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Colours, capsules and concept flavour names on cigarette packs appeal to youth in Mexico

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ABSTRACT

Background Flavoured cigarettes are popular in Mexico. We examined how cigarette packaging design features used to communicate flavour influence perceptions of appeal, harm, perceived interest and pack preference among Mexico City residents.

Methods We conducted an experimental survey. Participants aged 13–34 years were randomly assigned to one of three conditions, viewed packs with systematically manipulated design features (colour, capsule image and flavour name) and answered questions on appeal, perceived harm, perceived interest and pack preference. Data were analysed using mixed effects and conditional logistic regression.

Results 1500 adolescents and 950 adults participated. Regardless of flavour, cigarette packs with a background colour and capsule image were more appealing to adolescents (OR=13.19, 95% CI 11.53 to 15.10; OR=1.68, 95% CI 1.45 to 1.88) and adults (OR=4.18, 95% CI 3.73 to 4.69; OR=1.66, 95% CI 1.49 to 1.85) than packs without. Among adolescents, 'Tropical Burst' named packs were more appealing (OR=1.43, 95% CI 1.20 to 1.72) than packs without a flavour name and among adults, 'Arctic Air' named packs were more appealing (OR=1.20, 95% CI 1.02 to 1.14). Adolescents and adults reported a preference for trying packs that displayed a flavour name, background colour or capsule image ($b=0.104$, $b=0.702$, $b=1.316$, $p<0.001$ and $b=0.126$, $b=0.619$, $b=0.775$, $p<0.001$).

Conclusions Colours and flavour capsule images appeal to adolescents and adults in Mexico. Mexico should consider adopting plain packaging to reduce appeal and interest.

INTRODUCTION

Tobacco marketing influences tobacco-related attitudes and behaviours.¹ Cigarette packaging plays an important role in brand positioning, especially among youth and young adults, who are developing their brand preferences.¹ The tobacco industry manipulates different cigarette pack design features (eg, colours, pack shape) to offer products that are attractive.²

Mexico ratified the WHO Framework Convention on Tobacco Control (WHO FCTC) in 2004, and in 2008 enacted the Mexican General Law on Tobacco Control.³ Despite a decrease in smoking prevalence since the ratification of the WHO FCTC,⁴ there are still high rates of smoking in Mexico: 17.9% of adults (aged 20 and above) and 5.7% of adolescents (aged 10–19) are current smokers.⁵ Flavour capsule cigarettes (FCCs)

(cigarettes with one or more capsules placed inside the filter that can be crushed by a user to add flavour to the smoke) expanded the cigarette market in Mexico and overall prevalence of FCC use is 6.6%, accounting for 43% of all current smokers in Mexico.^{4,6} In 2020, FCCs comprised 27% of the cigarette market share in Mexico.⁷ Females, youth and young adults in Mexico are more likely than males and older populations to use FCCs.⁴

Flavoured tobacco products (eg, menthol, fruit and candy) are used to attract new consumers, and are particularly appealing to youth and young adults.^{8,9} FCCs, specifically, are perceived as more attractive than non-capsule cigarette packs and are associated with intentions to try among adolescents in Mexico and are more appealing to non-smokers than smokers in New Zealand.^{10–12} A multicountry study found that FCC smokers were more likely to report their brand was smoother and less harmful than other brands compared with non-FCC smokers.¹³ FCCs have been described as 'cool' and 'high tech', highlighting how the novelty of the product would appeal to youth.¹⁴ Female smokers have reported enjoying the experience of smoking FCCs because they can choose whether they want to burst the capsule, and they taste better and smell less.^{15,16}

Flavours and capsules in cigarettes are communicated on cigarette packs through imagery, colours and descriptors, such as concept flavour names (eg, Ice Xpress).⁸ Pack features play a key role in communicating information about the product and influencing consumers' product perceptions. For example, light coloured packs communicate a lighter cigarette to consumers, whereas red on packs communicates a stronger cigarette²; green packs are commonly known to contain menthol cigarettes.¹⁷ Colours, shades of colour and variant descriptors (eg, flavour names, colour and filter descriptions) influence perceptions of strength, taste, quality and perceived harmfulness.^{17–19}

