Differences in Tobacco Advertising Receptivity Among Young Adults by Sexual Identity and Sex: Findings From the Population Assessment of Tobacco and Health Study

Ollie Ganz,[a,b] Evan A. Krueger,[c] Andy S. L. Tan,[d,e] Eugene Talbot,[a] Cristine D. Delnevo,[a,b] and Jennifer Cantrell[f]

Tobacco use is disproportionately high among sexual minorities (i.e., lesbian/gay and bisexual [LGB] individuals). Receptivity to tobacco advertising is an established risk factor for tobacco use among the general population, yet little research has assessed how receptivity to tobacco advertising differs based on sexual identity and sex. Additionally, studies often fail to distinguish between LGB identities, creating a monolith of sexual identity that ignores different underlying risk factors and behaviors. This study examined differences in receptivity to advertising of five tobacco product categories (any tobacco, cigarettes, cigars, e-cigarettes, and smokeless tobacco) between straight/heterosexual and LGB young adults by sex. We used data from Wave 1 of the Population Assessment of Tobacco and Health Study Restricted Use File. Analyses were limited to young adults (aged 18–24) with complete data on sexual identity (n = 8,839). Multivariable logistic regressions examined the association between receptivity and sexual identity, controlling for demographics, past 30-day tobacco use, and media use, stratified by sex. In the multivariable models, gay males had higher odds of receptivity to cigar advertising and gay and bisexual males had higher odds of receptivity to e-cigarette advertising, compared with straight/heterosexual males. Compared with straight/heterosexual females, bisexual females had higher odds of receptivity to advertising for all products; lesbian/gay females had higher odds of receptivity

[a]Rutgers Institute for Nicotine and Tobacco Studies, Rutgers Biomedical and Health Sciences, New Brunswick, NJ, USA
[b]Department of Health Behavior, Society, and Policy, Rutgers School of Public Health, Piscataway, NJ, USA
[c]School of Social Work, Tulane University, New Orleans, LA, USA
[d]Annenberg School for Communication, University of Pennsylvania, Philadelphia, PA, USA
[e]Leonard Davis Institute of Health Economics, University of Pennsylvania, Philadelphia, PA, USA
[f]Department of Social and Behavioral Sciences, School of Global Public Health, New York University, New York, NY, USA

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to any tobacco advertising. In conclusion, our study identified elevated receptivity to tobacco marketing among sexual minorities—particularly sexual minority women. More research is needed to understand the sources of exposure to tobacco advertising and the reasons for elevated receptivity among LGB individuals.

Keywords: sexual minority; tobacco use; tobacco advertising; young adults; substance use

Statement of Public Health Significance: Tobacco use has a disproportionate, negative impact on sexual minorities. We found that sexual minority young adults report greater receptivity to tobacco advertising for certain products but this varied by sex and LGB subgroup. These findings may help develop interventions that address tobacco-related disparities and reduce tobacco use within LGB populations.

INTRODUCTION

Sexual minorities, including those who identify as lesbian, gay, or bisexual (LGB), are a critical tobacco-disparity population.[1–9] Compared with heterosexual adults, LGB adults report a higher prevalence of any current tobacco use (25.1% vs. 18.8%), current combustible use (18.9% vs. 15.0%), and current cigarette use (16.1% vs. 12.3%).[10] Furthermore, cigarette smoking prevalence among LGB individuals has remained largely unchanged over the past 30 years.[11] Sexual minorities are also more likely to report tobacco use disorder (ie, nicotine dependence)[3,12,13] and daily smoking,[14] compared with their heterosexual counterparts. Young adult sexual minorities are at an especially high risk for tobacco use, reporting a high prevalence of combustible tobacco use[5,7,8,15,16] and a greater likelihood of initiating and sustaining the use of cigarettes[17] compared with heterosexual young adults.

Research suggests that protobacco marketing,[18] which includes the advertising, promotion, and packaging of tobacco products, may contribute to LGB tobacco use disparities.[3,19–23] The causal effects of exposure to protobacco marketing on tobacco use behavior among youth and young adults in the general population are well-established.[24,25] Communication theories,[26–28] including McGuire's persuasion model,[29] posit that for advertising to impact behavior, individuals must (1) be exposed to the ad, (2) pay attention to and recall the ad, and then (3) have a favorable cognitive or affective response to the ad. In order for an ad to impact attitudes and ultimately behaviors, all of these steps must occur.[26,29] Furthermore, activation theory conceptualizes that there are individual differences in novelty seeking (ie, need for arousal/stimulation) and that attention, recall, and arousal to a tobacco advertisement are dependent on whether the message aligns with the individual's need for stimulation.[27,28,30] For the first two steps of McGuire's model (exposure and attention/recall), studies show that LGB individuals report disproportionate exposure to and recall of tobacco industry marketing,[3,19,20,22,23,31] due in large part to tobacco industry targeting. Formerly classified tobacco industry documents show that the tobacco industry has targeted the LGB community with its marketing efforts for decades.[18,32,33] The industry has engaged with and explicitly targeted the LGB community via direct advertising in LGB publications and publications with large LGB readership,[32,34,35] promoting their products at LGB venues (e.g., gay/lesbian bars),[32,34] sponsoring LGB events (e.g., Lesbian Film Festival),[34,36] establishing political ties with LGB leaders, and supporting certain LGB causes.[32,34] One focus group

study of LGB and transgender adults found that such targeting efforts were not necessarily perceived negatively but rather as indicating and promoting social acceptance.[37]

Yet, there is a dearth of research on the third step in the process of persuasion in terms of sexual minorities—response to favorable cognitive or affective response advertising. One measure of favorable response is receptivity to tobacco marketing, which is defined as involvement with or attachment to tobacco-related advertisements[38] (e.g., having a favorite tobacco advertisement)[38,39] and advertisement likeability.[40] Receptivity has been found to influence smoking attitudes and behaviors among the general population.[41–47] One study using data from the Population Assessment of Tobacco and Health (PATH) Study found that receptivity to tobacco advertising was associated with progression to susceptibility or ever use of tobacco products among young people.[42] A paucity of studies have shown that sexual minorities report greater receptivity to tobacco industry marketing compared with their heterosexual counterparts.[3,19,21,31] However, this research is limited in relation to the products and advertising channels examined. Because advertising tactics and volume vary greatly by channel and product,[24,48] there is a need for a comprehensive exploration of receptivity to pro-tobacco marketing across the diverse product landscape and communication channels (e.g., online). Additionally, most of these studies treat sexual minorities as a monolith and do not distinguish between gay/lesbian and bisexual individuals, which may result in erroneous conclusions, as data show that tobacco use risk factors and behaviors differ for lesbian/gay vs bisexual individuals as well as by sex.[7,15] Therefore, collapsing these identities into a single LGB variable could disguise disparities in the populations.[7,49] Indeed, research shows that certain LGB subgroups (e.g., sexual minority females) smoke at higher rates,[15] smoke more heavily,[3,50] report greater nicotine dependence,[3,12,13] and make fewer quit attempts,[3] compared with others. There is evidence that this is also the case for tobacco marketing. For instance, Tan et al. (2019) found that encoded e-cigarette ad exposure (i.e., minimal memory trace of the ad) was higher for bisexual women compared with lesbian/gay women.[23]

The objective of this study is to help elucidate the correlates of tobacco-related health disparities among sexual minorities by examining the differences in receptivity to tobacco advertising between heterosexual and LGB young adults by sex.

METHODS

Data Source and Sample Size

We used data from the PATH Study, a nationally representative, longitudinal study of tobacco-related risk factors and behaviors among youth and adults in the United States.[51] For this analysis, we used data from Wave 1 of the adult (18 and older) Restricted Use File (RUF).[52] We used Wave 1 for this analysis since it is the only wave in which all receptivity items are measured, and we used the RUF because it allows for the examination of LGB respondents separately, whereas the Public Use File collapses these individuals into one category. The analytic sample was limited to young adults (aged 18-24) with complete data on sexual identity (n = 8,839). Analyses were limited to young adults since receptivity questions were only asked for this age group, likely because the majority of people who use tobacco products initiate prior to age 25.[53] This study was approved as exempt by The Rutgers Institutional Review Board (Pro2020002096).

