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Figure 1: Standard cigarette and three dissuasive cigarette designs



Title: Reactions to, and trial intentions for, three dissuasive cigarette designs: A cross-sectional survey of adolescents in Scotland

Authors: Danielle Mitchell¹, Nathan Critchlow¹, Crawford Moodie¹, Linda Bauld^{2,3}

Affiliations:

¹ Institute for Social Marketing and Health, Faculty of Health Sciences and Sport, University of Stirling, FK9 4LA, Scotland.

² Usher Institute, College of Medicine and Veterinary Medicine, University of Edinburgh, Teviot Place, Edinburgh, EH8 9AG, Scotland.

³SPECTRUM Consortium, University of Edinburgh, Usher Institute, Old Medical School, University of Edinburgh, Teviot Place, Edinburgh EH8 9AG

Corresponding author: Danielle Mitchell, Institute for Social Marketing and Health, Faculty of Health Science and Sport, University of Stirling, Stirling, FK9 4LA. Email: danielle.mitchell1@stir.ac.uk Tel: +44 (0)1786 467390

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Abstract

Objectives: There has been growing academic and policy interest in opportunities to decrease the appeal of cigarette sticks, such as making them an unattractive colour or requiring them to display a health warning. We therefore explored reactions to, and trial intentions for, three ‘dissuasive’ cigarette designs among adolescents in Scotland.

Methods: A cross-sectional survey with 12-17 year olds in Scotland ($n=594$) was conducted between November 2017 and November 2018. Participants were shown one ‘standard’ cigarette (imitation cork filter with white paper casing) and three dissuasive cigarettes: (1) a cigarette with the warning ‘smoking kills’; (2) a cigarette with the warning ‘toxic’ and a skull and cross-bones image; and (3) a dark green cigarette. Participants rated each cigarette on nine five-point reaction measures (e.g. appealing/unappealing or attractive/unattractive). A composite reaction score was computed for each cigarette, which was binary coded (overall negative reactions versus neutral/positive reactions). Participants also indicated whether they would try each cigarette (coded: Yes/No). Demographics, smoking status, and smoking susceptibility were also measured.

Results: More participants had negative reactions to the dark green (93% of adolescents), ‘smoking kills’ (94%) and ‘toxic’ (96%) cigarettes, compared to the standard cigarette (85%). For all three dissuasive designs, Chi-square tests found that negative reactions were more likely among younger adolescents (vs. older adolescents), never-smokers (vs. ever smokers), and non-susceptible never-smokers (vs. susceptible never-smokers). Most participants indicated that they would not try any of the cigarettes (range: 84-91%).

Conclusion: Dissuasive cigarettes present an opportunity to further reduce the appeal of smoking among adolescents.

Keywords: Dissuasive cigarettes, Survey research, Adolescent smoking, Tobacco control, Smoking cessation, Health communication

INTRODUCTION

At least 14 countries require cigarettes to be sold in standardised (or plain) packaging.¹ Such legislation stipulates not only how the pack exterior and interior should look, but also the appearance of cigarette sticks. For instance, in the first five countries to fully implement standardised packaging (Australia, France, United Kingdom, New Zealand, Norway), the cigarette must be wrapped in white paper casing, the filter must be white or imitation cork, and a brand variant name or alphanumeric code must appear in a standardised font and size near to the filter.² In a separate effort to reduce the promotional power of cigarettes, some countries (Uganda, Senegal, Ethiopia, Canada, Brazil) have banned flavoured cigarettes, and these will also be banned from May 2020 across both the European Union and in the United Kingdom (UK), Turkey and Moldova.^{3,4}

In addition to standardising elements of cigarette appearance^{2,5} and removing opportunities to use flavouring to create appeal^{3,4,6,7} some countries are considering additional measures to reduce the appeal of cigarette sticks.^{8,9} For example, the Scottish Government intend to review the evidence on cigarettes that are unattractively coloured or display a health warning, often referred to as ‘dissuasive cigarettes’, as part of their tobacco control strategy.⁸ The Canadian Government has also consulted on the inclusion of warnings on cigarettes.⁹

