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Little Cigars and Cigarillos: Affect and Perceived Relative Harm among U.S. adults, 2015

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Abstract

Introduction

Similar to cigarette smoking, consumption of cigars delivers nicotine and byproducts of tobacco combustion and elevates the risk of addiction, illness, and premature death. This study examined the relationship of affect, perceived relative harm, and LCC smoking behavior among U.S. adults.

Methods

Data were from Tobacco Products and Risk Perceptions Survey conducted in 2015. The study included a probability based sample of 6,051 adults (18+) drawn from an online research panel. A current LCC smoker was defined as having ever smoked LCCs and was currently smoking LCCs every day, somedays, or rarely. Participants were asked whether smoking LCCs was less harmful, had about the same level of harm, or was more harmful than smoking regular cigarettes. Feelings about LCCs were collected using word association technique. Descriptive and multinomial logistic regression analyses were conducted.

Results

About 7% of the study participants were current LCC smokers. Adults with positive feelings had four-fold the adjusted odds to be current LCC smokers. Perceiving LCCs to be less harmful had 2.7 higher adjusted odds of being current LCC smokers.

Conclusions

Compared to cigarettes, LCCs evoked more positive feelings among adults and these positive feelings were strongly associated with both perceiving LCCs as less harmful than cigarettes and with current LCC smoking. Cessation and prevention interventions would benefit from applying the principles of social marketing in which information is provided not only to inform consumers but also to evoke negative feelings and associations with LCC smoking.

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INTRODUCTION

Similar to cigarette smoking, consumption of cigars—including large, premium cigars, cigarillos, as well as little filtered (cigarette-like) cigars— delivers nicotine and byproducts of tobacco combustion (e.g. carbon monoxide, nitrosamines, nitrogen oxide, and ammonia) and thus elevate the risk of addiction, premature death, and illness.[1-4] Cigars vary in size, filter, tip, and characterizing flavors.[5] In 2009, the Family Smoking Prevention and Tobacco Control Act (TCA) gave the Food and Drug Administration (FDA) the power to regulate cigarettes.[6] During the same year, the FDA prohibited the sales of cigarettes, *but not cigars*, that contain any artificial or natural flavors other than tobacco and menthol because flavors were strategically used to target youth and increase prevalence of smoking initiation.[6] Cigar characterizing flavors, particularly attractive to young people, are shown to increase the appeal of cigar smoking by masking the harshness and smell of tobacco.[7]

Little cigars and cigarillos (LCCs), often sold in singles or small packs, have been marketed as the less expensive and less harmful substitute for cigarettes.[8-10] Although LCC smoking exposes smokers to nicotine and other toxicants, known to impair vascular endothelial function[11] and cause oral, esophageal, and lung cancer,[4] LCC smokers tend to perceive them as less harmful and less addictive than cigarettes.[12] Perceptions about the potential harm and addictiveness of LCCs have been linked to intention of future behavior among adult cigarette smokers.[13] In cigarette smoking research, the role of feelings on smoking initiation is well-documented.[14] Cigarette smoking often begins in adolescence, with beginning smokers acting in response to emotion-based media appeals and social pressures that supply immediate positive associations with

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smoking, but no information on the risks of illness or addiction caused by smoking.[14] The immediate feelings an individual uses to judge the level of risk is termed the *Affect Heuristic*.[15] The risk perception theory based on the *Affect Heuristic* posits that information on risk could reduce the emotional (affective) favorability of a given behavior and that information on benefit could increase the favorability, thus influencing feelings and perceptions of harm, and in turn may discourage or promote the behavior.[15] Cigarette ads are designed to exploit feelings and generate positive imagery associated with smoking which in turn reduces the perceived harm and promote smoking behavior.[16,17]

In contrast with data on the relationship between affect, risk perception, and cigarette smoking, data on factors influencing perceptions of harm and the role of affect in shaping the beliefs about LCCs are limited. Therefore, based on the research on affect, risk, and decision making, we conducted this study on the perceptions of harm of LCCs relative to cigarettes and the impact of feelings on LCC smoking. The objectives of the current study were to explore perceptions of harm associated with LCC smoking relative to cigarette smoking, and examine the relationship of affect, perceived relative harm, and LCC smoking behavior among U.S. adults.