It remains largely unknown how specific design packaging features associated with FCCs influence consumers' perceptions, especially among youth. The current work fills this gap in knowledge by conducting a study experimentally altering pack features communicating flavour (ie, background colour, capsule, flavour name) to measure their effects on perceptions of product appeal, harm and interest among adolescents and young adults in a country with high consumption of FCCs. Our research question was: *What is the effect of specific pack features (background colour, capsule, flavour*



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name) on reported appeal, perceived harm and perceived interest? By providing a scientific knowledge base regarding which, if any, specific design features of cigarette packs are disproportionately appealing and result in misperceptions of harm, it is our intention that findings from this research inform future tobacco regulations.

METHODS

Sampling and recruitment

Participants were recruited in Mexico City, Mexico, in early 2020. One hundred neighbourhoods (of 1472 total), the primary sampling unit, were selected within Mexico City based on geographic variability and socioeconomic status (SES), resulting in a final sample of 30 low-SES and 70 middle or high-SES neighbourhoods. Neighbourhood SES is classified by the Mexico City Social Development Index developed by the Mexican City government. The secondary sampling units, city blocks, were randomly selected within each neighbourhood. All households within the selected city blocks were approached. Multiple individuals from each household were allowed to participate in the study if they met the inclusion criteria. Quota-based sampling was used to ensure that age, gender and SES (low and middle/high) were proportionally represented in the sample. Recruitment and data collection staff were assigned the number of participants to be recruited from each subgroup in a given neighbourhood and responses to the eligibility screening questions served the dual purpose of being able to monitor fulfilment of quotas as data collection progressed.

To be eligible, adults had to be 18–34 years old, a current resident of Mexico City, able to speak and read Spanish and a current cigarette smoker or former smoker who had quit in the past year; eligible adults provided electronic consent prior to participating in the study. Adolescents were eligible if they were 13–17 years old, a current resident of Mexico City and able to speak and read Spanish; parents of eligible adolescents gave informed oral consent and adolescents provided electronic assent. At the end of the survey, participants received a small financial voucher.

Experimental design

The study employed an electronic, self-administered experimental survey with two experimental procedures. The stimuli used in both experiments (figure 1) were images of the front of cigarette packs. The pack images shown were fictional and designed in collaboration with a Mexico-based graphic designer. The pack designs were based on an existing Korean brand, The

One, lending credibility to the design while avoiding strong brand effects among participants as it is not sold in Mexico or any country in Latin America. All packs featured a pictorial health warning label in rotation in Mexico at the time of data collection covering 30% of the front of the pack, as mandated by the country's regulations. Experimentally altered pack features—background colour, flavour capsule image and flavour name—were chosen based on findings from qualitative research conducted with adolescents and young adults in Mexico that found flavours and colours had a notable impact on perceptions of pack appeal.¹⁵ The pack features added resemble flavoured cigarette packs observed on the market in Mexico which often feature a mix of vibrant colours, capsule images and concept flavour descriptors.

Experiment 1

In the first experiment, participants were randomly assigned to one of three conditions: (a) fruity, (b) nutty, or (c) cool/minty; participants were unaware of which group they had been assigned to. Conditions were conceptualised based on general categories of flavours of cigarettes observed on the market in Mexico. Participants took part in an experiment in which they viewed a control pack (pack with no design features beyond brand name and logo) and seven cigarette packs that varied by pack design features (background colour, flavour capsule image, flavour name) within their assigned condition. Participants answered questions regarding appeal, perceived harm and perceived interest about each pack.

Experiment 2

In the second experiment, participants took part in a discrete choice experimental procedure. Participants were randomly assigned to one of two conditions that excluded the condition they were assigned to in experiment 1. The most efficient design which involved eight choice sets with three pack images per set was used; this design had a D-efficiency score of 1.²⁰ A 2×2×2 factorial design was used; the three pack design features that were manipulated had two levels each—flavour name (present/absent), background colour (present/absent) and flavour capsule image (present/absent). Participants viewed one choice set at a time (see figure 2 for example choice set), and answered the question, 'Which one of these would you rather try?' with the option of selecting one of the three packs, 'None of the above' or 'Prefer not to respond'.

