Assessing the Potential Impact of Cigarette Packs Designed for Lesbian, Gay, Bisexual, and Transgender Adults: A Randomized Experiment to Inform U.S. Regulation, 2018

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The Food and Drug Administration (FDA) can regulate the introduction of new tobacco products and some changes to existing products. Cigarette packs have been used as a marketing tool to target specific groups and priority populations. Research has shown that sexual and gender minority (SGM) adults are substantially more likely to use tobacco products than their straight and cisgender counterparts. However, research to inform the FDA's regulatory decisions regarding cigarette packs targeting priority populations is nascent. To fill this gap, we conducted an online experiment in 2018, randomizing U.S. adults who reported current smoking (N = 954, 52% were SGM) to view one of three cigarette packs. A graphic designer developed "Glacier" branded packs with three levels of SGM imagery: (1) no targeting, (2) subtle targeting, and (3) a rainbow "pride edition." Participants viewed and rated the pack using cognitive, affective, and behavioral measures informed by theory. We used a linear model framework to compare the two SGM-targeted packs with the not targeted version and tested interactions between pack and SGM identity for the dependent variables. We stratified results by SGM status. SGM status was a significant moderator of the relationship between the pack and ratings of appeal, positive affect, feeling shocked, and intent to try with a coupon. Findings from this study revealed that packs designed for SGM populations can disproportionately change cognitive, affective,

and behavioral intention responses for SGM smokers. Products entering the market should be assessed by FDA for the appeal of their packs to vulnerable populations.

Keywords: sexual and gender minority; marketing; smoking; tobacco products; regulation; inequities

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► INTRODUCTION

Tobacco use is an important health inequity for sexual and gender minority (SGM; e.g., lesbian, gay, bisexual, and transgender) people (Buchting et al., 2017; Wheldon, Kaufman, Kasza, & Moser, 2018). One cause of this inequity is the tobacco industry, which has targeted its marketing to marginalized populations, including SGM populations (Stevens, Carlson, & Hinman, 2004). Researchers have documented that tobacco industry marketing disproportionately affects SGM adults (Dilley, Spigner, Boysun, Dent, & Pizacani, 2008) and mediates permissive social norms toward smoking (Hinds, Loukas, & Perry, 2019). Thus, tobacco industry marketing can be considered a corporate determinant of health (McKee & Stuckler, 2018) and can be regulated from a public-health-as-social-justice framework (Beauchamp, 1976).

While marketing is difficult to regulate in the U.S. given protections for commercial speech, the Food and Drug Administration (FDA) can regulate the introduction of new tobacco products and some changes to existing products (Ehrlich & Woodlee, 2017). The packaging of tobacco products has become an important global intervention point (McNeill et al., 2017). According to tobacco industry internal documents, tobacco companies have carefully designed and tested packs as part of marketing to segment consumers. This has been done by designing packs for specific consumer groups and paying careful attention to color and visual design beyond just text descriptors (DiFranza, Clark, & Pollay, 2002; Lempert & Glantz, 2017). This results in packs that appeal to certain groups (Ford, Moodie, Purves, & MacKintosh, 2016; Hammond, Doxey, Daniel, & Bansal-Travers, 2011). Pack color has been used to circumvent an FDA ban on text descriptors that connote health such as "light" (Connolly & Alpert, 2014; Yong et al., 2016). For instance, it has been found that smokers associate white or light color packs as a indicating a lower-harm tobacco product (Lempert & Glantz, 2017).

In other industries, such as the beer industry, there are clear examples of the use of SGM pride-related imagery and limited-edition products to target SGM communities. For example, MillerCoors marketed a limited-edition pride-themed bottle of Miller beer from May to June 2019 (Murphy, 2019). Thus, it is important to assess if the design of cigarette packs can disproportionately influence marginalized groups, such as SGM people. This study aimed to provide data to inform FDA regulations by testing if the impact of SGM-targeted visual designs of cigarettes was moderated by SGM identity. To do so, we conducted a randomized experiment to assess the impact of three levels of SGM-targeted packs on cognitive, affective, and behavioral intention responses. We hypothesized that SGM identity would moderate affective and behavioral responses and did not hypothesize any moderation of cognitive responses.