While the cigarette pack and cigarette stick provide an opportunity for tobacco companies to promote their products, research has typically focused on the promotional influence of the pack. The cigarette stick, however, can also create appeal through decorative features, colour, length and diameter.¹⁰⁻¹⁴ With respect to whether this communicative power could be used for health promotion, two types of dissuasive cigarette designs have been examined. Firstly, research has explored reactions to unattractively coloured cigarettes, particularly different shades of green.¹⁵⁻¹⁹ Secondly, research has explored cigarettes that feature a health warning on the stick, including ‘Smoking kills’, average minutes of life lost

from smoking each cigarette, and the short and long-term harms of smoking.¹⁶⁻²⁷ More recently, research has also explored including both a warning message (smoking kills) and an image (skull and cross bones).^{26,27} Irrespective of design, dissuasive cigarettes are generally considered to reduce appeal and increase perceptions of harm, with some research suggesting that they may have the potential to encourage thoughts about quitting or prevent uptake among young people.¹⁵⁻²⁷

Only a few studies have examined how adolescents react to dissuasive cigarettes.^{17,20,27} Adolescents are a key group because when starting to smoke they often do so with single cigarettes which they have bought, been given or have stolen, and therefore may avoid exposure to the on-pack warnings at the point of consumption.^{28,29,30} Investigation with adolescents is particularly important in Scotland, where longer-term declines in youth smoking have recently begun to stall³¹ and because the Scottish Government has expressed a willingness to consider implementing dissuasive cigarettes if supported by the evidence.⁸

In this study, we therefore examine reactions to, and trial intentions for, a standard cigarette and three dissuasive cigarettes among adolescents in Scotland: (1) An unattractively coloured cigarette; (2) A cigarette with text warning; and (3) A cigarette with text and an image. This is the first quantitative study to examine reactions to a dissuasive cigarette with both a text and image warning among adolescents, a key target for preventative measures, in a market where standardised packaging is fully-implemented.

METHODS

Design and Recruitment

A cross-sectional self-report survey was conducted with 12-17 year olds ($n=594$) in secondary schools in three regions of Scotland (Central, East, and South). Data were collected between November 2017 and November 2018, covering between 6 and 18 months post-implementation of standardised packaging. Data collection took place post-implementation of standardised

packaging as the survey also contained questions about how young people had reacted to the new legislation (reported elsewhere). The length of data collection was determined by the speed of response from local authorities and schools, and availability of schools to administer the survey (e.g. avoiding school holidays and exam periods).

Before contacting schools, approval was obtained from local education authorities and, once granted, schools were contacted through letters and emails, and followed up by a phone call. Three schools agreed to take part. Pupils were informed about the study aim and objectives (e.g. We want to find out young people's opinions and attitudes towards tobacco packaging and cigarettes) by the lead researcher (DM) or a designated teacher (e.g. someone delivering health and wellbeing education), and provided with participant and parental information sheets, parent opt-out forms, and data privacy notices. Participants completed the survey under exam style conditions (i.e. individually and in silence) during designated class times that suited each school. Schools were given the option for pupils to complete either an online or physical version of the survey (both identical in content and question order). All participants were able to enter a ballot to win a computer tablet (an iPad) in return for participating.

Materials

Participants were shown four cigarette designs (Figure 1), consistent with those used in developmental focus group research with adolescents in Scotland.²⁷ The first had an imitation cork filter and white cigarette paper, as this mirrors the 'standard' cigarette design in Scotland. The second cigarette was dark green, consistent with research with adults in Australia and the UK,^{15,16,18,19} and with adolescents in Norway¹⁷ and Scotland.²⁷ Although this design has been explored with adolescents in two studies, only one of these was quantitative, and was conducted in Norway,¹⁷ which means there remains a gap in empirical understanding as to how adolescents react to dark green cigarettes. The third cigarette carried the warning 'Smoking