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METHODS

Data were from the Tobacco Products and Risk Perceptions Survey, an online cross-sectional survey conducted in August-September, 2015. This annual survey was administered by the Tobacco Center of Regulatory Science at Georgia State University. The overall goal of the survey was to investigate the perception of multiple tobacco products (i.e. cigarettes, electronic cigarettes, hookah, little cigars and cigarillos) how the risk perception relates to the individual's decision to use tobacco products. The study used a probability sample drawn from an online research panel designed to be representative of the U.S. population, known as *KnowledgePanel*. Since 2009, address-based sampling (ABS) has been employed to recruit panelists. This sampling methodology covers about 97% of U.S. households including those with unlisted telephone numbers, with no landline telephones, and have no access to the internet or no device to access the internet. Currently, 55,000 adults aged 18 and older have joined *KnowledgePanel*.

Final stage survey completion rate was 76.0% (N=6,051 adults aged 18 years and older). After exclusion of respondents who were unaware of LCCs or had missing values on the awareness variable, the final analytical sample used in the current study was 5,105 adults. The study was approved by the Institutional Review Board of Georgia State University.

Measures

Affect

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Consistent with previous research on affect and decision making,[14] word association technique was used to elicit feelings toward LCCs. After word association, participants are typically asked to assign a degree of negativity or positivity to the associated word/image. In prior studies these associations have been shown to be predictive of both preferences and behavior.[14] Using an open-ended (text) question, the study participants who were aware of LCCs were asked to report the first thought or image that comes to mind when hearing the phrase "little cigars, cigarillos, or filtered cigars." Data were collected on affect associated with the reported images or thoughts associated with LCCs using this question, "how do you feel about this thought or image?" Response options included very bad, somewhat bad, both good and bad, somewhat good, and very good, measured on five-point scale ranging from -2 to +2.

First image or thought and its associated affect were also elicited in response to the term "cigarette." The response categories "very good" and "somewhat good" were combined into "good," and "very bad" and "somewhat bad" were grouped and labeled "bad," creating a three-response category (good, neutral, bad) variable to represent affect (feelings) about the first thought or image associated with LCC smoking.

Relative harm perceptions of LCC smoking compared to cigarettes

All those who were aware of LCCs were asked whether smoking LCCs was less harmful, had about the same level of harm, or was more harmful than smoking regular cigarettes. Participants could also select "I don't know" in response to this question.

Perceived addictiveness of LCCs

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One direct measure of perceived addictiveness of LCCs was used. Participants were asked whether people can become addicted to LCCs; response options were yes, no, and "I don't know."

LCC smoking status

Participants were grouped into three mutually exclusive groups: current, former, and never LCC smokers. A current LCC smoker was defined as having ever smoked LCCs and was currently smoking LCCs every day, somedays, or rarely. Participants who reported ever smoking LCCs and responded *not at all* to the LCC use now question were categorized as former smokers. Never LCC smokers were participants who responded *no* when asked whether they have ever smoked LCCs, even one or two puffs.[18] Study participants who had reported they were not aware of LCCs prior to this study were classified as never users.

Cigarette smoking status

To assess cigarette smoking status, we used the commonly used measure for defining current, former, and never smokers.[9] Adults who reported smoking at least 100 cigarettes in their lifetime and were currently smoking every day or somedays were categorized as current cigarette smokers. Adults who have smoked 100 cigarettes in their lifetime and responded *not at all* to the "smoke now" question were classified as former cigarette smokers. Never cigarette smokers were adults who reported not having smoked at least 100 cigarettes in their lifetime.

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Demographic characteristics included in this study were sex, age, race/ethnicity, educational attainment, annual household income.