Sampling Frame and Data Collection

The PATH Study used a four-stage stratified area probability sampling design with a two-phase design for the adult cohort toward the end of data collection. The study oversampled young adults (aged 18–24), African Americans, and tobacco users.[51,54] Wave 1 data collection took place from September 12, 2013, to December 14, 2014. The weighted response rates for the household screener and the Wave 1 adult survey were 54% and 74%, respectively, based on the American Association for Public Opinion Research guidelines.[51,54] Additional details on the sampling approach and data collection procedures for the PATH Study design can be found elsewhere.[51,54]

Measures

Dependent Variable. Three separate items were used to measure receptivity. First, respondents were asked the following: "What is the brand of your favorite tobacco advertisement?" Respondents could either select a specific brand, "something else," or "I do not have a favorite tobacco advertisement." Next, participants were randomized to view 20 tobacco ads from a pool of ads for different tobacco products (i.e., cigarettes, snus, dip, chewing tobacco, large cigars, nonlarge cigars, and e-cigarettes) from different channels (i.e., print, television for e-cigarettes only, and online). After exposure to each ad, respondents were asked the following "In the past 12 months, have you seen this advertisement before this study?" Finally, respondents were asked whether they liked the ad, regardless of whether or not they had seen it; response options included "like this ad," "have no opinion about this ad," and "dislike this ad." Respondents who didn't like or recall any ads for a given tobacco product and didn't have a favorite tobacco ad or their favorite ad was not for that particular product were categorized as having "no advertising receptivity." Those who recalled at least one ad, didn't like any of the ads, didn't have a favorite ad, or their favorite ad was not for that particular product were categorized as having "low advertising receptivity"; respondents who liked at least one ad or had a favorite ad for that product were categorized as having "moderate advertising receptivity"; those who liked at least one ad and had a favorite tobacco ad for that product were categorized as having "high advertising receptivity." This definition was based on prior studies using data from the PATH Study to assess receptivity.[42,45,55] Product-specific receptivity variables were developed for cigarettes, cigars, smokeless tobacco, and e-cigarettes. Any tobacco advertising receptivity was defined based on an individual's highest reported receptivity to cigarette, cigar, smokeless tobacco, or e-cigarette advertisements. Product-specific and any tobacco receptivity was dichotomized—none/low and moderate/high receptivity. We dichotomized receptivity rather than treating it as a four-level variable to allow for sufficient cell sizes to examine differences by sex and sexual identity.

Independent Variable. To assess sexual identity, all respondents were asked, "Do you think of yourself as…" Answer choices for males included the following: (1) gay, (2) straight, that is not gay, (3) bisexual, and (4) something else. Answer choices for females included the following: (1) lesbian or gay, (2) straight, that is not lesbian or gay, (3) bisexual, and (4) something else. Young adults who identified as something else were excluded from analyses. Sex was categorized as male or female.

Covariates. Covariates included race/ethnicity (non-Hispanic [NH] white, NH Black, NH other, or Hispanic), education (less than high school, high school graduate/general

equivalency diploma [GED], some college, college, or more), and poverty level (below poverty level [<100% of poverty guideline], at or near poverty level [100%–199% of poverty guidelines], and at or above twice poverty level [≥200% of poverty guideline]).

We also examined past 30-day use of cigarettes, cigars (traditional cigars, cigarillos, and/or filtered cigars), e-cigarettes, and smokeless tobacco (loose snus, moist snuff, dip, spit, chewing tobacco, snus pouches, and/or dissolvable tobacco). Past 30-day use of any tobacco was defined as the use of any of these products.

TV and Internet use were also included as covariates as they may influence exposure to tobacco ads. Respondents were asked, "About how long do you spend watching TV on a typical day?" Response options include "none," "less than 1 hour," "1–2 hours," "3–4 hours," and "more than 4 hours." We treated TV as a continuous variable ranging from 1 ("none") to 5 ("more than 4 hours"). Respondents were also asked, "Overall, how often do you use the Internet?" and answer choices include "don't have regular Internet access," "less often," "every few weeks," "1–2 days a week," "3–5 days a week, "about once a week," and "several times a day." We treated Internet use as a continuous variable ranging from 0 ("don't have regular Internet access") to 6 ("several times a day").

Data Analysis

We conducted all analyses in Stata 17.1 MP[56] using SVY procedures to account for weighting and stratified all analyses by sex. First, we used chi-squared tests to examine the bivariate association between sexual identity and demographics, tobacco use, and media use. We then used chi-squared tests to examine the association between sexual identity and receptivity to any tobacco advertising and each product. Next, we ran multivariable logistic regression models to estimate the association between sexual identity and receptivity to any tobacco advertising and each product, controlling for race/ethnicity, education, poverty level, TV use, Internet use, and past 30-day use of the corresponding product (e.g, past 30-day cigarette use when examining receptivity to cigarette advertising). We ran each model three times, changing the reference group for sexual identity in each model to allow for comparison of odds ratios between groups (eg, lesbian/gay vs. bisexual and bisexual vs. straight/heterosexual). However, straight/heterosexual respondents are the reference group in the adjusted odds ratios (aORs) reported in the results. We then estimated the marginal prevalence of receptivity using the "margins" command in Stata in order to compare the prevalence of receptivity across groups, while controlling for covariates. Data were weighted to be nationally representative and to adjust for oversampling and nonresponse. Variance estimation procedures were used to account for stratification and clustering utilized in sampling; replicate weights, calculated using Fay's variant of balanced repeated replication, were used to calculate standard errors. We used the balanced repeated replication method to form replicate weights. Estimates with small cell sizes were suppressed per the PATH Study user guide.[51,54]

RESULTS

Table 1 summarizes the characteristics of the young adult males from Wave 1 of the PATH study by sexual identity. Among male young adults, sexual identity was associated with education such that a greater proportion of gay males reported having completed college or more (23.92%, 95% CI: 14.50, 36.82) compared with straight/heterosexual males (11.02%,

TABLE 1. Weighted Sample Characteristics of Young Adult Males (Aged 18–24; Unweighted *n* = 4,501)

	Straight/heterosexual (*n* = 4,293)	Gay (*n* = 114)	Bisexual (*n* = 94)	*P*-value
	% (95% CI)	% (95% CI)	% (95% CI)	
Total	95.43 (94.61, 96.12)	2.51 (2.02, 3.13)	2.06 (1.63, 2.59)	
Demographics				
Race/ethnicity				NS
NH White	55.16 (52.92, 57.39)	46.68 (36.45, 57.20)	57.89 (44.68, 70.06)	
NH Black	11.95 (10.86, 13.14)	13.74 (8.95, 20.52)	7.83 (3.58, 16.27)	
NH Other	11.74 (0.99, 13.86)	16.61 (7.44, 33.04)	17.78 (8.05, 34.81)	
Hispanic	21.15 (19.59, 22.79)	22.96 (15.38, 32.84)	16.50 (9.34, 27.50)	
Education				.0303
Less than HS	17.75 (16.53, 19.04)	16.31 (9.41, 26.77)	15.55 (9.03, 25.47)	
HS grad/GED	30.46 (29.23, 31.71)	23.56 (15.88, 33.47)	33.09 (22.96, 45.06)	
Some college	40.77 (39.09, 42.46)	36.21 (27.54, 45.89)	34.28 (24.19, 46.02)	
College or more	11.02 (9.59, 12.64)	23.92 (14.50, 36.82)	17.08 (7.84, 33.29)	
Poverty level				NS
Below poverty level (< 100% of poverty guideline)	44.43 (42.44, 46.45)	47.38 (35.82, 59.24)	46.59 (35.14, 58.41)	
At or near poverty level (100–199% of poverty guideline)	20.14 (18.54, 21.83)	24.32 (15.63, 35.79)	15.48 (8.47, 26.60)	
At or above twice poverty level (≥ 200% of poverty guideline)	35.43 (33.14, 37.78)	28.29 (18.63, 40.48)	37.93 (26.81, 50.49)	
Tobacco use				
Past 30 day any tobacco use[a]	45.30 (42.97, 47.65)	46.01 (35.52, 56.87)	43.67 (31.49, 56.65)	NS
Past 30 day cigarette use	33.85 (32.01, 35.74)	39.82 (30.80, 49.58)	35.23 (24.96, 47.09)	NS
Past 30 day cigar use[b]	21.27 (19.78, 22.83)	14.54 (9.44, 21.72)	17.78 (11.02, 27.41)	NS
Past 30 day e-cigarette use	15.83 (14.64, 17.09)	14.07 (8.40, 22.63)	16.83 (9.98, 26.97)	NS
Past 30 day smokeless tobacco use[c]	10.38 (9.39, 11.48)	[d]	7.95 (3.98, 15.24)	NS

(*Continued*)

TABLE 1. Weighted Sample Characteristics of Young Adult Males (Aged 18–24; Unweighted *n* = 4,501) (*Continued*)

	Straight/heterosexual (*n* = 4,293)	Gay (*n* = 114)	Bisexual (*n* = 94)	*P*-value
Media use				
TV use (1–5; M (SE))	2.97 (0.02)	2.99 (0.13)	2.72 (0.20)	NS
Internet use (0–6; M (SE))	1.40 (0.02)	1.18 (0.07)	1.40 (0.12)	0.0272

Abbreviations. CI = confidence interval; GED = General Equivalency Diploma; M = mean; HS = high school; NH = non-Hispanic; NS = non-significant; SE = standard error.