Measures

Demographics

All participants reported their age, sex and highest level of formal education. Adolescents also reported the highest level of formal education for their mother and father. Education questions were taken from the Global Adult Tobacco Survey (GATS)²¹ and the Global Youth Tobacco Survey (GYTS).²²

Smoking-related variables

Smoking status was determined based on questions taken from GATS,²¹ GYTS²² and the Youth Tobacco Survey.²³ Adolescents were considered smokers if they had ever smoked and had smoked a cigarette in the past 30 days. Adults were eligible if they had ever smoked and smoked in the past 30 days or if they were former smokers, but had quit in the past year.

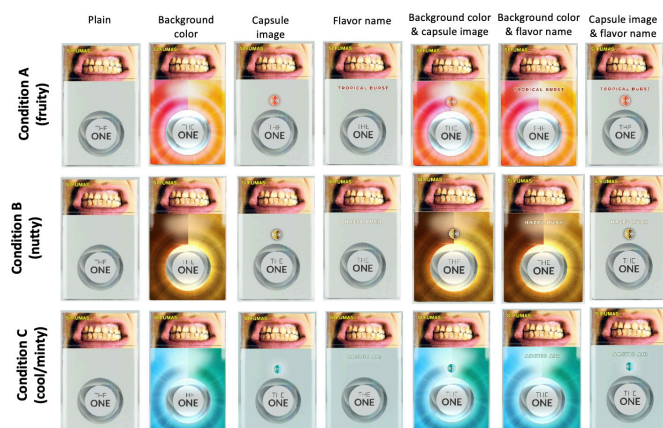


Figure 1 Pack images used as stimuli in experimental survey.

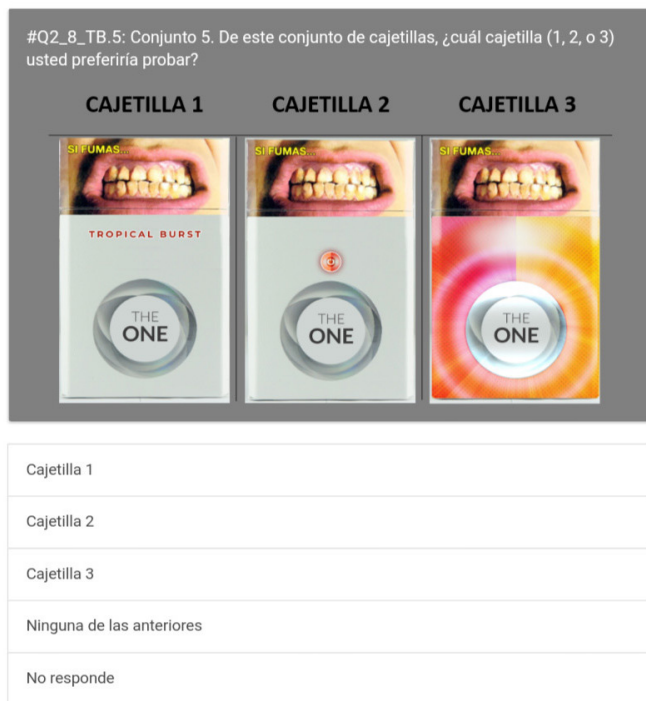


Figure 2 Example of choice set used in experiment 2.