► METHOD

Study Design and Participants

From September 14 to October 1, 2018, we fielded an online experiment by randomizing U.S. adults to view one of three cigarette packs on their computer screen. Randomization was conducted using the "question randomization" feature of Qualtrics software (Provo, Utah). Participants then rated the pack on cognitive, affective, and behavioral intention measures. We used Qualtrics Research Services to recruit English-speaking U.S. adults who reported that they were currently smoking and not color-blind. Qualtrics does not maintain its own survey panel but instead provides access to a proprietary blend of participants from contracted survey panels. We used quota sampling to ensure diversity by race (>15% identify as Black or African American), ethnicity (>15% identify as Hispanic/Latino of any race), gender (50/50 split based on sex assigned at birth), and sexual orientation (50/50 split between SGM and straight cisgender). Qualtrics provided participants an incentive in the form of "points" for their participation. Individual survey panels have different options for how to redeem those points. To ensure data quality, we used attention checks and required a minimum amount of time to complete the survey (i.e., greater than half of the median time to complete the survey established during a soft launch period).

The participants ($n = 954$) identified as: male (48.0%), female (48.7%), transgender (1.8%), or in another way (1.4%); straight (48.7%), gay or lesbian (23.3%), bisexual (27.8%); Asian (3.5%), American Indian/Alaska Native (4.1%), Black or African American (18.4%), White (71.5%), or as another race (6.5%); and, Hispanic, Latino/a, or Spanish origin (18.4%). Racial and ethnic identity were not mutually exclusive. For educational attainment, 71.3% reported less than 4 years of college.

Stimuli

To develop the stimuli, we contracted with a professional graphic designer who had experience in product packaging design. We engaged in an iterative design process with the designer to cocreate three levels of targeting to SGM populations: (1) no targeting design, (2) subtle targeting, and (3) a targeted rainbow "pride edition." The not targeted pack did not contain any colors or designs associated with SGM communities. The subtle targeting pack included some design elements associated with the SGM communities. The pride edition pack incorporated design elements that are closely linked

FIGURE 1 Packages Used in Experiment, 2018

with SGM populations. Drawing on targeted marketing and design elements associated with the SGM identities, SGM elements that were incorporated into the design included rainbow colors, lavender color, a font designed in honor of the creator of the LGBT pride flag (www.typewithpride.com), and references to the Mars/Venus symbols (i.e., ☿). Two members of the research team, who identify as SGM, worked with the designer to confirm that the subtle and pride packs communicated SGM messages. To avoid confounding by existing brands' targeting, we created a factitious generic cigarette brand, Glacier. The resulting stimuli are shown in Figure 1.

Measures

We selected our dependent variable measures based on the Context of Consumption Framework, a theoretical framework from the field of product visual design (Crilly, Moultrie, & Clarkson, 2004). This framework posits that visual design influences cognition, affect, and behavior related to the product. It has been explored and used in previous tobacco packaging research (Lee, Averett, Blanchflower, & Gregory, 2018). Cognitive response dependent variables included cognitive-aesthetic responses to the design (e.g., differentiation from similar products) and cognitive-semantic responses about information conveyed by the design (e.g., harmfulness). For cognitive-aesthetic responses, we assessed product appeal (one item, "How appealing or unappealing is this pack to you?"), product noticeability (one item, "How much does this pack stand out to you?"), and product uniqueness (one item, "How much is this

pack like other packs you've seen in stores?"). For cognitive-semantic responses, we assessed perceived quality (four-item scale, α = .93, e.g., "How much do you disagree or agree with the following statements? This brand has good quality products"; Schivinski & Dabrowski, 2014), perceived product safety compared with other tobacco products (four-item scale, α = .96, e.g., "This pack makes the product seem safer to smoke than other tobacco products"; Leas, Pierce, Dimofte, Trinidad, & Strong, 2018), and product safety compared with other cigarettes (one item, "Compared with cigarettes you've seen in stores, would you say the pack you just saw was . . . a lot less harmful, a little less harmful, equally harmful, a little more harmful, a lot more harmful"; Byron, Jeong, Abrams, & Brewer, 2018).

For affective response dependent variables, we assessed how the product made the respondent feel using positive (nine items, α = .97, i.e., good, happy, cheerful, warm-hearted, pleased, amused, stimulated, calm, soothed) and negative (2 items, α = .81, i.e., irritated, repulsed) scales, as well as one item to capture the feeling of shock, as identified in marketing literature (Wiles & Cornwell, 1991). Affective responses were rated from *not at all* to *very much* with the question stem, "How does this product make you feel?" For behavioral responses, we used a word-of-mouth scale that assessed the likelihood of recommending the product to others (three items, α = .95, e.g., "To what extent is it likely that you will say positive things about this product to others?" Zeithaml, Berry, & Parasuraman, 1996) and coupon influence ("Imagine you had a coupon for a free pack. How likely would you be to try this pack?").