kills' in red writing on white cigarette paper, as used in past research with adolescents and adults in Australia, the UK and Norway.^{16-21,27} Smoking kills is also a warning regularly communicated on the outer packaging, and with high recognition among adolescents.³² The final cigarette featured the word 'toxic' in black writing and a yellow skull and cross bones image on white cigarette paper. This image (i.e. skull and crossbones) is often used on other hazardous substances (e.g. chemicals such as bleach) and is used by the Health and Safety executive to describe 'acutely toxic' chemicals.³³ The image has also been used in a study in France,²⁶ and was considered to clearly communicate the harmfulness of smoking among developmental focus groups with adolescents in Scotland.²⁷

[Figure 1]

Measures

Demographics

Demographic variables included age, gender, ethnicity (coded: 'White British' and 'Other or prefer not to say') and socioeconomic status (SES). Consistent with previous health and behaviour surveys with adolescents in the UK, the Family Affluence Scale (FAS) was used to provide a measure of SES.^{34,35} Participants reported whether they have their own bedroom (0=No, Yes=1); how many vehicles their family own (0=None, 1 = Yes, one, 2=Two or more); how many computers their family own (0=None, 1 = One, 2 = Two, 3=More than two); and how many times they have travelled on holiday with their family in the last 12 months (0=Not all, 1 = Once, 2 = Twice, 3=More than twice).³⁵ Scores were summed and divided into low (0-2), medium (3-5), and high SES (6-9).³⁶

Smoking status

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Consistent with research with adolescents,³⁷ participants were shown five statements and asked to select which best described them: (1) *'I have never smoked, not even a puff or two'*; (2) *'I have only ever smoked once or twice but not anymore'*; (3) *'I smoke at least once a month'*; (4) *'I usually smoke between one and six cigarettes a week'*; and (5) *'I smoke more than six cigarettes a week'*. Those selecting the first option were categorised *'never-smokers'* and all others *'ever-smokers'*.

Smoking susceptibility

Among never-smokers, three items assessed susceptibility: (1) *'If one of your friends offered you a cigarette would you smoke it?'*; (2) *'Do you think you will smoke a cigarette at any point in the next year?'*; and (3) *'Do you think you will be smoking by the time you are 18?'*.³⁸ All were scored on a four-point Likert scale (*1=Definitely yes, 2= Probably yes, 3= Probably not, 4= Definitely not*). Never-smokers who selected *'Definitely not'* to all three items were categorised as *'Non-susceptible'*, with all other participants categorised as *'Susceptible'*.

Reactions to cigarettes

Participants were asked to rate each cigarette on nine reaction measures adapted from previous research^{18,38,39}: (1) Attractive/Unattractive and (2) Stylish/Unstylish; (3) Would be nice to be seen with/Would not be nice to be seen with; (4) Appealing to people my age/Not at all appealing to people my own age; (5) In general, my friends would approve of this cigarette/In general my friends would not approve of this cigarette; (6) In general, I would approve of my friends using this cigarette/In general, I would not approve of my friends using this cigarette; (7) Would be totally acceptable to family members/Would be totally unacceptable to family members; (8) Does look harmful to my health/Does not look harmful to my health; and (9) Would not put people off starting to smoke/Would put people off starting to smoke (henceforth

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3 this measure will be referred to as ‘off-putting’). Each reaction was scored on a five-point scale
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5 (e.g. 1=Not appealing to people my age – 5=Appealing to people my age). Reactions were
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7 given separately for each cigarette design.
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10 Consistent with a previous survey research exploring dissuasive cigarettes,¹⁸ a
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12 composite score was calculated for each cigarette across the nine reaction measures (range: 9-
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14 45). There was acceptable internal reliability in composite scores for each of the four cigarettes
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16 (range: $\alpha=0.80$ to 0.81). Composite scores were binary coded based on whether the participant
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18 had a negative reaction to each cigarette. As the middle possible score was 27, all participants
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20 with a composite score ≤ 26 were classed as having a negative overall reaction, while those
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22 with a score ≥ 27 were classed as having a neutral or positive reaction.
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28 ***Trial intentions***

