What is the impact of e-cigarette adverts on children’s perceptions of tobacco smoking? An experimental study

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WHAT IS THE IMPACT OF E-CIGARETTE ADVERTS ON CHILDREN’S PERCEPTIONS OF TOBACCO SMOKING? AN EXPERIMENTAL STUDY

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ABSTRACT

Objective: Exposure to e-cigarette adverts increases children’s positive attitudes towards using them. Given the similarity in appearance between e-cigarettes and tobacco cigarettes, we examined whether exposure to e-cigarette adverts has a cross-product impact on perceptions and attitudes towards smoking tobacco cigarettes.

Methods: Children aged 11-16 (n=564) were interviewed in their homes and randomised to one of three groups: two groups saw different sets of 10 images of e-cigarette adverts and one group saw no adverts. Of the 20 e-cigarette adverts, 10 depicted the product as glamorous, and 10 depicted it as healthy. The children then self-completed a questionnaire assessing perceived appeal, harms, and benefits of smoking tobacco cigarettes.

Results: The analyses were conducted on 411 children who reported never having smoked tobacco cigarettes or used e-cigarettes. Exposure to the adverts had no impact on the appeal or perceived benefits of smoking tobacco cigarettes. While the perceived harm of smoking more than 10 cigarettes per day was similar across groups, those exposed to either set of adverts perceived the harms of smoking one or two tobacco cigarettes occasionally to be lower than those in the control group.

Conclusions: This study provides the first evidence that exposure to e-cigarette adverts might influence children’s perceptions of smoking tobacco cigarettes, reducing their perceived harm of occasional smoking. These results suggest the potential for e-cigarette adverts to undermine tobacco control efforts by reducing a potential barrier (i.e., beliefs about harm) to occasional smoking.
WHAT THIS PAPER ADDS:

- What is already known on this subject:
  - Exposure of adolescents to e-cigarette adverts increases the appeal of using e-cigarettes.

- What important gaps in knowledge exist on this topic:
  - Given the similarities in appearance between e-cigarettes and tobacco cigarettes, could exposure to e-cigarette adverts increase the appeal of smoking tobacco cigarettes?

- What this study adds:
  - Exposing children to e-cigarette adverts associating e-cigarettes with glamour or their putative health-benefits did not increase the appeal or perceived benefits of smoking tobacco cigarettes.
  - Exposing children to either set of e-cigarette adverts did, however, lower their perceptions of the harm of smoking one or two tobacco cigarettes occasionally.
  - This study provides the first evidence that exposure to e-cigarette adverts might influence children’s perceptions of smoking tobacco cigarettes, reducing their perceived harm.
INTRODUCTION

In countries with comprehensive and established tobacco control policies, fewer adults and children smoke now than several decades ago. As the number of children experimenting with tobacco cigarettes is declining, experimentation with electronic cigarettes (e-cigarettes) is now more common than experimentation with tobacco cigarettes. For example, in England in 2014, 22% of children aged 11-15 had experimented with e-cigarettes while only 18% had experimented with tobacco cigarettes.[1] Similarly, in the USA e-cigarette use tripled from 2013 to 2014 amongst high-schoolers (5% to 13%) and middle-schoolers (1% to 4%), while tobacco smoking rates declined from 16% to 9 %, and 4% to 3% respectively, amongst these two groups from 2011 to 2014.[2]

The increasing exposure of children to e-cigarette adverts could be contributing to high rates of experimentation with that product.[3, 4] A recent analysis of US panel data shows promotional spending for e-cigarettes has rapidly increased, reaching $28 million in 2013, over eight times the spending in 2012.[5] Furthermore, a recent analysis of the online market found older e-cigarette brands were more likely to sell “cigalikes”, claiming they assist smoking cessation and are healthier and cheaper than tobacco cigarettes, whilst newer brands offered more flavours and were less likely to compare themselves with tobacco cigarettes.[6] These marketing trends are coupled with American adolescents’ exposure to televised e-cigarette adverts increasing by 256% from 2011 to 2013.[7] Previous studies suggest that such exposure can increase children’s positive attitudes and intentions to use e-cigarettes.[8] Adverts for e-cigarettes that are candy-like or sweet flavoured, as opposed to non-flavoured or tobacco-flavoured, may be especially appealing to adolescents and increase the desire to buy and try these products.[9]

Adverts for e-cigarettes feature messages historically used in the marketing of tobacco cigarettes. For example, e-cigarette adverts often depict their use as glamorous, cool,
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attractive, liked by celebrities, and as a symbol of freedom.[10,11] In past research ‘cool’ and ‘glamorous’ characters such as Joe Camel and the Marlboro man increased the appeal and initiation of smoking.[12, 13, 14, 15] E-cigarette adverts may also explicitly or implicitly depict the potential for e-cigarettes to foster health through claims of being safer than tobacco cigarettes.[10, 11, 16] Depictions of endorsements by doctors are reminiscent of tobacco cigarette advertising in the 1950s.[17] These two advertising themes of ‘glamour’ and ‘healthfulness’ are examined in the current study.

Given the physical and motor-behavioural similarities between tobacco cigarettes and many types of e-cigarettes, exposure to e-cigarettes in adverts may affect attitudes towards smoking tobacco cigarettes. Among adult smokers, seeing someone use an e-cigarette in-vivo or in video adverts increases the desire and urge to smoke tobacco cigarettes,[18, 19] and decreases intentions to abstain from smoking tobacco cigarettes amongst former smokers.[20]

Two studies have assessed the impact of e-cigarette adverts on the appeal and perceived harm of tobacco smoking amongst youth, but both studies had important limitations.[8, 9] One used a mixture of adverts with opposing messages, highlighting both the differences and similarities between e-cigarettes and tobacco.[8] Neither study had samples representative of general populations.

The present study builds on the existing limited evidence concerning the possible cross-cueing effects of e-cigarette advertising on the appeal of tobacco smoking amongst children, assessing the effects of two advertising themes used in earlier tobacco advertising (glamour and healthfulness) and using a sample representative of the general population. Our primary hypothesis was that exposing children to glamorous e-cigarette adverts increases the appeal of tobacco smoking, and our secondary hypothesis was that exposing children to healthful e-cigarette adverts that emphasise the potential health benefits of e-cigarettes over tobacco cigarettes reduces the appeal of tobacco smoking.
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METHODS

Design
Participants were randomised to one of three groups where they viewed: 10 adverts associating e-cigarette use with *glamour*, 10 adverts associating e-cigarette use with *health*, or no adverts (control).

Participants
The study included 564 children aged 11-16. This sample provided 90% power at \( p = .01 \) to detect a medium-size difference on appeal of smoking tobacco cigarettes between the three groups,[21] allowing for a reduction in sample size caused by excluding children with prior tobacco smoking or e-cigarette use.[1]

Sampling strategy
A market research agency (ICM Direct; http://www.icm-direct.com/) conducted the interviews. Participants were selected using a random location quota sampling procedure across the UK. Fifty super output areas (SOAs) were randomly selected (with probability of selection proportionate to their size) from the 32,844 lower layer super output areas (LSOAs) in England, 1,909 LSOAs in Wales, 2,500 data zones in Scotland (equivalent to LSOAs), and 890 LSOAs in Northern Ireland. Recruitment quotas based on census data and Office for National Statistics estimates for age, sex, ethnicity and tenure were set within each LSOA.

Materials
The adverts used in this study were selected following a pilot study in which participants rated 40 e-cigarette adverts based on how “cool” or “healthy” they portrayed e-cigarettes to be. From the pilot, we selected 10 adverts rated as more glamorous than healthful, and showing the largest differences between the two aspects. These “glamour” adverts were
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reminiscent of tobacco advertising in the 1950s-60s, depicting e-cigarettes as cool, attractive, fashionable, popular, and featuring attractive young people. We also selected 10 adverts with the largest differences in ratings of “healthy” over “cool.” These adverts featured people wearing white coats and claimed e-cigarettes can aid smoking cessation, do not contain carcinogens found in tobacco cigarettes, and are “safe and healthy”. Additional by-item analyses showed that the adverts allocated to the glamour group were significantly different and clearly distinct from adverts allocated to the health group (See Online Supplementary Materials).