Data are from the Population Assessment of Tobacco and Health Study Wave 1 Restricted-Use File (2013-2014).

[a]Includes cigarettes, cigars, e-cigarettes, and smokeless tobacco.

[b]Includes traditional cigars, cigarillos and filtered cigars.

[c]Includes loose snus, moist snuff, dip, spit, chewing tobacco, snus pouches and dissolvable tobacco

[d]Data were suppressed per PATH Study data suppression guidelines.

95% CI: 9.59, 12.64). Table 2 summarizes the characteristics of the young adult females from Wave 1 of the PATH study by sexual identity. A greater proportion of lesbian/gay female young adults identified as NH Black (24.72%, 95% CI: 17.62, 33.52), and a lower proportion identified as NH Other (3.76%, 95% CI: 1.56, 8.81) compared with straight/heterosexual female young adults (14.17%, 95% CI: 12.87; 15.59% and 10.23%, 95% CI: 8.82, 11.83). A greater proportion of lesbian/gay (61.05%, 95% CI: 50.60, 70.58) and bisexual (61.12%, 95% CI: 55.52, 66.44) female young adults reported living below the poverty line compared with their straight/heterosexual counterparts (48.30%, 95% CI: 46.31, 50.28). For all tobacco products, prevalence was lower for heterosexual/straight female young adults compared with LGB female young adults ($P < .001$).

Tables 3 and 4 present findings on receptivity to tobacco advertising by sexual identity for males and females, respectively. Among males (Table 3), moderate/high receptivity to e-cigarette advertising was significantly greater among gay (37.11%, 95% CI: 27.24, 48.19) and bisexual (35.03%, 95% CI: 23.38, 48.79) males compared with heterosexual males (15.97%, 95% CI: 14.74, 17.29). Receptivity to cigar advertising was higher among gay (28.00%, 95% CI: 18.37, 40.20) and bisexual (23.17%, 95% CI: 13.59, 36.63) young adults, but this was only marginally statistically significant. For females (Table 4), moderate/high receptivity to advertising for any tobacco product, cigarettes, cigars, and e-cigarettes was significantly higher among lesbian (24.31%–52.00%) and bisexual (23.93%–57.84%) females compared with heterosexual females (15.62%–35.25%; all $P < .001$). The association between sexual identity and receptivity to smokeless tobacco advertising was borderline significant ($P = .0476$).

Table 5 describes the associations between sexual identity and tobacco ad receptivity for males and females, adjusting for covariates. Among males, gay young adults reported greater odds of receptivity to cigar advertising (aOR: 1.98, 95% CI: 1.09, 3.56) compared with straight/heterosexual young adults. Both gay (aOR: 2.92, 95% CI: 1.76, 4.84) and bisexual (aOR: 2.58, 95% CI: 1.46, 4.57) young adults reported greater odds of receptivity to e-cigarette advertising compared with straight/heterosexual young adults. There were no differences in odds of receptivity between gay and bisexual males.

Among females, bisexual young adults reported higher odds of receptivity to any tobacco product (aOR: 2.44, 95% CI: 1.83, 3.26), cigarettes (aOR: 1.84, 95% CI: 1.35, 2.49), cigars (aOR: 1.93, 95% CI: 1.40, 2.66), e-cigarettes (aOR: 1.60, 95% CI: 1.24, 2.06), and smokeless tobacco (aOR: 1.50, 95% CI: 1.04, 2.17), compared with straight/heterosexual young adults. Lesbian/gay young adults reported higher odds of receptivity to any tobacco product compared with straight/heterosexual young adults (aOR: 2.17, 95% CI: 1.37, 3.42). There were no differences in odds of receptivity between gay/lesbian and bisexual females.

Figure 1A presents the marginal prevalence of receptivity by sexual identity among males, adjusting for covariates. Straight/heterosexual young adults reported a lower prevalence of receptivity to e-cigarette advertising compared with gay and bisexual young adults. There were no other differences in prevalence of receptivity after adjusting for covariates.

Figure 1B presents the marginal prevalence of receptivity by sexual identity among females, adjusting for covariates. Straight/heterosexual young adults reported a lower prevalence of receptivity to advertising for any tobacco product compared with gay/lesbian and bisexual young adults and lower prevalence of receptivity to cigarette, cigar, and e-cigarette advertising compared with bisexual young adults. There were no other differences in prevalence of receptivity after adjusting for covariates.

TABLE 2. Weighted Sample Characteristics of Young Adult Females (Aged 18–24; Unweighted *n* = 4,338)

	Straight/heterosexual (*n* = 3,794)	Lesbian/gay (*n* = 121)	Bisexual (*n* = 423)	P-value
	% (95% CI)	% (95% CI)	% (95% CI)	
Total	90.35 (89.25, 91.35)	2.25 (1.78, 2.85)	7.40 (6.59, 8.29)	
Demographics				
Race/ethnicity				.0091
NH White	55.99 (53.86, 58.10)	43.73 (32.90, 55.19)	52.79 (46.60, 58.90)	
NH Black	14.17 (12.87, 15.59)	24.72 (17.62, 33.52)	14.58 (11.19, 18.77)	
NH Other	10.23 (8.82, 11.83)	3.76 (1.56, 8.81)	10.36 (7.03, 15.01)	
Hispanic	19.61 (18.17, 21.13)	27.78 (20.16, 36.96)	22.27 (18.22, 26.94)	
Education				<.001
Less than HS	11.44 (10.56, 12.38)	17.97 (11.74, 26.52)	24.73 (20.51, 29.50)	
HS grad/GED	26.00 (24.92, 27.11)	26.75 (18.71, 36.69)	26.80 (21.77, 32.51)	
Some college	46.98 (45.60, 48.36)	44.44 (35.09, 54.21)	39.33 (34.58, 44.28)	
College or more	15.58 (14.15, 17.12)	10.84 (5.72, 19.57)	9.14 (6.11, 13.45)	
Poverty level				<.001
Below poverty level (<100% of poverty guideline)	48.30 (46.31, 50.28)	61.05 (50.60, 70.58)	61.12 (55.52, 66.44)	
At or near poverty level (100–199% of poverty guideline)	21.74 (20.17, 23.40)	16.12 (9.16, 26.79)	23.11 (18.40, 28.60)	
At or above twice poverty level (≥ 200% of poverty guideline)	29.96 (27.80, 32.21)	22.83 (15.02, 33.12)	15.77 (11.50, 21.24)	
Tobacco use				
Past 30 day any tobacco use[a]	26.15 (24.48, 27.90)	55.76 (44.59, 66.38)	58.32 (52.01, 64.36)	<.001
Past 30 day cigarette use	20.96 (19.46, 22.55)	44.20 (34.26, 54.63)	48.52 (42.67, 54.40)	<.001
Past 30 day cigar use[b]	8.29 (7.45, 9.22)	27.29 (19.47, 36.81)	25.67 (21.47, 30.37)	<.001
Past 30 day e-cigarette use	7.81 (7.05, 8.65)	18.45 (11.08, 29.10)	20.42 (16.90, 24.46)	<.001
Past 30 day smokeless tobacco use[c]	0.60 (0.42, 0.87)	2.34 (0.87, 6.10)	2.45 (1.37, 4.35)	<.001

(*Continued*)

TABLE 2. Weighted Sample Characteristics of Young Adult Females (Aged 18–24; Unweighted *n* = 4,338) (*Continued*)

	Straight/heterosexual (*n* = 3,794)	Lesbian/gay (*n* = 121)	Bisexual (*n* = 423)	P-value
Media use				
TV use (1–5; M (SE))	3.07 (0.02)	3.15 (0.12)	3.09 (0.06)	NS
Internet use (0–6; M (SE))	1.33 (0.02)	1.38 (0.12)	1.43 (0.05)	NS

Abbreviations: CI = confidence interval; GED = General Equivalency Diploma; HS = high school; M = mean; NH = non-Hispanic; NS = non-significant; SE = standard error.