Appeal, perceived harm and perceived interest

Appeal, perceived harm and perceived interest were measured using questions adapted from similar studies.^{24–28} Appeal was measured using the question, ‘How much do you like this cigarette pack?’. Response options were: ‘Dislike very much’, ‘Dislike’, ‘Neither dislike nor like’, ‘Like’, ‘Like very much’, ‘Don’t know’ and ‘No response’. Perceived harm was measured using the question, ‘How harmful do you think this product is to your health?’. Response options were: ‘Not at all harmful’, ‘Slightly harmful’, ‘Somewhat harmful’, ‘Very harmful’, ‘Extremely harmful’, ‘Don’t know’ and ‘No response’. To measure perceived interest, participants indicated how strongly they disagreed or agreed with the statement, ‘This cigarette pack made me want to use the product’. Response options were: ‘Strongly disagree’, ‘Disagree’, ‘Somewhat agree’, ‘Agree’, ‘Strongly agree’ and ‘No response’.

Analysis

Analyses were conducted using Stata V.16. Descriptive statistics were used to describe participant characteristics. X^2 tests were used to examine the distribution of participant characteristics across conditions.

Experiment 1

Responses to questions on the main outcomes were dichotomised. For appeal, the responses ‘like very much’ and ‘like’ were collapsed into the category ‘appealing’, and all other response options were collapsed into ‘not appealing’. For perceived harm, the responses ‘very harmful’ and ‘extremely harmful’ were collapsed into the category ‘harmful’, and all other responses were collapsed into ‘not harmful or unsure’. For perceived interest, the responses ‘strongly agree’, ‘agree’ and ‘somewhat agree’ were collapsed into ‘interested’ and all other responses were collapsed into ‘not interested’.

Mixed effects logistic regression models were used to assess the main effects and interaction effects of features on appeal, perceived harm and perceived interest, with features used as

fixed effects and participant ID used as a random intercept in the main effects and interaction models.

Experiment 2

Conditional logistic regression was used to analyse the data generated by the discrete choice experiment. Independent variables included pack features (ie, flavour name, background colour, capsule image) with the reference being the absence of such features. Condition was included as a case-specific variable. The first model estimated the main effects of pack features on pack preference. The second model included interaction terms to specifically examine interactions between pack design features and between background colour and condition. Subsequent models included interaction terms to explore interactions between condition and flavour name and condition and capsule image.

RESULTS

Sample characteristics

Table 1 shows the characteristics of the study sample (n=2450), including 1500 adolescents and 950 adult participants. Fifty-five adults were excluded from the analytical sample because they were never smokers or former smokers who quit more than 1 year ago (n=41), or their smoking status was unknown (n=14). Adolescents and adults’ mean age was 14.7 and 25.7 years, respectively. Almost one in five (17.7%) adolescent participants were smokers.

Experiment 1

Table 2 presents the results from the mixed effects logistic regression models for main effects and interactions for adults and adolescents for each outcome.

Appeal

Cigarette packs that included a background colour were at significantly greater odds of being perceived as more appealing than a pack without colour by adults (OR=4.18, 95% CI 3.73 to 4.69) and adolescents (OR=13.19, 95% CI 11.53 to 15.10). Packs that included a flavour capsule image were also at significantly greater odds of being perceived as appealing compared with packs without a flavour capsule by adults (OR=1.66, 95% CI 1.49 to 1.85) and adolescents (OR=1.68, 95% CI 1.45 to 1.88). Packs that included the flavour name ‘Arctic Air’ were at significantly greater odds of being perceived as appealing by adults (OR=1.20, 95% CI 1.02 to 1.14). Packs that included the flavour name ‘Tropical Burst’ were at significantly greater odds of being perceived as appealing by adolescents (OR=1.43, 95% CI 1.20 to 1.72).

Among adults and adolescents, background colour significantly interacted with capsule image on perceptions of appeal such that background colour had a weaker positive effect when added to packs with a capsule versus packs with no capsule image. Among adults, the flavour name ‘Hazel Rush’ significantly interacted with background colour on perceptions of appeal such that background colour had a weaker positive effect when added to packs labelled ‘Hazel Rush’ versus packs with no flavour name. Among adults and adolescents, the flavour name ‘Arctic Air’ significantly interacted with background colour on perceptions of appeal such that colour had a stronger positive effect when added to packs labelled ‘Arctic Air’. Among adolescents, the flavour name ‘Hazel Rush’ interacted with capsule