Statistical Analysis

Analyses were conducted in January, 2017 using Stata/MP 13.1 (StataCorp, College Station, TX) to assess the relationship of images and feelings to LCC smoking and perception of harm, and to compute weighted estimates representative of the U.S. adults. Survey specific weighting variables were used to account for the complex survey design and survey non-response. Weighted percentages overall and by LCC smoking status were estimated. To determine the characteristics associated with perceptions of relative harm of LCCs and with LCC smoking (current and former), we conducted multivariable multinomial logistic regression analyses. Adjusted odds ratio (AOR) and 95% confidence intervals (CI) were estimated. Significance level was set at $p<0.05$.

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RESULTS

The sample included 66.1% white, non-Hispanic, 11.6% Black, non-Hispanic, and 51.4% females. More details on the demographic characteristics of the study sample is included in a previous publication.[19] In 2015, among all adults, 7.1% (95% CI: 6.3, 8.0) were current LCC smokers, 25.2% (95% CI: 23.9, 26.6) were former LCC smokers, and 67.7% (95% CI: 66.2, 69.1) were never LCC smokers. Whereas 66.2% of the study participants rated the images associated with cigarettes as 'bad', 55.1% rated the images associated with *LCCs* as 'bad' (Figure 1). Compared to proportions of participants who felt 'neutral' or 'good' about images associated with *cigarettes*, higher proportions assigned 'neutral' or 'good' feelings to images associated with *LCCs*.

The majority of the study participants (65.0%; 95% CI: 63.3, 66.7) thought LCCs were as harmful as cigarettes; 7.6% (95% CI: 6.8, 8.6) less harmful; 9.8% (95% CI: 8.7, 10.9) more harmful than cigarettes; and 17.6% (95% CI: 16.3, 19.0) said 'I don't know'. Table 1 shows that, compared with perceiving LCCs to be equally harmful as cigarettes, expressing *good or neutral* feelings about LCC images was associated with higher odds of the perception that LCC smoking was less harmful than cigarettes (Table 1). Adults who thought LCCs were *not addictive* had a 9.6 fold higher adjusted odds to think LCC were less harmful. Males, those who were 18-24 years, and who were current LCC smoker were more likely to perceive LCCs as less harmful than cigarettes. Compared to White adults, Black adults were less likely to perceive LCCs as less harmful than cigarettes. Compared to never cigarette smokers, current cigarette smokers had 60% reduction in the adjusted odds of perceiving LCCs as less harmful than cigarettes.

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Adults who expressed *good or neutral* feelings about images associated with LCCs had four-folds the adjusted odds to be current LCC smokers than never LCC smokers (Table 2). Perceiving LCCs to be less harmful than cigarettes (compared to be equally harmful) had 2.7 higher adjusted odds of being current LCC smokers. Men were more likely than women to be current or former LCC smokers than to be never LCC smokers (Table 2). Self-identification as Non-Hispanic Black compared to Non-Hispanic White was associated with a 2.4-fold increase in the adjusted odds of being a current LCC smoker. Current cigarette smokers were more likely than never smokers to be current LCC smokers. No significant differences were observed in LCC smoking status by levels of education or household income.

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DISCUSSION

This study showed that compared to cigarettes, LCCs evoked more positive feelings (positive affect) among adults and that these positive feelings were strongly associated with both perceiving LCCs as less harmful than cigarettes and with current LCC smoking. Consistent with prior research,[20] the current study revealed that current LCC smoking is more prevalent among African Americans, males, younger adults, and current cigarette smokers. Efforts to reduce the burden of premature death and disease caused by combustible tobacco products should target minority populations and young adults. In order to be effective, health communication campaigns must be tailored to the characteristics of the population at risk.[21]

The finding that the majority of the study participants correctly perceived the harm of LCCs to be equal to that of cigarettes is encouraging. Similar to cigarette smoking, use of cigars (large, cigarillos, and little filtered cigars) may lead to premature mortality and morbidity. A systematic review of 22 studies on the effect of current exclusive cigar smoking among adults, documented elevated risk of developing oral, esophageal, laryngeal, pancreatic, and lung cancer, as well as coronary heart disease (CHD) and aortic aneurysm.[4] Yet, some individuals are still misinformed or uninformed about the harm of LCCs. This study revealed that perceiving LCCs as not addictive and favorable feelings may contribute perceiving LCCs as less harmful than cigarettes.

