Cigarette Pack Design and Adolescent Smoking Susceptibility: A Cross-sectional Survey

Journal:	*BMJ Open*
Manuscript ID:	bmjopen-2013-003282
Article Type:	Research
Date Submitted by the Author:	22-May-2013
Complete List of Authors:	Ford, Allison; University of Stirling, Institute for Social Marketing Hastings, Gerard; University of Stirling, Institute for Social Marketing Moodie, Crawford; University of Stirling, Institute for Social Marketing Mackintosh, Anne Marie; University of Stirling, Centre for Tobacco Control Research, Institute for Social Marketing
Primary Subject Heading:	Smoking and tobacco
Secondary Subject Heading:	Public health
Keywords:	PUBLIC HEALTH, SOCIAL MEDICINE, Health policy < HEALTH SERVICES ADMINISTRATION & MANAGEMENT

SCHOLARONE™
Manuscripts

For peer review only

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) .
Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

Title
Cigarette Pack Design and Adolescent Smoking Susceptibility: A Cross-sectional Survey

Authors
Allison Ford[1,2], Gerard Hastings[1,2], Crawford Moodie[1], Anne Marie MacKintosh[1]

Addresses and affiliations
[1]Institute for Social Marketing, University of Stirling, Stirling, FK9 4LA, UK
[2] UK Centre for Tobacco Control Studies, University of Stirling, Stirling, FK9 4LA, UK

Author Positions
Allison Ford *Postgraduate Research Student*
Gerard Hastings *Professor*
Crawford Moodie *Senior Research Fellow*
Anne Marie MacKintosh *Senior Researcher*

Corresponding author
Allison Ford, Institute for Social Marketing, University of Stirling, FK9 4LA, UK.
Tel: +44 (0) 1786 467390. Fax: +44 (0) 1786 467400. Email: a.j.ford@stir.ac.uk

Keywords
Smoking, cigarette packaging, plain packaging, youth

Word count
3753

For peer review only

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

ABSTRACT

Objectives: To compare adolescent's response to three different styles of cigarette packaging: *'novelty'* (branded packs designed with a distinctive shape, opening style or bright colour), *'regular'* (branded pack with no special design features) and *'plain'* (brown pack with a standard shape and opening and all branding removed, aside from brand name).
Design: Cross sectional in-home survey.
Setting: United Kingdom.
Participants: Random location quota sample of 1025 never smokers aged 11-16 years.
Main outcome measures: Susceptibility to smoking and composite measures of pack appraisal and pack receptivity derived from eleven survey items.
Results: Responses to the three pack types were negative for all survey items. However, 'novelty' packs were rated significantly less negatively than the 'regular' pack on most items, and the novelty and regular packs were rated less negatively than the 'plain' pack. For the novelty packs, logistic regressions, controlling for factors known to influence youth smoking, showed that susceptibility was associated with positive appraisal and also receptivity. For example, those receptive to the innovative Silk Cut Superslims pack were more than four times as likely to be susceptible to smoking than those not receptive to this pack (*AOR* = 4.42, 95% *CI* 2.50 to7.81, $p < 0.001$). For the regular pack, an association was found between positive appraisal and susceptibility but not with receptivity and susceptibility. There was no association with pack appraisal or receptivity for the plain pack.
Conclusion: Pack structure and colour is independently associated, not just with appreciation of and receptivity to the pack, but also with susceptibility to smoke. In other words, those who think most highly of innovative or brightly coloured cigarette packs are also the ones who indicate that they are most likely to go on to smoke. Plain packaging, in contrast, was found to directly reduce the appeal of smoking to adolescents.

For peer review only

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) .
Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

ARTICE SUMMARY

Article Focus

- To examine how adolescents respond to three different styles of cigarette packaging: 'regular', 'novelty', and 'plain'.

Key Messages

- Ratings for 'novelty' packs were significantly less negative than for the 'regular' pack. Ratings for the plain pack were significantly more negative than for the 'regular' pack and each of the 'novelty' packs.
- Pack structure and colour was independently associated, not just with appreciation of and receptivity to the pack, but also with susceptibility to smoke.
- Plain cigarette packaging was found to directly reduce the appeal of smoking to adolescents.

Strengths and Limitations

- The study allows an insight into how adolescents respond to novelty cigarette packaging that is available in the UK and other markets.
- This is the first study to examine how the attraction of cigarette packaging plays out in terms of smoking susceptibility using a sample size that supports robust statistical analysis.
- The cross-sectional nature of the survey does not enable causal relationships to be drawn about packaging and future smoking behaviour.

For peer review only

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

INTRODUCTION

It is now firmly established that children are influenced by different modes of tobacco marketing. Observational and longitudinal studies have consistently demonstrated a robust association between exposure to, and appreciation of, tobacco advertising and promotions and smoking susceptibility - a predictor of future tobacco use[1] - among adolescents.[2-4] More recently, a similar association has been found with point-of-sale (POS) displays.[5-7] This evidence has helped to inform tobacco control policy, resulting in advertising, promotions and POS display bans in the UK and elsewhere, to protect young people from the harmful influence of these types of marketing. Young people, however, continue to be exposed to tobacco packaging, a key promotional tool.[8, 9]

Audits of recent trends in tobacco pack design have shown increasingly frequent redesign of packs and rising numbers of limited-edition packs and innovative pack shapes, textures and methods of openings.[10-12] Tobacco industry analysts report new packaging developments, particularly those pertaining to new pack structures and technological printing advancements as "*ingenious innovations to keep the cigarette or cigar pack as an effective means, indeed the only means, to market the product*",[13] while "*a more playful and easy approach to new designs, shapes and colours"* means *"young consumers feel more catered for*".[14] Tobacco industry documents have revealed the appeal of innovative slim, oval, octagonal, and booklet pack shapes to young people.[15] Bright colours have also been used to communicate with this group.[16, 17] While tobacco companies are careful to name young adults as a key target market,[18-20] designers working alongside the tobacco industry have outlined the inevitable knock-on effect of tailoring designs for this audience. In 2007, for instance, an updated black and pink pack design for Camel No 9 was said to have a "*Britney Spears Factor...If you want to attract younger women with your design, it will most likely also appeal to underage girls*".[17]

The debate on plain packaging - which involves standardisation of pack size, shape, texture, method of opening, base colour and font – typically focuses on the potential benefits to young people most at risk of smoking uptake.[21] In England, 27% of 11 to 15 year olds have tried smoking[22]. Experimentation has been shown to result in a loss of autonomy over tobacco use and can quickly lead to nicotine dependence.[23, 24] Plain packaging studies indirectly conclude that plain packaging is likely to reduce youth smoking uptake.[25, 26] A recent study eliciting the opinions of tobacco control experts on the likely impact on smoking rates of plain packaging, estimated that two years after its introduction there would be a three percentage point decline for children compared with a one percentage point decline for adults.[27] A systematic review of plain packaging studies has outlined three main benefits of plain packaging.[28] Within each of these areas there is evidence of the benefit for children. Observational and experimental studies have shown plain packaging can: reduce appeal,[29-34] increase the salience of health warnings,[25, 30, 33, 35] and reduce false beliefs about the harmfulness of tobacco products.[32-34, 36] However, little is known outside the tobacco industry about how consumers respond to novel packaging such as limited editions,[39] or innovative pack shapes and openings,[11, 34, 37, 38] and only two studies have focused on children; a small exploratory qualitative study[11] and an internet survey which only assessed perceptions of plain packs.[34] Furthermore, no association between pack innovation and susceptibility has been explored.

This study compares young people's responses to three different styles of cigarette packaging: *'novelty'* (branded packs with either an innovative shape, style of opening or distinctive colour), *'regular'* (branded blue pack with a standard shape and opening) and

'plain' (a brown pack with a standard shape and opening and all branding removed, aside from brand name). It also investigates any link between these responses and susceptibility. This study is particularly relevant given the debate on plain packaging continues. New Zealand has announced its intent to implement plain packaging and follow Australia's lead, where plain packaging was introduced in December 2012. In the UK, plain packaging remains under consideration even though policy makers remain cautious about adopting this tobacco control measure.[40]

METHODS

Survey

Data were collected between July and September 2011 as part of Wave 6 of the Youth Tobacco Policy Survey (YTPS). The YTPS is a long running, repeat cross-sectional study examining the impact of tobacco policies on young people.[6, 41, 42] FACTS International, a market research company, recruited participants and conducted the survey. The fieldwork comprised in-home face-to-face interviews, accompanied by a self-completion questionnaire to gather more sensitive information on smoking behaviour. Ethical approval was obtained from the Institute for Socio-Management ethics committee at the University of Stirling prior to commencing the study.

