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Standardised cigarette packaging may reduce the implied safety of Natural American Spirit cigarettes

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ABSTRACT

Background Over two-thirds of Natural American Spirit (NAS) smokers believe their cigarettes might be 'less harmful', but toxicological evidence does not support this belief. We assessed whether standardised packaging could reduce the possibility of erroneous inferences of 'safety' drawn from NAS cigarette packaging.

Methods US adult smokers (n=909) were recruited to a between-subject survey experiment (3 brands×3 packaging/labelling styles) through Amazon Mechanical Turk and rated their perception of whether a randomly assigned cigarette package conveyed that the brand was 'safer' on a three-item scale (Cronbach's $\alpha=0.92$). We assessed whether NAS packs were rated higher on the 'implied safety' scale than two other brands and estimated the effect that plain packaging (ie, all branding replaced with a drab dark brown colour) and Australian-like packaging (ie, all branding replaced with a drab dark brown colour and a graphic image and text on 75% of the pack surface) had on perceptions of the NAS cigarette package.

Results Smokers' ratings of the standard NAS pack on the implied safety scale (mean=4.6; SD=2.9) were 1.9 times ($P<0.001$) higher than smokers' ratings of a Marlboro Red pack (mean=2.4; SD=2.3) and 1.7 times ($P<0.001$) higher than smokers' ratings of a Newport Menthol pack (mean=2.7; SD=2.4). These perceptions of implied safety were lower when plain packaging was used (Cohen's $d=0.66$; $P<0.001$) and much lower when Australian-like packaging was used (Cohen's $d=1.56$; $P<0.001$).

Conclusion The results suggest that NAS cigarette packaging conveys that its cigarettes are 'safer' and that such perceptions are lower with standardised packaging, both with and without warning images.

(USFDA) that they in fact reduce the health risks of smoking in order to be marketed as a 'Modified Risk Tobacco Product'. To date, no cigarette brand has provided such evidence.¹

In the USA, the brand 'Natural American Spirit' (NAS) is the cigarette brand most commonly perceived to be lower in harm, with 67% of its current consumers reporting that the brand might be 'less harmful'.² Several studies have discussed how attributes included in NAS packaging and advertising may be partially responsible for perceptions that these cigarettes are less harmful. For instance, a recent study by Pearson *et al* identified that claims such as '100% Additive-Free' and 'Made with Organic Tobacco' can lead some consumers to erroneously infer that the manufacturer has taken efforts to assure that the product is safer.⁵ In addition to text, Moran *et al*'s study of NAS advertising imagery suggests that consumers might associate some features with reduced harmfulness, including the use of pastel 'earth' colours, Native Americans, leaves and farmers.⁶ Similar claims were made in Epperson *et al*'s study of the social responsibility frames, such as '100% zero-waste-to-landfill' and 'Respect the Earth', which appear on the flip side of NAS cigarette packages.⁷ Although NAS is associated with these positive connotations, toxicological reports suggest that NAS cigarettes are in fact not less harmful, resulting in higher machine yields of known human carcinogens and nicotine than many other leading brands.^{8–10}

Some efforts to correct perceptions associated with 'additive-free' and 'organic' tobacco products have been taken throughout the world. In the USA, a Federal Trade Commission (USFTC) lawsuit in 2000 required that NAS packaging and advertising display the disclaimer 'No additives in our tobacco does NOT mean a safer cigarette'.¹¹ An additional settlement agreement with States' Attorney General in 2010 required NAS advertising to also display the message 'Organic does NOT mean a safer cigarette'.¹² Nonetheless, focus groups conducted by Byron *et al* found that many smokers do not notice these warnings and do not find them effective.¹³ In support of these findings, a national survey, fielded during a time when these disclaimers were on packaging and advertising, reported that more than two-thirds of Natural American Spirit smokers believed their cigarettes were less harmful.² Most recently, a settlement with Santa Fe Tobacco and the USFDA¹⁴ required removal of the term 'additive-free' and 'natural', save for on NAS's brand name and trademarks, as well as stipulated that Santa Fe Tobacco enter into discussion with the