Young adults and current LCC smokers are especially at risk of misperceiving the harm of LCC compared to cigarettes. Possible reasons for this relationship may be related to LCC product design (flavor and packaging), altering cigars (freaking), use as blunts and pattern of use. First) a recent review of 20 qualitative studies on the role of flavor in tobacco products on harm

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perception showed that flavored tobacco products, including electronic cigarettes, hookah, and LCCs, are believed to be less harmful that cigarettes.[22] A study among young adult LCC smokers revealed that flavored LCCs were perceived as less harmful than cigarettes because of attractive flavors[10] and package design, particularly the use of images of fruit on the package.[23] Second) some LCC users, specifically smokers of Black and Mild, modify their cigars before smoking by removing the filter paper (inner binder), a.k.a 'cancer paper.' This modification, known as 'freaking',[24] 'hyping' was believed to reduce the harm of cigar smoking.[25] Third) another reason for the perception of reduced harm could be due to the use of cigars as blunts to smoke marijuana, substance perceived as less harmful than tobacco.[10] Lastly, amount smoked and inhalation style (perceived 'no inhalation') of cigar smoking is different than that of cigarette smoking, thus, some users may perceive cigars as less harmful. Health education campaigns should provide accurate information regarding the addictive nature of nicotine in LCCs, as well as correct misperceptions surrounding the use of unaltered and altered LCCs.

In May, 2016, the Food and Drug Administration (FDA) extended its regulatory authority over products that meet the definition of tobacco products, including large cigars, cigarillos, and little cigars.[26] Under this rule, the FDA requires the display of health warnings on LCC packages and cigar advertisements.[26] The required warning statements for use on LCC packages include: addiction or nicotine statement, risk of mouth and throat cancer, risk of lung cancer, not being a safe alternative to cigarettes, and reproductive harm.[26] Our study provides baseline information on the perceived relative harm and perceived addictiveness of LCCs among U.S. adults that may change over time in response to the implementation of new regulations. Continuous monitoring of LCC smoking as well as the perceptions of harm and addictiveness among U.S. adults, not

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only among current smokers, is required to assess the potential impact of future regulatory and communication efforts.

Consistent with research on cigarette smoking, the current study provides evidence that implicit attitudes (affect) toward LCCs influence both perception of harm and LCC smoking behavior.[15,16,27] The role of both cognitive and affective (feeling) components of harm perception in cigarette smoking have been documented.[27] For example, repeated exposure to cigarette ads was shown to induce positive feelings for smoking and reduce the individual's perceived risk.[16] Given that feelings are subject to change, employing a similar strategy could prove effective to curb the rise in LCC smoking. LCC smoking cessation and prevention interventions would benefit from applying the principles of social marketing in which information is provided not only to inform consumers but also to evoke negative feelings and associations with LCC smoking.

In the current study, the estimated prevalence of current LCC smoking among U.S. adults (7.1%) was higher than that documented in previous studies, suggesting a rise in the prevalence of LCC smoking. Data from the 2012-2013 National Adult Tobacco Survey revealed that 5.8% of U.S. adults reported smoking at least 50 cigars, cigarillos, or filtered little cigars during their lifetime and now smoked "every day" or "some days" or "rarely.[18]" To guide and evaluate tobacco control interventions, continuous monitoring of cigarette and non-cigarette tobacco product use,[5] is critical, using consistent measures to allow for comparability across multiple studies. Consistent with previous research,[28-32] the current study showed that those who are Black, non-