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30 Consistent with previous assessment of trial intentions,¹⁹ participants were asked ‘*If one of your*
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32 *friends offered you one of the cigarettes how likely would you be to try each?*’, with response
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34 options ranging from 1=Very likely to 5=Not at all likely. Scale responses were binary coded
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36 based on whether participants indicated that they would not try the cigarette (scores 4-5) versus
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38 those who provided a neutral answer or suggested they would try the cigarette (scores 1-3).¹⁸
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44 **Analysis**

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46 A total of 686 responses were collected. We excluded 73 cases for not completing the consent
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48 form or for providing invalid or incomplete responses and 19 for being outwith the age range
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50 of the study (those aged 11 or 18 years old). The final sample used for analysis was 594.
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54 Data were analysed using SPSS version 23 (Chicago, SPSS Inc). Descriptive statistics
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56 examined demographics, smoking status, susceptibility, and trial intentions. Descriptive
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58 statistics examined mean scores for each cigarette on each of the nine reaction measures. As
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the scale data were ordinal, Wilcoxon Signed Rank tests examined differences in reactions to each of the cigarettes. Wilcoxon Signed Rank tests were conducted across all reaction measures and for all cigarette combinations (e.g. attractiveness reactions for the ‘standard’ cigarette vs. the green cigarette). A Bonferroni correction was applied to account for the six multiple comparisons on each reaction variable, resulting in a revised critical value of $p=0.008$.

Pearson Chi Square tests examined between-group differences in overall reactions (*negative vs. neutral and positive*) and trial intentions (*would not try vs. neutral and would try*). Chi-squares were run separately across all four cigarette designs for age, gender, SES group, ethnicity, smoking status, and susceptibility to smoke. As numbers in the lowest SES category were small (1.9% of total sample), we combined the low and medium categories for the purposes of analysis. We considered using multivariate logistic regressions with trial intentions for each cigarette the dependent variable and the aforementioned between-group variables as covariates.³⁶ This was not possible, however, as the proportion of participants reporting trial intentions was very low for some of the cigarette designs (see results), which meant that acceptable model fit could be not obtained for all four cigarette designs.

Ethical approval

Ethical approval was obtained from the University of Stirling’s General University Ethics Panel (GUEP273). At the beginning of the survey, participants were informed that participation would be confidential and anonymous, and consent was obtained. Once completed, participants were provided with a debrief leaflet, which included information on the harms of smoking and where to find further advice and information.

RESULTS

Sample characteristics

Accounting for missing data on gender ($n=1$), SES ($n=5$), smoking status ($n=12$) and susceptibility ($n=2$), 35% of participants were aged 12-13 years, 35% were 14-15 years, and 29% were aged 16-17 years. Just over half were female (53%), with most categorised as high SES (75%), and 'White British' (83%). Most participants were never-smokers (87%) and, among never-smokers, the majority (67%) were non-susceptible.

Reactions to dissuasive cigarettes versus the standard cigarette

Mean reaction scores to each of the four cigarettes were towards the negative end of each scale for all nine items (<3) (Table 1). The exception was whether the standard cigarette was considered off-putting, with the mean score ($M=3.21$; $SD=1.59$) suggesting a mostly neutral reaction. Wilcoxon Signed Rank tests found significantly less negative reactions to the standard cigarette than the dissuasive cigarettes for all nine measures (all $p<0.001$).

[Table 1]

Reactions to the dissuasive cigarettes

Compared to the 'Smoking kills' cigarette, Wilcoxon Signed-Rank tests found that the 'toxic' cigarette was rated significantly more negatively on all reaction measures (all $p<0.008$; except approving of friends, $p=0.007$, and perceived family acceptability $p=0.003$) (Table 1). Compared to the green cigarette, Wilcoxon Signed Rank tests found that the 'toxic' cigarette was rated significantly more negatively for appeal, attraction, being nice to be seen with, perceived harm, and being off-putting (all $p<0.001$). There were no significant differences in reactions between the green cigarette and 'smoking kills' cigarette.