Data are from the Population Assessment of Tobacco and Health Study Wave 1 Restricted-Use File (2013–2014).

[a]Includes cigarettes, cigars, e-cigarettes, and smokeless tobacco.

[b]Includes traditional cigars, cigarillos, and filtered cigars.

[c]Includes loose snus, moist snuff, dip, spit, chewing tobacco, snus pouches, and dissolvable tobacco.

TABLE 3. Weighted Tobacco Advertising Receptivity Among Young Adults (Aged 18-24) by Sexual Identity Among Males (unweighted *n* = 4,501)

	None/low	Moderate/high	*p*-value
Receptivity to Any Tobacco Product Advertising			
Sexual identity % (95% CI)			.4309
Gay (*n* = 114)	46.31 (35.76, 57.21)	53.69 (42.79, 64.24)	
Straight/heterosexual (*n* = 4,293)	53.73 (51.74, 46.27)	46.27 (44.30, 48.26)	
Bisexual (*n* = 94)	51.84 (38.55, 64.88)	48.16 (35.12, 61.45)	
Receptivity to Cigarette Advertising			
Sexual identity % (95% CI)			.3832
Gay (*n* = 114)	59.86 (48.55, 70.16)	40.17 (29.84, 51.45)	
Straight/heterosexual (*n* = 4,293)	66.58 (64.74, 68.38)	33.42 (61.62, 35.26)	
Bisexual (*n* = 94)	62.62 (49.40, 74.19)	37.38 (25.81, 50.60)	
Receptivity to Cigar Advertising[a]			
Sexual identity % (95% CI)			.0578
Gay (*n* = 114)	72.00 (59.80, 81.63)	28.00 (18.37, 40.20)	
Straight/heterosexual (*n* = 4,293)	82.51 (81.27, 83.69)	17.49 (16.31, 18.73)	
Bisexual (*n* = 94)	76.83 (63.37, 86.41)	23.17 (13.59, 36.63)	
Receptivity to E-Cigarette Advertising			
Sexual identity % (95% CI)			< .001
Gay (*n* = 114)	62.89 (51.81, 72.76)	37.11 (27.24, 48.19)	
Straight/heterosexual (*n* = 4,293)	84.03 (82.71, 84.03)	15.97 (14.74, 17.29)	
Bisexual (*n* = 94)	64.97 (51.21, 76.62)	35.03 (23.38, 48.79)	
Receptivity to Smokeless Tobacco Advertising[b]			
Sexual identity % (95% CI)			.7607
Gay (*n* = 114)	80.60 (68.15, 88.98)	19.40 (11.02, 31.85)	
Straight/heterosexual (*n* = 4,293)	83.67 (82.31, 84.96)	16.33 (15.04, 17.69)	
Bisexual (*n* = 94)	81.13 (65.15, 90.82)	18.87 (9.18, 34.85)	

Data are from the Population Assessment of Tobacco and Health Study Wave 1 Restricted-Use File (2013–2014)

[a]Includes traditional cigars, cigarillos and filtered cigars.

[b]Includes loose snus, moist snuff, dip, spit, chewing tobacco, snus pouches and dissolvable tobacco.

DISCUSSION

For advertising to impact consumer behavior, individuals must first be exposed to, pay attention to, recall, and respond positively to the advertisement. Our findings build upon prior studies showing disproportionately high exposure and recall to tobacco industry

TABLE 4. Weighted Tobacco Advertising Receptivity Among Young Adults (Aged 18–24) by Sexual Identity Among Females (Unweighted *n* = 4,338)

	None/low	Moderate/high	*p*-value
Receptivity to Any Tobacco Product Advertising			
Sexual identity % (95% CI)			< .001
Lesbian/gay (*n* = 121)	48.00 (38.02, 58.14)	52.00 (41.86, 61.98)	
Straight/heterosexual (*n* = 3,794)	64.75 (63.06, 66.41)	35.25 (33.59, 36.94)	
Bisexual (*n* = 423)	42.16 (36.25, 48.30)	57.84 (51.70, 63.75)	
Receptivity to Cigarette Advertising			
Sexual identity % (95% CI)			< .001
Lesbian/gay (*n* = 121)	56.19 (46.78, 65.17)	43.81 (34.83, 53.22)	
Straight/heterosexual (*n* = 3,794)	72.97 (71.24, 74.62)	27.03 (25.38, 28.76)	
Bisexual (*n* = 423)	49.55 (43.65, 55.46)	50.45 (44.54, 56.35)	
Receptivity to Cigar Advertising[a]			
Sexual identity % (95% CI)			< .001
Lesbian/gay (*n* = 121)	75.69 (65.65, 83.54)	24.31 (16.46, 34.35)	
Straight/heterosexual (*n* = 3,794)	86.80 (85.55, 87.96)	13.20 (12.04, 14.45)	
Bisexual (*n* = 423)	72.89 (67.35, 77.80)	27.11 (22.20, 32.65)	
Receptivity to E-Cigarette Advertising			
Sexual identity % (95% CI)			< .001
Lesbian/gay (*n* = 121)	74.09 (63.05, 82.73)	25.91 (17.27, 36.95)	
Straight/heterosexual (*n* = 3,794)	84.38 (83.08, 85.59)	15.62 (14.41, 16.92)	
Bisexual (*n* = 423)	76.07 (71.43, 80.17)	23.93 (19.83, 28.57)	
Receptivity to Smokeless Tobacco Advertising			
Sexual identity % (95% CI)			.0476
Lesbian/gay (*n* = 121)	83.65 (73.59, 90.38)	16.35 (9.62, 26.41)	
Straight/heterosexual (*n* = 3,794)	89.33 (88.10, 90.45)	10.67 (9.55, 11.90)	
Bisexual (*n* = 423)	85.43 (80.87, 89.05)	14.57 (10.95, 19.13)	

Data are from the Population Assessment of Tobacco and Health Study Wave 1 Restricted-Use File (2013–2014).

[a]Includes traditional cigars, cigarillos and filtered cigars.

[b]Includes loose snus, moist snuff, dip, spit, chewing tobacco, snus pouches and dissolvable tobacco.

marketing among sexual minorities, female LGB young adults in particular,[3,19,20,22,23,31] by demonstrating a greater positive response (ie, receptivity) to tobacco advertising among LGB young adults compared with heterosexual/straight young adults. Similarly, Fallin et al. found that LGB young adult females reported higher advertising receptivity compared with straight/heterosexual young adult females and that bisexual males reported greater receptivity to tobacco advertising compared with heterosexual/straight and gay young adults, although

TABLE 5. Weighted, Adjusted Logistic Regression Models of Sexual Identity Associated with Tobacco Advertising Receptivity Among Young Adults Stratified by Sex

	Moderate/high vs. no/low receptivity	
	Males	Females
Any Tobacco		
Sexual identity	aOR (95% CI)	aOR (95% CI)
Straight/heterosexual	Reference	Reference
Lesbian/gay	1.41 (0.82, 2.42)	2.17 (1.37, 3.42)[a]
Bisexual	0.95 (0.53, 1.71)	2.44 (1.83, 3.26)[a]
Cigarettes		
Sexual identity	aOR (95% CI)	aOR (95% CI)
Straight/heterosexual	Reference	Reference
Lesbian/gay	1.16 (0.66, 2.03)	1.65 (1.00, 2.73)
Bisexual	1.01 (0.59, 1.73)	1.84 (1.35, 2.49)[a]
Cigars[b]		
Sexual identity	aOR (95% CI)	aOR (95% CI)
Straight/heterosexual	Reference	Reference
Lesbian/gay	1.98 (1.09, 3.56)[a]	1.53 (0.87, 2.67)
Bisexual	1.06 (0.53, 2.09)	1.93 (1.40, 2.66)[a]
E-cigarettes		
Sexual identity	aOR (95% CI)	aOR (95% CI)
Straight/heterosexual	Reference	Reference
Lesbian/gay	2.92 (1.76, 4.84)[a]	1.76 (1.00, 3.12)
Bisexual	2.58 (1.46, 4.57)[a]	1.60 (1.24, 2.06)[a]
Smokeless Tobacco[c]		
Sexual identity	aOR (95% CI)	aOR (95% CI)
Straight/heterosexual	Reference	Reference
Lesbian/gay	1.52 (0.71, 3.26)	1.72 (0.85, 3.49)
Bisexual	0.93 (0.37, 2.32)	1.50 (1.04, 2.17)[a]

Abbreviations: aOR = adjusted odds ratio; CI = confidence interval.