Sampling strategy

Random location quota sampling was used to generate a sample of 11-16 year olds from households across the United Kingdom. Sampling involved random selection of 92 electoral wards, stratified by Government Office Region and A Classification Of Residential Neighbourhoods (ACORN) classification (a geo-demographic classification system that describes demographic and lifestyle profiles of small demographic areas) to ensure coverage of a range of geographic areas and socio-demographic backgrounds. Wards covering the islands, areas north of the Caledonian Canal, or with fewer than three urban/sub-urban Enumeration Districts, were excluded from the sampling frame for cost and practicality reasons. In each selected ward a quota sample, balanced across gender and age groups, was obtained. A total sample of 1373 was achieved. To examine the influence of pack design on susceptibility, this paper focuses exclusively on the 1025 never smokers in the sample. As the survey is part of a repeat cross-sectional survey, taking several measures at different time points, sample size was determined on the basis of enabling within survey sub-group analyses in addition to between wave analyses. The survey aims for a minimum of 1150 per wave, with a corresponding sampling error of approximately +/- 3% and has the potential to detect changes in proportions of approximately 6% between waves with 80% power, alpha = 0.05. At each wave, the sample provides a sub-group sample of approximately 100 per age, within gender, to allow sub-group analyses.

Development of the survey items and testing

A number of stages between April and July 2011 informed the development and refinement of the 11 survey items. Initially, a set of eight exploratory qualitative focus groups with 15 year olds generated understanding about how young people think about and respond to cigarette packaging. Ideas for survey items, question styles, and visual prompts were examined in a further six focus groups, segmented by gender and age (11-12, 13-14, 15-16 year olds). A draft questionnaire was then piloted with 12 participants aged 11-16 years. A professional interviewer administered the questionnaire, observed by a researcher. On completion of the questionnaire the interviewer left the room to enable the researcher to conduct a cognitive interview to assess participant understanding, ease of responding, relevance of questions and ability to respond.

For peer review only

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) .
Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

Selection of Packages

Informed by the exploratory focus groups, five cigarette packs were selected to reflect a range of design features (Image 1). Pack A (Mayfair), a popular and familiar brand, represented an everyday pack without any notable design features, other than the blue colour and was often referred to as 'standard'. It therefore provided the potential for use as a benchmark 'regular' pack against which other packs could be compared. Three packs (packs B-D) were selected to represent a range of 'novelty' packs, with innovative and distinctive designs and a range of colours. Pack B (Silk Cut Superslims) was an innovative, smaller and slimmer than usual pack shape with elegant and feminine aspects. Pack C (Marlboro Bright Leaf) provided an example of innovative opening, resembling a flip top cigarette lighter, more masculine features and dark colouring. Pack D (Pall Mall) represented a classic pack style but with a striking and unique bright pink colour. Pack E (a plain brown pack) represented a pack that was void of all design features.

Procedure

Parental permission and participant consent were secured prior to each interview. The interviews were conducted by trained professional researchers. Participants viewed an image of five cigarette packs and were asked to rate each pack on 11 items. To maximise privacy, should anyone else be in the room where the interview was taking place, questions were displayed on showcards to enable participants to read responses from the card and give the number corresponding to their answer. Participants sealed their self-completed questionnaires in an envelope before handing back to the interviewer.

Measures

General information

Demographic information (age, gender) and smoking by parents, siblings and close friends was obtained. Socioeconomic status was determined by the occupation of the chief income earner within the participant's household.

Smoking susceptibility

Never smokers were categorised as those who had 'never tried smoking, not even a puff or two'. Susceptibility, defined by the absence of a firm decision not to smoke[1] was assessed across three items. Never smokers were classified as non-susceptible if they answered 'definitely not' to the questions "If one of your friends offered you a cigarette, would you smoke it?" and "Do you think you will smoke a cigarette at any time during the next year?" and to the likelihood that "you will be smoking cigarettes at 18 years old". Participants who answered anything other than 'definitely not' to any of the three items were classified 'susceptible'.

Pack Responses

Eleven items assessed young people's responses to packaging across the five different pack designs. Participants were asked: "Can you tell me the number that best describes each pack?" and were assessed via scales: (a)Attractive/Unattractive; (b) Eye-Catching/Not eye-catching; (c) Cool/Not Cool; (d) Not at all harmful/Very harmful; (e) Fun/Boring; (f) Worth looking at/Not worth looking at; (g) Meant for someone like me/Not meant for someone like me; (h) Grown-up/Childish; (i) Puts me off smoking/Tempts me smoke; (j) I dislike this pack/I like this pack; and (k) I would not like to have this pack/I would like to have this pack. Responses were provided on five-point semantic scales (e.g. 1 = 'Attractive' to 5 =

Unattractive'). Prior to analysis, items (a – g) were reverse coded to make a low score (1) indicative of a negative rating and a high score (5) indicative of a positive pack rating.

Statistical Analysis

All data were analysed using SPSS version 19. The analysis focused on never smokers only. Paired t-tests were used to produce mean scores of the 11 items for: a) the 'regular' pack (Mayfair) relative to the mean scores for each of the three 'novelty' packs (Silk Cut Superslims, Marlboro Bright Leaf and Pall Mall); and b) the plain pack relative to the mean scores of each of the other four packs. As the data resulting from the five point scales is ordinal, the Wilcoxon signed rank test, a non-parametric procedure suited to paired data, was used to test for significant differences between the ratings.

For each pack, a principal components analysis was conducted on the eleven items, to explore the potential for reducing these 11 items to a smaller number of composite measures. Principal components were extracted using varimax rotation with the criteria of eigenvalues greater than 1, consideration of the scree plot and component loadings >.4. Two composite measures were derived from nine of the 11 items. Five items combined to form a composite *pack appraisal* measure (Cronbach's a>.8 for each pack): (a)Unattractive/Attractive; (b) Not eye-Catching/Eye-catching; (c) Not cool/Cool; (e) Boring/Fun; (f) Not worth looking at/Worth looking at. Four items combined to form a composite *pack receptivity* measure (Cronbach's a>.7 for each pack): (g) Meant for someone like me/Not meant for someone like me; (i) Puts me off smoking/Tempts me smoke; (j) I dislike this pack/I like this pack; (k) I would not like to have this pack/I would like to have this pack. Composite scores for each pack were derived by combining the pack ratings, with scores ranging from 5-25 for pack appraisal and 4-20 for pack receptivity. These scores were re-coded into binary variables to enable comparison of participants giving positive pack appraisal scores with those who gave non-positive appraisal scores and comparison of those who were receptive with those not receptive. Participants were classified as having a 'positive pack appraisal' (coded '1') if they scored 16 or more on the composite pack appraisal measure and 'non-positive pack appraisal' (coded '0') if they scored 15 or less. Participants were classified as 'receptive' (coded '1') to a pack if their composite receptivity score was 13 or more and 'not receptive' if their score was 12 or less (coded '0'). For each of the five packs, two hierarchical binary logistic regression models were constructed to examine whether any association existed between 1) positive pack appraisal and susceptibility and 2) receptivity to the pack and susceptibility. Each model controlled for the potential influence of demographic and smoking-related factors identified in past research as influencing youth smoking. These independent variables were entered in blocks. In each model, block one controlled for whether the majority of close friends smoke, any siblings smoke, and either parent smokes. Block two controlled for gender, socio-economic group, and age.

RESULTS

Sample

A total of 1373 interviews were completed. Excluding cases that were missing for smoking status (n = 3), 75% (n = 1025) were never smokers. Among these 1025 never smokers, 99% (n = 1019) provided information on smoking intentions, with 72% (n = 733) classified as non-susceptible and 28% (n = 286) susceptible (Table 1). Comparative national figures for 11-15 year olds indicate that smoking prevalence is in line with national data. In the 'Smoking, drinking and drug use among young people in England in 2011' survey[22], 75% of 11-15 year olds were never smokers, and 25% were ever smokers. This compares with 79% never smokers, and 21% ever smokers among 11 to 15 year olds in this sample.

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

Table 1 Gender, age and social grade of never smokers

	Never smoker *n*=1025 N (%)	Non-susceptible *n*=733 N (%)	Susceptible *n*=286 N (%)
Gender			
Male	528 (51.5)	373 (51)	152 (53)
Female	497 (48.5)	360 (49)	134 (47)
Age			
11	215 (21)	171 (23)	43 (15)
12	204 (20)	146 (20)	56 (20)
13	206 (20)	138 (19)	67 (23)
14	176 (17)	119 (16)	55 (19)
15	132 (13)	86 (12)	46 (16)
16	92 (9)	73 (10)	19 (7)
Social Grade			
ABC1	462 (46)	330 (46)	132 (47)
C2DE	548 (54)	391 (54)	151 (53)

Pack responses

Responses to all five cigarette packs were negative, with no scores on the positive end of the scale (>3). While all packs were rated negatively, mean scores for the three 'novelty' packs were significantly less negative than for the 'regular' Mayfair pack (Pack A) (see Table 2). Mean scores for Silk Cut Superslims (Pack B), with its innovative slim shape and size, and the bright pink Pall Mall pack, were significantly higher for all 11 items. Mean scores for the Marlboro Bright Leaf pack (Pack C) were significantly higher for 7 of the 11 items, except for "meant for someone like me", "childish" and "tempts me to smoke". This pack was also rated more harmful ($p = 0.045$) than the 'regular' Mayfair pack (Pack A).