INTRODUCTION

Although the Family Smoking Prevention and Tobacco Control Act of 2009 (FSPTCA) essentially banned the marketing of cigarettes as 'safe' or 'safer' in the USA,¹ more than 2.5 million US consumers believe they are smoking a brand of cigarettes that might be 'less harmful'.² This misconception of reduced harm is problematic from a public health perspective, because health-concerned smokers often switch to cigarettes they believe to be safer and delay or abandon quitting.³ Moreover, there is no scientific evidence to support the belief that any one brand or sub-brand of cigarette is safer.⁴ To prevent the marketing of cigarettes as less harmful, the FSPTCA instituted a permitting process requiring that brands provide evidence to the United States Food and Drug Administration



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Figure 1 Smokers were randomly assigned to rate each of the pack conditions illustrated. Note: permissions to print packaging in Australian likeness are provided under license from the Commonwealth of Australia.

USFDA and USFTC over the use of the new phrases ‘Tobacco Filler Ingredients: Tobacco & Water’ or ‘Tobacco Ingredients: Tobacco & Water.’

Standardised packaging, a policy measure now used in Australia and several European countries, but not in the USA,¹⁵ might aid in preventing erroneous inferences about the safety of cigarettes drawn from their packaging.^{16–20} Countries that have adopted standardised packaging have removed all tobacco branding, replaced this packaging with a standard colour and applied a photograph and warning of the harms of smoking to the packaging surface. These alterations are thought to remove cues prompting consumers to contemplate brand-related ideas and instead display a universal representation of the harms of smoking.

As a component of our ongoing trial assessing the impact of Australia’s model of cigarette packaging on American smokers, we sought to assess how standardised packaging might affect perceptions of harm conveyed through NAS cigarette packaging.²¹ For our trial, we obtained license from the Commonwealth of Australia to use features of their cigarette packaging design in a series of studies culminating in a randomised field trial of American smokers.²² We developed two packaging styles for the purposes of this field trial and related premarket studies. The first packaging style was a mock-up of what ‘plain’ cigarette packaging might look like if it were implemented in the USA (figure 1). This packaging style combined elements of the current US packaging (a US cigarette brand name and the Surgeon General’s Warnings) and Australian packaging (a single colour called ‘Pantone 448C’, which was selected for packaging in Australia after a series of premarketing studies).²³ This pack removed all branding images, had standardised fonts and colours and applied no additional enhancement to health warnings beyond the Surgeon General’s Warning, which is displayed on the side of the box. The second ‘Australian-like’ condition, however, further enhanced the plain packaging by applying a

large and graphic warning image and label to 75% of the pack surface. The packaging was designed to simulate what packaging might look like if the USA adopted Australia’s model of cigarette packaging.²⁴ The warning we used for the Australian-like packaging was selected from eight that we received a license to use from the Australia government. We selected the warning that smokers rated as the most effective at communicating the health risks of smoking in a separate study.²⁵ This warning—displayed on the front of the package—contained text that warned the reader that ‘Smoking Causes Peripheral Vascular Disease’ and an image illustrated a gangrenous foot, a type of peripheral vascular disease. The Surgeon General’s Warning on the side of the box was selected from the nine warnings that were available at the time of the study. We selected the Surgeon General’s Warning that most closely related to the message and disease aetiology presented in the Australian-like condition: ‘Quitting smoking now greatly reduces serious risks to your health’.

We hypothesised that smokers would perceive that the NAS packaging conveyed that its cigarettes were ‘safer’ compared with Marlboro Red and Newport Menthol—the two most popular cigarette brands of cigarettes in the USA (Hypothesis 1). We also hypothesised that both the plain and Australian-like packaging would reduce the perception that NAS cigarettes’ packaging conveys its cigarettes are ‘safer’ (Hypothesis 2). Finally, because standardisation inherently increases the similarity in design features on cigarette packaging, we hypothesised that brands packaged in the plain and Australian-like packaging would be perceived more similarly than the same brands packaged with current US packaging (Hypothesis 3).