Table 1 Participant characteristics (n=2450)

	n	%
Adolescents (n=1500)		
Age (mean=14.96, SD=1.44)	–	–
Gender		
Male	742	49.5
Female	753	50.2
Choose not to identify	5	0.3
Smoking status		
Smoker	265	17.7
Non-smoker	1179	78.6
Unknown	56	3.7
Neighbourhood SES		
Low	450	30.0
Middle	571	38.1
High	479	31.9
Mother's highest level of formal education		
No formal education or primary	191	12.7
Secondary/high school	981	65.4
Technical school, university or postgraduate	316	21.1
Unknown	12	0.8
Father's highest level of formal education		
No formal education or primary	135	9.0
Secondary/high school	901	60.1
Technical school, university or postgraduate	427	28.5
Unknown	37	2.4
Adults (n=950)		
Age (mean=25.72, SD=5.32)	–	–
Gender		
Male	498	49.5
Female	503	50.1
Choose not to identify	4	0.4
Neighbourhood SES		
Low	284	29.9
Middle	357	37.6
High	309	32.5
Highest level of education		
No formal education or primary	33	3.5
Secondary/high school	580	61.0
Technical school, university or postgraduate	337	35.5

SES, socioeconomic status.

image on perceptions of appeal such that it had a stronger positive effect when the name was added to capsule packs versus non-capsule packs.

Perceived harm

There were no main effects of design features on perceptions of harm among adults or adolescents.

Among adolescents, capsule image significantly interacted with background colour and the flavour name, 'Tropical Burst' on perceptions of harm such that capsules had a stronger positive effect when added to packs with a background colour versus packs with no colour and 'Tropical Burst' packs compared with packs with no flavour name.

Perceived interest

Adults and adolescents were at significantly greater odds of reporting interest in packs that included a background colour

(OR=3.10, 95% CI 2.73 to 3.51 and OR=4.48, 95% CI 3.88 to 5.17, respectively) and packs that included a flavour capsule image (OR=1.36, 95% CI 1.21 to 1.54 and OR=1.65, 95% CI 1.44 to 1.88, respectively) compared with packs without a background colour and a flavour capsule. Adults were at significantly greater odds of reporting interest in packs with the flavour names 'Tropical Burst' (OR=1.29, 95% CI 1.06 to 1.58) and 'Hazel Rush' (OR=1.41, 95% CI 1.14 to 1.74), whereas adolescents were at significantly greater odds of reporting interest in packs with the flavour name 'Tropical Burst' (OR=1.75, 95% CI 1.22 to 2.52) and 'Arctic Air' (OR=1.25, 95% CI 1.00 to 1.56) compared with packs with no flavour name.

Among adolescents, background colour significantly interacted with capsule image on interest such that it had a weaker positive effect when added to packs with a capsule image versus no image. Among adults, background colour significantly interacted with the name 'Hazel Rush' on perceived interest such that it had a weaker positive effect when added to packs named 'Hazel Rush'. Among adolescents, background colour significantly interacted with the name 'Arctic Air' such that it had a stronger positive effect when added to packs named 'Arctic Air'.

Experiment 2

Table 3 presents the results from the conditional logistic regression models. Adolescents and adults preferred packs that displayed a flavour name, a capsule image or background colour over packs without these features ($b=0.104$, $b=0.702$, $b=1.316$, $p<0.001$ respectively for adolescents and $b=0.126$, $b=0.619$, $b=0.775$, $p<0.001$ respectively for adults). Among adults, the display of a flavour name significantly interacted with background colour ($b=0.120$, $p<0.01$), such that pack preference increased when both flavour name and background colour were present. Background colour significantly interacted with capsule image among adolescents and adults ($b=0.398$ and $b=0.357$, $p<0.001$ respectively), such that pack preference increased when both background colour and capsule image were present. Presence of background colour interacted with condition B (nutty), such that this combination was preferred less than background colour combined with condition A (fruity), among adolescents ($b=-0.380$, $p<0.01$). Presence of background colour interacted with condition C (cool/minty) such that this combination resulted in stronger pack preference among adolescents and adults ($b=0.390$ and $b=0.406$, $p<0.01$) than background colour combined with condition A (fruity). Interactions between condition and flavour name and between condition and capsule image were not significant and the direction and statistical strength of the main effects did not change.