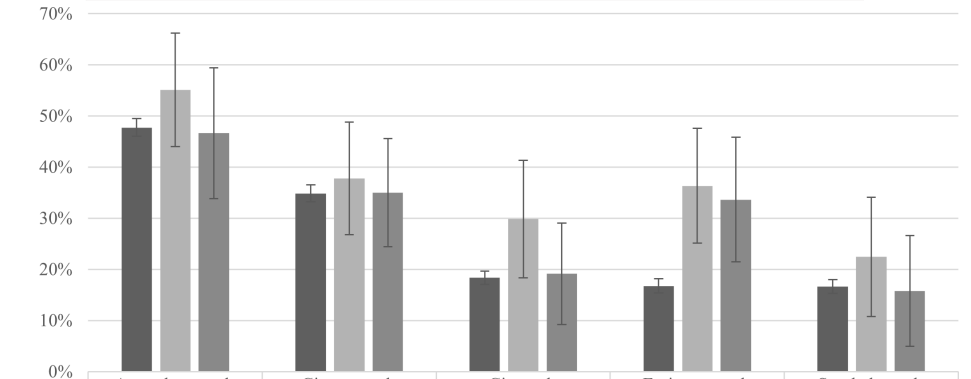
Data are from the PATH Study Wave 1 RUF (2013–2014). All models are adjusted for past 30-day product use, poverty level, education, race/ethnicity, TV use, and Internet use.

[a]Differs from straight/heterosexual ($P < .05$).

[b]Includes traditional cigars, cigarillos, and filtered cigars.

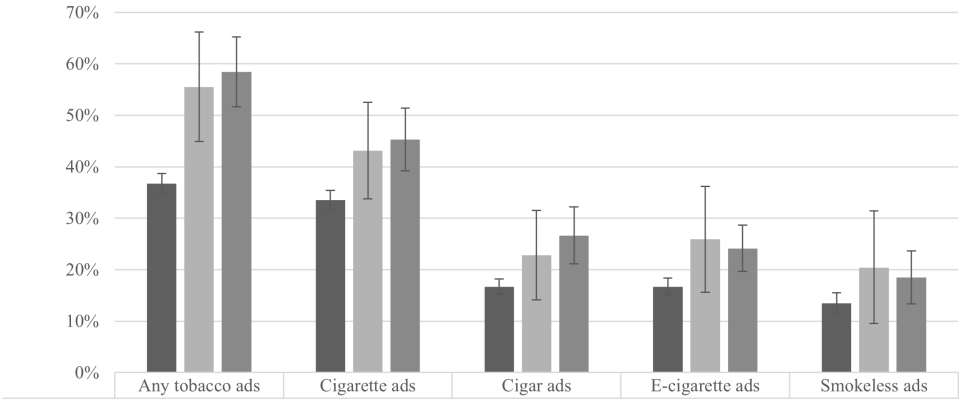
[c]Includes loose snus, moist snuff, dip, spit, chewing tobacco, snus pouches, and dissolvable tobacco.

their definition of receptivity was limited to the likelihood of using a tobacco promotional item.[3] Our study highlights the importance of examining within-group differences among sexual minority populations. For example, we found that among males, gay young adults, but not bisexual young adults, reported higher odds of receptivity to cigar advertising compared with heterosexual/straight young adults. Yet for females, bisexual young adults, but not gay/lesbian young adults, reported higher odds of receptivity to cigar advertising compared with heterosexual/straight young adults. If all sexual minority young adults had



	Any tobacco ads	Cigarette ads	Cigar ads	E-cigarette ads	Smokeless ads
Straight	47.72%	34.84%	18.33%	16.73%	16.63%
Gay	55.09%	37.77%	29.82%	36.32%	22.42%
Bisexual	46.61%	35.00%	19.10%	33.63%	15.79%

(A)



	Any tobacco ads	Cigarette ads	Cigar ads	E-cigarette ads	Smokeless ads
Straight	36.70%	33.50%	16.70%	16.70%	13.50%
Gay/lesbian	55.50%	43.10%	22.80%	25.90%	20.40%
Bisexual	58.40%	45.30%	26.60%	24.10%	18.50%

(B)

Figure 1. Weighted marginal prevalence of tobacco advertising receptivity by sexual identity among males (A) and females (B); PATH Study, 2013–2014.

been collapsed into one category in our analyses, we would not have been able to uncover these important within-group differences.

Among males, there were differences in odds of receptivity between heterosexual/straight and gay and bisexual young adults for e-cigarettes, and for cigars, only gay males—not bisexual males—reported higher odds of receptivity compared with heterosexual males.

While our study cannot explain why gay but not bisexual males reported greater odds of being receptive to cigar advertising, this finding certainly warrants more research. Cigars are a diverse product category. They vary greatly in terms of size, price, and appearance, and all have distinct user characteristics.[57,58] Furthermore, different cigar types (ie, cigarillos, filtered cigars, and premium cigars) are advertised in different ways. For example, cigarillos are heavily promoted at the point-of-sale with ads highlighting flavors and low cost, while premium cigars are typically promoted as luxury items and via specialty publications and tobacco/cigar shops.[59,60] The inability to identify the specific cigar brands and types in the advertisements shown to PATH Study participants makes it difficult to understand or explain our findings regarding the appeal of cigar advertising among gay males. Therefore, future research should examine receptivity to advertising for different cigar types among this population.

For females, there were differences in receptivity for all products between heterosexual/straight and gay and bisexual young adults. Specifically, compared with heterosexual/straight females, we found that while lesbian/gay females reported higher odds of receptivity to any tobacco product marketing, bisexual women reported higher odds of receptivity across every product type, compared with heterosexual/straight females. We did not identify any differences between LGB women in the odds of receptivity, which may be an issue of lack of statistical power, or perhaps, there indeed are no differences, as was the case in Fallin et al. analysis.[3] Substance use research has shown that compared with heterosexual individuals and other LGB subgroups, sexual minority females report disproportionately high rates of tobacco use,[7,11] with some studies showing even higher rates among bisexual females compared with lesbian/gay females for certain products.[3,11,61,62] Based on the Minority Stress Theory,[63] some hypothesize that higher rates of tobacco use among sexual minority women are a means of coping with homophobia, victimization, stigma, and discrimination associated with identifying as gay/lesbian or bisexual, in addition to experiences with sexism.[62,64] Yet, it remains unclear why sexual minority females are particularly receptive to tobacco industry marketing.