By contrast, ratings for the plain pack (Pack E) were significantly more negative than for the 'regular' Mayfair pack (pack A) and each of the 'novelty' packs (Packs B to D) (see Table 3). Mean scores for the plain pack ranged from 1.24 to 1.99, which were significantly lower for all 11 items when compared with each of the other four packs.

For peer review only

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) .
Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

Table 2 Mean ratings on response to 'regular' pack (Mayfair) versus 'novelty' packs

	Mayfair Vs Silk Cut Superslims			Mayfair Vs Marlboro Bright Leaf			Mayfair Vs Pall Mall		
	Mayfair Mean *SD*	Silk Cut Mean *SD*	P value*	Mayfair Mean *SD*	Marlboro Mean *SD*	P value	Mayfair Mean *SD*	Pall Mall Mean *SD*	P value
Unattractive (1) / Attractive (5)	1.92 *1.11*	2.13 *1.56*	<0.001	1.92 *1.11*	2.06 *1.23*	<0.001	1.92 *1.11*	2.32 *1.38*	<0.001
Not eye-catching (1) / Eye-catching (5)	2.04 *1.27*	2.38 *1.41*	<0.001	2.04 *1.27*	2.23 *1.35*	<0.001	2.04 *1.27*	2.72 *1.53*	<0.001
Not cool (1) / Cool (5)	1.60 *1.04*	1.85 *1.22*	<0.001	1.60 *1.04*	1.82 *1.22*	<0.001	1.60 *1.04*	1.83 *1.22*	<0.001
Very harmful (1) / Not at all harmful (5)	1.62 *1.04*	1.72 *1.14*	<0.001	1.62 *1.04*	1.58 *1.02*	0.045	1.62 *1.04*	1.69 *1.11*	<0.001
Boring (1) / Fun (5)	1.69 *0.98*	1.97 *1.21*	<0.001	1.69 *0.98*	1.85 *1.14*	<0.001	1.69 *0.98*	2.02 *1.26*	<0.001
Not worth looking at (1) / Worth looking at (5)	1.55 *0.98*	1.74 *1.15*	<0.001	1.55 *0.98*	1.67 *1.09*	<0.001	1.54 *0.98*	1.74 *1.13*	<0.001
Not meant for someone like me (1) / Meant or someone like me (5)	1.34 *0.77*	1.42 *0.89*	<0.001	1.34 *0.76*	1.34 *0.82*	0.658	1.34 *0.76*	1.44 *0.92*	<0.001
Grown-up (1) / Childish (5)	2.06 *1.31*	2.23 *1.37*	<0.001	2.06 *1.31*	2.08 *1.31*	0.596	2.06 *1.31*	2.39 *1.39*	<0.001
Puts me off (1) / Tempts me to smoke (5)	1.62 *1.06*	1.67 *1.08*	0.002	1.62 *1.06*	1.63 *1.08*	0.678	1.62 *1.06*	1.67 *1.10*	0.001
I dislike this pack (1) / I like this pack (5)	1.81 *1.14*	2.10 *1.29*	<0.001	1.81 *1.14*	1.97 *1.24*	<0.001	1.81 *1.14*	2.17 *1.36*	<0.001
I would not like to have this pack (1) / I would like to have this pack (5)	1.43 *0.92*	1.51 *1.00*	<0.001	1.43 *0.92*	1.50 *1.01*	<0.001	1.43 *0.92*	1.54 *1.05*	<0.001

*Wilcoxon signed rank test for significant differences

For peer review only

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l'Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

Table 3 Mean ratings on response to 'plain' pack versus 'regular' and 'novelty' packs

	Plain Vs regular pack A (Mayfair)			Plain Vs novelty pack B (Silk Cut Superslims)			Plain Vs novelty pack C (Marlboro Bright Leaf)			Plain Vs novelty pack D (Pall Mall)		
	Plain Mean *SD*	Mayfair Mean *SD*	P value*	Plain Mean *SD*	Silk Cut Mean *SD*	P value	Plain Mean *SD*	Marlboro Mean *SD*	P value	Plain Mean *SD*	Pall Mall Mean *SD*	P value
Unattractive (1) / Attractive (5)	1.48	1.91	<0.001	1.48	2.13	<0.001	1.48	2.05	<0.001	1.48	2.31	<0.001
	0.94	*1.11*		*0.94*	*1.25*		*0.94*	*1.23*		*0.94*	*1.38*	
Not eye-catching (1) / Eye-catching (5)	1.56	2.03	<0.001	1.56	2.37	<0.001	1.56	2.23	<0.001	1.56	2.72	<0.001
	1.01	*1.26*		*1.01*	*1.41*		*1.01*	*1.35*		*1.01*	*1.53*	
Not cool (1) / Cool (5)	1.34	1.60	<0.001	1.34	1.85	<0.001	1.34	1.82	<0.001	1.34	1.83	<0.001
	0.80	*1.04*		*0.80*	*1.22*		*0.80*	*1.22*		*0.80*	*1.22*	
Very harmful (1) / Not at all harmful (5)	1.50	1.62	<0.001	1.50	1.73	<0.001	1.50	1.58	<0.001	1.50	1.69	<0.001
	0.98	*1.04*		*0.98*	*1.14*		*0.98*	*1.02*		*0.98*	*1.11*	
Boring (1) / Fun (5)	1.34	1.68	<0.001	1.34	1.97	<0.001	1.33	1.85	<0.001	1.34	2.02	<0.001
	0.74	*0.98*		*0.74*	*1.21*		*0.74*	*1.14*		*0.74*	*1.26*	
Not worth looking at (1) / Worth looking at (5)	1.31	1.55	<0.001	1.31	1.74	<0.001	1.31	1.67	<0.001	1.31	1.74	<0.001
	0.76	*0.98*		*0.76*	*1.15*		*0.76*	*1.09*		*0.76*	*1.13*	
Not meant for someone like me (1) / Meant or someone like me (5)	1.24	1.34	<0.001	1.24	1.41	<0.001	1.24	1.34	<0.001	1.24	1.44	<0.001
	0.68	*0.76*		*0.68*	*0.89*		*0.68*	*0.82*		*0.68*	*0.92*	
Grown-up (1) / Childish (5)	1.99	2.06	0.006	1.98	2.23	<0.001	1.98	2.08	0.003	1.99	2.39	<0.001
	1.32	*1.31*		*1.31*	*1.37*		*1.32*	*1.31*		*1.32*	*1.40*	
Puts me off (1) / Tempts me to smoke (5)	1.48	1.62	<0.001	1.48	1.67	<0.001	1.48	1.63	<0.001	1.48	1.67	<0.001
	1.01	*1.06*		*1.01*	*1.08*		*1.01*	*1.08*		*1.01*	*1.10*	
I dislike this pack (1) / I like this pack (5)	1.51	1.82	<0.001	1.51	2.10	<0.001	1.51	1.97	<0.001	1.51	2.18	<0.001
	0.98	*1.14*		*0.98*	*1.29*		*0.98*	*1.24*		*0.98*	*1.36*	
I would not like to have this pack (1) / I would like to have this pack (5)	1.33	1.43	<0.001	1.33	1.51	<0.001	1.32	1.50	<0.001	1.33	1.54	<0.001
	0.87	*0.92*		*0.87*	*1.00*		*0.87*	*1.01*		*0.87*	*1.05*	

*Wilcoxon signed rank test for significant differences

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l'Enseignement Superieur (ABES) .

Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

Association between pack appraisal and susceptibility

Eight percent (n = 90) indicated positive appraisal of the 'regular' Mayfair pack. For the 'novelty' packs, 14% (n = 141) indicated positive appraisal for Marlboro Bright Leaf, 18% (n = 176) for Silk Cut Superslims and 21% (n = 209) for Pall Mall. Three percent (n = 34) had a positive appraisal score for the plain pack.