Overall reactions to cigarettes

Based on the binary coded composite reaction score, almost all participants had an overall negative reaction to the ‘smoking kills’ (94%), green (93%) and ‘toxic’ cigarette (96%). Over four-fifths (85%) had a negative reaction to the standard cigarette. Chi-square tests found a difference of age for all for cigarettes (range: $p<0.001$ to $p=0.007$) (Table 2), with the linear-by-linear associations showing that negative reactions were greater among 12-13 year olds than older age groups for the standard cigarette ($\chi^2=7.11$, $p=0.008$), ‘smoking kills’ cigarette ($\chi^2=5.89$, $p=0.015$), green cigarette ($\chi^2=10.66$, $p=0.001$), and ‘toxic’ cigarette ($\chi^2=4.72$, $p=0.030$). Never-smokers were more likely to react negatively to all four cigarettes than ever-smokers (all $p<0.001$). Non-susceptible never-smokers were more likely to react negatively to all four cigarettes than susceptible never-smokers (all $p<0.001$). Concerning gender, females were more likely to react negatively to the green cigarette than males ($\chi^2=5.32$, $p=0.021$). For ethnicity, participants categorised as ‘Other or preferred not to say’ were more likely to react negatively to the standard cigarette than those identifying as ‘White British’ ($\chi^2=3.68$, $p=0.055$).

[Table 2]

Trial intentions

Most participants indicated that they would not try the standard (84%), ‘smoking kills’ (89%), green (90%), and ‘toxic’ cigarette (91%) (Table 3). Chi-square tests found a main difference of age for all four cigarettes (all $p<0.001$), with the linear-by-linear associations showing that trial intentions were lower among 12-13 year olds than older age group for the standard ($\chi^2=14.64$, $p<0.001$), ‘smoking kills’ ($\chi^2=9.60$, $p=0.002$), green ($\chi^2=12.63$, $p<0.001$), and ‘toxic’ cigarette ($\chi^2=13.32$, $p<0.001$). Never-smokers (vs. ever-smokers) and non-susceptible

never-smokers (vs. susceptible) were less likely to have trial intentions for all four cigarettes (all $p < 0.001$). There were no differences by SES, gender, or ethnicity.

[Table 3]

DISCUSSION

We found that adolescents rated the three dissuasive cigarettes (featuring a text warning, text warning and symbol, or unattractively coloured) more negatively than a standard cigarette. Across the cigarettes, reactions were consistently more negative for the toxic cigarette featuring the image of a skull and cross bones on all key reaction measures, including appeal, attractiveness, harmfulness and whether it was off-putting. Most adolescents had overall negative reactions to each dissuasive cigarette – particularly the toxic cigarette - with the vast majority indicating that they would not try any of these, particularly younger adolescents and non-susceptible never-smokers.

Our findings are consistent with research that has shown that consumers have negative reactions to dissuasive cigarettes.¹⁵⁻²⁷ The findings are important given that there are fewer studies with adolescents than adults, even though the potential impact would be expected to be greater with the former.¹⁹ Adolescents are a population who often access single cigarettes from friends, peers or family^{28,29,30} and, as a consequence, may avoid exposure to prominent health warnings or unattractively coloured packaging (for those countries with standardised packaging) at the point of experimentation or consumption.⁴⁰ As tobacco companies have a long history of using the cigarette as a communication tool,¹⁰⁻¹⁴ and continue to do so in countries with large pictorial health warnings and/or standardised packaging (e.g. through capsule cigarettes and other novel filter designs)^{41,42} the evidence on dissuasive cigarettes suggests that they may help to further reduce the appeal of smoking.