While our study identified differences in receptivity among LGB populations, we are unable to identify reasons why LGB young adults are more receptive to tobacco marketing compared with heterosexual young adults, although ad content, such as features, language, and imagery, may be a contributing factor. Per activation theory,[27,28] if the content of a tobacco advertisement is particularly appealing to certain individuals and aligns with their need for stimulation, this can lead to attention, recall, and arousal, or in this case, higher receptivity, compared with other groups. Furthermore, receptivity could be high if the content of the advertisement is consistent with one's ideal self-image (e.g., attractive individuals portrayed having fun).[30,65,66] As noted earlier, the tobacco industry has a history of targeting the LGB community. Indeed, many ads that target the LGB community focus on values such as pride, choice, and freedom.[67] For example, Natural American Spirit, a popular cigarette brand among sexual minority populations,[68,69] has promoted the following message in magazine ads: "Freedom to speak. To choose. To marry. To love."[70] More recently, tobacco brands have posted on social media in support of National Pride Day,[71] and recently, Altria, a major tobacco company, tweeted a statement that they are "proud to support the Respect for Marriage Act," emphasizing their "support for LGBTQ+ issues."[72] Furthermore, ad content could account for differences in receptivity observed by sex. Prior studies have identified differences in tobacco advertising and packaging features that appeal to men vs. women. Indeed, internal tobacco industry research shows that messaging highlighting

the psychosocial benefits of cigarette smoking, such as peer-group belonging, has been particularly appealing to women.[73] One study of young women found that "female-oriented" cigarette packs (eg, containing descriptors like "slim," pink packaging) were more appealing than packs without these attributes.[74] Unfortunately, we were not able to examine the content of the ads that respondents were exposed to in this study since the PATH Study does not make this information available. Research is needed to understand ad features, such as language and imagery, that are appealing to different LGB populations, as well as where LGB populations are exposed to tobacco advertising. Qualitative studies, such as focus groups, may be particularly useful for elucidating the underlying appeal of tobacco marketing among this population.

This study has limitations. Studies suggest that disparities in exposure to pro-tobacco marketing between sexual minority and heterosexual youth, as well as within-group differences among sexual minority youth (e.g., males vs. females), vary by advertising channel (e.g., magazine and social media).[22] While respondents were exposed to ads from multiple channels, this study was not powered to examine differences in receptivity by channel, but future studies should examine this. Furthermore, while this study attempted to capture the diversity that exists within the LGB community by distinguishing between LGB subgroups in our analyses, we were unable to look at further differences by race/ethnicity due to sample size limitations. However, we did control for race/ethnicity in our multivariable models. But given the history of the tobacco industry's targeted marketing toward minority groups,[24,75] including Black/African American and Hispanic individuals, future studies must examine receptivity to tobacco marketing at the intersection of multiple identities. This study also relied on self-reported exposure to tobacco ads, which may be subject to recall bias. Furthermore, data from this study are from 2013 to 2014. We did not use more recent data from the PATH Study because Wave 1 was the only time point in which all receptivity items were measured. However, the tobacco marketplace changes rapidly and our findings on receptivity may have changed in the past decade. Additionally, our study may be underestimating receptivity among LGB respondents depending on the content of the advertisements shown in the PATH Study. While the specific ads shown are not shared by the PATH Study, they are likely more general ads, rather than those explicitly targeting LGB individuals, given that questions about receptivity were assessed among all young adults. Had the ads featured been those targeting LGB individuals, receptivity may have been even higher for certain LGB groups. Lastly, data are cross-sectional, and therefore, causality cannot be inferred.

CONCLUSION

Although our study is cross-sectional, our findings suggest that receptivity to tobacco marketing may play a role in tobacco use disparities and that regulatory actions, such as restrictions on marketing and public education campaigns that counter industry messaging, may help to reduce tobacco use among LGB populations and reduce tobacco-related health disparities. Of note, there have been few antitobacco campaigns tailored to sexual minority populations,[75,76] with the exception of *This Free Life*, the U.S. Food and Drug Administration's public education program to reduce cigarette smoking among sexual and gender minority young adults.[77,78] There is a great need for antitobacco campaigns that are targeted to specific LGB subgroups—sexual minority women in particular—and more

research to understand the sources of exposure to tobacco industry marketing and the reasons for elevated receptivity among LGB populations.[23]

REFERENCES

[1] Wang TW, Gentzke AS, Creamer MR, et al. Tobacco product use and associated factors among middle and high school students - United States, 2019. *MMWR Surveill Summ*. 2019;68(12):1–22. https://doi.org/10.15585/mmwr.ss6812a1

[2] Kasza KA, Ambrose BK, Conway KP, et al. Tobacco-product use by adults and youths in the United States in 2013 and 2014. *N Engl J Med*. 2017;376(4):342–353. https://doi.org/10.1056/NEJMsa1607538

[3] Fallin A, Goodin A, Lee YO, Bennett K. Smoking characteristics among lesbian, gay, and bisexual adults. *Prev Med*. 2015;74:123–130. https://doi.org/10.1016/j.ypmed.2014.11.026

[4] Hoffman L, Delahanty J, Johnson SE, Zhao X. Sexual and gender minority cigarette smoking disparities: an analysis of 2016 behavioral risk factor surveillance system data. *Prev Med*. 2018;113:109–115. https://doi.org/10.1016/j.ypmed.2018.05.014

[5] Johnson SE, Holder-Hayes E, Tessman GK, King BA, Alexander T, Zhao X. Tobacco product use among sexual minority adults: findings from the 2012-2013 national adult tobacco survey. *Am J Prev Med*. 2016;50(4):e91–e100. https://doi.org/10.1016/j.amepre.2015.07.041

[6] Lunn MR, Cui W, Zack MM, Thompson WW, Blank MB, Yehia BR. Sociodemographic characteristics and health outcomes among lesbian, gay, and bisexual U.S. adults using healthy people 2020 leading health indicators. *LGBT Health*. 2017;4(4):283–294. https://doi.org/10.1089/lgbt.2016.0087

[7] Wheldon CW, Kaufman AR, Kasza KA, Moser RP. Tobacco use among adults by sexual orientation: findings from the population assessment of tobacco and health study. *LGBT Health*. 2018;5(1):33–44. https://doi.org/10.1089/lgbt.2017.0175

[8] Schuler MS, Rice CE, Evans-Polce RJ, Collins RL. Disparities in substance use behaviors and disorders among adult sexual minorities by age, gender, and sexual identity. *Drug Alcohol Depend*. 2018;189:139–146. https://doi.org/10.1016/j.drugalcdep.2018.05.008

[9] Krueger EA, Braymiller JL, Barrington-Trimis JL, Cho J, McConnell RS, Leventhal AM. Sexual minority tobacco use disparities across adolescence and the transition to young adulthood. *Drug Alcohol Depend*. 2020;217:108298. https://doi.org/10.1016/j.drugalcdep.2020.108298

[10] Cornelius ME, Loretan CG, Wang TW, Jamal A, Homa DM. Tobacco product use among adults - United States, 2020. *MMWR Morb Mortal Wkly Rep*. 2022;71(11):397–405. https://doi.org/10.15585/mmwr.mm7111a1

[11] Li J, Berg CJ, Weber AA, et al. Tobacco use at the intersection of sex and sexual identity in the U.S., 2007-2020: a meta-analysis. *Am J Prev Med*. 2021;60(3):415–424. https://doi.org/10.1016/j.amepre.2020.09.006

[12] McCabe SE, Hughes TL, Matthews AK, et al. Sexual orientation discrimination and tobacco use disparities in the United States. *Nicotine Tob Res*. 2019;21(4):523–531. https://doi.org/10.1093/ntr/ntx283

[13] Jun H-J, Webb-Morgan M, Felner JK, et al. Sexual orientation and gender identity disparities in substance use disorders during young adulthood in a United States longitudinal cohort. *Drug Alcohol Depend*. 2019;205:107619. https://doi.org/10.1016/j.drugalcdep.2019.107619

[14] Azagba S, Shan L, Latham K, Qeadan F. Disparities in adult cigarette smoking and smokeless tobacco use by sexual identity. *Drug Alcohol Depend*. 2020;206:107684. https://doi.org/10.1016/j.drugalcdep.2019.107684

[15] Delahanty J, Ganz O, Hoffman L, Guillory J, Crankshaw E, Farrelly M. Tobacco use among lesbian, gay, bisexual and transgender young adults varies by sexual and gender identity. *Drug Alcohol Depend*. 2019;201:161–170. https://doi.org/10.1016/j.drugalcdep.2019.04.013

[16] McCabe SE, Matthews AK, Lee JGL, Veliz P, Hughes TL, Boyd CJ. Tobacco use and sexual orientation in a national cross-sectional study: age, race/ethnicity, and sexual identity-attraction differences. *Am J Prev Med*. 2018;54(6):736–745. https://doi.org/10.1016/j.amepre.2018.03.009