For each pack, logistic regression analysis, controlling for smoking related and demographic variables, was conducted to examine the relationship between pack appraisal and susceptibility. For the 'regular' and each of the 'novelty' packs positive appraisal was significantly associated with susceptibility. Those with a positive appraisal of the 'regular' Mayfair pack were twice as likely to be susceptible as those giving a non-positive appraisal (*AOR* = 2.05, 95% *CI* 1.29 to 3.25, $p = 0.002$. This was even more pronounced for each of the novelty packs. Participants with a positive appraisal of the smaller Silk Cut Superslims pack were more than twice as likely to be susceptible (*AOR* = 2.20, 95% *CI* 1.55 to 3.14, $p < 0.001$) and participants with a positive appraisal of the brightly coloured Pall Mall pack were almost 2.5 times as likely to be susceptible (*AOR* = 2.45, 95% *CI* 1.76 to 3.43, $p < 0.001$). This association was strongest for the innovative Marlboro Bright Leaf pack, whereby susceptibility was 2.51 times higher for participants expressing a positive appraisal of the pack (*AOR* = 2.51, 95% *CI* 1.71 to 3.67, $p < 0.001$, see Table 4). There was no association between positive appraisal of the plain pack and susceptibility (*AOR* = 1.04, 95% *CI* 0.48 to 2.26, $p = 0.914$).

For peer review only

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

Table 4 Logistic regression of association between susceptibility to smoke and pack appraisal of the 'novelty' Marlboro Bright Leaf pack

Dependent variable : Susceptibility, 1 = Susceptible, 0=Non-susceptible	*n* = 968	*AOR*	95% *CI* Lower	95% *CI* Upper	P value
Block 1					
Close friends smoking					
Most do not smoke	815	1.00			0.401
Majority smoke	46	1.48	0.77	2.83	0.240
Do not know/not stated	107	1.19	0.76	1.88	0.444
Sibling smoking					
No siblings smoke	807	1.00			<0.001
Any siblings smoke	134	2.39	1.60	3.57	<0.001
Do not know/not stated	27	1.99	0.89	4.44	0.093
Parental smoking					
Neither parent smokes	544	1.00			0.054
Either parent smokes	367	1.89	1.06	3.39	0.032
Not sure/not stated/no mum/dad	57	1.29	0.94	1.78	0.113
Block 2					
Gender					
Male	497	1.00			
Female	471	0.86	0.64	1.15	0.301
Socio-economic group					
ABC1	448	1.00			
C2DE	520	0.79	0.59	1.06	0.120
Age	968	1.06	0.97	1.16	0.223
Block 3					
Packaging appraisal of Marlboro Bright Leaf					
Not positive appraisal	828	1.00			
Positive appraisal	140	2.51	1.71	3.67	<0.001
Model summary at each block					
	Test of model coefficients				Nagelkerke *R*
	χ^2	*Df*	*p*		
Block 1	24.761	6	<0.001		0.036
Block 2	7.819	3	0.050		0.047
Block 3	21.700	1	<0.001		0.078
Final model	54.279	10	<0.001		0.078

AOR = Adjusted odds ratio. Nine hundred and sixty-eight cases analysed, 57 cases with missing values. Cases correctly classified = 72.3%. 97.1% of non-susceptible never smokers and 10.1% of susceptible never smokers were correctly classified.

Association between pack receptivity and susceptibility

Four percent (*n* = 35) indicated being receptive to the 'regular' Mayfair pack. For the 'novelty' packs, five percent (*n* = 50) were receptive to Marlboro Bright Leaf, six percent (*n* = 61) to Silk Cut Superslims and seven percent (*n* = 71) to Pall Mall. For the plain pack, three percent (*n* = 27) indicated being receptive to this pack.

For each pack, logistic regression analysis, controlling for demographic and smoking related variables, was used to examine the relationship between pack receptivity and smoking susceptibility. Receptivity to the three 'novelty' pack styles was positively associated with susceptibility. Participants receptive to the Pall Mall pack were more than 3.5 times as likely to be susceptible (*AOR* = 3.69, 95% *CI* 2.21 to 6.19, $p < 0.001$) and those receptive to the Marlboro Bright Leaf pack almost 2.5 times as likely to be susceptible (*AOR* = 2.42, 95% *CI*

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) .
Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

1.32 to 4.44, $p = 0.004$), compared to participants not receptive to these packs. Participants receptive to the Silk Cut Superslims pack were more than four times as likely to be susceptible compared with those who were not receptive (*AOR* = 4.42, 95% *CI* 2.50 to 7.81, $p < 0.001$, see Table 5). No significant association was observed between susceptibility and receptivity to the 'regular' Mayfair pack (*AOR* = 1.97, 95% *CI* 0.96 to 4.03, $p = 0.064$) or the plain pack (*AOR* = 0.92, 95% *CI* 0.38 to 2.27, $p = 0.863$).

Table 5: Logistic regression of association between susceptibility to smoke and packaging receptivity to Silk Cut Superslims

Dependent variable : Susceptibility, 1 = Susceptible, 0=Non-susceptible	***n* = 970**	***AOR***	**95% *CI* Lower**	**95% *CI* Upper**	***p***
Block 1					
Close friends smoking					
Most do not smoke	814	1.00			0.948
Majority smoke	47	1.12	0.57	2.20	0.744
Do not know/not stated	109	1.00	0.64	1.59	0.985
Sibling smoking					
No siblings smoke	810	1.00			<0.001
Any siblings smoke	132	2.22	1.483	3.32	<0.001
Do not know/not stated	28	2.23	1.023	4.88	0.044
Parental smoking					
Neither parent smokes	550	1.00			0.010
Either parent smokes	362	2.05	1.149	3.67	0.015
Not sure/not stated/no mum/dad	58	1.46	1.064	2.01	0.019
Block 2					
Gender					
Male	501	1.00			
Female	469	0.879	0.656	1.18	0.384
Socio-economic group					
ABC1	447	1.00			
C2DE	523	0.85	0.63	1.14	0.270
Age	970	1.05	0.96	1.15	0.305
Block 3					
Packaging receptivity to Silk Cut Superslims					
Not receptive	912	1.00			
Receptive	58	4.42	2.50	7.81	<0.001
Model summary at each block					
	Test of model coefficients				Nagelkerke *R*
	χ^2	*df*	*p*		
Block 1	27.947	6	<0.001		0.041
Block 2	4.824	3	0.185		0.048
Block 3	26.640	1	<0.001		0.085
Final model	59.411	10	<0.001		0.085

AOR = Adjusted odds ratio. Nine hundred and seventy cases analysed, 55 cases with missing values. Cases correctly classified = 72.7%. 96.3% of non-susceptible never smokers and 13.1% of susceptible never smokers were correctly classified.

For peer review only

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

DISCUSSION

This study examines never smokers' responses to three different styles of cigarette packaging: *'novelty'* (branded packs designed to incorporate unique and distinctive features), *'regular'* (branded packs with no special design features) and *'plain'* (a brown pack with a standard shape and opening and all branding removed, aside from brand name). Responses to all three types of pack were negative across all survey items. However, ratings of *novelty* packs, with a distinctive shape, opening style or bright colour, were significantly less negative than the *regular* pack on most items, and both styles of packaging were rated less negatively than the *plain* pack on all items. For example, the bright pink Pall Mall and tall and narrow Silk Cut Superslims packs were rated higher than a regular blue king size pack (Mayfair) on all survey items. The Marlboro Bright Leaf pack, with its unique 'Zippo' style opening was rated higher than Mayfair on most items. For the three distinctive styles, logistic regressions, controlling for factors known to influence youth smoking, showed that susceptibility was associated with positive appraisal and also receptivity. For example, those receptive to the innovative Silk Cut Superslims pack were more than four times as likely to be susceptible to smoking, compared with participants who were not receptive to this pack. For the regular pack, an association was found between positive appraisal and susceptibility but not with receptivity and susceptibility. For the plain pack, no association was found between pack appraisal or receptivity and susceptibility.

The study benefits from a national sample of adolescents. Given that smoking prevalence is in line with national data,[22] the sample is likely to be representative of the wider adolescent population in the UK. In addition, the main outcome measure of susceptibility is a well validated measure of smoking intentions.[1] There are, however, a number of potential limitations. The cross-sectional nature of the survey does not enable causal relationships to be drawn about packaging and future smoking behaviour. The interviews were conducted in-home, where a family member may be present. In this instance participants may be worried about having positive perceptions surrounding tobacco and socially desirable responses may have provided lower ratings. Finally, despite concealing brand names and identifiers, prior brand knowledge may have influenced pack responses, especially for the '*regular'* Mayfair pack which is a common youth brand.

Despite these limitations, the findings are consistent with the growing body of evidence that on-pack branding - especially when accompanied by innovative and distinctive design features - makes cigarette packs more appealing to young people, and removing these does the reverse.[11, 29-34] It supports previous research which has found 'slim' packs particularly appealing to young females,[43] and innovative methods of openings to young adults[38] and adolescents.[11] This replicates tobacco industry research findings that young people are attracted to something 'new'.[44, 45] The study adds to this literature by demonstrating a significant association between novel and distinctive pack designs and susceptibility to smoking in the future. It also provides a measure for pack appraisal and receptivity, both of which were independently associated with susceptibility.