Measures

I Tobacco cigarette related measures

Appeal of smoking tobacco cigarettes was rated on three bipolar items: unattractive vs. attractive, not cool vs. cool, boring vs. fun.[21] Responses were recorded on scales ranging from 1 to 5, with higher scores denoting greater appeal. The items formed a reliable scale (α=.81).

Perceived positive (pros) and negative (cons) attributes of tobacco smoking were assessed with the Decisional Balance for Adolescent Smoking Scale developed by Hudmon and colleagues [22] and validated for use with children.[23, 24, 25] Participants rated six items describing perceived pros (e.g., “Kids who smoke have more friends”) and six items describing perceived cons of smoking (e.g., “Smoking makes teeth yellow”) on 5-point scales. Scale reliability for both subscales was high (α_pros=.81; α_cons=.87).

Perceived harms of tobacco smoking were assessed using three-items from previous research: “Smoking can harm your health” rated from 1 = Strongly disagree to 5 = Strongly agree,
“How dangerous do you think it is to smoke more than 10 cigarettes a day?” and “How dangerous do you think it is to smoke one or two cigarettes occasionally?” both rated on five point scales ranging from 1 = Not very dangerous to 5 = Very dangerous.[26] Scale reliability in the current sample was modest (α=.50) therefore we analysed the items separately as in previous studies.[26, 27, 28]

Prevalence estimates of tobacco smoking were given on an open-ended question: “How many young people your age out of 100 do you think smoke tobacco cigarettes?”.[29]

Susceptibility to tobacco smoking was assessed using three items: “Do you think you will be smoking tobacco cigarettes when you are 18 years old?”; “Do you think you will smoke a tobacco cigarette at any time during the next year?” and “If one of your friends offered you a tobacco cigarette, would you smoke it?”.[21, 30] Participants who did not respond “definitely not” to all three items were categorised as susceptible.

II E-cigarette related measures

Appeal of using e-cigarettes was assessed using the same three bipolar items used to assess the appeal of smoking tobacco cigarettes (α=.88).

Prevalence estimates of e-cigarette use was assessed by adapting the item used to assess prevalence estimates of tobacco smoking: “How many young people your age out of 100 do you think use e-cigarettes?”

Measures assessed only in the two conditions in which adverts were shown:
Appeal of e-cigarette adverts was assessed by asking: “How much do you like this advert (not the product)?” [31] Responses ranged from 1 = Not at all to 4 = A lot. Responses to the adverts were averaged into a single index (α=.88).

Interest in buying and trying e-cigarettes was assessed with one item: “Does this advert make you want to buy and try this product?” with scores ranging from 1 = Not at all to 4 = Yes, a lot.[31] Responses were averaged across the 10 adverts (α=.91).

Other measures for all conditions

Tobacco smoking was assessed using the questions “Have you ever smoked a tobacco cigarette?” and “Have you ever tried tobacco cigarette smoking, even one or two puffs?” [30] Items assessing tobacco cigarette smoking were adapted to assess use of e-cigarettes: “Have you ever used an e-cigarette?” and “In the past 30 days, on how many days did you use an e-cigarette?” Gender, age, ethnicity and geographic location within the UK were also recorded.

Procedure

ICM Direct recruited participants and collected the data. Trained interviewers knocked on doors at households from eligible LSOAs and obtained written consent from parents/guardians. Children were randomly assigned to one of the three groups, using a pre-established random sequence generated by the statistical package R. After children verbally assented, interviewers instructed them and handed over the study booklets. Interviewers assisted participants when requested. Those allocated to the glamour and healthful conditions were shown a block of 10 print-adverts in the booklets, while those allocated to the control condition were not shown any adverts. Children across all conditions were told the study was
about their views on e-cigarettes, and their thoughts about the e-cigarette adverts shown [only in glamour and healthful conditions] (see booklets in Online Supplementary Materials).

Exposure to the adverts was not timed and their order was not counterbalanced. Each advert was shown only once. Children in all three groups completed all measures in one session (£10 compensation).

Analyses

Responses to the primary and secondary outcomes were not normally distributed, so differences between the groups were assessed using non-parametric tests (Kruskal-Wallis for comparisons between more than two groups; Mann-Whitney for comparisons between two groups). Logistic regression was used for measures with dichotomous outcomes.

RESULTS

Sample characteristics

Of the 564 children randomised 153 (27.1%) were excluded because they had already smoked tobacco cigarettes or used e-cigarettes, leaving a final sample of 411 children. Sample characteristics are summarised in Table 1. Randomisation was effective: the three experimental groups did not differ on any of the demographic characteristics.
Table 1. Demographic and smoking-related characteristics of (a) all randomised participants (n = 564) and (b) participants who had never smoked tobacco cigarettes or used e-cigarettes (n = 411)

### (a) All randomised participants (n = 564)

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Glamorous Adverts</th>
<th>Health Adverts</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>n</strong></td>
<td>187</td>
<td>186</td>
<td>191</td>
<td>564</td>
</tr>
<tr>
<td><strong>Age - M (SD)</strong></td>
<td>13.43 (1.81)</td>
<td>13.38 (1.64)</td>
<td>13.38 (1.74)</td>
<td>13.40 (1.73)</td>
</tr>
<tr>
<td><strong>Gender - Male % (n)</strong></td>
<td>44.4 (83)</td>
<td>52.2 (97)</td>
<td>52.4 (100)</td>
<td>49.6 (280)</td>
</tr>
<tr>
<td><strong>Ethnicity - White % (n)</strong></td>
<td>77.5 (145)</td>
<td>77.4 (144)</td>
<td>80.1 (153)</td>
<td>78.4 (442)</td>
</tr>
<tr>
<td><strong>Ethnicity - Asian % (n)</strong></td>
<td>11.8 (22)</td>
<td>12.4 (23)</td>
<td>8.4 (16)</td>
<td>10.8 (61)</td>
</tr>
<tr>
<td><strong>Ethnicity - Black % (n)</strong></td>
<td>5.9 (11)</td>
<td>4.3 (8)</td>
<td>5.2 (10)</td>
<td>5.1 (29)</td>
</tr>
<tr>
<td><strong>Ethnicity - Mixed % (n)</strong></td>
<td>1.6 (3)</td>
<td>5.9 (11)</td>
<td>5.8 (11)</td>
<td>4.4 (25)</td>
</tr>
<tr>
<td><strong>Ethnicity - Other % (n)</strong></td>
<td>3.2 (6)</td>
<td>0 (0)</td>
<td>.5 (1)</td>
<td>1.2 (7)</td>
</tr>
<tr>
<td><strong>Cigarette use - Yes % (n)</strong></td>
<td>22.5 (42)</td>
<td>20.4 (38)</td>
<td>20.9 (40)</td>
<td>21.3 (120)</td>
</tr>
<tr>
<td><strong>Cigarette experimentation - Yes % (n)</strong></td>
<td>24.1 (45)</td>
<td>25.3 (47)</td>
<td>22 (42)</td>
<td>23.8 (134)</td>
</tr>
<tr>
<td><strong>E-cigarette awareness - Yes % (n)</strong></td>
<td>88.2 (165)</td>
<td>88.2 (164)</td>
<td>84.8 (162)</td>
<td>87.1 (491)</td>
</tr>
<tr>
<td><strong>E-cigarette use - Yes % (n)</strong></td>
<td>17.1 (32)</td>
<td>12.9 (24)</td>
<td>13.1 (25)</td>
<td>14.4 (81)</td>
</tr>
</tbody>
</table>

### (b) Final sample of non-smokers and non-users of e-cigarettes (n = 411)

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Glamorous Adverts</th>
<th>Health Adverts</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>n</strong></td>
<td>133</td>
<td>136</td>
<td>142</td>
<td>411</td>
</tr>
<tr>
<td><strong>Age - M (SD)</strong></td>
<td>13.09 (1.74)</td>
<td>13.14 (1.62)</td>
<td>13.03 (1.69)</td>
<td>13.09 (1.68)</td>
</tr>
<tr>
<td><strong>Gender - Male % (n)</strong></td>
<td>40.6 (54)</td>
<td>49.3 (67)</td>
<td>51.4 (73)</td>
<td>47.2 (19)</td>
</tr>
<tr>
<td><strong>Ethnicity - White % (n)</strong></td>
<td>72.2 (96)</td>
<td>72.8 (99)</td>
<td>76.8 (109)</td>
<td>74.0 (304)</td>
</tr>
</tbody>
</table>