METHODS

Design

We used a 3 (brand type) × 3 (package style) between-subjects experimental design to have adult smokers rate a randomly assigned cigarette pack in a survey (n=909).

Sample recruitment

Participants were invited via Amazon Mechanical Turk (www.mturk.com) to participate in a brief survey implemented on Qualtrics (www.qualtrics.com) and were compensated US\$0.40 if they successfully completed the survey. Links to the survey were posted on MTurk between 3 March and 6 September 2016. All respondents were screened to determine their eligibility. Respondents in our study were required to be between ages 21 and 50, to have smoked in the last week (1–7 days vs 0 days), to smoke a brand of cigarettes being studied (NAS, Marlboro or Newport) and to pass an attention check. To check attention, respondents were asked to evaluate—on a five-point scale anchored at ‘not at all the case’ and ‘definitely the case’—the reasons behind their initial decision to start smoking. In this series of questions, one of the five questions was: ‘to check your attention, select ‘not at all the case’ here,’ to which we required that all respondents select ‘not at all the case’ in order to demonstrate attention and thus be eligible for the study.

Procedure

After determining eligibility, respondents were randomly assigned to view and rate images of one of nine cigarette packages (figure 1). In the US condition, the most frequently used NAS sub-brand (NAS full-bodied) was used as the study group and the two most popular cigarette brands of cigarettes in the USA,² Marlboro Red and Newport Menthol, were used as controls. The three design conditions were as follows.

Current US pack: a pack that could be purchased in the USA today, with the Surgeon General's Warning displayed on the side of the box.

Plain pack: a plain drab dark brown pack with all brand images removed, the brand name in a standard Arial font and the Surgeon General's Warning displayed on the side of the box.

Australian-like pack: a plain drab dark brown pack with the brand name in a standard Arial font and a health warning and a large photographic image displayed prominently on 75% of the pack surface. The Surgeon General's Warning was displayed on the side of the box.

Measures

After viewing one of the nine images, respondents were asked to rate their perception of the design of the package. We focus on three items that asked respondents about the perception of whether the cigarette packaging they viewed was designed to convey that the cigarettes were harm reducing. 'To what extent do you agree that this pack makes the cigarettes seem...': '...healthier than other cigarettes'; '...lower in nicotine or tar than other cigarettes' and '...safer to smoke than other cigarettes?' Responses to all items were provided on a digital-analogue scale that ranged from '1=completely disagree' to '6=completely agree'. These three items formed what we refer to as the 'implied safety scale', achieved high psychometric reliability (Cronbach's $\alpha=0.92$) and were summed and rescaled to range from 0 to 10 for ease of interpretation.

Demographics and smoking history

Respondents recorded their race/ethnicity ('White', 'Black', 'all others') on a single survey item, with 'Hispanic' listed as a single category that we combined into the 'other' category. Respondents also recorded their age (years), education level ('<high school grad', 'high school grad', 'college grad'), sex ('male', 'female'), the number of days they smoked in the week before taking the survey (1–7 days) and the brand of cigarettes they smoked. We constructed a dummy variable that indicated whether respondents evaluated their own brand or another brand (viewed own brand vs another brand).

Statistical analysis

Analysis of variance and X^2 tests were used to check that random assignment yielded equivalent groups with respect to smoking history and demographic characteristics. Analysis of variance was also used to test whether there were differences in respondents' perceptions of the standard US packages across brands and whether the effects of plain packaging and Australian-like packaging varied significantly by brand. Means, SDs, ratios of means and Holm-adjusted pairwise t-tests were used to describe the pairwise differences between brands on the implied safety scale. Cohen's d and Student's t-tests were computed to describe the magnitude and significance of the effect of plain packaging and Australian-like warnings relative to the current package for each brand of cigarettes. We used Intraclass Correlation Coefficients (ICCs) to compare the proportion of the total variation in ratings on the implied safety scale that occurred between brands across each of the pack conditions. We calculated 95% CIs for ICCs via bootstrap: by fixing the brand and pack style that each respondent was assigned to and by drawing 1000 times from the distribution of responses rating each brand and style on the implied safety scale. We also used analysis of variance to assess whether rating one's own brand had any impact on ratings of implied safety. All analyses were performed using R V.3.2.2; all tests were two-tailed and significance was assessed at $\alpha=0.05$.