[17] Talley AE, Sher KJ, Littlefield AK. Sexual orientation and substance use trajectories in emerging adulthood. *Addiction*. 2010;105(7):1235–1245. https://doi.org/10.1111/j.1360-0443.2010.02953.x

[18] Blosnich J, Lee JGL, Horn K. A systematic review of the aetiology of tobacco disparities for sexual minorities. *Tob Control*. 2013;22(2):66–73. https://doi.org/10.1136/tobaccocontrol-2011-050181

[19] Dilley JA, Spigner C, Boysun MJ, Dent CW, Pizacani BA. Does tobacco industry marketing excessively impact lesbian, gay and bisexual communities? *Tob Control*. 2008;17(6):385–390. https://doi.org/10.1136/tc.2007.024216

[20] Emory K, Buchting FO, Trinidad DR, Vera L, Emery SL. Lesbian, gay, bisexual, and transgender (LGBT) view it differently than non-LGBT: exposure to tobacco-related couponing, e-cigarette advertisements, and anti-tobacco messages on social and traditional media. *Nicotine Tob Res*. 2019;21(4):513–522. https://doi.org/10.1093/ntr/nty049

[21] Soneji S, Knutzen KE, Tan ASL, et al. Online tobacco marketing among US adolescent sexual, gender, racial, and ethnic minorities. *Addict Behav*. 2019;95:189–196. https://doi.org/10.1016/j.addbeh.2019.03.015

[22] Azagba S, Shan L. Exposure to tobacco and e-cigarette advertisements by sexual identity status among high school students. *Addict Behav*. 2022;125:107165. https://doi.org/10.1016/j.addbeh.2021.107165

[23] Tan ASL, Hanby EP, Sanders-Jackson A, Lee S, Viswanath K, Potter J. Inequities in tobacco advertising exposure among young adult sexual, racial and ethnic minorities: examining intersectionality of sexual orientation with race and ethnicity. *Tob Control*. 2021;30(1):84–93. https://doi.org/10.1136/tobaccocontrol-2019-055313

[24] U. S. Department of Health and Human Services. *Preventing Tobacco Use Among Youth and Young Adults: a Report of the Surgeon General*. In: Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health: Atlanta, GA; 2012.

[25] National Cancer Institute. *The Role of the Media in Promoting and Reducing Tobacco Use. Tobacco Control Monograph no.19*. In: U.S. Department of Health and Human Services, National Institutes of Health, National Cancer Institute. NIH: Bethesda, MD; 2008.

[26] Wakefield M, Flay B, Nichter M, Giovino G. Role of the media in influencing trajectories of youth smoking. *Addiction*. 2003;98 Suppl 1:79–103. https://doi.org/10.1046/j.1360-0443.98.s1.6.x

[27] Donohew L, Palmgreen P, Duncan J. An activation model of information exposure. *Commun Monogr*. 1980;47(4):295–303. https://doi.org/10.1080/03637758009376038

[28] Donohew L, Palmgreen P, Lorch EP. Attention, need for sensation, and health communication campaigns. *Am Behav Sci*. 1994;38(2):310–322. https://doi.org/10.1177/0002764294038002011

[29] McGuire WJ. Attitudes and attitude change. In: Lindsay G, Aronson E, eds. *Handbook of Social Psychology*. Random House: New York; 1985:65–72.

[30] Audrain-McGovern J, Rodriguez D, Patel V, Faith MS, Rodgers K, Cuevas J. How do psychological factors influence adolescent smoking progression? the evidence for indirect effects through tobacco advertising receptivity. *Pediatrics*. 2006;117(4):1216–1225. https://doi.org/10.1542/peds.2005-0808

[31] Struble CA, Bauer SJ, Lundahl LH, Ghosh S, Ledgerwood DM. Electronic cigarette use among sexual minority and heterosexual young adults in a U.S. national sample: exploring the modifying effects of advertisement exposure. *Prev Med*. 2022;155:106926. https://doi.org/10.1016/j.ypmed.2021.106926

[32] Washington HA. Burning love: big tobacco takes aim at LGBT youths. *Am J Public Health*. 2002;92(7):1086–1095. https://doi.org/10.2105/ajph.92.7.1086
[33] Hendlin YH, Small S, Ling PM. "No-Barriers" tobacco product? selling smokeless tobacco to women, people of colour and the LGBTQ+ community in the USA. *Tob Control*. 2023;32(3):330–337. https://doi.org/10.1136/tobaccocontrol-2020-056178
[34] Stevens P, Carlson LM, Hinman JM. An analysis of tobacco industry marketing to lesbian, gay, bisexual, and transgender (LGBT) populations: strategies for mainstream tobacco control and prevention. *Health Promot Pract*. 2004;5(3 Suppl):129S–134S. https://doi.org/10.1177/1524839904264617
[35] Smith EA, Malone RE. The outing of philip morris: advertising tobacco to gay men. *Am J Public Health*. 2003;93(6):988–993. https://doi.org/10.2105/ajph.93.6.988
[36] Spivey JD, Lee JGL, Smallwood SW. Tobacco policies and alcohol sponsorship at lesbian, gay, bisexual, and transgender pride festivals: time for intervention. *Am J Public Health*. 2018;108(2):187–188. https://doi.org/10.2105/AJPH.2017.304205
[37] Smith EA, Thomson K, Offen N, Malone RE. "If you know you exist, it's just marketing poison": meanings of tobacco industry targeting in the lesbian, gay, bisexual, and transgender community. *Am J Public Health*. 2008;98(6):996–1003. https://doi.org/10.2105/AJPH.2007.118174
[38] Audrain-McGovern J, Tercyak KP, Shields AE, Bush A, Espinel CF, Lerman C. Which adolescents are most receptive to tobacco industry marketing? implications for counter-advertising campaigns. *Health Commun*. 2003;15(4):499–513. https://doi.org/10.1207/S15327027HC1504_07
[39] Lovato C, Watts A, Stead LF, Cochrane Tobacco Addiction Group. Impact of tobacco advertising and promotion on increasing adolescent smoking behaviours. *Cochrane Database Syst Rev*. ;2011:10. https://doi.org/10.1002/14651858.CD003439.pub2
[40] Pokhrel P, Fagan P, Kehl L, Herzog TA. Receptivity to e-cigarette marketing, harm perceptions, and e-cigarette use. *Am J Health Behav*. 2015;39(1):121–131. https://doi.org/10.5993/AJHB.39.1.13
[41] Kim AE, Lee YO, Shafer P, Nonnemaker J, Makarenko O. Adult smokers' receptivity to a television advert for electronic nicotine delivery systems. *Tob Control*. 2015;24(2):132–135. https://doi.org/10.1136/tobaccocontrol-2013-051130
[42] Pierce JP, Sargent JD, Portnoy DB, et al. Association between receptivity to tobacco advertising and progression to tobacco use in youth and young adults in the path study. *JAMA Pediatr*. 2018;172(5):444–451. https://doi.org/10.1001/jamapediatrics.2017.5756
[43] Abdel Magid HS, Bradshaw PT, Ling PM, Halpern-Felsher B. Association of alternative tobacco product initiation with ownership of tobacco promotional materials among adolescents and young adults. *JAMA Netw Open*. 2019;2(5). https://doi.org/10.1001/jamanetworkopen.2019.4006
[44] Agaku IT, Davis K, Patel D, et al. A longitudinal study of the relationship between receptivity to e-cigarette advertisements and e-cigarette use among baseline non-users of cigarettes and e-cigarettes, United States. *Tob Induc Dis*. 2017;15(42):42. https://doi.org/10.1186/s12971-017-0145-8
[45] Pierce JP, Sargent JD, White MM, et al. Receptivity to tobacco advertising and susceptibility to tobacco products. *Pediatrics*. 2017;139(6). https://doi.org/10.1542/peds.2016-3353
[46] Moran MB, Soneji S, Tan ASL, Choi K. Associations between exposure and receptivity to branded cigarette advertising and subsequent brand preference among US young adults. *Nicotine Tob Res*. 2020;22(6):1030–1035. https://doi.org/10.1093/ntr/ntz093
[47] Strong DR, Messer K, Hartman SJ, et al. Pre-adolescent receptivity to tobacco marketing and its relationship to acquiring friends who smoke and cigarette smoking initiation. *Ann Behav Med*. 2017;51(5):730–740. https://doi.org/10.1007/s12160-017-9896-y