Regarding demographics, we assessed sexual orientation and gender identity with three questions: (1) "What sex were you assigned at birth, on your original birth certificate? [male, female]," "How do you describe yourself? [male; female; transgender; do not identify as male, female, or transgender], and "Do you consider yourself to be: [straight or heterosexual, gay or lesbian, bisexual]?" Participants who identified as either gender minority or sexual minority were classified as SGM. We defined current smoking as having smoked 100 cigarettes in one's lifetime and reporting currently smoking some days or every day.

Other measures are reported in our codebook along with the original data in our institutional repository (University of North Carolina Dataverse, doi:10.15139/S3/5QZXJY, available from: https://dataverse.unc.edu/dataverse/R03CA212542).

Analysis

We analyzed the results in a linear-models framework using indicator coding for Packs 2 (subtle targeting) and 3 (pride edition) with Pack 1 (no targeting) as the reference. We tested results for moderation between the pack viewed and each dependent variable by SGM identity (Yes or No). Because we found significant evidence of moderation, we stratified our results by SGM status. We used SPSS v25 (IBM, Armonk, NY) to conduct analyses and used appropriate models for continuous and ordinal dependent variables. In our survey, participants participated in two prior experiments (rating packs from a heated tobacco product and a product with varied levels of organic labeling). Thus, we controlled for the conditions of both prior experiments in all models. We did not adjust for having multiple dependent variables. Missing data were minimal ($<0.6\%$ in each of all model variables); we used pairwise deletion, treating missingness completely at random. The East Carolina University and Medical Center Institutional Review Board reviewed and approved our study protocol (No. 16-001200).

▶ RESULTS

The results of our experiment are presented in Table 1. To briefly orient the reader, each column shows the difference in response to the subtle targeting pack or the pride edition pack compared with the not targeted pack. The subtle and pride edition pack designs produced different ratings compared with the not targeted reference pack in theory-informed measures of consumer response to visual design. While this shows that SGM-targeted visual design can change responses to the pack, our main focus is on the interaction between pack and SGM identity. Using superscript b, we indicate where there was a significant

interaction between the pack shown and SGM identity. This indicates that the response to the pack compared with the not targeted pack differed significantly by SGM identity. To show the size and direction of those differences in responses, for both the subtle targeting and pride edition pack, columns are stratified by SGM identity. Among participants assigned to the subtle pack, we identified significant moderation of being shocked by the design, with higher ratings of being shocked compared with the reference not targeted pack from SGM participants (odds ratio = 2.20, confidence interval [1.17, 4.11]) than non-SGM-identified participants (odds ratio = 0.93, confidence interval [0.57, 1.53]). Among participants assigned to the pride pack, responses to the pride edition pack were significantly moderated by SGM identity for its appeal, positive affective response, shock value, and interest in trying with a coupon. Again, for the pride edition pack, the pattern of effects shows that each outcome variable except for uniqueness was rated more positively by SGM participants than straight/cisgender participants.

▶ DISCUSSION

Principal Findings

In a randomized experiment, we found that cognitive, affective, and behavioral intention responses to SGM-targeted cigarette packs can be significantly moderated by SGM identity. Sexual and gender minority adults rated a pride edition pack more positively than their straight and cisgender counterparts when compared with a nontargeted pack. Specifically, we identified moderation in measures of appeal, positive affect, being shocked, and intention to try with a coupon. We did not identify moderation in any of our semantic responses. This suggests that product packaging with targeted SGM designs could disproportionately, negatively affect SGM population health. Additionally, it suggests that targeted marketing in the form of product packaging may influence domains outside of measures of quality and safety.

