Packaging colour research by tobacco companies: the pack as a product characteristic

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ABSTRACT
Background Tobacco companies use colour on cigarette packaging and labelling to communicate brand imagery, diminish health concerns, and as a replacement for prohibited descriptive words (‘light’ and ‘mild’) to make misleading claims about reduced risks.

Methods We analysed previously secret tobacco industry documents to identify additional ways in which cigarette companies tested and manipulated pack colours to affect consumers’ perceptions of the cigarettes’ flavour and strength.

Results Cigarette companies’ approach to package design is based on ‘sensation transference’ in which consumers transfer sensations they derive from the packaging to the product itself. Companies manipulate consumers’ perceptions of the taste and strength of cigarettes by changing the colour of the packaging. For example, even without changes to the tobacco blends, flavourings or additives, consumers perceive the taste of cigarettes in packages with red and darker colours to be fuller flavoured and stronger, and cigarettes in packs with more white and lighter colours are perceived to taste lighter and be less harmful.

Conclusions Companies use pack colours to manipulate consumers’ perceptions of the taste, strength and health impacts of the cigarettes inside the packs, thereby altering their characteristics and effectively creating new products. In countries that do not require standardised packaging, regulators should consider colour equivalently to other changes in cigarette characteristics (eg, physical characteristics, ingredients, additives and flavourings) when making determinations about whether or not to permit new products on the market.

INTRODUCTION
Tobacco companies have long understood that pack colours influence consumers’ purchasing decisions. On reviewing previously secret internal industry documents available at the time, Wakefield et al demonstrated that tobacco companies use pack design to communicate brand imagery and influence consumers’ perceptions of taste, strength and harm as an important element in their overall marketing strategies. 1 Subsequent studies showed that companies use pack colours to play an important role in communicating brand imagery and product characteristics, 2 to target specific groups 3–6 and to diminish health concerns. 1,7 Sometimes developing pack and promotional concepts before product development. 8 Cigarettes from packs with brand descriptors including ‘light’, ‘low’, ‘mild’, ‘smooth’, ‘silver’ and ‘gold’ are perceived as having lower health risks. 9–14 Before descriptors such as ‘light’ and ‘mild’ were prohibited, 15 the companies associated them with specific package colours to make the same misleading claims about reduced risks without using words. 10 13 14 16–24 To address this practice, the WHO Framework Convention on Tobacco Control (FCTC) commits signatories to implement national laws that ensure that tobacco product packaging and labelling do not promote tobacco products by any means that are false or misleading 15 and recommends standardised packaging. 26 Companies understand that pack structures, shapes, openings, descriptors and colours communicate brand imagery and influence perceptions of product quality, strength and taste. 27

In 1954, psychologist and marketing pioneer Cheskin 28 described using scientific testing to analyse the impact of colour on consumers’ purchasing choices and explained how colour could be used to design effective packaging. Tobacco companies followed the work of Cheskin and his Color Research Institute (CRI) on consumers’ emotional responses to packages and the impact that package colour had on their perceptions of how the product inside the package tasted. Cheskin revealed that on an unconscious level ‘people transferred sensations of color and design to sensations of taste’, which he called ‘sensation transference’. 9,28 He demonstrated that consumers transfer sensations or impressions they have about packaging to the product itself; indeed, consumers do not distinguish between the package and the product. 28

The existing literature focuses on how colour is used in package design to ‘communicate information’ such as product identification and brand imagery (eg, the red chevron shouts ‘Marlboro’), targeted groups (eg, pastels say ‘women’s cigarettes’) or reduced health risks (eg, silver whispers ‘ultra-light’ cigarettes). Since Wakefield’s 2002 study, 1 more than 6 million documents have been added to the Truth Tobacco Industry Documents library that match her search terms, and more than 200 000 more documents have been added using narrower search terms that focus on taste. Building on Wakefield’s work, we show how the industry relied on Cheskin’s work to use pack designs and colours not only to communicate marketing information, but also to influence consumers’ experiences of smoking the cigarettes themselves by altering their perceptions of the cigarettes’ taste. This understanding distinguishes between using pack colours to communicate information about a brand or sub-brand that might be associated with a particular taste versus using pack colours to manipulate consumer perceptions of the cigarette’s taste.

As of March 2016, 180 countries had become Parties to the WHO FCTC, which calls for tobacco...
product regulation (including packaging), and the USA enacted the Family Smoking Prevention and Tobacco Control Act (FSPTCA). Since pack colours alter smokers’ experience of the cigarettes’ taste and strength, one can argue that pack colour changes are tantamount to product changes, which could have implications for laws regulating the introduction of new tobacco products.

METHODS
Between January 2013 and December 2014, we analysed previously secret tobacco company documents available at the UCSF Truth Tobacco Documents Library (TTDL, https://industrydocuments.library.ucsf.edu/tobacco/) on the industry’s internal research on how cigarette package colours influence consumers’ perceptions of the cigarettes inside the package, in particular the cigarettes’ taste. We used standard snowball search techniques, beginning with the search terms ‘(flavour OR flavour) AND (color OR colour)’ (106 169 documents), ‘taste AND (color OR colour)’ (98 460), ‘taste perception AND pack’” (3384), ‘(color OR colour) and “taste perception” and pack’” (1110), ‘(color OR colour) code’ (3654), ‘sensory science’ (181) and ‘sensation transference’ (11); additional documents were found by reviewing adjacent documents (Bates numbers).

We narrowed our initial searches to documents detailing the companies’ market research and scientific literature reviews concerning the use of colour in package design to influence consumers’ perceptions of the cigarettes’ taste and other sensory experiences. We reviewed ~400 documents; this paper is based on 54 documents showing what the tobacco companies researched and understood about pack colours’ influence on consumers’ perceptions of cigarettes’ taste.

RESULTS
Sensation transference: the package is the product
Since the 1950s, tobacco companies conducted extensive social science and psychology research to better understand how product colour affects consumers’ perceptions of the cigarettes inside the packs.28 30–35 Companies including Philip Morris (PM),36 RJ Reynolds (RJR),37 38 Lorillard,39 Brown and Williamson (B&W)30 and British American Tobacco (BAT)41 incorporated Cheskin’s theory of ‘sensation transference’,28 in their market research and package design testing and worked to design cigarette packages that would affect their customers’ sensations and perceptions of the taste of the cigarettes inside the packs.