[48] Moran MB, Heley K, Baldwin K, Xiao C, Lin V, Pierce JP. Selling tobacco: a comprehensive analysis of the U.S. tobacco advertising landscape. *Addict Behav*. 2019;96:100–109. https://doi.org/10.1016/j.addbeh.2019.04.024
[49] Emory K, Kim Y, Buchting F, Vera L, Huang J, Emery SL. Intragroup variance in lesbian, gay, and bisexual tobacco use behaviors: evidence that subgroups matter, notably bisexual women. *NICTOB*. 2016;18(6):1494–1501. https://doi.org/10.1093/ntr/ntv208
[50] Gonzales G, Przedworski J, Henning-Smith C. Comparison of health and health risk factors between lesbian, gay, and bisexual adults and heterosexual adults in the United States: results from the national health interview survey. JAMA Intern Med. 2016;176(9):1344-1351.
[51] Hyland A, Ambrose BK, Conway KP, et al. Design and methods of the population assessment of tobacco and health (PATH) study. *Tob Control*. 2017;26(4):371–378. https://doi.org/10.1136/tobaccocontrol-2016-052934
[52] Health USDo, Abuse HSNIoHNIoD, Health USDo, Food HS, Products DACfT. *Population Assessment of Tobacco and Health (PATH) Study [United States] Restricted-Use Files. Inter-university Consortium for Political and Social Research [distributor]*; 2022.
[53] U.S. Department of Health and Human Services. *The Health Consequences of Smoking—50 Years of Progress: A Report of the Surgeon General*. In: U.S. Department of Health and Human Services, Centers for Disease Control, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health: Rockville (MD); 2014.
[54] *Population Assessment of Tobacco and Health (PATH) Study [United States] Public-Use Files: User Guide*. In: Ann Arbor, MI; 2019.
[55] Ganz O, Rimal RN, Cohn AM, Johnson AL, Delnevo CD, Horn K. Receptivity to tobacco advertising among young adults with internalizing problems: findings from the population assessment of tobacco and health study. *Subst Use Misuse*. 2020;55(4):546–556. https://doi.org/10.1080/10826084.2019.1688349
[56] *Stata/MP 17.1 MP for Windows*. 2021. https://doi.org/10.35940/ijmm.B1707.091221
[57] Corey CG, Holder-Hayes E, Nguyen AB, et al. US adult cigar smoking patterns, purchasing behaviors, and reasons for use according to cigar type: findings from the population assessment of tobacco and health (PATH) study, 2013-2014. *Nicotine Tob Res*. 2018;20(12):1457–1466. https://doi.org/10.1093/ntr/ntx209
[58] Corey CG, King BA, Coleman BN, et al. Little filtered cigar, cigarillo, and premium cigar smoking among adults--United States, 2012-2013. *MMWR Morb Mortal Wkly Rep*. 2014;63(30):650–654.
[59] National Academies of Sciences. *Engineering, and Medicine. Premium Cigars: Patterns of Use, Marketing, and Health Effects*. In: The National Academies Press: Washington, DC; 2022.
[60] Sterling KL, Vishwakarma M, Ababseh K, Henriksen L. Flavors and implied reduced-risk descriptors in cigar ads at stores near schools. *Nicotine Tob Res*. 2021;23(11):1895–1901. https://doi.org/10.1093/ntr/ntab136
[61] Shokoohi M, Salway T, Ahn B, Ross LE. Disparities in the prevalence of cigarette smoking among bisexual people: a systematic review, meta-analysis and meta-regression. *Tob Control*. 2021;30(e2):e78–e86. https://doi.org/10.1136/tobaccocontrol-2020-055747
[62] Romm KF, Huebner DM, Pratt-Chapman ML, et al. Disparities in traditional and alternative tobacco product use across sexual orientation groups of young adult men and women in the US. *Subst Abus*. 2022;43(1):815–824. https://doi.org/10.1080/08897077.2021.2010259
[63] Meyer IH. Prejudice, social stress, and mental health in lesbian, gay, and bisexual populations: conceptual issues and research evidence. *Psychol Bull*. 2003;129(5):674–697. https://doi.org/10.1037/0033-2909.129.5.674
[64] McCann E, Brown MJ, Taylor J. The views and experiences of bisexual people regarding their psychosocial support needs: a qualitative evidence synthesis. *J Psychiatr Ment Health Nurs*. 2021;28(3):430–443. https://doi.org/10.1111/jpm.12680

[65] Aloise-Young PA, Hennigan KM, Graham JW. Role of the self-image and smoker stereotype in smoking onset during early adolescence: a longitudinal study. *Health Psychol*. 1996;15(6):494–497. https://doi.org/10.1037//0278-6133.15.6.494
[66] Barton J, Chassin L, Presson CC, Sherman SJ. Social image factors as motivators of smoking initiation in early and middle adolescence. *Child Dev*. 1982;53(6):1499–1511.
[67] *Bright Marketing Solutions. Case study: Tobacco*. 2022. https://marketingtherainbow.info/case%20studies/cs-fmcg/tobacco
[68] Pearson JL, Johnson A, Villanti A, et al. Misperceptions of harm among natural american spirit smokers: results from wave 1 of the population assessment of tobacco and health (PATH) study (2013-2014). *Tob Control*. 2017;26(e1):e61–e67. https://doi.org/10.1136/tobaccocontrol-2016-053265
[69] Budenz A, Grana R. Cigarette brand use and sexual orientation: intersections with gender and race or ethnicity. *Prev Chronic Dis*. 2021;18. https://doi.org/10.5888/pcd18.210160
[70] Trinkets and Trash. *American Spirit*. 2022. https://www.trinketsandtrash.org/detail.php?artifactid=4610&page=5
[71] Trinkets and Trash. *Optimo*. 2022. https://www.trinketsandtrash.org/detail.php?artifactid=15545&page=1
[72] @altrianews. ". *We're Proud to Support the Respect for Marriage Act. We Joined with More Than 200 Companies in Favor of This Legislation, the Goals of Which Are Consistent with Our Company Values and Aligned with Our Long-Term Support for Lgbtq+ Issues*. 2022. twitter.com/AltriaNews/status/1600979849245610003
[73] Anderson SJ, Glantz SA, Ling PM. Emotions for sale: cigarette advertising and women's psychosocial needs. *Tob Control*. 2005;14(2):127–135. https://doi.org/10.1136/tc.2004.009076
[74] Doxey J, Hammond D. Deadly in pink: the impact of cigarette packaging among young women. *Tob Control*. 2011;20(5):353–360. https://doi.org/10.1136/tc.2010.038315
[75] Cruz TB, Rose SW, Lienemann BA, et al. Pro-tobacco marketing and anti-tobacco campaigns aimed at vulnerable populations: a review of the literature. *Tob Induc Dis*. 2019;17. https://doi.org/10.18332/tid/111397
[76] National Cancer Institute. *A Socioecological Approach to Addressing Tobacco-Related Health Disparities. National Cancer Institute Tobacco Control Monograph 22. NIH Publication no.17-CA-8035A*. Bethesda, MD: U.S. Department of Health and Human Services, National Institutes of Health, National Cancer Institute. 2017.
[77] Crankshaw E, Gaber J, Guillory J, et al. Final evaluation findings for this free life, a 3-year, multi-market tobacco public education campaign for gender and sexual minority young adults in the United States. *Nicotine Tob Res*. 2022;24(1):109–117. https://doi.org/10.1093/ntr/ntab146
[78] Guillory J, Crankshaw E, Farrelly MC, et al. LGBT young adults' awareness of and receptivity to the this free life tobacco public education campaign. *Tob Control*. 2021;30(1):63–70. https://doi.org/10.1136/tobaccocontrol-2019-055239

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Correspondence regarding this article should be directed to Ollie Ganz, Rutgers Center for Tobacco Studies, 303 George Street, Suite 500 New Brunswick, NJ 08901, USA. E-mail: Og96@sph.rutgers.edu