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Combining pictorials with a concise message has been suggested to increase the chances of attention being paid to the warning, the comprehension and retention of the message,^{43,44} and potential impact on preventing smoking initiation.⁴⁴ Consistent with this, we found that the cigarette with a warning ('toxic') and image (skull and crossbones) was perceived most negatively by adolescents; however, all three dissuasive cigarettes were viewed more negatively than the standard cigarette and trial intentions were low for each. As desensitisation occurs with all warnings, rotating dissuasive cigarette designs may help maximise impact. For instance, this could be achieved by requiring text warnings on cigarettes for one year, unattractively coloured cigarettes for the second year, text warnings and symbols on cigarettes for the third year, and then starting the rotation sequence again for subsequent years. This would mirror the approach used in the European Union for on-pack health warnings, where the images are replaced annually.

Regarding limitations, the study was conducted in a school setting with teachers and peers present and, therefore, participants may have felt uncomfortable disclosing their smoking status or may have provided socially desirable responses. Most participants were of high or medium SES, due to a large proportion of the sample being recruited from one school in an affluent area, and the majority were never-smokers. We therefore provide very limited insight into reactions and trial intentions among those from low SES backgrounds or ever-smokers. Nevertheless, although the absolute values given may not be representative, that our findings are consistent with previous research suggests that the overall trends are likely to be generalisable to other populations. Future research using a larger and more representative sample would be able to examine to what extent reactions vary by SES (if at all) and how findings differ between never and ever-smokers (or between different levels of smoking heaviness, e.g. experimenters versus established smokers). Few participants reported trial intentions for any of the dissuasive cigarettes and therefore this distribution of responses,

combined with the modest sample size, meant it was not possible to use multivariate models to examine the association between cigarette reactions and trial intentions while controlling for other covariates (e.g. demography and smoking status). To reduce participant burden we only explored three dissuasive designs. Given that the cigarettes were displayed in the same order; this may have caused an order effect. Randomisation would be beneficial in future research, as would research exploring how reactions vary among participants who are randomised to see only one cigarette design, thus removing any bias or confounding effect from exposure to multiple designs. Further research exploring alternative colours or dissuasive messages, or cigarettes featuring multiple dissuasive features (e.g. a warning, unattractive colour and imagery),^{25,26} would be also beneficial.

In conclusion, adding dissuasive features to cigarettes, for example by making them an unattractive colour or featuring a written and/or pictorial warning, elicits negative reactions among adolescents in Scotland and reduces interest in trialling these. The findings therefore provide support to the Scottish and Canadian Government's willingness to consider dissuasive cigarettes as a future tobacco control measure.

What this paper adds:

- In addition to standardised packaging, there is growing interest in communicating health messages through dissuasive cigarettes.
- Most research has focused on adults and on limited styles of dissuasive cigarettes (warning messages and unappealing colours), therefore, we examined how adolescents in Scotland reacted to three different dissuasive cigarette designs, including a cigarette with both a written warning and hazardous image.
- Reactions to all three dissuasive cigarette designs were negative. Rotating these designs may help reduce habituation.

- The findings demonstrate that dissuasive cigarettes would likely have the intended impact in dissuading smoking uptake among young people.

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Declaration of interests: No conflicts to declare.

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Table 1: Within-group individual reactions towards a ‘standard’ cigarette and three dissuasive cigarettes