### Main analyses

Descriptive statistics (M, SD) for the outcome variables are summarised in Table 2. The mean ranks from non-parametric analyses are shown in Online Supplementary Materials.
Table 2. Descriptive statistics [Mean (SD)] of outcome measures in the three experimental groups (excluding children who had ever smoked tobacco or used e-cigarettes)

<table>
<thead>
<tr>
<th>Measures assessed across the three experimental conditions</th>
<th>Control</th>
<th>Glamour</th>
<th>Health</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appeal of tobacco smoking</td>
<td>1.21 (.44)</td>
<td>1.16 (.34)</td>
<td>1.20 (.57)</td>
<td>1.19 (.46)</td>
</tr>
<tr>
<td>Perceived pros of tobacco smoking</td>
<td>1.81 (.75)</td>
<td>1.85 (.72)</td>
<td>1.92 (.82)</td>
<td>1.86 (.76)</td>
</tr>
<tr>
<td>Perceived cons of tobacco smoking</td>
<td>4.63 (.45)</td>
<td>4.56 (.80)</td>
<td>4.38 (.98)</td>
<td>4.52 (.78)</td>
</tr>
<tr>
<td>Smoking can harm your health</td>
<td>4.83 (.56)</td>
<td>4.79 (.77)</td>
<td>4.72 (.86)</td>
<td>4.78 (.74)</td>
</tr>
<tr>
<td>How dangerous is smoking more than 10 cigarettes a day?</td>
<td>4.68 (.63)</td>
<td>4.66 (.69)</td>
<td>4.61 (.85)</td>
<td>4.65 (.73)</td>
</tr>
<tr>
<td>How dangerous is smoking one or two cigarettes occasionally?</td>
<td>3.57 (1.03)\textsuperscript{a,b}</td>
<td>3.24 (1.18)\textsuperscript{a}</td>
<td>3.11 (1.28)\textsuperscript{b}</td>
<td>3.30 (1.18)</td>
</tr>
<tr>
<td>Tobacco smoking prevalence estimates</td>
<td>32.55 (23.30)</td>
<td>35.19 (26.44)</td>
<td>29.47 (24.29)</td>
<td>32.37 (24.78)</td>
</tr>
<tr>
<td>Appeal of using e-cigarettes</td>
<td>1.58 (.80)</td>
<td>1.66 (.86)</td>
<td>1.65 (.80)</td>
<td>1.63 (.82)</td>
</tr>
<tr>
<td>E-cigarette use prevalence estimates</td>
<td>17.45 (15.55)\textsuperscript{a}</td>
<td>25.06 (24.27)\textsuperscript{a,b}</td>
<td>18.16 (20.42)\textsuperscript{b}</td>
<td>20.24 (21.20)</td>
</tr>
</tbody>
</table>

Measures assessed only in the two conditions were adverts were shown

| Appeal of e-cigarette adverts                               | /          | 1.74 (.63) | 1.83 (.63) | 1.79 (.63) |
| Interest in buying and trying e-cigarettes                 | /          | 1.36 (.49) | 1.44 (.57) | 1.40 (.53) |

Note: Means (SDs) in the same row with same letters are significantly different at $p<.05$
I Tobacco related outcomes

There were no statistically significant differences between the groups on appeal of smoking tobacco cigarettes, perceived pros and cons of smoking tobacco cigarettes, susceptibility to smoking tobacco cigarettes, or the prevalence estimates for tobacco smoking. Of the three items assessing the perceived harms of smoking tobacco cigarettes, there was a difference between the groups on the item, “How dangerous do you think it is to smoke one or two cigarettes occasionally?” Children exposed to either set of e-cigarette adverts perceived the danger as lower than the control group (Kruskall-Wallis test, \( \chi^2(2)=10.07, p=.007 \)). Both those in the glamour (\( U=7680.500, Z=-2.225, p=.026, r=.136 \)), and those in the health condition (\( U=7492.000, Z=-3.057, p=.002, r=.184 \)) perceived occasional smoking of one or two tobacco cigarettes to be less harmful than did those in the control condition. There was no significant difference in perceived harm of occasional smoking between participants in the glamour and health conditions (\( U=9054.000, Z=-.926, p=.354, r=.045 \); see Table 2 Online Supplementary Materials).

II E-cigarette related outcomes

The appeal of using e-cigarettes did not differ between experimental groups, but estimates of the prevalence of e-cigarette use differed significantly between conditions (Kruskal-Wallis test, \( \chi^2(2)=6.95, p=.031 \)), with those in the glamour condition estimating that more children were using e-cigarettes compared with the control group (\( U=7461.000, Z=-2.213, p=.027, r=.136 \)) and the health group (\( U=7981.500, Z=-2.334, p=.020, r=.140 \)). There was no significant difference in prevalence estimates of e-cigarette use between children in the health and control groups (\( U=9003.000, Z=-.153, p=.879, r=.009 \)).
Outcomes assessed only in the groups exposed to e-cigarette adverts

Children exposed to either set of adverts did not differ in how appealing they found the adverts or their interest in buying or trying e-cigarettes, both of which were low.

Exploratory analyses

Two sets of post-hoc analyses were conducted to explore the finding that exposure to either set of e-cigarette adverts reduced the perceived harm of occasional smoking of tobacco cigarettes. First, we examined participants’ responses to the three harm items across the three experimental conditions (see Figure 1 below and Table 3 in Online Supplementary Materials). We found that exposure to either set of adverts increased the number of participants who perceived occasional smoking of one or two tobacco cigarettes as “not very dangerous”.

We used the same measures of perceived harm of tobacco smoking in another study assessing the impact of exposure to candy-like flavoured and non-flavoured e-cigarette adverts. Using results from this study and the current study, we conducted a meta-analysis of the proportions of participants who responded to the item “How dangerous do you think it is to smoke one or two cigarettes occasionally?” by stating that is was “not very dangerous”, comparing those exposed to any type of advert for e-cigarettes with those in the control groups.
Children’s exposure to any of the adverts for e-cigarettes used in each of the two studies increased the perception that occasional smoking of one or two cigarettes was not very dangerous: OR=5.79, 95% CI [2.47, 13.58], I²=24%, Z=4.04, p<.001 (see Figure 2).

--------------- PLACE FIGURE 2 ABOUT HERE ==============

**DISCUSSION**

In an experiment examining the effects of glamorous and healthful e-cigarette adverts amongst UK 11-16 year olds, exposure to the adverts had no impact on the appeal, susceptibility, or perceived benefits of smoking tobacco cigarettes. Whilst the perceived harm of smoking more than 10 cigarettes per day was similar across groups, those exposed to either set of adverts perceived the harms of smoking one or two tobacco cigarettes occasionally to be lower than did those in the control group. The lack of impact of the adverts upon appeal and susceptibility to tobacco smoking is encouraging and replicates findings from two other studies using similar measures.[8, 9] However, the impact on perceived harms is concerning given that harm perceptions are predictive of tobacco smoking.[32, 33, 34] Perceived harm of occasional smoking is particularly predictive of subsequent engagement with smoking [35, 36] and differentiates smokers from non-smokers.[37] Furthermore, although the health consequences of occasional smoking can be as severe as regular smoking [38], young smokers who smoke occasionally do not consider themselves smokers, believing they are immune to the risks associated with smoking, with low intentions to quit.[39, 40] Although the adverts did not affect perceptions of appeal, susceptibility, and perceived benefits of smoking tobacco cigarettes, their effect on perceived harm is both theoretically and empirically important. In theories like the Health Belief Model, perceived threat is a key construct affecting changes in health behaviour. In the empirical literature, perceived risk
significantly predicts intentions and behaviours generally,[41, 42] as well as more specifically in relation to smoking.[32, 33, 34]

