nicotine levels to achieve product benefits consistent with female smoking patterns [108,109]. Indeed, the general emphasis on low delivery products targeting women reflects internal research regarding the reduced importance of nicotine among female smokers. In 2000, BAT proposed development of a new female brand that would deliver sensory pleasure in direct response to this issue. [45]

### Commercial products and the changing market-place

Internal research resulted in the introduction of a number of female-targeted brands and product styles from 1967 through the early 1990s. A summary of these brands and their commercial outcome is presented in Table 6.

The success of female-targeted brands was highly dependent on addressing wants and needs identified among women. VS was popular in 1968 not only because it was positioned as the first cigarette for the independent woman, but it was successfully tailored to female product wants, both visually (with extra length and slimness) and through increased mildness [81]. The More brand similarly achieved success with unique prod-

uct attributes that reinforced perceptions of style and independence including longer length, more puffs at the same cost, easier draw, and improved flavor [81].

Internal documents indicated a shift in female smoker preferences and brand choices between the 1970s and 1990s. As the market evolved, cigarette manufacturers found that many new brands developed specifically for women were not as successful at accurately meeting changing female needs and failed to achieve market success. A 1980 RJR study concluded that several female brands either positioned themselves too narrowly or limited their market potential by introducing product attributes that were not generally accepted by women [70]. By 1990, PM also recognized the need to re-evaluate the original strategic positioning of VS cigarettes, not-

**Table 6** Commercial outcome of several female-targeted brands.

| <i>Brand</i>    | <i>Year</i> | <i>Company</i>   | <i>Description</i>  | <i>Outcome</i>  |
|-----------------|-------------|------------------|---|---|
| Silva Thins     | 1967        | American Tobacco | Positioned as the lowest tar 100 mm cigarette for men and women with female emphasis due to long length [69]  | Not successful in repositioning specifically toward females [69]  |
| Virginia Slim   | 1968        | PM               | First successful female-oriented brand symbolizing female liberation and equality [32]                        | First rapid then stable market share growth [69,81]   |
| EMBRA           | 1969        | RJR              | 100 mm with satin covered filter and unique pack; portrayal of women differed from VS [81]                    | Discontinued after 10 months because of poor sales trends [69]  |
| Eve             | 1970        | Liggett & Myers  | Floral design tipping; fresh full-bodied satisfying [81] symbolizing passive femininity [32]                  | Limited market potential [81]   |
| MORE            | 1974        | RJR              | Brown color, longer length, more puffs, same cost, easier draw, better flavor [81]                            | Regular and lights styles successful [81]   |
| Dawn            | 1975        | RJR              | Extra-long 120 mm all-white cigarette [69,81]   | Discontinued in 1976; low consumer demand/absence of unique product benefit [69]  |
| Max             | 1975        | Lorillard        | First 120 mm extended from Kent; positioned as a lot longer than 100 s but no extra cost for extra puffs [69] | Not successful; limited size of the 120 mm market [69]  |
| Satin           | 1983        | Lorillard        | Satin tip, 100 mm [81]  | Not successful [81]   |
| VS SuperSlims   | 1989        | PM               | Low smoke, ultra low-tar, sleek 17 mm, 100 mm, 70% less sidestream [110]                                      | Currently on market   |
| Chelsea         | 1989        | RJR              | 'The first cigarette that smells good'. Provide pleasant aroma via EVG technology [76]                        | Feminine products changed due to limited market appeal and reintroduced as Horizon [76]   |
| Horizon         | 1990        | RJR              | New package, copy, and retail incentives used to eliminate 'feminine' appearance [76]                         | Marketing support removed from test market due to competitive pressure within industry. 'Technology incorporated in these products remains viable' [76] |
| Newport Stripes | 1986        | Lorillard        | Full circumference, light, 100 mm [46]  | Not successful in reaching the female market [46]   |
| Misty           | 1991        | B & W            | Female savings brand [111]  | Successful [111]  |
| Dakota          | Early 1990s | RJR              | Developed under VF [4]  | Little market impact and eventually removed from market   |

ing: '... what was a bold proposition in 1968 does not appear to be as relevant to female smokers today' [67].

Changing female trends led to the introduction of cigarettes that did not necessarily fit traditional feminine brand criteria [47,94]. For example, in 1992 PM proposed a king-size (non-100 mm) version of VS to meet the growing product preference for 85 mm cigarettes among young adult female smokers [112]. Increasingly, cigarette manufacturers targeted females by promoting popular dual-sex brands that also featured traditional female brand style characteristics. As observed in an undated RJR document: '... dual sex brands which are attentive to female wants/concerns are likely to provide the larger opportunity' [113].