This study provides the first direct evidence that the attractiveness of cigarette packaging is associated with susceptibility to smoke. This suggests that mandating plain packaging may reduce youth smoking. Differences among the packaging styles highlight the influence of innovative and unique branding elements on adolescents' future smoking intentions. Despite marketing restrictions on advertising and POS displays, children continue to be influenced by tobacco companies through packaging design. The study confirms the need for policymakers to control this powerful type of marketing and countries considering plain packaging should

For peer review only

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

be urged to follow Australia's lead. Furthermore it supports the draft European Commission Tobacco Products Directive which recommends the need for partial pack standardisation. Such measures would prohibit the use of compact 'slimmer' packs in that they are misleading in terms of harm.

This is a cross-sectional study which depends on (albeit well validated) measures of future smoking intentions. There is a need, therefore, to follow up young people over time to provide additional confirmation of the findings. That packaging design is driven by creative and technological industries provides a challenge for tobacco control. The tobacco industry is increasingly finding new ways to use the pack as a means of promoting the product. Within the pack, inlays and innerliners extend its promotional ability.[46] Outside the pack, printed tear tapes,[47] "soft-look" and easy open films,[48] and special coatings to produce "surface-feel effects",[13] aim to enhance the tobacco brand experience. These developments should be monitored.

For peer review only

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

Acknowledgements We would like to thank our late colleague Dr Lynn MacFadyen for her contribution to the development and design of the YTPS, and FACTS International for undertaking the fieldwork.

Contributors AF designed data collection tools, analysed the data, drafted and revised the paper. AF is the guarantor. AMM and GH devised the study. AMM designed data collection tools and advised on the data analyses. GH, CM and AMM offered guidance on the initial drafting of the paper and helped revise the paper. All authors read and approved the final manuscript. All authors had access to and can take responsibility for the data and analysis.

Funding This work was supported by a grant from Cancer Research UK (C312/A8721). The UK Centre for Tobacco Control Studies contributed to the funding of Allison Ford and Gerard Hastings. The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

Competing Interests None Declared

Ethics Approval The study obtained ethics approval from the ethics committee of the Institute for Socio-Management at the University of Stirling. Participants provided informed consent before participating.

Data sharing statement There is no additional data available.

For peer review only

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) .
Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

REFERENCES

1 Pierce J, Choi WS, Gilpin EA, et al. Validation of susceptibility as a predictor of which adolescents take up smoking in the United States. *Health Psychol* 1996;**15**:355–61.

2 DiFranza JR, Wellman RJ, Sargent JD, et al. Tobacco promotion and the initiation of tobacco use: Assessing the evidence for causality. *Pediatrics* 2006;**117**:e1237–48.

3 National Cancer Institute. Tobacco Control Monograph 19: The role of the media in promoting and reducing tobacco use. Bethesda, MD: National Cancer Institute, 2008.

4 Lovato C, Watts A, Stead LF. Impact of tobacco advertising and promotion on increasing adolescent smoking behaviours. *Cochrane Database of Systematic Reviews* 2011, Issue 10. Art. No.: CD003439.

5 Paynter J, Edwards R. The impact of tobacco promotion at the point of sale: A systematic review. *Nicotine Tob Res 2009*;**11**:322–8.

6 Mackintosh AM, Moodie C, Hastings G. The association between point-of-sale displays and youth smoking susceptibility. *Nicotine Tob Res* 2012;**14**:616–20.

7 Spanopoulos D, Britton J, McNeill A, et al. Tobacco display and brand communication at the point of sale: implications for adolescent smoking behaviour. *Tob Control* Published Online First: 28 February 2013. doi:10.1136/tobaccocontrol-2012-050765

8 Wakefield M, Morley C, Horan JK, et al. The cigarette pack as image: new evidence from tobacco industry documents. *Tob Control* 2002;11:(Suppl 1):i73-i80.

9 Freeman B, Chapman S, Rimmer M. The case for plain packaging of tobacco products. *Addiction* 2008;**103**:580-90.

10 Moodie C. Hastings G. Making the pack the hero, tobacco industry response to marketing restrictions in the UK: Findings from a long-term audit. *Int J Ment Health Addict* 2011;**9**:24-38.

11 Centre for Tobacco Control Research. *The packaging of tobacco products*. Stirling: Centre for Tobacco Control Research, University of Stirling, 2012.

12 Moodie C. Angus K. Ford A. The importance of cigarette packaging in a dark market: The 'Silk Cut' experience. *Tob Control* Published Online First: 14 November 2012. doi:10.1136/tobaccocontrol-2012-050681

13 Glogan T. Tightening legislation in tobacco packaging – innovation blossoms! *Tobacco Journal International* 2013. http://www.tobaccojournal.com/Tightening_legislation_in_tobacco_packaging___innovation_blossoms.51660.0.html (accessed 3 May 2013).

14 Helk A. Appealing to all the senses. *Tobacco Journal International* 2006. http://www.tobaccojournal.com/Appealing_to_all_the_senses.47923.0.html (accessed 3 May 2013).

For peer review only

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

15 Kotnowski K, Hammond D. The impact of cigarette pack shape size and opening: Evidence from tobacco company documents. *Addiction* Published Online First: 22 April 2013. DOI: 10.1111/add.12183

16 M&C Saatchi. *Contact Report*. M&C Saatchi, 2000. http://www.tobaccopapers.com/PDFs/0500-0599/0533.pdf (accessed 3 May 2013).

17 Helk A. "The last bastion of masculinity has fallen". *Tobacco Journal International* 2007. http://www.tobaccojournal.com/The_last_bastion_of_masculinity_has_fallen.48422.0.html (accessed 3 May 2013)

18 Perry CL. The tobacco industry and underage youth smoking: Tobacco industry documents from the Minnesota litigation. *Arch Pediatr Adolesc Med 1999;***153**;935-41.

19 Hastings GB, MacFadyen L. *Keep smiling. No one's going to die: An analysis of internal documents from the tobacco industry's main UK advertising agencies*. Centre for Tobacco Control Research and Tobacco Control Resource Centre. London: British Medical Association, 2000.

20 Cummings KM, Morley CP, Horan JK, et al. Marketing to America's youth: Evidence from corporate documents. *Tob Control 2002*;**11**:(Suppl 1);i5-i17.

21 Department of Health. *Consultation on standardised packaging of tobacco products*. Department of Health, 2012. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/170568/dh_133575.pdf (accessed 3 May 2013).

22 Fuller, E. *Smoking, drinking and drug use among young people in England in 2011*. London: NatCen Social Research, 2012

23 DiFranza JR, Savageau JA, Fletcher K, et al. Measuring the loss of autonomy over nicotine use in adolescents: the DANDY (Development and Assessment of Nicotine Dependence in Youths) study. *Arch Pediatr Adolesc Med* 2002;**156**;397-403.

24 Gervais A, O'Loughlin J, Meshefedjian G, et al. Milestones in the natural course of cigarette use onset in adolescents. *Can Med Assoc J* 2006;**175**;255-61.

25 Goldberg ME, Liefeld J, Kindra G, et al. *When packages can't speak: Possible impacts on plain and generic packaging of tobacco products*. Expert Panel Report Prepared for Health Canada. Ottawa: Health Canada, 1995.

26 McCool J, Webb L, Cameron LD, et al. Graphic warning labels on plain cigarette packs: Will they make a difference to adolescents? *Soc Sci Med* 2012;**74**:1269-73.

27 Pechey R, Spiegelhalter D, Marteau TM. Impact of plain packaging of tobacco products on smoking in adults and children: and elicitation of international experts' estimates. *BMC Public Health* 2013;**13**:18

28 Moodie C, Stead M, Bauld L, et al. *Plain tobacco packaging: A systematic review*. London: Public Health Research Consortium, 2012.

For peer review only

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) .
Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

29 Centre for Health Promotion. *Effects of plain packaging on the image of tobacco products among youth*. Toronto: Centre for Health Promotion, University of Toronto, 1993.

30 Rootman I, Flay BR. *A study on youth smoking: plain packaging, health warnings, event marketing and price reductions.* Toronto: Centre for Health Promotion, University of Toronto, 1995.

31 Bondy SJ, Paglia A, Kaiserman MJ. Tobacco purchasing and marketing. In: Stephens T, Morin M, eds. *Youth smoking survey, 1994: Technical report*. Ottawa: Minister of Supply and Services Canada, 1996:153-79.

32 Hammond D, Dockrell M, Arnott D, et al. Cigarette pack design and perceptions of risk among UK adults and youth. *Eur J Public Health* 2009;**19**:631-7.

33 Germain D, Wakefield MA, Durkin SJ. Adolescents' perceptions of cigarette brand image: does plain packaging make a difference? *J Adolesc Health* 2010;**46**:385-92.