Only two other studies thus far have examined the perceived harms of tobacco smoking following exposure to e-cigarette adverts. Vasiljevic and colleagues found no significant differences in perceived harm of both regular and occasional tobacco smoking following exposure to either candy-like flavoured or non-flavoured e-cigarette adverts amongst English school-children.[9] However, meta-analysis using data from that study and the current study showed that exposure to any kind of e-cigarette advert reduced the perceived harm of occasional smoking one or two tobacco cigarettes. By contrast, Farrelly and colleagues’ experiment found that exposing children to four e-cigarette TV adverts did not decrease the perceived harm of tobacco smoking.[8] However, their measure of perceived harm (“How harmful are cigarettes”) was general and not time-specific. A similar item (“Smoking can harm your health”) that was used in the present study and the study by Vasiljevic et al.[9] replicated the results by Farrelly et al.[8] in showing that brief exposure to e-cigarette adverts did not affect children’s general perceptions that smoking is harmful. A broader set of items assessing harm, potentially specifying type of harm, time frame, and under what conditions the harm would occur, should be used in future studies alongside qualitative studies exploring how children perceive harms of tobacco smoking when exposed to e-cigarette adverts.[43]

The present study also found that children exposed to glamourous e-cigarette adverts estimated the number of young e-cigarette users to be greater than did children exposed either to healthful e-cigarette adverts or no adverts. This extends recent findings that exposure to e-cigarette adverts fosters more positive attitudes and intentions to use e-cigarettes in children, suggesting that exposure to e-cigarette adverts may shift the perceived norms of e-cigarette use amongst children.[8, 9] This may contribute to the increasing prevalence of e-cigarette
use amongst children. We only observed this effect for glamorous depictions of e-cigarette use. That we did not find a similar effect for healthful adverts suggests that glamorous depictions may be more potent at shifting the norms of e-cigarette use amongst children. Our findings suggest that restricting youth-targeted advertising with glamorous images of e-cigarettes may curb the rising experimentation and use of e-cigarettes in young people, but this requires evaluation.

Strengths and limitations

The current study provides novel, robust, and timely evidence contributing to the small but growing evidence base on the potential for e-cigarettes to influence attitudes towards smoking tobacco cigarettes. The study is limited by assessing perceptions and attitudes and not actual tobacco smoking or e-cigarette use. However, there is a large body of evidence demonstrating that perceptions and attitudes influence many judgements and behaviours [44, 45]. In keeping with this, the appeal of tobacco smoking predicts subsequent tobacco smoking in young people.[29, 46] Nevertheless, future studies should examine more direct measures of behavior or incorporate implicit measures of appeal that avoid social desirability biases.

The study was also limited by using momentary exposure to still e-cigarette adverts. The reported effects may therefore underestimate the impact of the prolonged and vivid exposure to e-cigarette adverts that children experience in real-life settings (on television, internet, and social media). The present study should be extended to examine children’s responses to e-cigarette adverts in more naturalistic settings, over longer periods of time, and using more vivid forms of advertisement. The advertising stimuli depicted primarily “cigalike” devices, rather than advanced generation devices, which could limit generalizability across the range of e-cigarettes currently available in the marketplace. However, the choice to focus on first generation devices was deliberate, given that we wished
to explore how devices that looked like tobacco cigarettes impacted beliefs about or interest in tobacco cigarettes. Future studies could explore differential effects of first and second generation e-cigarettes.

**Implications for policy**

Since May 2016, e-cigarette marketing across Europe falls under the new Tobacco Products Directive (TPD).[47] The new regulations limit the exposure of children to TV and newspaper e-cigarette adverts. However, the proposed implementation of these regulations in the UK and other EU member states still allows some form of e-cigarette advertising (posters, leaflets, billboards in shops) so children may still be exposed to e-cigarette adverts. The TPD also does not explicitly prohibit the use of glamorous or healthful themes/content. In the US, the Food and Drug Administration recently began regulating e-cigarettes, but the regulations do not include provisions to limit youth exposure to e-cigarette advertising or to restrict e-cigarette adverts with potentially youth-appealing themes/content.[48]

From a policy viewpoint, we note that our study only examined in-the-moment responses to e-cigarette adverts, and therefore our findings may under or overestimate the impact these adverts may have in the longer term. Contemporary marketing communications are aimed not so much at stimulating immediate purchasing,[49] but doing so more indirectly by raising awareness, interest, and identification with products and brands.[50, 51] These outcomes are subtle and develop gradually, and are unlikely to be observed in studies such as ours investigating the immediate effects of advertising.

However, this is the first study to provide evidence for the possible cross-cueing and re-normalising effects of e-cigarettes on tobacco smoking [see 52, 53] by showing that associating e-cigarettes with either glamour or health lowers the perceived harm of occasional smoking of one or two tobacco cigarettes amongst children who have not used tobacco cigarettes or e-cigarettes. Moreover, our study shows that glamorous e-cigarette adverts can
shift the perceived normativeness of e-cigarette use by increasing the perceived prevalence of children who are e-cigarette users. These findings, coupled with the growing popularity of e-cigarette products amongst children,[2, 54, 55] and the wider literature on the dangers to the developing brain arising from nicotine exposure and addiction,[16, 56] suggest a need to re-examine the rules surrounding the marketing of e-cigarettes.
E-CIGARETTE ADVERTS AND CHILDREN

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Contributors: All authors designed the study. DCP supervised the study and oversaw the acquisition of data. DCP, MV and TMM were responsible for the analysis and interpretation of data. MV drafted the manuscript; DCP, JKP, KMR and TMM were responsible for critical revision of the manuscript. All authors gave final approval of the manuscript.

Data Sharing Statement: We are willing to make all data available to any interested parties. Please contact the corresponding author for more information.

Ethics Approval: The experiment was conducted in accordance with APA standards for the ethical treatment of human participants, and gained the prior approval by the Psychology Research Ethics Committee of the University of Cambridge (Pre.2014.103).
Competing Interests Statement: All authors have completed the Unified Competing Interest form and declare: DCP, MV, JKP, and TMM have no competing interests to declare; KMR has a royalty interest in a store mapping and audit system owned by the University of North Carolina at Chapel Hill but these systems were not used in this study. The system has been used in past and ongoing projects to identify retailers selling e-cigarettes and vape shops.
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Figure Captions:

Figure 1. Proportions (%) of participants responding to each response option for each of the three items measuring perceived harm of smoking tobacco cigarettes.

Figure 2. Forest plot of meta-analysis of impact of exposure to e-cigarette adverts on the perception that occasional smoking of one or two cigarettes is not very dangerous.
Figure 1. Proportions (%) of participants responding to each response option for each of the three items measuring perceived harm of smoking tobacco cigarettes.
Figure 2. Forest plot of meta-analysis of impact of exposure to e-cigarette adverts on the perception that occasional smoking of one or two cigarettes is not very dangerous

168x33mm (120 x 120 DPI)

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>Experimental</th>
<th>Control</th>
<th>Weight M-H, Fixed, 95% CI</th>
<th>Odds Ratio M-H, Fixed, 95% CI</th>
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<tbody>
<tr>
<td>Vasiljevic et al.</td>
<td>37</td>
<td>313</td>
<td>82.8%</td>
<td>4.05 [1.56, 10.52]</td>
</tr>
<tr>
<td>Petrescu et al.</td>
<td>27</td>
<td>278</td>
<td>133</td>
<td>14.20 [1.91, 105.66]</td>
</tr>
<tr>
<td>Total (95% CI)</td>
<td>591</td>
<td>289</td>
<td>100%</td>
<td>5.79 [2.47, 13.58]</td>
</tr>
</tbody>
</table>

| Total events      | 64          | 6       |
| Heterogeneity: C² = 1.31, df = 1 (P = 0.25); I² = 24% |
| Test for overall effect: Z = 4.04 (P < 0.0001) |
ONLINE SUPPLEMENTARY MATERIALS:

WHAT IS THE IMPACT OF E-CIGARETTE ADVERTS ON CHILDREN’S PERCEPTIONS OF TOBACCO SMOKING? AN EXPERIMENTAL STUDY

Petrescu, D. C., Vasiljevic, M., Pepper, J. K., Ribisl, K. M., & Marteau, T. M.