PM hired Cheskin and CRI to help redesign its Marlboro pack in the 1950s.42 43 CRI conducted psychological studies on how colour could inform pack design, resulting in the new Marlboro flip-top pack with its distinctive chevron design, red colour and brand name lettering.42 44 PM spent 7 years engaged in ‘an extraordinary degree of calculation, thoughtful planning and scientific testing’ on the new Marlboro packaging, refuting the industry cliché that ‘no one smokes the package’.44 By adding red to the mostly white package, PM converted Marlboro from a ‘woman’s cigarette’ to a new brand that was ‘high quality’ and ‘full flavour’,42 43 with Marlboro’s new ‘macho’ image further developed by Leo Burnett’s ‘Marlboro Man’ advertising campaign.45 46

RJRs ‘Brand Marketing Training Module’ emphasises how package changes are tantamount to changes in the physical product itself: “Your primary concern is consumers’ reaction to and perceptions of the product inside the package, not their judgment as to which is the most attractive package [emphasis added].”17 Moreover, “a package is much more than a container; it … generates expectations and people generally get what they expect. In repeated tests, consumers will declare one product superior to another although only the packages or labels [not the cigarettes] are different [emphasis added].”37 The manual states that designing an effective new package is important not only because it could be “the major factor in a new marketing strategy by significantly improving consumer perceptions of the total product,” but also because “a package change can create a ‘new’ product” by giving customers the existing product in a new form (emphasis added).57

Company research demonstrating that altering pack colour changes perceptions of cigarettes’ characteristics
Building on Cheskin’s work and sensation transference, as early as the 1950s the companies used ocular measurements (eye movements),50 tachistoscopic testing (consumers’ recall time after flashing a picture of the package)66 and repertory grid techniques (colour’s influence on consumers’ assessment of the products’ sensory properties)41 alongside traditional market surveys to determine how cigarette pack colours not only enhanced the visual prominence of their brands and supported brand imagery, but also influenced consumers’ experience of smoking the cigarettes. Table 1 compiles internal industry research documents focusing on the impact that cigarette pack colours have on particular perceptions of the taste of the cigarettes inside the pack. These documents generally show that consumer perceptions of full, rich or strong flavoured cigarettes are associated with red and dark colours such as brown or black, whereas consumer perceptions of mild, smooth and mellow flavours are associated with light colours such as light blue or silver. Menthol and ‘cool’ or ‘fresh’ are universally associated with green, and low strength is associated with white or very light shades. Even subtle changes in colour tones, such as using a lighter beige background, can have these effects.

Taste and strength
Particular pack colours led consumers to perceive the cigarettes had what companies considered ‘good’ and ‘bad’ attributes, including full or enhanced flavour, rich tobacco taste, strong taste, good aftertaste, taste like Marlboro, smooth, satisfying, mild, mellow, low strength, artificial taste, cool, fresh or menthol flavoured. Since pack colours influence consumers’ perceptions of the cigarettes’ taste and strength, selecting or changing package colours was seen not only as part of brand and image development, but also as part of ‘product development’, similar to selecting the cigarettes’ physical ingredients (table 1).

In the 1960s, Louis Cheskin Associates conducted ‘association tests’ with 1800 cigarette smokers to help PM determine which of three proposed pack colour combinations would most effectively create ‘favourable associations’ (eg, ‘high quality tobacco’, ‘rich tobacco flavour’, ‘mild’ and ‘low-tar and nicotine’) and be less likely to create ‘unfavourable associations’ (eg, ‘low quality tobacco’, ‘little tobacco flavour’, ‘strong’ and ‘high tar and nicotine’).31 These associations were based on the packages alone; the respondents never smoked the cigarettes. Packages with certain colour and label combinations (eg, brown pack with a brown label) were more effective than others (eg, brown package with red-brown label) at leading consumers to believe that the cigarettes inside the pack had ‘rich tobacco flavour’, ‘high quality tobacco’ and ‘low-tar and nicotine’.31

RJ studied how package colour influences consumers’ perceptions of cigarette taste and strength when it began researching a new package for Camel Filters in 1975. They aimed to develop a contemporary package that would appeal to young
men while retaining the cigarette’s flavour quality perception. RJR contracted Data Development Corporation to conduct a package study to test consumers’ perceptions of the product’s taste attributes (as well as brand imagery).70–72 Study respondents first rated how they perceived the cigarettes would taste based only on seeing four different test packages, and next rated the cigarettes’ taste ‘attributes’ after smoking cigarettes from one of the test packs.70–72 The study found no significant differences in how consumers perceived the cigarettes’ characteristics after smoking them and concluded that the risk of adopting any of the proposed alternative packs would outweigh the potential gains of younger imagery: “Younger” imagery seems to be increasing at the expense of some [perceived] flavor quality of the cigarette. The current pack is seen more than the others as denoting a cigarette for people who are looking for flavor [emphasis added].70

In 1979, RJR began testing revised Camel Filters packaging. RJR sought to reduce consumers’ perception that Camel Filters were stronger than most other cigarettes while at the same time maintain desired product perceptions (taste, satisfaction, ‘tar’ and nicotine, smoothness) and brand attributes (masculine, young adult, rugged).68 73 Test respondents viewed package prototypes and measured their perceptions of the product’s strength, harshness, taste, quality, smoothness, ‘satisfaction’ and tar perception, in addition to measuring the pack’s visual prominence.68 The tests revealed that small pack refinements such as increasing white space, reducing the red band and lightening brown colour tones could influence how consumers perceived cigarette strength (figure 1).68

Although Marlboro Ultra Lights were not actually marketed until the late 1990s, in 1981 PM conducted internal consumer taste preference studies in which smokers tested identical Marlboro Ultra Lights cigarettes in a blue pack versus a red pack.54 Marlboro smokers generally preferred the cigarettes in the red package and perceived the cigarettes in the red pack to have more taste than those in the blue pack. Some found cigarettes in the blue package ‘too mild’ or ‘not easy drawing’, while others perceived the cigarettes in the red pack as ‘too strong’ or ‘harsher’ than those in the blue pack.54