DISCUSSION

Our study found that colour and flavour capsule image appeal to adolescents and adults in Mexico City, are associated with perceived interest and contribute to pack preference. Consistent with past research,^{16 19 29} colour plays an important role in pack attractiveness and interest in trying. The association between colour and appeal is particularly strong among adolescents who, as non-smokers or less experienced smokers, may use the colour of the pack as a heuristic to make judgements about the product such as strength or flavour of the product. While little research has used experimental measures to assess the effect of the flavour capsule image in isolation, our findings that adolescents and adults find flavour capsule imagery appealing and prefer these packs are consistent with past research conducted in Mexico that

Table 2 Effects of pack features on appeal, perceived harm and perceived interest

	Adults (n=950)			Adolescents (n=1500)		
	OR	95% CI	P value	OR	95% CI	P value
Effects of pack features on pack appeal (likes product)						
Colour	4.182	3.731 to 4.688	<0.001	13.193	11.526 to 15.102	<0.001
Capsule image	1.657	1.486 to 1.848	<0.001	1.678	1.499 to 1.878	<0.001
Flavour name						
Tropical Burst	1.043	0.879 to 1.238	0.629	1.433	1.196 to 1.716	<0.001
Hazel Rush	1.090	0.911 to 1.304	0.348	1.154	0.962 to 1.385	0.123
Arctic Air	1.204	1.018 to 1.143	0.031	1.196	0.990 to 1.446	0.064
Colour × capsule image	0.749	0.602 to 0.931	0.009	0.760	0.603 to 0.959	0.020
Colour × flavour name						
Tropical Burst	0.944	0.696 to 1.280	0.710	0.833	0.606 to 1.145	0.261
Hazel Rush	0.670	0.490 to 0.917	0.012	0.834	0.601 to 1.156	0.276
Arctic Air	1.581	1.161 to 2.153	0.004	1.791	1.254 to 2.559	0.001
Capsule image × flavour name						
Tropical Burst	0.919	0.678 to 1.244	0.582	0.981	0.722 to 1.334	0.904
Hazel Rush	1.283	0.939 to 1.755	0.118	1.409	1.030 to 1.928	0.032
Arctic Air	1.120	0.824 to 1.520	0.472	1.217	0.872 to 1.698	0.247
Effects of pack features on perceived harm (product harmful)						
Colour	0.894	0.776 to 1.030	0.121	0.895	0.798 to 1.005	0.060
Capsule image	0.871	0.756 to 1.004	0.056	0.920	0.820 to 1.033	0.158
Flavour name						
Tropical Burst	1.116	0.885 to 1.407	0.352	0.974	0.805 to 1.178	0.786
Hazel Rush	0.902	0.705 to 1.155	0.400	1.091	0.904 to 1.317	0.364
Arctic Air	1.048	0.831 to 1.322	0.692	0.998	0.819 to 1.216	0.983
Colour × capsule image	0.985	0.742 to 1.307	0.915	1.269	1.007 to 1.598	0.043
Colour × flavour name						
Tropical Burst	1.193	0.805 to 1.768	0.379	1.384	1.000 to 1.914	0.050
Hazel Rush	1.372	0.906 to 2.078	0.136	1.094	0.793 to 1.508	0.586
Arctic Air	0.844	0.568 to 1.253	0.399	0.869	0.622 to 1.215	0.412
Capsule image × flavour name						
Tropical Burst	0.965	0.651 to 1.430	0.860	1.511	1.092 to 2.091	0.013
Hazel Rush	0.824	0.544 to 1.249	0.362	1.037	0.752 to 1.431	0.823
Arctic Air	0.979	0.659 to 1.452	0.915	1.045	0.748 to 1.459	0.798
Effects of pack features on perceived interest (interested in pack)						
Colour	3.097	2.728 to 3.516	<0.001	4.479	3.878 to 5.172	<0.001
Capsule image	1.362	1.210 to 1.539	<0.001	1.646	1.441 to 1.879	<0.001
Flavour name						
Tropical Burst	1.294	1.061 to 1.579	0.011	1.411	1.144 to 1.741	0.001
Hazel Rush	1.315	1.071 to 1.614	0.001	1.181	0.953 to 1.463	0.128
Arctic Air	1.133	0.930 to 1.380	0.215	1.252	1.004 to 1.562	0.046
Colour × capsule image	0.812	0.636 to 1.037	0.095	0.727	0.554 to 0.956	0.022
Colour × flavour name						
Tropical Burst	0.999	0.708 to 1.410	0.995	0.867	0.599 to 1.255	0.449
Hazel Rush	0.614	0.434 to 0.870	0.006	0.771	0.527 to 1.127	0.179
Arctic Air	1.033	0.732 to 1.457	0.854	1.557	1.039 to 2.334	0.032
Capsule image × flavour name						
Tropical Burst	1.109	0.788 to 1.561	0.554	0.780	0.543 to 1.119	0.177
Hazel Rush	0.944	0.667 to 1.335	0.744	1.570	1.079 to 2.282	0.018
Arctic Air	0.948	0.674 to 1.333	0.759	0.843	0.575 to 1.235	0.380