It was generally acknowledged internally that female taste preferences had not changed but that addressing them within a female-only brand position was no longer as relevant. For example, in 1994, RJR survey research showed that consumers, especially females, believed that Camel was harsh and lacked smoothness, and Marlboro was a much smoother product [114], which largely explained female preference for Marlboro. B&W (1995) examined product attributes important to female smokers ( $n = 300$ ) of both fashion and mainstream (dual-sex) brands. Researchers found that among both groups of female smokers, taste perception (mild, satisfying, enjoyment) was the major factor influencing brand choice [38].

A 2000 BAT document (2000) concluded that women want 'real' cigarettes rather than niche products (i.e. slims) including brands with 'multidimensional femininity'. This document proposed a Light 'global female brand' targeted at young adult females under 30 (EASU30) with brand attributes such as contemporary femininity and sensory pleasure [45]. As more overtly feminine product positioning became dated, the industry also focused increasingly on social and health concerns [95]. For example, in 1990, internal recommendations at PM described increased opportunities for 'reduced smoke' (lower tar) cigarettes with less odor/pleasant aroma [67].

## DISCUSSION

Internal documents reveal that the tobacco industry's targeting of women goes far beyond advertising and marketing. The industry sought to identify gender-based differences in motivational factors, smoking patterns and product preferences in an effort to promote and enhance smoking among girls and women. Internal product development efforts have identified a variety of cigarette features aimed at meeting the needs and wants of female smokers. The resulting products exploit mistaken health notions about the relative safety of light cigarettes; create

false perceptions of social and health effects through reduced sidestream smoke and improved aroma and aftertaste; match female taste preferences through flavored, smooth and mild-tasting cigarettes; and target physiological and inhalation differences with greater ease of draw, increased sensory pleasure and altered tar and nicotine levels.

While the tobacco industry continues to target female smokers, their strategies today prove to be more multifaceted and less readily identifiable than they were decades ago. Most female smokers in the United States now smoke 'gender neutral' (dual-sex) brands, while female-only brands account for 5–10% of the cigarette market [115]. In spite of these apparent changes in the market, internal research demonstrates that gender continues to be a determinant of product preference and confirms published research noting the female dominance of longer, lighter and menthol-style cigarettes. Brands targeting women are now positioned as 'style' choices within more popular dual-sex brands; yet the research utilizing female motivations and product preferences continues to drive these 'style' differences.

In industrialized countries such as the United States, female smoking rates have decreased at a slower rate than male rates, narrowing the gender gap since the 1970s [115]. World-wide, male smoking rates are slowly declining, but female smoking rates are expected to rise to 20% by 2025 [1], driven by the growth of female markets in developing countries [6]. Cigarette manufacturers may play a major role in targeting women in those countries where smoking rates have remained generally low. Published research efforts have also observed differential smoking effects across subgroups of women [116]. However, these efforts have yet to consider the potential effects of product characteristics that have been tailored to different demographic segments of women. These areas of research demand further investigation.

A number of published studies have shown differential gender differences in smoking cessation attempts and the effects of nicotine replacement therapies, indicating that women have a harder time quitting [7,8]. Further research would be necessary to examine whether female-targeted design changes which exploit female smoking behavior or physiological differences have contributed to increased initiation, reduced cessation and increased smoking-related disease among women. For example, the success of 'low tar' and 'light' cigarettes among women may lead to false health perceptions that prevent or delay smoking cessation among women who want to reduce smoking related health risks.

Future investigations should also examine the effects of gender differences in smoking behavior and topography on differences in lung cancer risk and other smoking-attributable disease documented in the published litera-

ture [4], as well as the role of product design in contributing to these differences. These behavioral and product differences must also be assessed for differences in measures of toxicity and related health effects. For example, a 1988 BAT study reported higher deliveries of NNK, a known carcinogenic TSNA, in lower circumference cigarettes [117]; these findings may have serious implications for women due to their stronger preference for reduced circumference cigarettes.

Review of internal industry marketing and product strategies has important implications for effective prevention and cessation efforts as well as the development of policy and regulations addressing smoking-related health risks among women [22]. Gender-specific, multi-strategy prevention and treatment approaches, highlighted in past research, are crucial to achieving successful outcomes among women [4,5,15,18,115]. Efforts to curb smoking among women must focus not only on traditional public health interventions such as increasing price, promoting clean air and educating women about the dangers of smoking, but should also focus on regulation of packaging (generic packaging and graphic warnings) as well as the product. Public health regulatory agencies should regulate tobacco products, including cigarettes designed for women, to protect the public's health.

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