In 1984, RJR launched ‘Project XG’ to create a product that would replace Marlboro as the most relevant brand among younger adult smokers.....74 RJR recognised that to achieve this goal they needed to use package colours and design and ‘non-menthol taste cues’ to improve consumers’ perceptions of XG’s product attributes, resulting in more smoothness, more strength, more tobacco taste, less harshness and “a positive taste benefit similar to Marlboro but smoother…” (table 1).54

Table 1  Summary of industry research on effects of package colour on smoker perceptions of the flavour and taste of cigarettes in the package

<table>
<thead>
<tr>
<th>Consumer perceptions</th>
<th>Colour</th>
<th>Company</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full flavour</td>
<td>Red</td>
<td>PM</td>
<td>1950</td>
</tr>
<tr>
<td></td>
<td>RJR</td>
<td>2001</td>
<td></td>
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<tr>
<td></td>
<td>RJR</td>
<td>1991</td>
<td></td>
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<td></td>
<td>RJR</td>
<td>1987</td>
<td></td>
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<td></td>
<td>BAT</td>
<td>1986</td>
<td></td>
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<tr>
<td></td>
<td>RJR</td>
<td>1984</td>
<td></td>
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<tr>
<td></td>
<td>RJR</td>
<td>1984</td>
<td></td>
</tr>
<tr>
<td></td>
<td>RJR</td>
<td>1980</td>
<td></td>
</tr>
<tr>
<td>Rich tobacco taste, flavourful</td>
<td>Brown</td>
<td>PM</td>
<td>1965</td>
</tr>
<tr>
<td></td>
<td>PM</td>
<td>1999</td>
<td></td>
</tr>
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<td></td>
<td>RJR</td>
<td>1984</td>
<td></td>
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<tr>
<td></td>
<td>RJR</td>
<td>1979</td>
<td></td>
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<tr>
<td></td>
<td>Blue</td>
<td>B&amp;W</td>
<td>1978</td>
</tr>
<tr>
<td></td>
<td>B&amp;W</td>
<td>1977</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PM</td>
<td>1999</td>
<td></td>
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<tr>
<td></td>
<td>PM</td>
<td>1998</td>
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<td></td>
<td>RJR</td>
<td>1986</td>
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<td></td>
<td>RJR</td>
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<td></td>
<td>Beige</td>
<td>RJR</td>
<td>1987</td>
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<td></td>
<td>RJR</td>
<td>1984</td>
<td></td>
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<td>RJR</td>
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<td>B&amp;W</td>
<td>1994</td>
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<td>Beige</td>
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<td></td>
<td>Beige</td>
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<td>1986</td>
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<td>Black</td>
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<td></td>
<td>Brown</td>
<td>RJR</td>
<td>1979</td>
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<tr>
<td></td>
<td>B&amp;W</td>
<td>1994</td>
<td></td>
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<tr>
<td></td>
<td>Red</td>
<td>PM</td>
<td>1981</td>
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<td></td>
<td>RJR</td>
<td>1987</td>
<td></td>
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<td></td>
<td>RJR</td>
<td>1984</td>
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<td></td>
<td>RJR</td>
<td>1979</td>
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<tr>
<td>Tastes like Marlboro</td>
<td>Red</td>
<td>RJR</td>
<td>1984</td>
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<td></td>
<td>Red</td>
<td>RJR</td>
<td>2001</td>
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<td></td>
<td>Green</td>
<td>RJR</td>
<td>2001</td>
</tr>
<tr>
<td>Good aftertaste</td>
<td>Silver</td>
<td>B&amp;W</td>
<td>1978</td>
</tr>
<tr>
<td>Smooth</td>
<td>Blue</td>
<td>B&amp;W</td>
<td>1978</td>
</tr>
<tr>
<td>Artificial taste</td>
<td>Gray</td>
<td>RJR</td>
<td>1985</td>
</tr>
<tr>
<td>Low strength</td>
<td>White, lighter shades</td>
<td>RJR</td>
<td>1979</td>
</tr>
<tr>
<td>Mild</td>
<td>Blue</td>
<td>PM</td>
<td>1999</td>
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<tr>
<td></td>
<td>PM</td>
<td>1998</td>
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<td></td>
<td>PM</td>
<td>1981</td>
<td></td>
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<td></td>
<td>Silver</td>
<td>B&amp;W</td>
<td>1978</td>
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<td></td>
<td>Gray</td>
<td>RJR</td>
<td>1986</td>
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<tr>
<td>Mellow</td>
<td>Blue</td>
<td>B&amp;W</td>
<td>1978</td>
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<tr>
<td>Menthol</td>
<td>Green</td>
<td>RJR</td>
<td>2001</td>
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<td></td>
<td>RJR</td>
<td>1991</td>
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<td>RJR</td>
<td>1980</td>
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<tr>
<td>Cool</td>
<td>Green</td>
<td>RJR</td>
<td>2001</td>
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<tr>
<td>Fresh</td>
<td>Green</td>
<td>RJR</td>
<td>1987</td>
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<td></td>
<td>Silver</td>
<td>B&amp;W</td>
<td>1978</td>
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Maintaining full flavour in reduced tar cigarettes

Beginning in the 1970s, tobacco companies sought to create and market products that reportedly had reduced tar to address consumers’ health concerns while still delivering ‘full flavour’ that met consumers’ taste preferences.40 67 68 73 75–77

In 1977, responding to growing consumer health concerns and consistent with broader industry marketing practices, B&CW began testing pack designs for a new Viceroy low-tar cigarette and examined how changes in package colours could lead consumers to believe that the cigarettes inside were low-tar and full taste.40 B&CW faced the problem that perceptions of tar level and taste are not independent; low-tar is associated with weak taste and high-tar is associated with full taste. Researchers sought a pack design that would receive the same taste ratings
as, but lower tar ratings than, Marlboro Lights. After initially finding variations in pack design produced only minor changes in the taste/tar perception, B&W researchers recommended using a royal blue pack to make a clear statement about ‘taste’ and ‘impact’ and letting advertising pull down the perceived tar level (table 1).

To verify that the proposed package design for the new low-tar cigarette supported the desired product perceptions, B&W tested Viceroy Rich Lights in royal blue versus silver packs in 1978. After participants smoked cigarettes from royal blue and silver packs that, unbeknownst to them, contained identical cigarettes, they rated the cigarettes from each pack on different attributes. B&W analysed respondents’ taste perceptions and concluded, “The blue pack outscored the silver pack on satisfaction, full taste, tobacco taste. The silver pack achieved higher score for aftertaste, mildness, smoothness, mellowness, freshness”. The test also showed that the silver pack was perceived as ‘low-tar’ cigarettes and ‘for women’, while the blue pack was perceived as ‘average-tar’ and ‘for men’ (table 1).