34 Moodie C, Ford A, Mackintosh AM, et al. Young people's perceptions of cigarette packaging and plain packaging: An online survey. *Nicotine Tob Research* 2012;**14**:98-105.

35 Beede P, Lawson R. The effect of plain packages on the perception of Cigarette health warnings. *Public Health* 1992;**106**:315-22.

36 Environics Research Group. *Consumer research on the size of health warning messages – Quantitative study of Canadian youth*. Prepared for Health Canada. Toronto: Environics Research Group, 2008.

37 Borland R, Savvas S, Sharkie F, et al. The impact of structural packaging design on young adult perceptions of tobacco products. *Tob Control* 2013;**22**:97-102.

38 Moodie C, Ford A. Young adult smokers' perceptions of cigarette pack innovation, pack colour and plain packaging. *Australasian Marketing Journal* 2011;**19**:174-80.

39 Gallopel-Morvan K, Moodie C, Hammond D, et al. Consumer perceptions of cigarette pack design in France: a comparison of regular, limited edition and plain packaging. *Tob Control* 2012;**21**:502-6.

40 Doward J. No 10 accused of 'caving in' to cigarette lobby as plain packs put on hold. *The Observer* 2013. http://www.guardian.co.uk/society/2013/may/04/cigarette-lobby-plain-packs (accessed 15 May 2013).

41 Brown A, Moodie C. The influence of tobacco marketing on adolescent smoking intentions via normative beliefs. *Health Educ Res* 2009;**24**:721-33.

42 Moodie C, MacKintosh AM, Brown A, et al. The effect of tobacco marketing awareness on youth smoking susceptibility and perceived prevalence, before and after the introduction of a tobacco advertising ban. *Eur J Public Health* 2008;**18**:484-90.

43 Hammond D, Daniel S, White CM. The Effect of Cigarette Branding and Plain Packaging on Female Youth in the United Kingdom. *J Adolesc Health,* 2013;**52**:151-57.

For peer review only

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

44 Philip Morris. Marketing New Products in a Restrictive Environment. Philip Morris. 1990. Bates No. 2044762173/2364. http://legacy.library.ucsf.edu/tid/vra81c00 (accessed 7 May 2013).

45 Philip Morris (1992). Opportunities in packaging innovation. Philip Morris. 1992. Bates No. 2048976191/6208. http://legacy.library.ucsf.edu/tid/hwe36e00 (accessed 7 May 2013).

46 McEwen W. From riches to rags? *Tobacco Journal International* 2011. http://www.tobaccojournal.com/From_riches_to_rags.50411.0.html (accessed 16 May 2013).

47 McEwen W. New technologies drive tear tape opportunities. *Tobacco Journal International* 2011. http://www.tobaccojournal.com/New_technologies_drive_tear_tape_opportunities.50668.0.html (accessed 16 May 2013).

48 Glogan T. Seeing the trends in brands. *Tobacco Journal International* 2010. http://www.tobaccojournal.com/Seeing_the_trends_in_the_brands.49866.0.html (accessed 16 May 2013.

For peer review only

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) .
Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

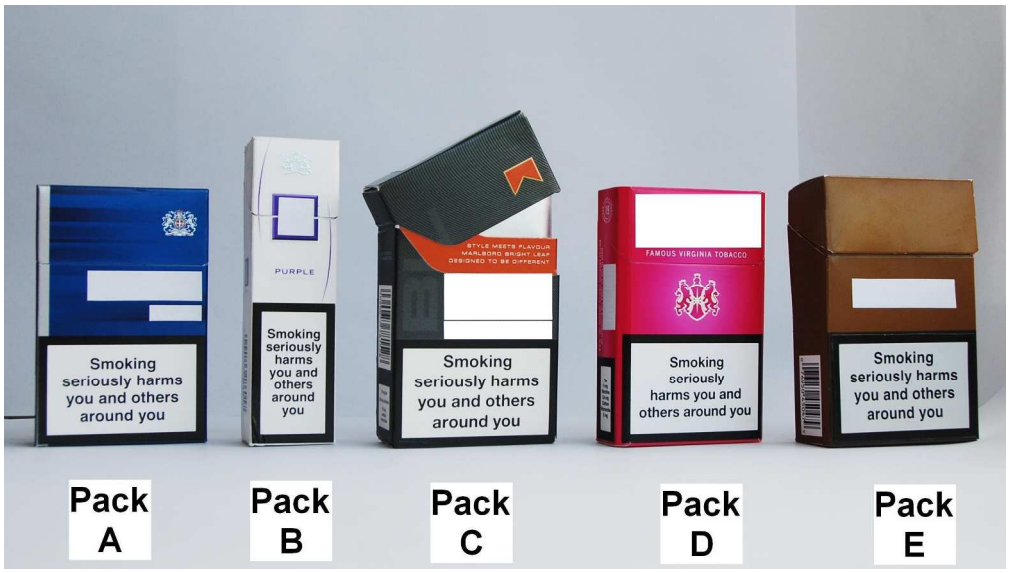

Image 1 Visual stimuli shown to participants: Pack A = 'regular' pack (Mayfair), Pack B = 'novelty' pack with innovative slim shape and size (Silk Cut Superslims), Pack C = 'novelty' pack with innovative method of opening (Marlboro Bright Leaf), Pack D = 'novelty' pack with distinctive and unique colour (Pall Mall), Pack E = 'plain' pack
741x417mm (96 x 96 DPI)

eview only

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No	Recommendation
Title and abstract	1✓	(*a*) Indicate the study's design with a commonly used term in the title or the abstract
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found
Introduction		
Background/rationale	2✓	Explain the scientific background and rationale for the investigation being reported
Objectives	3✓	State specific objectives, including any prespecified hypotheses
Methods		
Study design	4✓	Present key elements of study design early in the paper
Setting	5✓	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection
Participants	6✓	(*a*) *Cohort study*—Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up *Case-control study*—Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls *Cross-sectional study*—Give the eligibility criteria, and the sources and methods of selection of participants
		(*b*) *Cohort study*—For matched studies, give matching criteria and number of exposed and unexposed *Case-control study*—For matched studies, give matching criteria and the number of controls per case
Variables	7✓	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable
Data sources/ measurement	8✓	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group
Bias	9✓	Describe any efforts to address potential sources of bias
Study size	10✓	Explain how the study size was arrived at
Quantitative variables	11✓	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why
Statistical methods	12✓	(*a*) Describe all statistical methods, including those used to control for confounding
		(*b*) Describe any methods used to examine subgroups and interactions
		(*c*) Explain how missing data were addressed
		(*d*) *Cohort study*—If applicable, explain how loss to follow-up was addressed *Case-control study*—If applicable, explain how matching of cases and controls was addressed *Cross-sectional study*—If applicable, describe analytical methods taking account of sampling strategy
		(*e*) Describe any sensitivity analyses

Continued on next page

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

Results		
Participants	13✓	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed
		(b) Give reasons for non-participation at each stage
		(c) Consider use of a flow diagram
Descriptive data	14✓	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders
		(b) Indicate number of participants with missing data for each variable of interest
		(c) *Cohort study*—Summarise follow-up time (eg, average and total amount)
Outcome data	15✓	*Cohort study*—Report numbers of outcome events or summary measures over time
		Case-control study—Report numbers in each exposure category, or summary measures of exposure
		Cross-sectional study—Report numbers of outcome events or summary measures
Main results	16✓	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included
		(*b*) Report category boundaries when continuous variables were categorized
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses
Discussion		
Key results	18✓	Summarise key results with reference to study objectives
Limitations	19✓	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias
Interpretation	20✓	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence
Generalisability	21✓	Discuss the generalisability (external validity) of the study results
Other information		
Funding	22✓	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

For peer review only

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

Cigarette Pack Design and Adolescent Smoking Susceptibility: A Cross-sectional Survey

Journal:	*BMJ Open*
Manuscript ID:	bmjopen-2013-003282.R1
Article Type:	Research
Date Submitted by the Author:	16-Jul-2013
Complete List of Authors:	Ford, Allison; University of Stirling, Institute for Social Marketing Mackintosh, Anne Marie; University of Stirling, Centre for Tobacco Control Research, Institute for Social Marketing Moodie, Crawford; University of Stirling, Institute for Social Marketing Richardson, Sol; University of Nottingham, Hastings, Gerard; University of Stirling, Institute for Social Marketing
Primary Subject Heading:	Smoking and tobacco
Secondary Subject Heading:	Public health
Keywords:	PUBLIC HEALTH, SOCIAL MEDICINE, Health policy < HEALTH SERVICES ADMINISTRATION & MANAGEMENT

SCHOLARONE™
Manuscripts

For peer review only

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) .
Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

Title
Cigarette Pack Design and Adolescent Smoking Susceptibility: A Cross-sectional Survey