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Hispanic, young adults, males, and current cigarette smokers are at higher risk of LCC smoking and in turn higher risk for tobacco related diseases. Flavors,[33,34] affordable prices,[31] and targeted advertisement may explain the high uptake of LCCs among these subpopulations. Cantrell, et al (2013) documented the high availability of LCCs, aggressive exterior advertisement, and lower prices of LCCs in African American and young adult predominant neighborhoods.[35,36] Furthermore, this study confirms that perception of reduced harm compared to cigarettes is positively related to LCC smoking.[13,37] Harm perceptions and personal characteristics can inform and guide future LCC-related research, policy, and interventions. For example, the impact of health communications and tobacco counter-marketing efforts tailored to the audience characteristics is maximized.[21]

Limitations

Use of an online research panel (*KnowledgePanel*) to draw the study sample may raise concerns about generalizability of the results to the U.S. adults. However, *KnowledgePanel* is a probability-based and designed to be representative of non-institutionalized USA adults. Given the cross-sectional nature of the survey, it cannot be determined whether the perception of reduced relative harm and associating LCC thoughts and images with positive feelings preceded or followed LCC smoking behavior. Thus, causal inferences are not warranted. Longitudinal or experimental study designs would be useful to remove concerns about causality. The survey focused on eliciting perceptions in relation to LCCs used with tobacco and did not include

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blunts, thus, the findings may not reflect LCCs use with other products than tobacco. Finally, the study relied on self-reporting of LCC smoking and thus may raise issues of response bias.

Conclusions

The study suggests that favorable affect plays an important role in LCC smoking behavior and in shaping harm perceptions. The results document that current LCC smoking is more prevalent among African Americans, males, younger adults, and current cigarette smokers. The findings have implications for policy, research, and public health interventions. Enhanced surveillance efforts tracking the prevalence of use and perceptions of LCCs could benefit evaluation of new implemented LCC-related policy. Experimental research on strategies to evoke negative feelings about LCCs are necessary to inform health communication efforts. Cessation services should be provided to populations at higher risk of LCC smoking, namely, African Americans and young adults. Targeted health communication efforts to correct information and create negative feelings toward LCCs could prove effective in reducing the burden of LCC smoking among vulnerable populations.

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analysis or interpretation of the data, writing the manuscript, or the decision to submit the paper for publication.

Contributors

All authors were involved in the design of the study. Majeed conducted the statistical analysis and wrote the first draft of the manuscript and all authors contributed to and have approved the final manuscript.

Conflict of Interest

None

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Figure titles

FIGURE 1- Feelings about images associated with "little cigars, cigarillos, or filtered cigars" and "cigarette" among U.S. adults, 2015.

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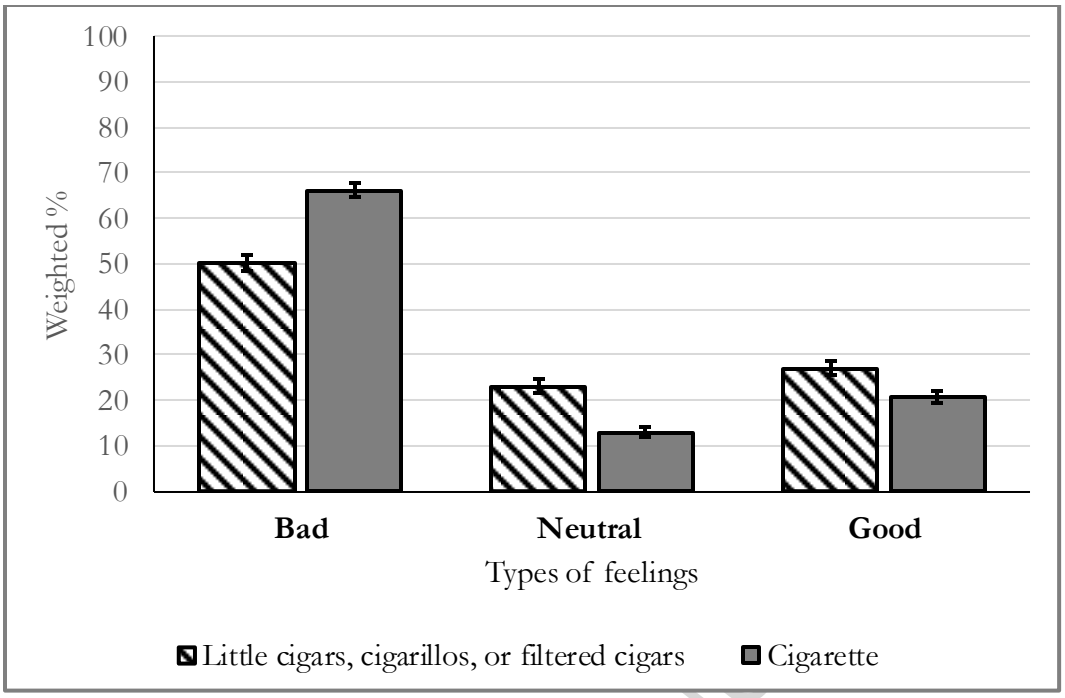