Results in Context

The visual design of cigarette packs is important to tobacco industry marketing efforts (Lempert & Glantz, 2017) and is an important intervention point globally (McNeill et al., 2017). The tobacco industry has evaded bans on using text descriptors that imply reduced harm by using visual design to convey the same information (Connolly & Alpert, 2014; Yong et al., 2016). It is well known that the tobacco industry uses cigarette pack design as a marketing tool to segment its market and appeal to particular populations (DiFranza et al., 2002). While this is a standard marketing practice, in

TABLE 1

Effects of Experimental Pack Treatments Compared With Reference Pack and 95% Confidence Intervals, Stratified by SGM identity, 2018,
n = 954

Dependent Variables[a]	Pack 2: Subtle/Gender			Pack 3: Pride Edition		
	All (n = 321)	SGM No (n = 150)	SGM Yes (n = 170)	All (n = 322)	SGM No (n = 155)	SGM Yes (n = 166)
Cognitive						
Aesthetic						
Appeal (OR)	**0.48 [0.36, 0.63]**	**0.47 [0.31, 0.71]**	**0.46 [0.05, 0.13]**	1.32 [0.99, 1.75][b]	0.94 [0.63, 1.40]	**1.90 [1.27, 2.85]**
Noticeability[c] (OR)	0.89 [0.67, 1.18]	0.92 [0.61, 1.37]	0.88 [0.60, 1.31]	**2.54 [1.90, 3.40]**	**1.89 [1.26, 2.85]**	**3.57 [2.35, 5.44]**
Uniqueness[c] (OR)	**0.72 [0.53, 0.96]**	0.68 [0.44, 1.04]	0.77 [0.50, 1.17]	**0.47 [0.35, 0.64]**	**0.57 [0.37, 0.87]**	**0.38 [0.24, 0.60]**
Semantic						
Quality (b)	**−0.21 [−0.35, −0.07]**	**−0.28 [−0.50, −0.05]**	−0.13 [−0.30, 0.03]	−0.01 [−0.14, 0.13]	−0.12 [−0.34, 0.11]	0.12 [−0.05, 0.28]
Perceived safety compared with other tobacco products (b)	0.03 [−0.15, 0.20]	−0.14 [−0.40, 0.13]	0.20 [−0.03, 0.44]	−0.03 [−0.21, 0.15]	−0.17 [−0.43, 0.09]	0.13 [−0.11, 0.36]
Comparative safety–cigarettes (OR)	0.97 [0.68, 1.38]	1.08 [0.68, 1.72]	0.76 [0.43, 1.35]	1.15 [0.81, 1.63]	1.03 [0.65, 1.62]	1.30 [0.75, 2.26]
Affective[d]						
Positive (b)	**−0.22 [−.40, −.04]**	**−0.32 [−0.61, −0.04]**	−0.10 [−0.33, 0.13]	0.17 [−0.01, 0.36][b]	−0.02 [−0.30, 0.26]	**0.39 [0.16, 0.62]**
Negative (b)	0.12 [−0.02, 0.30]	0.01 [−0.22, 0.23]	**0.26 [0.09, 0.42]**	0.03 [−0.12, 0.17]	0.07 [−0.16, 0.29]	0.02 [−0.15, 0.19]
Shocked (OR)	1.23 [0.85, 1.79][b]	0.93 [0.57, 1.53]	**2.20 [1.17, 4.11]**	**1.78 [1.24, 2.55]**[b]	1.26 [0.78, 2.02]	**3.31 [1.80, 6.06]**
Behavioral intention						
Word of mouth (b)	−0.11 [−0.29, 0.07]	−0.15 [−0.42, 0.12]	−0.05 [−0.29, 0.19]	0.18 [−0.004, 0.35][b]	0.04 [−0.23, 0.30]	**0.33 [0.09, 0.57]**
Try with coupon (OR)	**0.70 [0.53, 0.93]**	0.67 [0.44, 1.01]	0.72 [0.48, 1.08]	0.99 [0.75, 1.32][b]	0.71 [0.48, 1.06]	1.40 [0.92, 2.11]

NOTE: SGM = sexual and gender minority. The interaction term was not included in the model presented. Boldfaced entries indicate significance at $p < .05$.
[a](b) indicates use of linear regression (intercepts as follows: brand equity-quality, 0.02; perceived safety, −0.33; positive affect, 1.00; negative affect, 0.32; behavioral word of mouth, −0.34). All others are odds ratios signified by (OR) modeled for an ordinal dependent variable. All models control for the condition of the prior experiments. [b]Indicates a significant interaction between pack assignment and SGM status. [c]Indicates a scale scored from 0 to 3. [d]Indicates a scale scored 0 to 4. All others are scored from −2 to 2 with a neutral zero.

the context of a harmful product, it has serious implications for the health equity of targeted populations (Grier & Kumanyika, 2010).