Authors
Allison Ford[1,2], Gerard Hastings[1,2], Crawford Moodie[1], Anne Marie MacKintosh[1]

Addresses and affiliations
[1]Institute for Social Marketing, University of Stirling, Stirling, FK9 4LA, UK
[2] UK Centre for Tobacco Control Studies, University of Stirling, Stirling, FK9 4LA, UK

Author Positions
Allison Ford *Postgraduate Research Student*
Gerard Hastings *Professor*
Crawford Moodie *Senior Research Fellow*
Anne Marie MacKintosh *Senior Researcher*

Corresponding author
Allison Ford, Institute for Social Marketing, University of Stirling, FK9 4LA, UK.
Tel: +44 (0) 1786 467390. Fax: +44 (0) 1786 467400. Email: a.j.ford@stir.ac.uk

Keywords
Smoking, cigarette packaging, plain packaging, youth

Word count
3753

For peer review only

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

ABSTRACT

Objectives: To compare adolescent's response to three different styles of cigarette packaging: *'novelty'* (branded packs designed with a distinctive shape, opening style or bright colour), *'regular'* (branded pack with no special design features) and *'plain'* (brown pack with a standard shape and opening and all branding removed, aside from brand name).
Design: Cross sectional in-home survey.
Setting: United Kingdom.
Participants: Random location quota sample of 1025 never smokers aged 11-16 years.
Main outcome measures: Susceptibility to smoking and composite measures of pack appraisal and pack receptivity derived from eleven survey items.
Results: Responses to the three pack types were negative for all survey items. However, 'novelty' packs were rated significantly less negatively than the 'regular' pack on most items, and the novelty and regular packs were rated less negatively than the 'plain' pack. For the novelty packs, logistic regressions, controlling for factors known to influence youth smoking, showed that susceptibility was associated with positive appraisal and also receptivity. For example, those receptive to the innovative Silk Cut Superslims pack were more than four times as likely to be susceptible to smoking than those not receptive to this pack (*AOR* = 4.42, 95% *CI* 2.50 to7.81, $p < 0.001$). For the regular pack, an association was found between positive appraisal and susceptibility but not with receptivity and susceptibility. There was no association with pack appraisal or receptivity for the plain pack.
Conclusion: Pack structure and colour is independently associated, not just with appreciation of and receptivity to the pack, but also with susceptibility to smoke. In other words, those who think most highly of innovative or brightly coloured cigarette packs are also the ones who indicate that they are most likely to go on to smoke. Plain packaging, in contrast, was found to directly reduce the appeal of smoking to adolescents.

For peer review only

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) .
Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

ARTICE SUMMARY

Article Focus

- To examine how adolescents respond to three different styles of cigarette packaging: 'regular', 'novelty', and 'plain'.

Key Messages

- Ratings for 'novelty' packs were significantly less negative than for the 'regular' pack. Ratings for the plain pack were significantly more negative than for the 'regular' pack and each of the 'novelty' packs.
- Pack structure and colour was independently associated, not just with appreciation of and receptivity to the pack, but also with susceptibility to smoke.
- Plain cigarette packaging was found to directly reduce the appeal of smoking to adolescents.

Strengths and Limitations

- The study allows an insight into how adolescents respond to novelty cigarette packaging that is available in the UK and other markets.
- This is the first study to examine how the attraction of cigarette packaging plays out in terms of smoking susceptibility using a sample size that supports robust statistical analysis.
- The cross-sectional nature of the survey does not enable causal relationships to be drawn about packaging and future smoking behaviour.

For peer review only

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) .
Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

INTRODUCTION

It is now firmly established that children are influenced by different modes of tobacco marketing. Observational and longitudinal studies have consistently demonstrated a robust association between exposure to, and appreciation of, tobacco advertising and promotions and smoking susceptibility - a predictor of future tobacco use[1] - among adolescents.[2-4] More recently, a similar association has been found with point-of-sale (POS) displays.[5-7] This evidence has helped to inform tobacco control policy, resulting in advertising, promotions and POS display bans in the UK and elsewhere, to protect young people from the harmful influence of these types of marketing. Young people, however, continue to be exposed to tobacco packaging, a key promotional tool.[8, 9]

Audits of recent trends in tobacco pack design have shown increasingly frequent redesign of packs and rising numbers of limited-edition packs and innovative pack shapes, textures and methods of openings.[10-12] Tobacco industry analysts report new packaging developments, particularly those pertaining to new pack structures and technological printing advancements as "*ingenious innovations to keep the cigarette or cigar pack as an effective means, indeed the only means, to market the product*",[13] while "*a more playful and easy approach to new designs, shapes and colours"* means *"young consumers feel more catered for*".[14] Tobacco industry documents have revealed the appeal of innovative slim, oval, octagonal, and booklet pack shapes to young people.[15] Bright colours have also been used to communicate with this group.[16, 17] While tobacco companies are careful to name young adults as a key target market,[18-20] designers working alongside the tobacco industry have outlined the inevitable knock-on effect of tailoring designs for this audience. In 2007, for instance, an updated black and pink pack design for Camel No 9 was said to have a "*Britney Spears Factor...If you want to attract younger women with your design, it will most likely also appeal to underage girls*".[17]

The debate on plain packaging - which involves standardisation of pack size, shape, texture, method of opening, base colour and font – typically focuses on the potential benefits to young people most at risk of smoking uptake.[21] In England, 27% of 11 to 15 year olds have tried smoking[22]. Experimentation has been shown to result in a loss of autonomy over tobacco use and can quickly lead to nicotine dependence.[23, 24] Plain packaging studies indirectly conclude that plain packaging is likely to reduce youth smoking uptake.[25, 26] A recent study eliciting the opinions of tobacco control experts on the likely impact on smoking rates of plain packaging, estimated that two years after its introduction there would be a three percentage point decline for children compared with a one percentage point decline for adults.[27] A systematic review of plain packaging studies has outlined three main benefits of plain packaging.[28] Within each of these areas there is evidence of the benefit for children. Observational and experimental studies have shown plain packaging can: reduce appeal,[29-34] increase the salience of health warnings,[25, 30, 33, 35] and reduce false beliefs about the harmfulness of tobacco products.[32-34, 36] However, little is known outside the tobacco industry about how consumers respond to novel packaging such as limited editions,[39] or innovative pack shapes and openings,[11, 34, 37, 38] and only two studies have focused on children; a small exploratory qualitative study[11] and an internet survey which only assessed perceptions of plain packs.[34] Furthermore, no association between pack innovation and susceptibility has been explored.

This study compares young people's responses to three different styles of cigarette packaging: *'novelty'* (branded packs with either an innovative shape, style of opening or distinctive colour), *'regular'* (branded blue pack with a standard shape and opening) and

'plain' (a brown pack with a standard shape and opening and all branding removed, aside from brand name). It also investigates any link between these responses and susceptibility. This study is particularly relevant given the debate on plain packaging continues. New Zealand has announced its intent to implement plain packaging and follow Australia's lead, where plain packaging was introduced in December 2012. In the UK, plain packaging remains under consideration even though policy makers remain cautious about adopting this tobacco control measure.[40]

METHODS

Survey

Data were collected between July and September 2011 as part of Wave 6 of the Youth Tobacco Policy Survey (YTPS). The YTPS is a long running, repeat cross-sectional study examining the impact of tobacco policies on young people.[6, 41, 42] FACTS International, a market research company, recruited participants and conducted the survey. The fieldwork comprised in-home face-to-face interviews, accompanied by a self-completion questionnaire to gather more sensitive information on smoking behaviour. Ethical approval was obtained from the Institute for Socio-Management ethics committee at the University of Stirling prior to commencing the study.

Sampling strategy

Random location quota sampling was used to generate a sample of 11-16 year olds from households across the United Kingdom. Sampling involved random selection of 92 electoral wards, stratified by Government Office Region and A Classification Of Residential Neighbourhoods (ACORN) classification (a geo-demographic classification system that describes demographic and lifestyle profiles of small demographic areas) to ensure coverage of a range of geographic areas and socio-demographic backgrounds. Wards covering the islands, areas north of the Caledonian Canal, or with fewer than three urban/sub-urban Enumeration Districts, were excluded from the sampling frame for cost and practicality reasons. In each selected ward a quota sample, balanced across gender and age groups, was obtained. A total sample of 1373 was achieved. To examine the influence of pack design on susceptibility, this paper focuses exclusively on the 1025 never smokers in the sample. As the survey is part of a repeat cross-sectional survey, taking several measures at different time points, sample size was determined on the basis of enabling within survey sub-group analyses in addition to between wave analyses. The survey aims for a minimum of 1150 per wave, with a corresponding sampling error of approximately +/- 3% and has the potential to detect changes in proportions of approximately 6% between waves with 80% power, alpha = 0.05. At each wave, the sample provides a sub-group sample of approximately 100 per age, within gender, to allow sub-group analyses.