FIGURE 1

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TABLE 1– Characteristics associated with perceptions of relative harm of little cigars and cigarillos among U.S. adults, 2015

	Perceptions of Relative Harm[a]		
Participant characteristics	Less harmful	More harmful	"I don't know"
	AOR (95% CI)	AOR (95% CI)	AOR (95% CI)
Feelings about images associated with LCCs			
Good or neutral	**1.8** (1.3, 2.4)**	**0.6** (0.5, 0.9)**	1.0 (0.8, 1.2)
Bad	1.0	1.0	1.0
Perceived addictiveness of LCCs			
Not addictive	**9.6** (5.5, 17.0)**	**2.6* (1.2, 5.6)**	**2.9** (1.4, 6.3)**
Yes addictive	1.0	1.0	1.0
"I don't know"	**3.9** (2.6, 5.9)**	**1.8* (1.1, 3.1)**	**7.9** (6.1, 10.4)**
Sex			
Male	**1.5* (1.1, 2.0)**	1.1 (0.8, 1.5)	1.0 (0.8, 1.2)
Female	1.0	1.0	1.0
Age (years)			
18-24	**2.4** (1.3, 4.3)**	1.7 (0.8, 3.4)	0.7 (0.4, 1.2)
25-34	1.1 (0.7, 1.7)	**1.7* (1.1, 2.5)**	0.7 (0.5, 1.0)
35-44	0.9 (0.5, 1.4)	1.2 (0.7, 2.0)	0.7 (0.5, 1.0)
45-54	1.2 (0.8, 1.9)	1.1 (0.7, 1.7)	0.7 (0.5, 1.0)
55-64	1.3 (0.9, 2.1)	1.2 (0.8, 1.8)	0.9 (0.7, 1.3)
65+	1.0	1.0	1.0
Race/Ethnicity			
White, NH	1.0	1.0	1.0
Black, NH	**0.4** (0.2, 0.7)**	1.1 (0.7, 1.7)	**1.6* (1.1, 2.2)**
Other, NH	0.8 (0.3, 1.8)	**1.9* (1.1, 3.4)**	**2.2** (1.2, 3.8)**
Hispanic	0.8 (0.5, 1.2)	0.8 (0.6, 1.3)	1.2 (0.9, 1.7)
Education			
<High school	1.0	1.0	1.0
High school	0.6 (0.3, 1.2)	0.8 (0.4, 1.6)	0.7 (0.5, 1.1)
Some college	0.8 (0.4, 1.5)	1.3 (0.7, 2.6)	**0.6* (0.4, 0.9)**
College degree +	0.8 (0.4, 1.7)	1.1 (0.5, 2.2)	0.7 (0.4, 1.1)
Household income			
$24,999 or less	1.0	1.0	1.0
$25,000-$84,999	1.2 (0.7, 1.9)	0.7 (0.5, 1.0)	1.1 (0.8, 1.5)
$85,000 or more	1.1 (0.7, 1.9)	**0.6** (0.4, 0.9)**	0.9 (0.6, 1.3)
Cigarette smoking status			
Current smoker	**0.4** (0.3, 0.7)**	**1.7** (1.1, 2.5)**	1.2 (0.9, 1.7)
Former smoker	**0.5** (0.4, 0.8)**	1.4 (1.0, 2.1)	0.9 (0.7, 1.1)
Never smoker	1.0	1.0	1.0
LCC smoking status			
Current smoker	**1.8* (1.1, 3.0)**	1.4 (0.9, 2.3)	**0.5* (0.3, 0.9)**
Former smoker	1.3 (1.0, 1.9)	1.1 (0.8, 1.4)	**0.7** (0.5, 0.9)**
Never smoker	1.0	1.0	1.0