Pilot Study pp. 2-7
Main Study (Supplementary Tables) pp. 8-10
Glamour Group Booklet pp. 11-33
Health Group Booklet pp. 34-56
Control Group Booklet pp. 57-68
Pilot Study

Methods

Design

The study consisted of an online survey in which participants rated e-cigarette adverts with regard to how “cool” and “healthy” they perceived them to be.

Participants and recruitment

Participants aged 16 (n = 255) took part in the pilot study. Participants were recruited by Onepoll [http://www.onepoll.com/], a market research agency, who sent invitations to members of their panel to allow their appropriately aged children take part in the study. Electronic consent was obtained from both children and parents.

Procedure

Pictures were selected from a large number of e-cigarette adverts sourced online. Two authors DCP and MV rated the adverts with regard to how healthy and glamourous their content was. A total of 40 adverts were selected to be piloted. In order to minimise fatigue, participants were divided into two groups rating 20 adverts each. Participants rated each advert on two 7-point scales ranging from Uncool (1) to Cool (7) and from Unhealthy (1) to Healthy (7).

Data analysis

Of the initial 255 participants, 119 (46.7%) had experimented with tobacco cigarettes in the past and were excluded from analyses. The final analysis was based on 136 participants who had never smoked.
Ratings on the two bipolar items were not normally distributed, therefore data were analysed using non-parametric tests. For each of the 40 adverts, Wilcoxon signed-rank tests were conducted to compare their “health” and “cool” ratings.

Results
Ten adverts were selected to be shown to participants in the glamour condition of the main study. All 10 adverts were selected on the basis of showing significantly higher scores on “cool” ratings as compared to “health” ratings as indicated by Wilcoxon signed-rank tests. Only 6 adverts showed significantly higher ranks for “health” ratings as compared to “cool” ratings and were selected to be used in the main study. One advert (Advert 40) showed a marginally significant difference in the Wilcoxon signed-rank test ($Z = -1.800, p = .072, r = -.22$) and was also included in the main study. Three additional adverts were selected to be shown in the health condition on the basis of having high health scores albeit these were not significantly higher than their “cool” ratings. Results from each of the 40 Wilcoxon signed-rank tests are summarised in Table 1 below. A visual representation of all scores is presented in terms of means, for ease of interpretation (see Figure 1).
Figure 1. Pilot study results. Mean ratings for each of the 40 adverts tested are shown (10 health and 10 glamour adverts were selected to be used in the main study).

To ensure that the 20 adverts identified for the main study successfully discriminate between glamour and health, we performed a by-item analysis. We collapsed participants’ ratings for each advert to create average ratings, one on the glamour dimension and one on the health dimension. The resulting data were normally distributed, and we thus proceeded with between-item t-tests to compare the health ratings for adverts allocated to the health group ($M = 3.34, SD = .14$) with the health ratings for adverts allocated to the glamour group ($M = 2.93, SD = .14$), which were significantly different, $t(18) = -6.36, p < .001, d = 2.99$. Likewise, we also compared the glamour ratings for adverts allocated to the glamour group ($M = 3.43, SD = .15$) with the glamour ratings for adverts allocated to the health group ($M =$
3.06, SD = .23), which were again significantly different, t(18) = 4.20, p = .001, d = 1.98.

Additional t-tests confirmed that adverts allocated to the health group had higher health ratings than glamour ratings, t(18) = -3.29, p = .004, d = 1.55, and adverts allocated to the glamour group had higher glamour ratings than health ratings, t(18) = 7.49, p < .001, d = 3.53. Please see Figure 2 for a graphical representation of these results.

![Boxplot illustrating the allocation of adverts into a Glamour group (10 adverts) and a Health group (10 adverts) based on health and glamour ratings obtained in the pilot study.](image)

*Figure 2. Boxplot illustrating the allocation of adverts into a Glamour group (10 adverts) and a Health group (10 adverts) based on health and glamour ratings obtained in the pilot study.*
Table 1. Median scores for “Cool” and “Health” ratings and Wilcoxon signed difference ranks for each of the 40 adverts

<table>
<thead>
<tr>
<th>Picture</th>
<th>Cool ratings</th>
<th>Health ratings</th>
<th>Negative ranks Mean rank (n)</th>
<th>Positive ranks Mean rank (n)</th>
<th>Ties n</th>
<th>Effect size r</th>
<th>Selected Yes/No</th>
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<td>3.00*</td>
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<td>3.00*</td>
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<td>19.78 (27)</td>
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<td>-.45</td>
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<td>3.00*</td>
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<td>21.37 (30)</td>
<td>31</td>
<td>-.49</td>
<td>Yes</td>
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<td>Picture 4 (n = 69)</td>
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<td>2.00b</td>
<td>12.50 (11)</td>
<td>15.03 (16)</td>
<td>12</td>
<td>-.16</td>
<td>No</td>
</tr>
<tr>
<td>Picture 5 (n = 69)</td>
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<td>3.00*</td>
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<td>2.00b</td>
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<td>33</td>
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<td>3.00*</td>
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<td>18.85 (21)</td>
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<td>3.00*</td>
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<td>20.82 (28)</td>
<td>32</td>
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<td>4.00a</td>
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<td>14.03 (15)</td>
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<td>4.00b</td>
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<td>15.30 (15)</td>
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<td>Picture 16 (n = 69)</td>
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<td>3.00b</td>
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<td>3.00a</td>
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<td>Picture 18 (n = 69)</td>
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<td>3.00b</td>
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<td>16.92 (12)</td>
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<td>3.00&lt;sup&gt;b&lt;/sup&gt;</td>
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<td>16.88 (12)</td>
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<td>4.00&lt;sup&gt;a&lt;/sup&gt;</td>
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<td>17.35 (10)</td>
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<td>18.63 (20)</td>
<td>35</td>
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<td>Picture 26 (n = 67)</td>
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<td>14.21 (12)</td>
<td>14.72 (16)</td>
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<td>17.78 (20)</td>
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<td>17.73 (13)</td>
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<td>13.44 (9)</td>
<td>37</td>
<td>-.30</td>
<td>Yes</td>
</tr>
<tr>
<td>Picture 40 (n = 67)</td>
<td>3.00&lt;sup&gt;a&lt;/sup&gt;</td>
<td>4.00&lt;sup&gt;b&lt;/sup&gt;</td>
<td>14.38 (17)</td>
<td>11.83 (9)</td>
<td>41</td>
<td>-.22</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Note: Medians in the same row with same letters are significantly different at p<.05
Main study

Table 2. Non-parametric mean ranks of outcome measures in the three experimental groups (excluding children who had ever smoked tobacco or used e-cigarettes)

<table>
<thead>
<tr>
<th>Measures assessed across the three experimental conditions (Kruskal-Wallis)</th>
<th>Control Mean rank</th>
<th>Glamour Mean rank</th>
<th>Health Mean rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appeal of tobacco smoking</td>
<td>212.47</td>
<td>207.64</td>
<td>198.37</td>
</tr>
<tr>
<td>Perceived pros of tobacco smoking</td>
<td>197.67</td>
<td>207.54</td>
<td>212.32</td>
</tr>
<tr>
<td>Perceived cons of tobacco smoking</td>
<td>208.29</td>
<td>215.37</td>
<td>194.89</td>
</tr>
<tr>
<td>Smoking can harm your health?</td>
<td>206.23</td>
<td>210.58</td>
<td>201.40</td>
</tr>
<tr>
<td>How dangerous is smoking more than 10 cigarettes a day?</td>
<td>205.61</td>
<td>206.27</td>
<td>206.11</td>
</tr>
<tr>
<td>How dangerous is smoking one or two cigarettes occasionally?</td>
<td>230.92$^{a,b}$</td>
<td>200.40$^a$</td>
<td>188.02$^b$</td>
</tr>
<tr>
<td>Tobacco smoking prevalence estimates</td>
<td>206.28</td>
<td>215.18</td>
<td>189.58</td>
</tr>
<tr>
<td>Appeal of using e-cigarettes</td>
<td>196.58</td>
<td>207.21</td>
<td>213.66</td>
</tr>
<tr>
<td>E-cigarette use prevalence estimates</td>
<td>193.64$^a$</td>
<td>224.95$^{a,b}$</td>
<td>191.82$^b$</td>
</tr>
</tbody>
</table>
Table 2 continued

| Susceptibility to smoking tobacco – dichotomous outcome (Logistic Regression) |
|---|---|---|
| Susceptibility | n (%) | n (%) | n (%) |
| 63 (33.7%) | 79 (42.5%) | 72 (37.7%) |