In 1979, RJR began ‘Project BY’, an effort to enter the non-menthol, full-flavour, low-tar (‘FFLT’) market category, and conducted a study to inform new BY packaging alternatives, aiming to appeal to its target market of FFLT male smokers aged 25–34. In addition to examining the overall appeal and user imagery associated with alternative packages, the study assessed how changes in pack design affected consumers’ ‘product perceptions’ including ‘satisfaction’, ‘taste’, ‘tar and nicotine’ and ‘smoothness’. RJR’s study based on viewing (not smoking) 27 proposed packs including variations on names, colours and designs concluded that these elements work together to create product perceptions (eg, wedge and diagonal designs could mitigate high tar perceptions from dark colours but maintain positive taste perceptions), effectively contributing to product development.

RJR’s changes in Camel pack designs from 1930 to 2005 (figure 2, top) illustrate that they used pack colours to influence consumers’ perceptions of the cigarettes’ taste. In 1930, Camel packs used a dark tan background above and below the camel, a dark brown camel and dark lettering. In 1961, the dark background was removed above the camel and lightened below the camel, and the camel colour was lightened. In 1972, all of the background was white, the lettering was lightened and the tab was changed from dark blue to white for its ‘low tar Camel taste’. In 1990, the dark pyramid was removed, and the lettering was further lightened for ‘extra mild Camel taste’. In 2005, the tan trees were removed, the camel was made lighter, and the pyramid was silver for ‘extra smooth and mellow’ taste and ‘ultra-lights’ cigarettes.

In 2010, shortly after FSPTCA’s enactment, RJR introduced the Camel ‘Break Free Adventure’ campaign aimed at young adults and hipsters. Since FSPTCA forbade the use of terms such as ‘light’ and ‘mild’ seen in the 1972 and 1990 packs, the 2010 pack used the identifier ‘Blue’ and a white background to connote ‘light’, but also used colours, themes and geographic references that appeal to their target young consumers. In 2014, RJR re-introduced Camel Crush, a novel tobacco product containing a capsule with menthol-flavoured liquid (subsequently pulled from the market by the Food and Drug Administration (FDA) in 2015). Camel Crush packs used the same concepts that Cheskin highlighted in the 1950s, with ‘bold tasting’ products using black and red packs and ‘menthol fresh’ products using white and green packs (figure 2, bottom).

Figure 1 Details of proposed refinements in a 1979 new package design for Camel Filters, consisting mainly of increasing the amount of white space on the pack and lightening the brown color tones to reduce consumers’ perceptions of the cigarettes’ strength.

Refinements in the package consist mainly of increasing the amount of white space on the pack and lightening the brown color tones. While other changes were made these were essential to give the revised package the appearance of reduced strength.

Refinements Made in Package

Rational for Change

<table>
<thead>
<tr>
<th>A. Color/Surface Area Changes</th>
<th></th>
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<tbody>
<tr>
<td>1. The red band was reduced in size which increased the amount of white surface area in the upper portion of the pack.</td>
<td>Reduce strength perceptions.</td>
</tr>
<tr>
<td>2. Lighter brown color tones in the lower portion of the package.</td>
<td>Reduce strength perceptions.</td>
</tr>
<tr>
<td>3. The closure seal was changed from brown to white and a red stripe was added to match the red banding.</td>
<td>Reduce strength perceptions, improve quality look, better brand name recognition.</td>
</tr>
<tr>
<td>4. The bottom panel was changed from brown with white print to white with brown print. A red stripe was also added to match the red band.</td>
<td>Reduce strength perceptions, better brand name recognition.</td>
</tr>
<tr>
<td>5. Color of the word ‘CAMEL’ was made a lighter brown.</td>
<td>Reduce strength perceptions.</td>
</tr>
<tr>
<td>6. The camel itself was rendered in two colors, yellow and brown, and was also reduced in size. Ground shadows were also added beneath the camel to improve dimensionality.</td>
<td>Improve quality image.</td>
</tr>
</tbody>
</table>
Attractiveness

The companies found that they could manipulate package colours to make the cigarettes inside more attractive to consumers by influencing perceptions that the cigarettes are higher quality, more prestigious or upscale, convey trust or responsibility, are more exciting or relaxing or are especially appealing to men, women or young people (table 1). For example, in the 1970s BAT began using the repertory grid technique to quantify how important brand image variables, including colour, are to individuals’ assessments of cigarettes’ sensory properties. Based on psychologist George Kelly’s theory that individuals develop personal ‘constructs’ (basic terms expressed as contrasts between two ideas) to describe their experience, respondents were shown cigarette packs with design variations (including changes in colours, lettering, dominant design shapes elements and motifs or crests) and asked what associations the pack appearance created, what type of smoking experience they would expect from the cigarettes inside those packs and the general personality of people they would expect to smoke those cigarettes. Interviewers elicited sets of descriptive terms (‘constructs’) and created lists of opposite terms (‘binary grids’) to describe the ‘smoke character’ (figure 3) (as well as other attributes) associated with each pack, and BAT hoped that this initial study would demonstrate how the repertory grid technique could quantify consumers’ subjective perceptions of cigarette characteristics.

Figure 2  Top: Examples of changes in Camel pack designs from 1930 through 2005, illustrating how RJR changed pack colours in ways that the research presented in this paper indicate would affect consumers’ perceptions of the cigarettes’ taste, with progressively lighter colours and more white conveying ‘low tar’ taste, ‘extra mild’ taste and ‘extra smooth and mellow’ taste. Bottom: Examples of Camel pack designs after enactment of the US Family Smoking Prevention and Tobacco Control Act in 2009, including a 2010 pack from RJR’s ‘Break Free Adventure’ that uses the word ‘Blue’ in lieu of the newly forbidden identifiers ‘low’, ‘light’ or ‘mild’, and Camel Crush packs that use black and red colours for ‘bold taste’ and green and white colours for ‘menthol fresh’ taste.