Individual items	¹ Standard vs. Smoking kills			² Standard vs. Green			³ Standard vs. Toxic			⁴ Smoking kills vs. Green			⁵ Smoking kills vs. Toxic			⁶ Green vs. Toxic		
	Standard (SD)	Smoking kills (SD)	<i>p</i> ¹	Standard (SD)	Green (SD)	<i>p</i> ¹	Standard (SD)	Toxic (SD)	<i>p</i> ¹	Smoking kills (SD)	Green (SD)	<i>p</i> ¹	Smoking kills (SD)	Toxic (SD)	<i>p</i> ¹	Green (SD)	Toxic (SD)	<i>p</i> ¹
Unappealing(1)/Appealing(5)	2.59 (1.45)	1.96 (1.19)	<0.001	2.59 (1.45)	1.95 (1.25)	<0.001	2.59 (1.45)	1.70 (1.09)	<0.001	1.96 (1.19)	1.95 (1.25)	<i>n.s.</i>	1.96 (1.19)	1.70 (1.09)	<0.001	1.95 (1.25)	1.70 (1.09)	<0.001
Unattractive(1)/Attractive(5)	2.13 (1.26)	1.58 (0.89)	<0.001	2.13 (1.26)	1.54 (1.01)	<0.001	2.13 (1.26)	1.33 (0.82)	<0.001	1.58 (0.89)	1.54 (1.01)	<i>n.s.</i>	1.58 (0.89)	1.33 (0.82)	<0.001	1.54 (1.01)	1.33 (0.82)	<0.001
Unstylish(1)/Stylish(5)	2.05 (1.39)	1.75 (1.24)	<0.001	2.05 (1.39)	1.77 (1.30)	<0.001	2.05 (1.39)	1.66 (1.25)	<0.001	1.75 (1.24)	1.77 (1.30)	<i>n.s.</i>	1.75 (1.24)	1.66 (1.25)	<0.001	1.77 (1.30)	1.66 (1.25)	<i>n.s.</i> ²
Friends would not approve(1)/would approve(5)	1.88 (1.35)	1.68 (1.20)	<0.001	1.88 (1.35)	1.65 (1.17)	<0.001	1.88 (1.35)	1.58 (1.15)	<0.001	1.68 (1.20)	1.65 (1.17)	<i>n.s.</i>	1.68 (1.20)	1.58 (1.15)	<0.001	1.65 (1.17)	1.58 (1.15)	<i>n.s.</i> ²
Would not approve of friends(1)/would approve(5)	1.64 (1.17)	1.55 (1.10)	<0.001	1.64 (1.17)	1.51 (1.06)	<0.001	1.64 (1.17)	1.49 (1.06)	<0.001	1.55 (1.10)	1.51 (1.06)	<i>n.s.</i>	1.55 (1.10)	1.49 (1.06)	0.007	1.51 (1.06)	1.49 (1.06)	<i>n.s.</i>
Family would not accept(1)/would accept(5)	1.40 (0.93)	1.33 (0.85)	<0.001	1.40 (0.93)	1.31 (0.85)	<0.001	1.40 (0.93)	1.30 (0.83)	<0.001	1.33 (0.85)	1.31 (0.85)	<i>n.s.</i>	1.33 (0.85)	1.30 (0.83)	0.003	1.31 (0.85)	1.30 (0.83)	<i>n.s.</i>
Would not be nice to be seen with(1)/would be nice(5)	1.69 (1.18)	1.40 (0.89)	<0.001	1.69 (1.18)	1.46 (1.02)	<0.001	1.69 (1.18)	1.33 (0.89)	<0.001	1.40 (0.89)	1.46 (1.02)	<i>n.s.</i>	1.40 (0.89)	1.33 (0.89)	<0.001	1.46 (1.02)	1.33 (0.89)	<0.001
Harmful(1)/not at all harmful	1.73 (1.17)	1.46 (1.04)	<0.001	1.73 (1.17)	1.46 (1.06)	<0.001	1.73 (1.17)	1.34 (1.0)	<0.001	1.46 (1.04)	1.46 (1.06)	<i>n.s.</i>	1.46 (1.04)	1.34 (1.0)	<0.001	1.46 (1.06)	1.34 (1.00)	<0.001
Off-putting(1)/Not at all off-putting	3.21 (1.59)	2.32 (1.41)	<0.001	3.21 (1.59)	2.27 (1.46)	<0.001	3.21 (1.59)	1.91 (1.31)	<0.001	2.32 (1.41)	2.27 (1.46)	<i>n.s.</i>	2.32 (1.41)	1.91 (1.31)	<0.001	2.27 (1.46)	1.91 (1.31)	<0.001

Notes:

All test subject to Bonferroni correction, critical value *p*=0.008.

¹ Wilcoxon Signed Rank Test.

² Value significant before Bonferroni correction.

Range of missing data across comparisons: ¹5-26, ²6-26, ³7-27, ⁴6-25, ⁵7-25, ⁶7-27.