Measures assessed only in the two conditions were adverts were shown (Mann-Whitney)

<table>
<thead>
<tr>
<th></th>
<th>Mean rank</th>
<th>Mean rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appeal of e-cigarette adverts</td>
<td>133.26</td>
<td>145.28</td>
</tr>
<tr>
<td>Interest in buying and trying e-cigarettes</td>
<td>133.45</td>
<td>145.29</td>
</tr>
</tbody>
</table>

Note: Mean ranks in the same row with same letters are significantly different at $p<.05$
Table 3. Frequencies and percentages of participants’ response ratings on the question: “How dangerous do you think it is to smoke one or two cigarettes occasionally?”

<table>
<thead>
<tr>
<th></th>
<th>Control n = 187</th>
<th>Glamourous Adverts n = 186</th>
<th>Health Adverts n = 191</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not very dangerous - % (n)</td>
<td>0.8 (1)</td>
<td>8.1 (11)</td>
<td>11.3 (16)</td>
</tr>
<tr>
<td>Not dangerous - % (n)</td>
<td>13.5 (18)</td>
<td>16.2 (22)</td>
<td>22.5 (32)</td>
</tr>
<tr>
<td>Neither - % (n)</td>
<td>37.6 (50)</td>
<td>38.2 (52)</td>
<td>29.6 (42)</td>
</tr>
<tr>
<td>Dangerous - % (n)</td>
<td>24.1 (32)</td>
<td>18.4 (25)</td>
<td>16.9 (24)</td>
</tr>
<tr>
<td>Very dangerous - % (n)</td>
<td>24.1 (32)</td>
<td>19.1 (26)</td>
<td>19.7 (28)</td>
</tr>
</tbody>
</table>
“Study on e-cigarettes”

• Please fill in this form carefully.

• There are no right or wrong answers. We are interested only in what you think.

• It is important that the information you give is accurate and truthful.

• The researchers have no way of finding out who you are so you can be totally honest (please don’t write your name on this survey).
Study details

An e-cigarette is an electronic device that runs on a battery and produces vapour instead of smoke.

The aim of this study is to describe what people like you think about adverts for e-cigarettes.

What the study involves:

- You will be shown 10 e-cigarette adverts and asked to rate each one
- You will then be asked several questions about your thoughts on smoking tobacco cigarettes and using e-cigarettes
- You will also be asked several general questions about you
- For each question please cross the circle that best describes your views. For example, if you like the advert quite a lot you would cross the third circle as shown below:

How much do you like this advert (not the product)?

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

- | | | | |
Next, you will be shown 10 e-cigarette adverts and asked to rate each one.
1. How much do you like this advert (not the product)?

   Not at all    A lot
   1        4
   2        3

2. Does this advert make you want to buy and try this product?

   Not at all    Yes, a lot
   1        4
   2
   3
3. How much do you like this advert (not the product)?

Not at all  
1  
2  
3  
4  
A lot

4. Does this advert make you want to buy and try this product?

Not at all  
1  
2  
3  
4  
Yes, a lot

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5. How much do you like this advert (not the product)?

Not at all 1 2 3 A lot 4

6. Does this advert make you want to buy and try this product?

Not at all 1 2 3 Yes, a lot 4
7. How much do you like this advert (not the product)?

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all</td>
<td>〇</td>
<td>〇</td>
<td>〇</td>
<td>〇</td>
</tr>
<tr>
<td>A lot</td>
<td>〇</td>
<td>〇</td>
<td>〇</td>
<td>〇</td>
</tr>
</tbody>
</table>

8. Does this advert make you want to buy and try this product?

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all</td>
<td>〇</td>
<td>〇</td>
<td>〇</td>
<td>〇</td>
</tr>
<tr>
<td>Yes, a lot</td>
<td>〇</td>
<td>〇</td>
<td>〇</td>
<td>〇</td>
</tr>
</tbody>
</table>
9. How much do you like this advert (not the product)?

Not at all 1
2 3 A lot 4

10. Does this advert make you want to buy and try this product?

Not at all 1
2 3 Yes, a lot 4
11. How much do you like this advert (not the product)?

Not at all  1  2  3  A lot  4

12. Does this advert make you want to buy and try this product?

Not at all  1  2  3  Yes, a lot  4
13. How much do you like this advert (not the product)?

<table>
<thead>
<tr>
<th>Not at all</th>
<th>A lot</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

14. Does this advert make you want to buy and try this product?

<table>
<thead>
<tr>
<th>Not at all</th>
<th>Yes, a lot</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>
15. How much do you like this advert (not the product)?

- Not at all
  - 1
- A lot
  - 4

16. Does this advert make you want to buy and try this product?

- Not at all
  - 1
- Yes, a lot
  - 4
17. How much do you like this advert (not the product)?

<table>
<thead>
<tr>
<th>Not at all</th>
<th>A lot</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

18. Does this advert make you want to buy and try this product?

<table>
<thead>
<tr>
<th>Not at all</th>
<th>Yes, a lot</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>
19. How much do you like this advert (not the product)?

- Not at all
- 1
- 2
- 3
- A lot
- 4

20. Does this advert make you want to buy and try this product?

- Not at all
- 1
- 2
- 3
- Yes, a lot
- 4
The next questions ask about tobacco cigarettes.

21. Please cross the circles for (a), (b) and (c) that best describe how you feel about smoking tobacco cigarettes:

   a) 
   ![Unattractive and Attractive options]

   b) 
   ![Not cool and Cool options]

   c) 
   ![Boring and Fun options]
Please cross the circle that best describes your views on each of the next 12 statements:

22. Kids who smoke get more respect from others.
   - Strongly disagree 1
   - Somewhat disagree 2
   - Neither agree nor disagree 3
   - Somewhat agree 4
   - Strongly agree 5

23. Kids who smoke have more friends.
   - Strongly disagree 1
   - Somewhat disagree 2
   - Neither agree nor disagree 3
   - Somewhat agree 4
   - Strongly agree 5

24. Kids who smoke go out on more dates.
   - Strongly disagree 1
   - Somewhat disagree 2
   - Neither agree nor disagree 3
   - Somewhat agree 4
   - Strongly agree 5

25. Smoking helps people cope better with frustrations.
   - Strongly disagree 1
   - Somewhat disagree 2
   - Neither agree nor disagree 3
   - Somewhat agree 4
   - Strongly agree 5

26. Smoking is pleasurable.
   - Strongly disagree 1
   - Somewhat disagree 2
   - Neither agree nor disagree 3
   - Somewhat agree 4
   - Strongly agree 5
27. Smoking cigarettes relieves tension.

28. Smoking stinks.

29. Smoking is a messy habit.

30. Smoking makes teeth yellow.

31. Smoking can affect the health of others.
32. Smoking cigarettes is hazardous to people’s health.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Somewhat disagree</th>
<th>Neither agree nor disagree</th>
<th>Somewhat agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

33. Cigarette smoke bothers other people.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Somewhat disagree</th>
<th>Neither agree nor disagree</th>
<th>Somewhat agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
The following 3 questions ask whether you might smoke tobacco cigarettes in the future.