Figure 3  Binary grid used by British American Tobacco researchers in 1978 to describe consumers’ perceptions of the ‘smoke character’ associated with cigarette packs.
DISCUSSION
As early as the 1950s, tobacco companies developed a sophisticated understanding that by changing pack colours they could not only alter brand appeal and make misleading health claims, but could also change consumers’ perceptions of the taste, strength and other sensory attributes of the cigarettes inside the packages without changing the physical ingredients of the cigarettes themselves. The companies use pack colours to alter the characteristics of the products, just as they use tobacco blends, flavourings and additives to change the products’ physical characteristics to manipulate consumers’ perceptions of the cigarettes’ flavour and taste. They design packages that create the ideal balance between ‘low-tar’ and ‘full-flavour’ attributes. For example, the companies understand that by merely increasing the use of red on packs, consumers perceive the cigarettes inside to have fuller, stronger, richer taste, and by lightening the pack’s colour palette or increasing the amount of white, companies can reduce perceptions of the cigarette’s strength without changing the cigarette’s formula.

Importantly, RJR’s manual stated that beyond marketing, designing new packages was important because “a package change can create a ‘new product’” by giving customers the existing product in a new form (emphasis added).

Implications for tobacco product regulation

The FCTC to (which USA is not a party) and FSPTCA regulate new tobacco product introductions, ingredients disclosures and packaging and labelling. The Guidelines for Implementation of FCTC Articles 9 (product content regulation) and 10 (product disclosures regulation) recommend that Parties prohibit or restrict ingredients that may be used to increase the attractiveness of tobacco products, that have certain colouring properties that make the products more appealing or create the impression that they have a health benefit. The Guidelines for Implementation of Article 11 (packaging and labelling) seek to counter established industry tactics for circumventing tobacco packaging and labelling regulation and urge Parties to consider adopting standardised packaging measures to prevent the industry from continuing to use packaging and labelling to mislead consumers and promote its products.

Our findings provide evidence of how tobacco companies adjust pack designs and colours to manipulate consumers by altering their perceptions of the products inside the packs and to create the impression that some cigarettes are less harmful than others. This evidence can be used to support adoption of measures to prevent companies from using packaging to deceive consumers and to regulate the introduction and marketing of new tobacco products. In particular, these findings and the accompanying legal analysis (see online supplementary text) support mandatory reporting of package designs along with the mandatory reporting of physical product contents, because package designs influence consumers’ perceptions of the cigarettes’ taste as do physical tobacco constituents (eg, additives and flavourings) that would be required to be disclosed under such reporting laws. For example, under Canada’s tobacco reporting regulations, manufacturers and importers must provide Health Canada with annual reports that include tobacco product ingredients, toxic constituents, toxic emissions as well as information on product packaging. Our findings support regulations that would specifically mandate the reporting of colour changes in packaging reports and would support adoption of similar measures by other countries.

Packaging and labelling colour should be treated as tobacco product ingredients

The FSPTCA requires companies to obtain authorisation from FDA before introducing new tobacco products into the market, and products with different characteristics (including changed ingredients and designs) will not be authorised unless it is demonstrated that the changes would be appropriate for the protection of public health. The industry documents summarised here demonstrate that tobacco companies routinely change colours in cigarette packaging and labelling not merely to communicate information about the product, but also to change consumers’ perceptions of the product’s taste and strength, thereby changing the product’s ingredients and effectively creating a ‘new product’. Since these design changes do not involve words, they allow tobacco companies to evade laws and regulations designed to prevent the companies from manipulating consumers. Indeed, package design experts wrote in 1995 that colour is a potent tool because it is “beyond the law. Words can be regulated, and so can pictures, but color cannot.”

FDA initially stated that it would consider tobacco product labels and packaging as ‘part of the product in its premarket reviews, but then retreated from this position after industry pressure and lawsuits. FDA’s original position was appropriate and consistent with industry understanding and practices, and it should be followed (see online supplementary text). Likewise, other countries should treat products with packaging changes as new products when implementing FCTC Article 11.

Implications for standardised packaging

Australia became the first country to mandate standardised packaging along with product standardisation in December 2012, and in 2015 Ireland and the UK passed similar laws. In December 2015, France passed a standardised packaging law, and in March 2016, Canada announced plans to adopt standardised packaging and Finland, Norway, Sweden and New Zealand were expected to follow suit, with the European Union as a whole also considering the measure.

Before Australia’s law was implemented, several papers suggested that standardised packaging may help reduce misperceptions of risk communicated through pack design and help promote cessation, especially among youth. Standardised packaging may reduce smoking in current smokers by making the packs less appealing, by producing less craving and motivation to seek tobacco and by increasing attention to health warnings. Since the introduction of standardised packaging in Australia, evidence among adult smokers suggests that plain packaging has achieved its specific objectives and reduced the appeal of tobacco products, increased the effectiveness of health warnings, helped reduce the extent to which smokers are misled about the harms of smoking and reduced the ability of the pack to appeal to young people. The industry documents reviewed in this paper can be used to support standardised packaging by confirming that companies use the colours on packaging to manipulate and impact consumers’ perceptions about taste, strength and relative risk of the cigarettes inside the pack.

CONCLUSION
Tobacco companies use cigarette pack colours to manipulate not only consumers’ brand choices and perceptions of harm, but also smokers’ experiences of the taste and strength of the
cigarettes inside the pack to effectively create new products, just as they would by making changes to the cigarette’s ingredients or physical properties. Since changes in packaging colours influence consumers’ perceptions and experiences of smoking the cigarettes, including leading consumers to believe that the products taste better, these package changes effectively create new tobacco products. In countries that do not require standardised packaging, regulators should recognise this reality and consider colour equivalently to other changes in cigarette characteristics (eg, ingredients, additives and flavourings) when determining whether to permit new products on the market.

**What this paper adds**

- Cigarette pack colours are used not only to manipulate consumers’ brand choices and perceptions of harm, but also to change smokers’ perceptions of the taste and strength of the cigarettes inside the pack without changing the cigarettes themselves.

- When tobacco companies change pack colours, they effectively create new tobacco products, just as when they make changes to the cigarettes’ ingredients, additives or flavourings; all new tobacco products should be subject to equivalently rigorous new tobacco product review.