Table 2. Whether participant had an overall negative reaction to the 'standard' and dissuasive cigarettes and differences by demography and smoking status

Variable	<i>Standard cigarette</i>				<i>'Smoking Kills' cigarette</i>				<i>Green cigarette</i>				<i>'Toxic' cigarette</i>			
	%	n	χ^2	p	%	n	χ^2	p	%	n	χ^2	p	%	n	χ^2	p
Overall	85	445			94	492			93	480			96	497		
Age			15.94	<0.001			12.84	0.002			16.94	<0.001			10.03	0.007
12-13 years	94	151			99	161			100	156			100	160		
14-15 years	79	152			91	172			90	170			94	175		
16-17 years	83	142			93	159			91	154			95	162		
Gender			0.33	n.s.			0.10	n.s.			5.32	0.021			1.71	n.s.
Female	86	243			94	268			95	268			97	272		
Male	84	201			94	223			90	211			95	224		
SES			0.28	n.s.			0.10	n.s.			0.12	n.s.			0.004	n.s.
Low and Medium	84	111			95	126			93	123			96	126		
High	85	327			94	360			93	351			96	365		
Ethnicity			3.68	0.055			0.05	n.s.			0.12	n.s.			0.10	n.s.
Other/prefer not to say	78	71			95	86			92	82			96	85		
White British	86	369			94	402			93	394			96	408		
Smoking status			63.69	<0.001			40.60	<0.001			36.59	<0.001			24.71	<0.001
Never-smoker	90	402			97	430			96	420			98	432		
Ever-smoker	53	37			77	54			76	53			85	57		
Susceptibility¹			26.70	<0.001			10.14	0.001			14.28	<0.001			11.90	0.001
Non-susceptible	95	296			98	307			98	302			99	307		
Susceptible	78	105			92	122			90	117			94	126		

Notes:

¹ Never-smokers only χ^2 = Pearson Chi SquareOverall reaction: Total score across nine reaction items, binary coded into negative (≤ 26) or neutral or positive reaction (≥ 27).

Table 3: Participants who said they would not trial the standard and dissuasive cigarette, and differences by demography and smoking status.

Variable	Standard cigarette				'Smoking Kills' cigarette				Green cigarette				'Toxic' cigarette			
	%	n	χ^2	p	%	n	χ^2	p	%	n	χ^2	p	%	n	χ^2	p
Overall	84	478			89	502			90	508			91	512		
Age			22.12	<0.001			16.93	<0.001			24.47	<0.001			21.09	<0.001
12-13 years	94	180			96	182			98	186			98	186		
14-15 years	78	159			84	170			84	170			86	174		
16-17 years	80	139			86	150			87	152			87	152		
Gender			1.66	n.s.			0.03	n.s.			0.75	n.s.			0.08	n.s.
Female	82	251			88	268			91	275			91	275		
Male	86	226			89	233			89	232			90	236		
SES			0.43	n.s.			0.38	n.s.			0.03	n.s.			0.26	n.s.
Low and medium	82	116			87	123			89	126			89	126		
High	85	352			89	369			90	372			91	376		
Ethnicity			0.50	n.s.			0.97	n.s.			1.10	n.s.			1.81	n.s.
Other/prefer not to say	82	80			86	84			87	85			87	85		
White British	85	393			89	413			90	418			91	422		
Smoking status			155.04	<0.001			126.31	<0.001			69.95	<0.001			120.44	<0.001
Never-smoker	92	443			94	455			94	452			96	461		
Ever-smoker	34	25			49	36			62	45			55	40		
Susceptibility			36.21	<0.001			22.52	<0.001			20.80	<0.001			14.28	<0.001
Non-susceptible	97	327			98	329			97	327			98	330		
Susceptible	80	114			87	124			86	123			90	129		

Notes:

¹ Never-smokers only

χ^2 = Pearson Chi Square

Trial intentions: Binary from original scale variable, No trial intentions (score 4/5) or neutral/positive trial intentions (score 1-3).