34. Do you think you will smoke a tobacco cigarette at any time during the next year?

<table>
<thead>
<tr>
<th>Definitely not</th>
<th>Probably not</th>
<th>Probably yes</th>
<th>Definitely yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

35. Do you think you will be smoking tobacco cigarettes when you are 18 years old?

<table>
<thead>
<tr>
<th>Definitely not</th>
<th>Probably not</th>
<th>Probably yes</th>
<th>Definitely yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

36. If one of your friends offered you a tobacco cigarette, would you smoke it?

<table>
<thead>
<tr>
<th>Definitely not</th>
<th>Probably not</th>
<th>Probably yes</th>
<th>Definitely yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
In the following three questions please cross the circles that best describe your opinions on smoking tobacco cigarettes.

37. Smoking can harm your health.

![Strongly disagree](1 2 3 4 5)

38. How dangerous do you think it is to smoke more than 10 cigarettes a day?

![Not very dangerous](1 2 3 4 5)

39. How dangerous do you think it is to smoke one or two cigarettes occasionally?

![Not very dangerous](1 2 3 4 5)
40. How many young people your age out of 100 do you think smoke tobacco cigarettes?

___________

41. Have you ever smoked a tobacco cigarette?

No  Yes

42. Have you ever tried tobacco cigarette smoking, even a few puffs?

No  Yes
The next questions ask about your knowledge and use of e-cigarettes. An e-cigarette is an electronic device that runs on a battery and produces vapour instead of smoke. There are many types of e-cigarettes and other vaping devices, such as e-hookah and vape pens, with some looking like regular cigarettes and some looking like pens. Some common brands are E-Lites, NJOY, Blu, and Nicolites.

43. Please cross the circles for (a), (b) and (c) that best describe how you feel about using e-cigarettes:

a) Unattractive

   1  2  3  4  5

b) Not cool

   1  2  3  4  5

c) Boring

   1  2  3  4  5
44. Before today, have you ever heard of e-cigarettes?

- [ ] No
- [ ] Yes

45. How many young people your age out of 100 do you think use e-cigarettes?

___________

46. Have you ever used an e-cigarette?

- [ ] No
- [ ] Yes

If you answered YES to question 46 please go to question 47. Otherwise, please skip the next question and go to question 48.

47. In the past 30 days, on how many days did you use an e-cigarette? __________
The next three questions ask for general information about you:

48. What is your gender?

   Male   Female

49. How old are you? ___________ years

50. What is your ethnic group?

   A. White  
   B. Mixed/multiple ethnic groups  
   C. Asian/Asian British  
   D. Black/African/Caribbean/Black British  
   E. Other ethnic group

Please check you have answered every question.

Thank you for your participation!
Health Group Booklet

“Study on e-cigarettes”

• Please fill in this form carefully.

• There are no right or wrong answers. We are interested only in what you think.

• It is important that the information you give is accurate and truthful.

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**Study details**

An e-cigarette is an electronic device that runs on a battery and produces vapour instead of smoke.

The aim of this study is to describe what people like you think about adverts for e-cigarettes.

What the study involves:

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- You will then be asked several questions about your thoughts on smoking tobacco cigarettes and using e-cigarettes

- You will also be asked several general questions about you

- For each question please cross the circle that best describes your views. For example, if you like the advert quite a lot you would cross the third circle as shown below:

How much do you like this advert (not the product)?

<table>
<thead>
<tr>
<th>Not at all</th>
<th>A lot</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

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https://mc.manuscriptcentral.com/tobaccocontrol
Next, you will be shown 10 e-cigarette adverts and asked to rate each one.
21. How much do you like this advert (not the product)?

Not at all  
1 2 3 4
A lot

22. Does this advert make you want to buy and try this product?

Not at all  
1 2 3 4
Yes, a lot
23. How much do you like this advert (not the product)?

Not at all 1 2 3 A lot 4

24. Does this advert make you want to buy and try this product?

Not at all 1 2 3 Yes, a lot 4
25. How much do you like this advert (not the product)?

Not at all 1 2 3 4
A lot

26. Does this advert make you want to buy and try this product?

Not at all 1 2 3 4
Yes, a lot
27. How much do you like this advert (not the product)?

Not at all
1
2
3
A lot
4

28. Does this advert make you want to buy and try this product?

Not at all
1
2
3
Yes, a lot
4
29. How much do you like this advert (not the product)?

Not at all 1 2 3 A lot 4

30. Does this advert make you want to buy and try this product?

Not at all 1 2 3 Yes, a lot 4
31. How much do you like this advert (not the product)?

Not at all
1

2

3

A lot
4

32. Does this advert make you want to buy and try this product?

Not at all
1

2

Yes, a lot
4
33. How much do you like this advert (not the product)?

- Not at all
  - 1
- A lot
  - 4

34. Does this advert make you want to buy and try this product?

- Not at all
  - 1
- Yes, a lot
  - 4
35. How much do you like this advert (not the product)?

Not at all  1  2  3  A lot  4

36. Does this advert make you want to buy and try this product?

Not at all  1  2  3  Yes, a lot  4
37. How much do you like this advert (not the product)?

<table>
<thead>
<tr>
<th>Not at all</th>
<th>1</th>
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<th>3</th>
<th>A lot</th>
</tr>
</thead>
<tbody>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

38. Does this advert make you want to buy and try this product?

<table>
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<tr>
<th>Not at all</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>Yes, a lot</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
39. How much do you like this advert (not the product)?

Not at all 1 2 3 A lot 4

40. Does this advert make you want to buy and try this product?

Not at all 1 2 3 Yes, a lot 4
The next questions ask about tobacco cigarettes.

21. Please cross the circles for (a), (b) and (c) that best describe how you feel about smoking tobacco cigarettes:

a)

- **Unattractive**
  - 1
  - 2
  - 3
  - 4
  - 5

b)

- **Not cool**
  - 1
  - 2
  - 3
  - 4
  - 5

C)

- **Boring**
  - 1
  - 2
  - 3
  - 4
  - 5

- **Fun**
  - 1
  - 2
  - 3
  - 4
  - 5
Please cross the circle that best describes your views on each of the next 12 statements:

### 22. Kids who smoke get more respect from others.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Somewhat disagree</th>
<th>Neither agree nor disagree</th>
<th>Somewhat agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="circle1" alt="Circle" /></td>
<td><img src="circle2" alt="Circle" /></td>
<td><img src="circle3" alt="Circle" /></td>
<td><img src="circle4" alt="Circle" /></td>
<td><img src="circle5" alt="Circle" /></td>
</tr>
</tbody>
</table>

### 23. Kids who smoke have more friends.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Somewhat disagree</th>
<th>Neither agree nor disagree</th>
<th>Somewhat agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="circle1" alt="Circle" /></td>
<td><img src="circle2" alt="Circle" /></td>
<td><img src="circle3" alt="Circle" /></td>
<td><img src="circle4" alt="Circle" /></td>
<td><img src="circle5" alt="Circle" /></td>
</tr>
</tbody>
</table>

### 24. Kids who smoke go out on more dates.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Somewhat disagree</th>
<th>Neither agree nor disagree</th>
<th>Somewhat agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="circle1" alt="Circle" /></td>
<td><img src="circle2" alt="Circle" /></td>
<td><img src="circle3" alt="Circle" /></td>
<td><img src="circle4" alt="Circle" /></td>
<td><img src="circle5" alt="Circle" /></td>
</tr>
</tbody>
</table>

### 25. Smoking helps people cope better with frustrations.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Somewhat disagree</th>
<th>Neither agree nor disagree</th>
<th>Somewhat agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="circle1" alt="Circle" /></td>
<td><img src="circle2" alt="Circle" /></td>
<td><img src="circle3" alt="Circle" /></td>
<td><img src="circle4" alt="Circle" /></td>
<td><img src="circle5" alt="Circle" /></td>
</tr>
</tbody>
</table>

### 26. Smoking is pleasurable.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Somewhat disagree</th>
<th>Neither agree nor disagree</th>
<th>Somewhat agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="circle1" alt="Circle" /></td>
<td><img src="circle2" alt="Circle" /></td>
<td><img src="circle3" alt="Circle" /></td>
<td><img src="circle4" alt="Circle" /></td>
<td><img src="circle5" alt="Circle" /></td>
</tr>
</tbody>
</table>
27. Smoking cigarettes relieves tension.