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Implications for FDA Review of New Tobacco Products

The 2009 Family Smoking Prevention and Tobacco Control Act1 (FSPTCA) requires tobacco companies to obtain premarket authorization from the U.S. Food and Drug Administration (FDA) before they can legally market a “new tobacco product” in the United States. A “new tobacco product” is defined as a tobacco product that was not commercially marketed in the U.S. on February 15, 2007, or that has been modified, including but not limited to changing any part or any other additive or ingredient.2 The companies can obtain this authorization using one of three pathways, described more fully below and spelled out in FSPTCA sections 905(j) and 910:

(1) Submit a premarket tobacco product application (PMTA); 3

(2) Submit a “substantial equivalence” (SE) report; 4 or

(3) Demonstrate that the product is exempt from new product or SE requirements. 5

As of September 2015 (the most recent data posted by FDA as of April 2016), FDA had received a total of 5,333 product submissions, including 1,721 regular SE submissions (including 662 streamlined applications), 3,517 provisional SE submissions, and 68 SE exemption submissions, as well as 12 premarket applications for new tobacco products and 15 modified risk tobacco product applications. 6 7 Of the 5,306 SE submissions it had received, 6 as of April 2016 the agency had issued 555 SE orders, 176
Not Substantially Equivalent (NSE) orders, and 37 “Refuse to Accept” orders (for incomplete SE reports), 23 SE order rescissions, and 982 manufacturers had withdrawn their applications. Of the 3,517 provisional SE applications, as of April 2016 FDA has issued 48 provisional NSE orders (4 in February 2014, 7 in August 2014, 10 in May 2015, 1 in August 2015, 5 in September 2015, 10 in October 2015, and 11 in February 2016, leaving 3,469 new tobacco products that were introduced between February 2007 and March 2011 and had not been evaluated by FDA remaining on the market while awaiting SE review.⁸

Products that do not have pre-market authorization as required by FSPTCA section 910 are deemed “adulterated” under FSPTCA section 902.⁹ Products with labeling that is false or misleading in any particular are deemed “misbranded” under FSPTCA section 903.¹⁰ Products that FDA determines are “not substantially equivalent” (NSE) and for which it issues NSE orders are considered both adulterated and misbranded.¹¹ When a tobacco product is deemed adulterated or misbranded, it is illegal to sell or distribute the product in interstate commerce or import the product into the United States.¹¹,¹²

**Premarket Tobacco Product Application**

Under the premarket tobacco product application (PMTA) pathway, manufacturers must present data and information sufficient to enable FDA to make a finding that the marketing of a new tobacco product is "appropriate for the protection of the public health," and the product and its manufacture and labeling conform to requirements in the Act and related rules.³ The public health standard requires FDA to
consider the risks and benefits to the population as a whole, including users and nonusers of the tobacco product, and taking into account:

(A) the increased or decreased likelihood that existing users of tobacco products will stop using such products; and
(B) the increased or decreased likelihood that those who do not use tobacco products will start using such products.  

Importantly, FSPTCA 910(b)(1)(F) requires new tobacco product applications to contain “specimens of the labeling proposed to be used for such tobacco product” in addition to reports of health risks; statements of components, ingredients, additives, properties, and principles of operation; descriptions of manufacturing methods; and other relevant information and product samples. This statutory requirement establishes that Congress intended product labeling, like other tobacco product characteristics, to be an important factor in FDA’s determination of whether the marketing of a tobacco product for which an application has been submitted is appropriate for the protection of the public health. FDA highlighted this statutory requirement in its September 2011 Guidance for Industry, Applications for Premarket Review of New Tobacco Products (“PMTA Guidance”), further specifying that the requirement includes “labels, inserts/onserts, instructions, and other accompanying information or materials.”

In addition to implementing the public health standard, FDA is required to deny any PMTA if the product’s package labeling is “false or misleading in any particular.” Therefore, in its September 2011 PMTA Guidance, FDA recommends that manufacturers submit adult human subject studies that provide evaluations of “consumer perceptions including risk perceptions based on the product itself, as well as on the packaging and labeling of the new tobacco product [emphasis added]” to enable FDA to determine whether the product’s packaging or labeling is false or misleading in any particular and
whether allowing the product on the market would be appropriate for the protection of the public health.16

As of April 2016, FDA had received just 12 PMTA applications6 for which it issued four “Refuse-to-File” (RTF; i.e., refuse to undertake an extensive new product review) final actions and eight PMTA marketing orders in October 2015 (for Swedish Match snus products).8 FDA may refuse to file an application if it is missing one or more items required by FSPTCA section 910(b) (e.g., a full statement of the components ingredients, additives, and properties of the product; samples of the product; or specimens of the labeling).7,15 In its “Brief Summary of Refusal-to-File Determinations,”7 FDA cited a failure to provide an adequate example (“specimen”) of the proposed labeling as a deficiency in one or more of the PMTA applications it reviewed. Notably, FDA stated that one or more of the submitted labeling specimens were deficient and triggered a RTF action because the specimen was not reproduced in color.7 These RTFs are significant because they show that FDA has not been willing to authorize the marketing of a new tobacco product under the PMTA route if it is unable to properly evaluate the package, including the color of the package.

Substantial Equivalence

Manufacturers may avoid the PMTA process if they use the SE pathway. To obtain an SE order, the manufacturer must submit an SE report to FDA and demonstrate that the product has the “same characteristics” as a tobacco product commercially marketed in the U.S. on February 15, 2007, or its different characteristics do not raise “different questions of public health” compared to the 2007 product, and the product is otherwise in compliance with the Act.18 If the new product raises different questions of
public health, the product is not SE. The FSPTCA defines “substantial equivalence” in terms of “characteristics,” and defines “characteristics” as the “materials, ingredients, design, composition, heating source, or other features of a tobacco product [emphasis added].” 19, 20 The statute does not further define each of the terms used in the definition of “characteristics.” However, the fact that the definition is not limited to “materials” and “ingredients,” and also includes “design” and “other features,” suggests that packaging and labeling, and their coloring, are included, especially given that labeling is included in PMTA reviews along with ingredients and other features, 15 and given the provision’s goal of protecting against any product changes or differences of any kind that could cause new or increased public health harms.