Bolded values indicate statistical significance ($p < 0.05$).

finds youth and young adults find FCCs attractive and report an intention to try.^{10 11}

Existing literature highlights that younger smokers are more open to novel flavours and a recent study in Mexico found that unknown flavours spark curiosity among young adult smokers.^{8 16} Adolescents found packs displaying the flavour names ‘Tropical

Burst’ and ‘Arctic Air’ appealing and reported interest in trying these packs. We hypothesise that ‘Tropical Burst’ may be particularly appealing due to the implied fruity flavour; a preference for sweet flavours among youth compared with adults has been established.³⁰ When they had a background colour, adolescents preferred packs from the ‘nutty’ condition less than packs from

Table 3 Discrete choice experiment—main effects of and interactions between pack features on pack preference

	Model 1: main effects only		Model 2: main and interaction effects	
	Adolescents (n=1030)	Adults (n=915)	Adolescents (n=1030)	Adults (n=915)
	Coefficient (SE)	Coefficient (SE)	Coefficient (SE)	Coefficient (SE)
Colour	1.316 (0.056)***	0.775 (0.056)***	1.055 (0.106)***	0.461 (0.110)***
Capsule image	0.702 (0.038)***	0.619 (0.040)***	0.471 (0.066)***	0.372 (0.063)***
Flavour name	0.104 (0.023)***	0.126 (0.023)***	0.121 (0.059) [†]	0.022 (0.041)
Colour × capsule image			0.398 (0.067)***	0.357 (0.657)***
Colour × flavour name			0.044 (0.054)	0.120 (0.040)**
Capsule image × flavour name			−0.083 (0.049)	0.057 (0.036)
Condition × colour				
A (Fruity)			Reference	Reference
B (Nutty)			−0.380 (0.133)**	−0.241 (0.136)
C (Cool/minty)			0.390 (0.130)**	0.406 (0.139)**

*P<0.05; **p<0.01; ***p<0.001.

the ‘fruity’ condition, but packs from the ‘cool/minty’ condition more. In the absence of any explicit indications of flavour (eg, descriptors), we hypothesise that adolescents readily identified the blue and green coloured pack from the ‘cool/minty’ condition as a menthol or mint variant. Past research finds that consumers identify blue and green coloured cigarette packs as menthol or mint flavoured and find these packs attractive.¹⁹