RESULTS

In [table 1](#), we display results suggesting that randomised respondents across packaging groups were balanced with respect to race ($P=0.96$), age ($P=0.84$), education level ($P=0.72$), sex ($P=0.58$), the number of days they smoke per week ($P=0.30$) and whether they rated their own brand versus another brand ($P=0.91$). The randomisation of respondents across brands was also balanced with respect to race ($P=0.39$), age ($P=0.90$), education level ($P=0.72$), sex ($P=0.097$), the number of days they smoke per week ($P=0.30$) and whether they rated their own brand versus another brand ($P=0.20$). A total of $n=296$ respondents were randomised to rate a pack of cigarettes that could be purchased in the USA today, $n=305$ were randomised to rate a plain pack and $n=308$ were randomised to rate an Australian-like pack. Across these groups, a total of $n=280$

Table 1 Demographic characteristics by packaging and brand presentation (n=909)

Variable	Level	Stimulus pack				F or X^2 P value	Stimulus brand			F or X^2 P value
		Total (n=909)	Current (n=296)	Standardised (n=305)	Australian like (n=308)		Natural American Spirit (n=280)	Marlboro Red (n=352)	Newport Menthol (n=277)	
		%	%	%	%		%	%	%	
Race	White	71	71	72	70	0.946	75	68	71	0.385
	Black	11	10	11	12		10	11	12	
	Other	18	19	17	18		15	21	17	
Age in years	Mean (SD)	100	31.8 (7.1)	31.7 (6.9)	31.5 (7.1)	0.840	31.6 (7.0)	31.8 (7.0)	31.6 (7.1)	0.899
Education level	<HS grad	12	12	12	12	0.723	12	13	11	0.724
	HS grad	50	51	47	52		49	51	49	
	College grad	38	36	41	37		39	36	40	
Sex	Male	62	65	60	63	0.579	63	59	67	0.097
	Female	37	35	40	37		37	41	33	
Days smoked each week	Mean (SD)	100	5.8 (1.9)	6.0 (1.7)	5.9 (1.8)	0.303	6.0 (1.7)	5.8 (1.9)	6.0 (1.8)	0.301
Brand viewed is brand smoked	Yes	61	60	61	61	0.905	62	57	64	0.199
	No	39	40	39	39		38	43	36	

HS, high school.