- Strongly disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Strongly agree

28. Smoking stinks.

- Strongly disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Strongly agree

29. Smoking is a messy habit.

- Strongly disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Strongly agree

30. Smoking makes teeth yellow.

- Strongly disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Strongly agree

31. Smoking can affect the health of others.

- Strongly disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Strongly agree
32. Smoking cigarettes is hazardous to people’s health.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Somewhat disagree</th>
<th>Neither agree nor disagree</th>
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33. Cigarette smoke bothers other people.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Somewhat disagree</th>
<th>Neither agree nor disagree</th>
<th>Somewhat agree</th>
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</table>
The following 3 questions ask whether you might smoke tobacco cigarettes in the future.

34. Do you think you will smoke a tobacco cigarette at any time during the next year?

<table>
<thead>
<tr>
<th>Definitely not</th>
<th>Probably not</th>
<th>Probably yes</th>
<th>Definitely yes</th>
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35. Do you think you will be smoking tobacco cigarettes when you are 18 years old?

<table>
<thead>
<tr>
<th>Definitely not</th>
<th>Probably not</th>
<th>Probably yes</th>
<th>Definitely yes</th>
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36. If one of your friends offered you a tobacco cigarette, would you smoke it?

<table>
<thead>
<tr>
<th>Definitely not</th>
<th>Probably not</th>
<th>Probably yes</th>
<th>Definitely yes</th>
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</table>
In the following three questions please cross the circles that best describe your opinions on smoking tobacco cigarettes.

37. Smoking can harm your health.

38. How dangerous do you think it is to smoke more than 10 cigarettes a day?

39. How dangerous do you think it is to smoke one or two cigarettes occasionally?
40. How many young people your age out of 100 do you think smoke tobacco cigarettes?

___________

41. Have you ever smoked a tobacco cigarette?

No   Yes

42. Have you ever tried tobacco cigarette smoking, even a few puffs?

No   Yes
The next questions ask about your knowledge and use of e-cigarettes. An e-cigarette is an electronic device that runs on a battery and produces vapour instead of smoke. There are many types of e-cigarettes and other vaping devices, such as e-hookah and vape pens, with some looking like regular cigarettes and some looking like pens. Some common brands are E-Lites, NJOY, Blu, and Nicolites.

43. Please cross the circles for (a), (b) and (c) that best describe how you feel about using e-cigarettes:

a) Unattractive

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Attractive

b) Not cool

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Cool

c) Boring

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Fun

https://mc.manuscriptcentral.com/tobaccocontrol
44. Before today, have you ever heard of e-cigarettes?

No  Yes

45. How many young people your age out of 100 do you think use e-cigarettes?

_________

46. Have you ever used an e-cigarette?

No  Yes

If you answered YES to question 46 please go to question 47. Otherwise, please skip the next question and go to question 48.

47. In the past 30 days, on how many days did you use an e-cigarette? __________
The next three questions ask for general information about you:

48. What is your gender?  
   - Male  
   - Female

49. How old are you? _____________ years

50. What is your ethnic group?  
   - F. White  
   - G. Mixed/multiple ethnic groups  
   - H. Asian/Asian British  
   - I. Black/African/Caribbean/Black British  
   - J. Other ethnic group

Please check you have answered every question.

Thank you for your participation!
Control Group Booklet

“Study on e-cigarettes”

• Please fill in this form carefully.

• There are no right or wrong answers. We are interested only in what you think.

• It is important that the information you give is accurate and truthful.

• The researchers have no way of finding out who you are so you can be totally honest (please don’t write your name on this survey).
**Study details**

An e-cigarette is an electronic device that runs on a battery and produces vapour instead of smoke.

The aim of this study is to describe what people like you think about e-cigarettes.

What the study involves:
- You will be asked several questions about your thoughts on smoking tobacco cigarettes and using e-cigarettes
- For each question please cross the circle that best describes your views. For example, if you think that using e-cigarettes is moderately attractive you would respond by crossing the circle as shown below:

**Please cross the circle that best describes how you feel about using e-cigarettes:**

![Circle Example](image.png)
The next questions ask about tobacco cigarettes.

1. Please cross the circles for (a), (b) and (c) that best describe how you feel about smoking tobacco cigarettes:

   a) 
   ![Unattractive Scale]
   ![Attractive Scale]

   b) 
   ![Not cool Scale]
   ![Cool Scale]

   c) 
   ![Boring Scale]
   ![Fun Scale]
Please cross the circle that best describes your views on each of the next 12 statements:

2. Kids who smoke get more respect from others.

- Strongly disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Strongly agree

3. Kids who smoke have more friends.

- Strongly disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Strongly agree

4. Kids who smoke go out on more dates.

- Strongly disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Strongly agree

5. Smoking helps people cope better with frustrations.

- Strongly disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Strongly agree

6. Smoking is pleasurable.

- Strongly disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Strongly agree
7. Smoking cigarettes relieves tension.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
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<th>Somewhat agree</th>
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8. Smoking stinks.

<table>
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<tr>
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9. Smoking is a messy habit.

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10. Smoking makes teeth yellow.

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11. Smoking can affect the health of others.

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12. Smoking cigarettes is hazardous to people’s health.

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13. Cigarette smoke bothers other people.

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The following 3 questions ask whether you might smoke tobacco cigarettes in the future.

14. Do you think you will smoke a **tobacco cigarette** at any time during the next year?

- [ ] Definitely not
- [ ] Probably not
- [ ] Probably yes
- [ ] Definitely yes

15. Do you think you will be smoking tobacco cigarettes when you are 18 years old?

- [ ] Definitely not
- [ ] Probably not
- [ ] Probably yes
- [ ] Definitely yes

16. If one of your friends offered you a **tobacco cigarette**, would you smoke it?

- [ ] Definitely not
- [ ] Probably not
- [ ] Probably yes
- [ ] Definitely yes
In the following three questions please cross the circles that best describe your opinions on smoking tobacco cigarettes.

17. Smoking can harm your health.

[Circle 1] Strongly disagree
[Circle 2] Strongly agree

18. How dangerous do you think it is to smoke more than 10 cigarettes a day?

[Circle 1] Not very dangerous
[Circle 5] Very dangerous

19. How dangerous do you think it is to smoke one or two cigarettes occasionally?

[Circle 1] Not very dangerous
[Circle 5] Very dangerous
20. How many young people your age out of 100 do you think smoke tobacco cigarettes?

_________

21. Have you ever smoked a tobacco cigarette?

No  Yes

22. Have you ever tried tobacco cigarette smoking, even a few puffs?

No  Yes
The next questions ask about your knowledge and use of e-cigarettes. An e-cigarette is an electronic device that runs on a battery and produces vapour instead of smoke. There are many types of e-cigarettes and other vaping devices, such as e-hookah and vape pens, with some looking like regular cigarettes and some looking like pens. Some common brands are E-Lites, NJOY, Blu, and Nicolites.

23. Please cross the circles for (a), (b) and (c) that best describe how you feel about using e-cigarettes:

   a) Unattractive
      1  2  3  4  5
      [ ] [ ] [ ] [ ] [ ]

   b) Not cool
      1  2  3  4  5
      [ ] [ ] [ ] [ ] [ ]

   c) Boring
      1  2  3  4  5
      [ ] [ ] [ ] [ ] [ ]
24. Before today, have you ever heard of e-cigarettes?

No ☐ Yes ☐

25. How many young people your age out of 100 do you think use e-cigarettes?

___________

26. Have you ever used an e-cigarette?

No ☐ Yes ☐

If you answered YES to question 26 please go to question 27. Otherwise, please skip the next question and go to question 28.

27. In the past 30 days, on how many days did you use an e-cigarette? _________
The next three questions ask for general information about you:

28. What is your gender?

   [ ] Male
   [ ] Female

29. How old are you? _____________ years

30. What is your ethnic group?

   [K. White]
   [L. Mixed/multiple ethnic groups]
   [M. Asian/Asian British]
   [N. Black/African/Caribbean/Black British]
   [O. Other ethnic group]

Please check you have answered every question.

Thank you for your participation!