No features were associated with perceptions of harm among adult smokers. Among adolescents, capsule images interacted with background colour and the flavour name ‘Tropical Burst’—packs with these features were more likely to be perceived as harmful when a capsule image was added. It is possible that perceptions of harm among adult smokers who are more likely established smokers are not as easily influenced, including by pack features, as brand preference is likely already well established³¹ and harm perceptions may therefore be less flexible among this group of consumers. There are mixed findings in the literature on the associations between FCCs and perceived harm—for example, one study found that FCC users in Mexico and the USA perceive their brand to be less harmful than non-FCCs, but this was not true in Australia.¹³ A recent study of adolescents aged 12–14 in Mexico found that participants found packs with one capsule, but not packs with two capsules, less harmful than non-FCC packs.¹⁰ Studies of adult smokers in the USA and young adult susceptible non-smokers, former smokers and smokers in New Zealand found no differences in perceptions of harm between FCCs and non-FCCs.^{12 32} This study helps elucidate the relationship between FCCs and perceptions of harm and suggests there may be differences in perceptions of harm of FCCs based on locality, age group (ie, adolescents vs adults) and combinations with other specific design elements (eg, colour, flavour). This is the first known study to examine the relationship between specific concept flavour names and perceptions of harm; further research could examine how these names influence perceptions among adolescents.

The study findings support the WHO FCTC’s recommendation to adopt plain packaging to reduce appeal of cigarettes among adolescents. The removal of features such as colour, flavour terminology (including concept names) and flavour capsule imagery on packs is essential for countering the appeal of cigarettes among adolescents and adults. Mexico should also consider a flavour ban. The growth of flavoured cigarettes, driven by the flavour capsule product category, continues to fuel the combustible cigarette market in the country and the Latin American region. As the flavour capsule market grows and

flavours and capsules themselves remain unregulated, innovation continues. For example, multiple flavour varieties per pack and multiple capsules in the filter of each cigarette have been observed on the market in Mexico. Flavour capsules have even been extended to novel product lines, such as heated tobacco products.³³ Left unregulated, gains made by existing tobacco control regulation are threatened.

This study’s sample was limited to residents living in Mexico City, an urban and populous city. Therefore, the results may not be generalisable to Mexico as a whole. The pack stimuli used in the experiments were fictional. However, the brand and health warning label were authentic and the use of fictional stimuli (based on current manufacturer marketing practices) allowed us to assess the effects of pack design features independently of brand familiarity or preference. The use of a real brand, but one likely unknown to residents of Mexico, helped us avoid strong brand effects while maintaining product credibility. As the pack stimuli appeared on a digital screen, it is possible that some pack features were not prominent to participants. However, all survey questionnaires were completed on tablets and efforts were taken to ensure that images were large and clear. While pack assessments were reliant on self-report, engaging participants in two experimental procedures allowed us to triangulate our findings. In terms of strengths, discrete choice experiments are viewed as a gold standard for studies of consumer perceptions, allowing for

What this paper adds

- ⇒ The literature on how packaging design features commonly used to market flavour capsule cigarettes influence consumer perceptions of the product is limited. This study adds to a small body of literature that finds flavour capsule cigarettes and the design features used to market the product via packaging appeal to youth and young adults.
- ⇒ This study extends our knowledge of how specific cigarette pack design features, namely colour and concept flavour names, influence youth and young adult perceptions of appeal, harm and perceived interest.
- ⇒ The findings highlight cigarette packaging design features (such as colour, capsule image and flavour name) that influence perceptions, which in turn may affect smoking behaviour, are important to consider when formulating policies to address flavoured tobacco and smoking initiation.

manipulation and identification of specific features that influence consumer choice. This study adds to a small body of literature^{11 12} that uses this method to examine consumer perceptions of FCCs.

This study increases our knowledge of the effect of pack design features on appeal, perceived harm, perceived interest and pack preference among adolescents and adults in Mexico City. Our results provide a strong argument that the removal of colour, capsule imagery and flavour names from cigarette packs—for example, through requirements for plain packaging—is likely to reduce appeal and counter interest in trying the product.

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Competing interests MBM serves as a paid expert witness in litigation sponsored by the Public Health Advocacy Institute against RJ Reynolds Tobacco. This arrangement has been reviewed and approved by the Johns Hopkins University in accordance with its conflict of interest policies.

Patient consent for publication Not required.

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