**Exemption from Substantial Equivalence**

Under the exemption from SE pathway, a manufacturer that modifies a legally sold product by adding or deleting a tobacco additive, or increasing or decreasing the quantity of an existing tobacco additive, may be exempt from submitting a SE report if the modified version of the product is “minor,” the product’s marketing “would be appropriate for protection of the public health,” and an exemption is “otherwise appropriate.” 5 As of April 2016, FDA received 73 SE exemption submissions, 6 issued one exemption from SE action, 50 “refuse to accept” (RTA) letters for exemption requests, and received two withdrawals. 8 In its decision summary for the exemption from SE request, 21 FDA does not discuss whether there were any packaging or color changes or public health impacts of the new tobacco product.

**FDA Guidances on Substantial Equivalence**

FDA’s Center for Tobacco Products issues guidance documents for industry and
FDA staff that, while not legally binding requirements, represent FDA’s current thinking on a particular topic and provide information to assist those who must understand and comply with the law. Before issuing a final guidance, FDA often publishes a draft guidance to solicit comments from industry, other stakeholders, and the general public. Both draft and final guidances are only guidelines and are not binding on FDA or the companies. In particular, FDA can later adopt and use “an alternative approach [even if it contradicts a published guidance] if the approach satisfies the requirements of the applicable statutes and regulations.”

FDA stated in its September 2011 Draft Guidance for Industry and Food and Drug Administration Staff. Demonstrating the Substantial Equivalence of a New Tobacco Product: Responses to Frequently Asked Questions that FDA considered the label and packaging of a tobacco product to be a “part” of that product, and that a change to any part of a tobacco product after February 15, 2007 makes that product a "new tobacco product." Thus, FDA indicated that a cigarette would be considered a “new tobacco product” subject to enforcement under requirements for SE reports and PMTA applications (FSPTCA sections 905(j) and 910) if a modification to the font size, ink color, or background color of a tobacco product’s packaging raised different questions of public health. The standard FDA described in its September 2011 draft guidance was consistent with the industry practices described in our paper.

Perhaps anticipating the tobacco industry’s First Amendment commercial speech claims and imminent lawsuits, FDA softened this policy in its March 2015 Guidance for Industry, Demonstrating the Substantial Equivalence of a New Tobacco Product: Responses to Frequently Asked Questions by stating that a label is not a “part” of the
tobacco product, unless the label is modified in a way that renders the product “distinct” from the predicate product. The language of the March 2015 guidance is confusing because it says that a product can both have the “same characteristics” as a predicate product and also be “distinct” from that product.\textsuperscript{24} FDA explained that a product with a label change might be considered a “distinct product” depending on the circumstances, for example, if changes were made to a product’s logo, “identifiable patterns of color,” product descriptors, or any combination thereof.\textsuperscript{24} Importantly, when a company changes the tobacco product’s label, FDA believes it is a “new product” subject to the SE provisions if the label change would “lead consumers to believe that the product is different from the predicate” or if consumers are “likely to perceive it as ‘new’ by virtue of the different label.”\textsuperscript{24} In this regard, we have documented that actual industry practices treat color changes in packaging and labels as “distinct” changes to the product.\textsuperscript{26}

FDA’s March 2015 guidance offers a muddled description of its current thinking on how color changes in packaging may make a tobacco product “distinct” and therefore a “new product.” FDA indicates that if a product is new because it is “distinct” but otherwise has the “same characteristics” as the predicate product, FDA thinks the manufacturer may comply with the law by submitting a streamlined “Same Characteristics SE Report” in lieu of submitting a full SE report or premarket application under section 910(b).\textsuperscript{24} (The “Same Characteristics” report, unanticipated in the FSPTCA, is an invention of FDA and intended to be easier for the manufacturer to prepare and for FDA to review.) In contrast, if a change to a logo, colors, product descriptors or other aspects of the label is unlikely to lead consumers to believe that the
product is different from the predicate, then the guidance indicates that FDA would not consider the product a “new tobacco product” subject to the related statutory requirements. As an example, FDA suggests in the guidance that a change in background color from green to red may result in a “distinct product,” but a change from white to cream likely would not.

If a company changes the label on a product that is being legally marketed because a “provisional SE report” was previously filed, the guidance indicates that FDA will allow the changed product to remain on the market so long as a new Same Characteristics SE Report was filed by April 3, 2015. For products that are not already on the market, the guidance indicates that a manufacturer may legally market a product that is otherwise “identical” except for a change in the label 90 days after it submits a Same Characteristics SE Report. According to the process suggested by the guidance, the product may then remain on the market unless and until FDA issues a not substantially equivalent (NSE) order.

**Industry Lawsuit and Subsequent Submissions**

Even though FDA’s guidance indicated that FDA would be taking a considerably more permissive approach to label changes than a plain reading of the statute might suggest and was not legally binding, Philip Morris, R.J. Reynolds, Lorillard, and three other tobacco companies sued FDA in April 2015, claiming that FDA’s more permissive approach to label changes in its March 2015 guidance was still an abuse of discretion that infringed the companies’ free speech rights under the First Amendment to the United States Constitution. In May 2015, FDA issued an interim enforcement policy on new tobacco products, added as a footnote to the agency’s March 2015 guidance, stating
that for tobacco products in which the only modification or difference is “a label change that creates a distinct product with identical characteristics to the predicate product,” FDA would not take any actions against the manufacturers for not first obtaining a premarket authorization and would not issue any “not substantially equivalent” orders. In June 2015, after FDA weakened its enforcement policy, the companies dropped their lawsuit.

Shortly after FDA announced its new enforcement policy, the companies submitted and FDA accepted and issued orders on, the new streamlined shorter, easier Same Characteristics SE reports. On July 17, 2015, FDA announced it had issued 125 SE orders in June 2015, which included final actions on streamlined Same Characteristics SE reports for 105 products.