Research paper

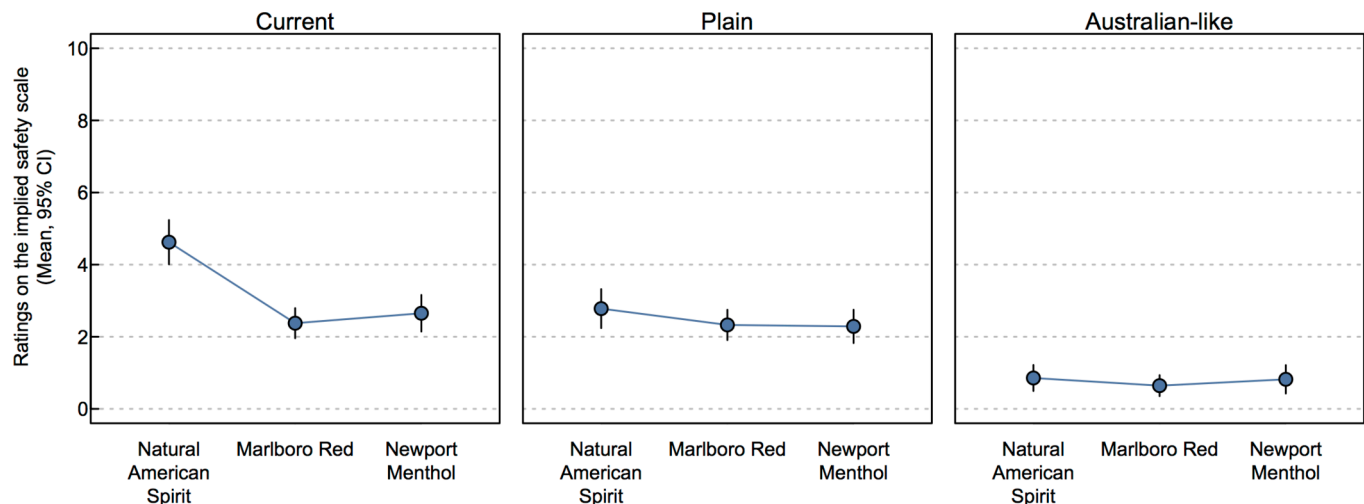


Figure 2 The Natural American Spirit package was rated higher than the Marlboro Red and Newport Menthol on the implied safety scale.

respondents rated NAS packaging, $n=352$ rated Marlboro Red and $n=277$ rated Newport Menthol.

Analysis of variance suggested that there was neither a main effect of respondents rating their own versus another brand ($F(1,290)=0.20$; $P=0.66$) nor an interaction effect between brand rated and respondent's own brand ($F(2,290)=0.50$; $P=0.61$); therefore, this stratification was collapsed. **Figure 2** shows that the ratings of the packages of the three brands differed significantly on the implied safety scale in the current US packaging condition ($F(2,293)=22.51$; $P<0.001$). Pairwise comparisons suggested that smokers' ratings of the standard NAS pack (mean=4.6; SD=2.9) were 1.9 times (4.6/2.4; $P<0.001$) higher than smokers' ratings of a Marlboro Red pack (mean=2.4; SD=2.3) and 1.7 times (4.6/2.7; $P<0.001$) higher than smokers' ratings of a Newport Menthol pack (mean=2.7; SD=2.4) on the implied safety scale. Smokers' ratings of the Marlboro Red pack did not statistically differ from smokers' ratings of the Newport Menthol pack ($P=0.44$) on the implied safety scale.

Figure 3 shows that the effect of plain packaging on cigarette safety ratings differed by brand ($F(2,596)=7.4$; $P<0.001$). In pairwise comparisons across brands, plain NAS cigarette packs

were rated lower than the US NAS cigarette packs on the implied safety scale (Cohen's $d=0.66$; $P<0.001$). However, there was a negligible difference between plain and US packs for Marlboro Red (Cohen's $d=0.02$; $P=0.87$) and Newport Menthol (Cohen's $d=0.15$; $P=0.29$) on the implied safety scale.

Figure 3 also shows that the Australian-like packaging was associated with lower ratings on the implied safety scale compared with standard US packaging, but the magnitude of the difference varied significantly between brands ($F(2,598)=13.5$; $P<0.001$). In pairwise comparison across brands, the ordering in terms of the magnitude of the difference between Australian-like and US packaging on the implied safety scale was as follows, NAS (Cohen's $d=1.56$; $P<0.001$), Marlboro Red (Cohen's $d=0.88$; $P<0.001$) and Newport Menthol (Cohen's $d=0.84$; $P<0.001$).

Finally, in **figure 4**, we show that variance between cigarette brands on the implied safety scale was lower for plain and Australian-like packs than current US packs. Specifically, in the standard US pack condition, 13% (95% CI 7 to 22) of the total variation in ratings on the implied safety scale occurred between brands. However, in the plain packaging condition, only 1% (95% CI 0 to 5) of the total variation in cigarette safety ratings occurred