** p<0.01, * p<0.05; [a] About the same harm was used as the reference group in the multinomial logistic regression model; All variables appear in the table were included in the model. NH: Non-Hispanic.

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TABLE 2– Characteristics of smokers of little cigars and cigarillos among U.S. adults, 2015

	LCC Smoking Status	
	Current LCC smoker	Former LCC smoker
Participant characteristics	AOR (95% CI)	AOR (95% CI)
Feelings about images associated with LCCs		
Good or neutral	**4.0** (2.8, 5.7)**	**1.6** (1.4, 2.0)**
Bad	1.0	1.0
Perceived relative harm of LCCs		
Less harmful	**2.7** (1.7, 4.4)**	1.4 (1.0, 2.0)
About the same	1.0	1.0
More harmful	1.6 (1.0, 2.6)	1.1 (0.8, 1.5)
"I don't know"	**0.6* (0.4, 0.9)**	**0.7** (0.6, 0.9)**
Sex		
Male	**5.6** (3.9, 7.9)**	**3.3** (2.8, 4.0)**
Female	1.0	1.0
Age (years)		
18-24	**8.9** (4.6, 17.3)**	1.3 (0.8, 2.1)
25-34	**8.3** (4.8, 14.3)**	**2.4** (1.8, 3.2)**
35-44	**5.6** (3.3, 9.6)**	1.1 (0.8, 1.5)
45-54	**3.7** (2.1, 6.3)**	1.1 (0.9, 1.5)
55-64	**2.2** (1.3, 3.8)**	1.1 (0.9, 1.5)
65+	1.0	1.0
Race/Ethnicity		
White, NH	1.0	1.0
Black, NH	**2.4** (1.5, 3.9)**	0.8 (0.6, 1.2)
Other, NH	1.2 (0.6, 2.3)	0.8 (0.5, 1.3)
Hispanic	1.4 (0.9, 2.2)	1.0 (0.7, 1.3)
Education		
<High school	1.0	1.0
High school	0.9 (0.5, 1.7)	1.1 (0.7, 1.8)
Some college	1.3 (0.6, 2.5)	1.6 (1.0, 2.6)
College degree +	1.0 (0.5, 2.0)	1.7 (1.0, 2.7)
Household income		
$24,999 or less		
$25,000-$84,999	0.6 (0.4, 1.0)	1.0 (0.8, 1.4)
$85,000 or more	0.6 (0.4, 1.0)	1.0 (0.8, 1.4)
Cigarette smoking status		
Current smoker	**14.5** (9.4, 22.3)**	**6.3** (4.8, 8.3)**
Former smoker	**3.1** (2.0, 4.9)**	**5.7** (4.6, 7.0)**
Never smoker	1.0	1.0

** p<0.01, * p<0.05; Note, *never smoker of LCCs* was the reference group in the multinomial logistic regression. NH: Non-Hispanic.

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Highlights

- Participants were more likely to have favorable feeling about LCCs than cigarettes.
- Those who thought LCCs were not addictive also thought they were less harmful.
- Adults who had favorable feelings about LCCs were more likely to smoke them.
- Favorable affect has important role in LCC smoking and in harm perceptions.

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