Legal Implications of Using Color to Change Consumers’ Perceptions of the Taste, Strength, and Texture of Tobacco Products

FDA’s original September 2011 thinking was correct and supported by the tobacco companies’ own research and marketing activities, as well as by the legal framework for new product and SE reviews established in FSPTCA sections 910 and 905(j). Because consumers perceive tobacco products in packages with changed label colors (including labels with slightly lightened colors or more white space) to taste and feel different from products in their original packages, FDA should treat products in packages with changes in label colors as “new products” subject to the SE provisions requiring regular SE reports, and should conduct social science evaluations of the packaging changes. In contrast, FDA’s March 2015 policy is inconsistent with the tobacco companies’ actual product characteristic decisions in which the companies
sometimes change pack colors to alter consumers’ perceptions and experiences about the taste, strength, and texture of the cigarettes inside the pack just as when they make changes in the rod length, tobacco blend, or additives. Cigarette packaging and labels modified in this way operate as cigarette “characteristics” or ingredients and are “part” of the tobacco products. When tobacco companies change these product characteristics, they create distinct and “new tobacco products.” Indeed, the companies explicitly acknowledge this fact in some of their internal discussions of product changes.\textsuperscript{33-36} Under the FSPTCA such new products require premarket authorization.\textsuperscript{32}

A change to the tobacco blend, rod length, or additives would not be subject to First Amendment protection. Likewise, a change to package colors is not subject to First Amendment protections if it is regulated not to restrict commercial speech, but as a product change that changes how consumers experience the taste or texture of the cigarettes when smoked.

Ingredient and product changes, including changes to packaging and labeling, that influence consumers’ experiences of smoking the cigarettes contrast with packaging and labeling changes that include new communicative text or images that are used to communicate accurate product information to legal consumers, which may trigger First Amendment protections if regulated to restrict commercial speech. However, even if FDA’s treatment of color changes to packaging or labeling were seen as regulating commercial speech that might be subject to First Amendment protections, it could not qualify for such constitutional protections because such color changes are false and misleading. The common industry practices documented in our paper\textsuperscript{26} demonstrate that pack and labeling colors, by changing the way consumers experience the cigarettes’ taste
and texture, can mislead consumers into thinking inaccurately that some cigarette brands or sub-brands are significantly less or more harmful than others. This conclusion is further supported by other research finding that smokers think cigarettes are less harmful than other cigarettes if they perceive them to taste and feel “lighter,” “smoother,” less “harsh,” or less “full-flavored,”\textsuperscript{37}. Moreover, if color changes that alter consumers’ harm or risk perceptions are considered commercial speech, products making such changes would also likely violate FSPTCA section 911\textsuperscript{38} if the manufacturer did not first obtain a “modified risk tobacco product” (MRTP) order from FDA. FSPTCA section 911 prohibits tobacco companies from marketing tobacco products with labeling that represents explicitly or implicitly that the product presents a lower risk of disease or is less harmful than other tobacco products unless FDA issues an MRTP order stating that the product actually would reduce harm and benefit the public health.\textsuperscript{38} Products that violate FSPTCA section 911 are deemed “adulterated” under FSPTCA section 902,\textsuperscript{9} and products with labeling that is false or misleading in any particular are deemed “misbranded” under FSPTCA section 903.\textsuperscript{10} 

**Summaries of FDA Final Actions on New Tobacco Product Submissions**

While FDA has the authority and capacity to do “Social Science” reviews,\textsuperscript{39} which would include consideration of color in packaging and its impact on the population using the “public health standard,” it is not clear if FDA is regularly doing any such reviews or how FDA is considering any information it might be receiving from any such reviews. FDA posts summaries of selected SE, NSE, and other marketing orders on its Tobacco Product Marketing Orders website, but these postings suggest that FDA has not regularly been doing social science reviews of color or labeling changes, and they provide little
insight into the agency’s current thinking on how it treats changes in packaging and label colors in PMTA and SE reviews. Large sections of the reports are redacted to prevent disclosure of unsubstantiated trade secrets claimed by the industry (“(b)(4)” redactions).

In many cases, so much of the report is redacted that it is difficult to understand the basis for FDA’s SE determination. (See, for example, the April 2015 Technical Project Lead (TPL) Review for SE0010167-SE0010171, the March 2015 TPL Review for SE0010365-SE0010369 and SE0010422, and the June 2014 Technical Project Lead (TPL) Memorandum: SE Reports SE0003503-SE0003524 & SE0010338-SE0010359.)

Most SE reports include Chemistry, Engineering, and Toxicology reviews, with only a few including Social Science reviews. One example of a SE evaluation that did include a Social Science review is the SE report on eight SE applications for Swedish Match loose moist snuff products sold in plastic cans, which appears to consider whether the darker color of the new tobacco products compared to the corresponding predicate tobacco products increases the appeal of the new products. However, while the report states that the SE reports submitted by the manufacturer included information about consumer perception testing, the submitted information did not actually address the specific color differences between the new and corresponding predicate products. The report stated that at the time the social science reviews were conducted (July 2012, January 2013, August 2013, and September 2013), “the available scientific evidence is not sufficient to establish that the product color differences in this case are significant enough to cause the new tobacco products to raise different questions of public health,” and therefore concluded that the differences in product appeal between the predicate and corresponding new tobacco products did not raise different questions of public health.
FDA’s conclusion ignores and contradicts the fact that tobacco companies use color differences to influence consumers’ perceptions of the taste, strength, and general appeal of their tobacco products. At the very least, the darker color of the product in the Swedish Match SE application raises different questions of public health in regard to how consumers will perceive its taste compared to the predicate and how that might affect existing and potential new consumers’ purchase and use decisions.

**Conclusion**

The routine industry practices documented in our paper -- using color changes and differences in packaging and labels as ingredients that alter consumers’ perceptions of the cigarettes’ taste, texture, and strength -- support the position originally taken by FDA in its September 2011 guidance on SE, in which FDA considered cigarette packaging and labeling as a “part” (i.e., a “characteristic”) of the new tobacco product in the same way it considers other tobacco product ingredients when it evaluates SE reports. Analogous to changes in rod length, tobacco blend, or additives, color changes in packaging and labels that operate as ingredients changes are not entitled to First Amendment protections. While FDA is not legally bound by its guidances, the agency should follow the guidelines it articulated in its original September 2011 guidance, rather than the convoluted recommendations in its March 2015 guidance. Moreover, even if FDA relied on its March 2015 interpretation, color changes in tobacco product packaging and labels render tobacco products “distinct” by FDA’s definition since they lead consumers to believe that the products in one pack are different from identical products in another pack with different colored labeling. Therefore, FDA should consider any tobacco product with color changes in its packaging and labels as a “new product”
subject to rigorous SE review. FDA should require full-length SE reports, rather than streamlined “Same Characteristics” reports, for all SE submissions with any color changes to the product’s packaging and labeling, and should conduct Social Science reviews that consider the public health impacts of new tobacco products as actually used by consumers for all SE submissions.
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