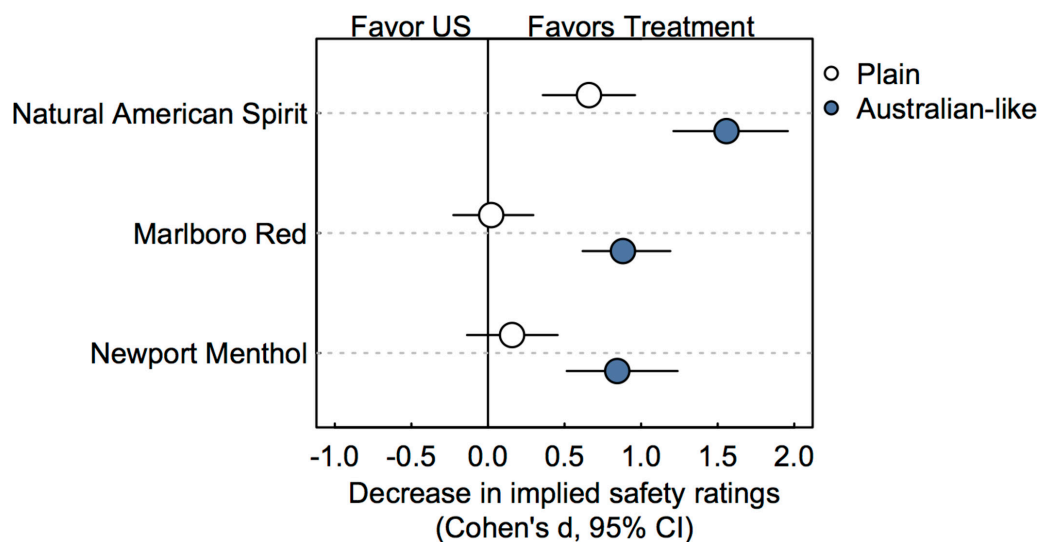


Figure 3 Both plain and Australian-like packs decreased ratings of NAS's implied safety relative to US packs. Only the Australian-like packs decreased ratings of the implied safety of Marlboro Red and Newport Menthol.

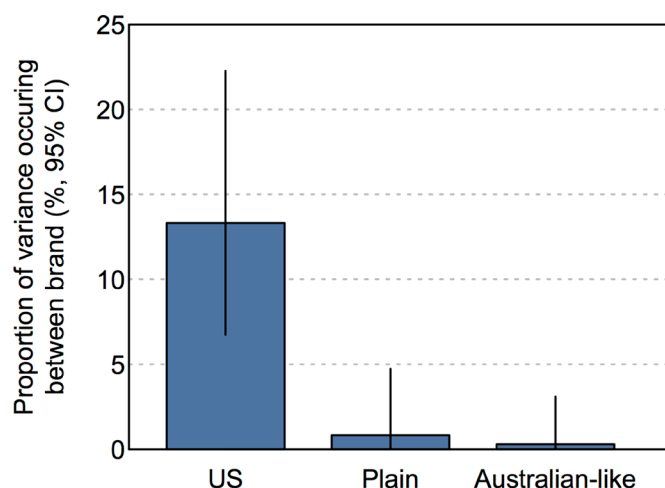


Figure 4 Brands were rated more similarly on the implied safety scale in the plain and Australian-like pack condition than the US pack condition.

between brands. Moreover, the Australian-like packaging essentially eliminated between-brand variance on the implied safety scale, with 0% (95% CI 0 to 3) of the total variation in ratings on the implied safety scale occurring between brands.

DISCUSSION

Using a large web-based experiment, we demonstrated that the plain and Australian-like cigarette packaging assessed herein could reduce the perception that NAS cigarettes are safer. Either packaging style also appeared to force brands to be more similar with regard to their perceived safety; however, the Australian-like packaging had a much larger effect on ratings on the implied safety scale for all brands. As such, these findings suggest that the forms of packaging assessed herein may aid in promoting adherence to requirement in the FSPTCA that no tobacco manufacturer use marketing attributes that either implicitly or explicitly convey that their brand is less harmful, unless they have provided evidence for this claim.