Our findings have important implications for efforts to address targeted marketing of harmful products toward SGM populations. Prior research has shown that the tobacco industry targets SGM populations (Stevens et al., 2004). Exposure to tobacco industry marketing may disproportionately affect sexual minority populations (Dilley et al., 2008), and tobacco marketing influences pro-tobacco social norms that are associated with smoking (Hinds et al., 2019). Such social norms are manifested as pro-tobacco imagery in gay and lesbian press (Smith, Offen, & Malone, 2006) as well as the normalization of harmful products within SGM communities (Drabble, Keatley, & Marcelle, 2006). Indeed, some evidence suggests tobacco products and tobacco industry marketing are viewed positively by SGM adults (Smith, Thomson, Offen, & Malone, 2008).

In the marketing literature, burgeoning evidence on SGM targeting finds that marketing toward SGM people can be effective (Oakenfull, 2007), responses may be driven by strength of identification with SGM communities (Oakenfull, 2007), and non-SGM responses may be driven by level of prejudice (Bhat, Leigh, & Wardlow, 1996). Our findings are the first to address SGM-targeted cigarette packaging and add to the limited literature on SGM targeting by documenting the importance of cognitive-aesthetic and affective responses to packaging, which are less frequently utilized in studies of tobacco product packaging with some exceptions (e.g., Bansal-Travers, Hammond, Smith, & Cummings, 2011; Hammond et al., 2011).

Our results are consistent with the broader field of marketing research. First, the existing literature shows effective targeting of tobacco industry marketing to marginalized groups, including by race, socioeconomic status, and consumer profiles (Ling & Glantz, 2002; Yerger, Przewoznik, & Malone, 2007). Indeed, RJ Reynolds's "Uptown" cigarette, which was planned to target African Americans, included targeted packaging design features (Balbach, Gasior, & Barbeau, 2003). Second, it is well documented that marketing and product design synergistically influence consumers' cognitive, affective, and behavioral responses to a given product (Crilly et al., 2004; Solomon, 2017).

This study adds to prior work by showing that marketing in the form of cigarette packs that are designed for SGM populations can change responses to that marketing. Thus, we extend the prior research on exposure to marketing to show how exposure to SGM-specific marketing may make a given product more appealing, generate positive feelings, and increase willingness to try the product for SGM populations more so than their straight/cisgender counterparts.

Strengths and Limitations

Our study has a number of strengths, including its use of a professional graphic designer with training in product packaging design and the use of a randomized experimental design. Additionally, our dependent variables are drawn from a theoretical framework that has been used in cigarette packaging research (Crilly et al., 2004; Lee et al., 2018). However, the strength of our internal validity must be balanced against the weaker ecological validity from an online experiment. Real-world ratings and consumer behaviors, such as purchasing products, happen in a much more complex environment than our experiment. Although our sample was diverse by race, ethnicity, gender, sexual orientation, and educational attainment, there were relatively few gender minority participants. The use of quota sampling limits our ability to generalize findings nationally; however, online panels show promise for generalizing nationally when conducting experiments rather than prevalence studies (Jeong et al., 2018).

Future efforts should extend our work. One important consideration we did not examine is how our results would differ by overlapping SGM identity with other identities such as gender, gender minority status, socioeconomic status, and race/ethnicity. It is possible that the moderation of responses by SGM status that we identified may itself be further modified by these characteristics. Our measure of sexual orientation did not include all identities used in SGM communities and may have misclassified some sexual minority participants who identify in other ways. Future work should consider the role of community affiliation and identity centrality in understanding SGM-targeted marketing. Future work should also extend this to other tobacco products.

Implications for Practice

Researchers and FDA regulators considering new tobacco products should include assessment of their appeal to vulnerable populations. Regarding how to assess the visual design of products, our findings support the use of a theoretical framework to understand consumers' responses to visual product design that draws on multiple outcomes: cognitive, affective, and behavioral (Crilly et al., 2004). That is, it may not be adequate to solely measure cognitive-semantic perception responses such as harm. The link between an individual's identity and marketing that appeals to that identity may play an important role in consumer

responses to a product. Marketing of harmful products can disproportionately affect vulnerable populations. Public health practitioners allied with SGM community organizations should identify and address the negative social norms that are reinforced in marketing for harmful industries, such as tobacco (Drabble, 2000; Drabble et al., 2006). This might include addressing policies regarding donations, ensuring presence at pride festivals, and authentically engaging with SGM leaders on tobacco control efforts. Thus, ensuring equity in tobacco product regulation and in tobacco control may require attention to identity-based targeting of tobacco products and their marketing.

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