As hypothesised, we found that smokers believe NAS packaged cigarettes to be safer than other brands on the market. This finding further reinforces the USFDA's warning letters sent to the makers of NAS warning them that consumers interpret marketing features on their products as conveying that the brand is a 'Modified Risk Tobacco Product', rendering their product adulterated under the terms of the FSPTCA.²⁶ While we did not assess which design features specifically are conveying these perceptions in our experiment, Pearson *et al.*'s study found that terms such as 'Natural' and '100% Additive-free,' as well other design features on NAS packaging, can convey these perceptions of reduced harm.⁵

These findings also support the hypothesis that both plain and Australian-like packaging could reduce the perceptions that NAS cigarettes packaging conveys their cigarettes are 'safer.' These results advance the findings in Pearson's *et al.*'s study, which showed that removing the term 'additive-free' did not substantially change the perceived harm of NAS, by documenting two efficacious regulatory solutions that would substantially alter these perceptions. The effectiveness of the plain and especially the Australian-like packaging is consistent with previous studies that have also shown that standardising cigarette packaging can affect harm perceptions conveyed about brands.^{19 20 22 27-29} We should also note that only the Australian-like warning was

associated with lower ratings of the perceived safety of Marlboro Red and Newport Menthol cigarettes, which is in line with other studies that have also found that incorporating pictures on packaging increases the attention to and the salience of warning messages.³⁰

The plain and Australian-like packaging styles also increased the similarity in harm perceptions among brands. This constraint on brands is a compelling facet of these packaging styles given that the FSPTCA requires that no brand can use marketing that conveys that it is less harmful without first completing a permitting process. As numerous brands are still thought of as less harmful,² these or similar packaging styles may represent an option for addressing this issue. Future studies could assess whether plain, Australian-like or comparable packaging strategies also increase the similarity of perceptions among other brands that are thought of as less harmful (eg, former light cigarette brands).

A major strength of this study was in the large sample and randomised design; however, there are also limitations. First, the study was based on a convenience sample that is younger and more educated than the general population of US smokers and therefore is limited in its ability to generalise to the US population of smokers. However, the primary purpose was to make comparisons across experimental conditions. Insofar as randomisation controlled both measured and unmeasured confounding, our study will be unbiased in accomplishing this aim. Moreover, the consistency of our results with previous studies—both on the effects of packaging and the ratings of NAS relative to other packaging—increases our confidence in the generalisability of these results. Second, we did not address the specific attributes that are conveying that NAS is less harmful. Previous studies have suggested that there could be multiple attributes that are doing so. Third, while our results suggest that NAS packaging implies that its cigarettes are safer, our scale did not directly assess whether respondents thought the cigarettes were actually safer even if they believed the pack implied that they were. Future studies could explore the relationship between these two beliefs. Finally, at the time we designed our experiment the outcome of the ongoing class-action lawsuit against Santa Fe tobacco was unknown and the USFDA warning letter to Santa Fe tobacco²⁶ directly referenced the use of the term 'natural' as a term that consumers interpreted to imply 'modified risk'. Therefore, in our experiment, we removed the term 'natural' from NAS's brand name in the Plain and Australian-like conditions, expecting this would be a probable outcome. The most recent agreement between the USFDA and Santa Fe tobacco,¹⁴ however, required the removal of the term 'natural' from NAS packaging and advertising, but not from the brand name. It is possible that altering the brand name from 'Natural American Spirit' to 'American Spirit' could have resulted in changes in perceptions of implied safety in addition to the changes we made to pack design. However, the fact that the ratings of implied safety presented in the other brands were also impacted by the Australian-like condition gives an indication that these packaging alterations had a measurable impact.

While taking into account these important limitations, our results clearly suggest that standardised packaging (either with or without warning images) could reduce the possibility that consumers draw erroneous inferences about the relative safety of NAS cigarettes and could reduce the heterogeneity in this perception among US brands. Future studies should address whether these effects extend to other brands that are thought of as less harmful, such as former light and mild cigarettes.

Research paper

What this paper adds

- ▶ Consumers can interpret cues on Natural American Spirit cigarette packaging as claims of reduced harmfulness.
- ▶ Plain packaging or packaging with large graphic warnings could reduce the chance that consumers erroneously infer that these cigarettes are less harmful.

Contributors ECL, JPP, CVD and DRS designed data collection tools. ECL wrote the statistical analysis plan and cleaned and analysed the data. CVD monitored data collection for the whole study. All authors drafted and revised the paper.

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