Development of the survey items and testing

A number of stages between April and July 2011 informed the development and refinement of the 11 survey items. Initially, a set of eight exploratory qualitative focus groups with 15 year olds generated understanding about how young people think about and respond to cigarette packaging. Ideas for survey items, question styles, and visual prompts were examined in a further six focus groups, segmented by gender and age (11-12, 13-14, 15-16 year olds). A draft questionnaire was then piloted with 12 participants aged 11-16 years. A professional interviewer administered the questionnaire, observed by a researcher. On completion of the questionnaire the interviewer left the room to enable the researcher to conduct a cognitive interview to assess participant understanding, ease of responding, relevance of questions and ability to respond.

For peer review only

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) .
Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

Selection of Packages

Informed by the exploratory focus groups, five cigarette packs were selected to reflect a range of design features (Image 1). Pack A (Mayfair), a popular and familiar brand, represented an everyday pack without any notable design features, other than the blue colour and was often referred to as 'standard'. It therefore provided the potential for use as a benchmark 'regular' pack against which other packs could be compared. Three packs (packs B-D) were selected to represent a range of 'novelty' packs, with innovative and distinctive designs and a range of colours. Pack B (Silk Cut Superslims) was an innovative, smaller and slimmer than usual pack shape with elegant and feminine aspects. Pack C (Marlboro Bright Leaf) provided an example of innovative opening, resembling a flip top cigarette lighter, more masculine features and dark colouring. Pack D (Pall Mall) represented a classic pack style but with a striking and unique bright pink colour. Pack E (a plain brown pack) represented a pack that was void of all design features.

Procedure

Parental permission and participant consent were secured prior to each interview. The interviews were conducted by trained professional researchers. Participants viewed an image of five cigarette packs and were asked to rate each pack on 11 items. To maximise privacy, should anyone else be in the room where the interview was taking place, questions were displayed on showcards to enable participants to read responses from the card and give the number corresponding to their answer. Participants sealed their self-completed questionnaires in an envelope before handing back to the interviewer.

Measures

General information

Demographic information (age, gender) and smoking by parents, siblings and close friends was obtained. Socioeconomic status was determined by the occupation of the chief income earner within the participant's household.

Smoking susceptibility

Never smokers were categorised as those who had 'never tried smoking, not even a puff or two'. Susceptibility, defined by the absence of a firm decision not to smoke[1] was assessed across three items. Never smokers were classified as non-susceptible if they answered 'definitely not' to the questions "If one of your friends offered you a cigarette, would you smoke it?" and "Do you think you will smoke a cigarette at any time during the next year?" and to the likelihood that "you will be smoking cigarettes at 18 years old". Participants who answered anything other than 'definitely not' to any of the three items were classified 'susceptible'.

Pack Responses

Eleven items assessed young people's responses to packaging across the five different pack designs. Participants were asked: "Can you tell me the number that best describes each pack?" and were assessed via scales: (a)Attractive/Unattractive; (b) Eye-Catching/Not eye-catching; (c) Cool/Not Cool; (d) Not at all harmful/Very harmful; (e) Fun/Boring; (f) Worth looking at/Not worth looking at; (g) Meant for someone like me/Not meant for someone like me; (h) Grown-up/Childish; (i) Puts me off smoking/Tempts me smoke; (j) I dislike this pack/I like this pack; and (k) I would not like to have this pack/I would like to have this pack. Responses were provided on five-point semantic scales (e.g. 1 = 'Attractive' to 5 =

Unattractive'). Prior to analysis, items (a – g) were reverse coded to make a low score (1) indicative of a negative rating and a high score (5) indicative of a positive pack rating.

Statistical Analysis

All data were analysed using SPSS version 19. The analysis focused on never smokers only. Paired t-tests were used to produce mean scores of the 11 items for: a) the 'regular' pack (Mayfair) relative to the mean scores for each of the three 'novelty' packs (Silk Cut Superslims, Marlboro Bright Leaf and Pall Mall); and b) the plain pack relative to the mean scores of each of the other four packs. As the data resulting from the five point scales is ordinal, the Wilcoxon signed rank test, a non-parametric procedure suited to paired data, was used to test for significant differences between the ratings.

For each pack, a principal components analysis was conducted on the eleven items, to explore the potential for reducing these 11 items to a smaller number of composite measures. Principal components were extracted using varimax rotation with the criteria of eigenvalues greater than 1, consideration of the scree plot and component loadings >.4. Two composite measures were derived from nine of the 11 items. Five items combined to form a composite *pack appraisal* measure (Cronbach's a>.8 for each pack): (a)Unattractive/Attractive; (b) Not eye-Catching/Eye-catching; (c) Not cool/Cool; (e) Boring/Fun; (f) Not worth looking at/Worth looking at. Four items combined to form a composite *pack receptivity* measure (Cronbach's a>.7 for each pack): (g) Meant for someone like me/Not meant for someone like me; (i) Puts me off smoking/Tempts me smoke; (j) I dislike this pack/I like this pack; (k) I would not like to have this pack/I would like to have this pack. Composite scores for each pack were derived by combining the pack ratings, with scores ranging from 5-25 for pack appraisal and 4-20 for pack receptivity. These scores were re-coded into binary variables to enable comparison of participants giving positive pack appraisal scores with those who gave non-positive appraisal scores and comparison of those who were receptive with those not receptive. Participants were classified as having a 'positive pack appraisal' (coded '1') if they scored 16 or more on the composite pack appraisal measure and 'non-positive pack appraisal' (coded '0') if they scored 15 or less. Participants were classified as 'receptive' (coded '1') to a pack if their composite receptivity score was 13 or more and 'not receptive' if their score was 12 or less (coded '0'). For each of the five packs, two hierarchical binary logistic regression models were constructed to examine whether any association existed between 1) positive pack appraisal and susceptibility and 2) receptivity to the pack and susceptibility. Each model controlled for the potential influence of demographic and smoking-related factors identified in past research as influencing youth smoking. These independent variables were entered in blocks. In each model, block one controlled for whether the majority of close friends smoke, any siblings smoke, and either parent smokes. Block two controlled for gender, socio-economic group, and age.

RESULTS

Sample

A total of 1373 interviews were completed. Excluding cases that were missing for smoking status (n = 3), 75% (n = 1025) were never smokers. Among these 1025 never smokers, 99% (n = 1019) provided information on smoking intentions, with 72% (n = 733) classified as non-susceptible and 28% (n = 286) susceptible (Table 1). Comparative national figures for 11-15 year olds indicate that smoking prevalence is in line with national data. In the 'Smoking, drinking and drug use among young people in England in 2011' survey[22], 75% of 11-15 year olds were never smokers, and 25% were ever smokers. This compares with 79% never smokers, and 21% ever smokers among 11 to 15 year olds in this sample.

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

Table 1 Gender, age and social grade of never smokers

	Never smoker *n*=1025 N (%)	Non-susceptible *n*=733 N (%)	Susceptible *n*=286 N (%)
Gender			
Male	528 (51.5)	373 (51)	152 (53)
Female	497 (48.5)	360 (49)	134 (47)
Age			
11	215 (21)	171 (23)	43 (15)
12	204 (20)	146 (20)	56 (20)
13	206 (20)	138 (19)	67 (23)
14	176 (17)	119 (16)	55 (19)
15	132 (13)	86 (12)	46 (16)
16	92 (9)	73 (10)	19 (7)
Social Grade			
ABC1	462 (46)	330 (46)	132 (47)
C2DE	548 (54)	391 (54)	151 (53)

Pack responses

Responses to all five cigarette packs were negative, with no scores on the positive end of the scale (>3). While all packs were rated negatively, mean scores for the three 'novelty' packs were significantly less negative than for the 'regular' Mayfair pack (Pack A) (see Table 2). Mean scores for Silk Cut Superslims (Pack B), with its innovative slim shape and size, and the bright pink Pall Mall pack, were significantly higher for all 11 items. Mean scores for the Marlboro Bright Leaf pack (Pack C) were significantly higher for 7 of the 11 items, except for "meant for someone like me", "childish" and "tempts me to smoke". This pack was also rated more harmful ($p = 0.045$) than the 'regular' Mayfair pack (Pack A).

By contrast, ratings for the plain pack (Pack E) were significantly more negative than for the 'regular' Mayfair pack (pack A) and each of the 'novelty' packs (Packs B to D) (see Table 3). Mean scores for the plain pack ranged from 1.24 to 1.99, which were significantly lower for all 11 items when compared with each of the other four packs.

For peer review only

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

Table 2 Mean ratings on response to 'regular' pack (Mayfair) versus 'novelty' packs

	Mayfair Vs Silk Cut Superslims			Mayfair Vs Marlboro Bright Leaf			Mayfair Vs Pall Mall		
	Mayfair Mean *SD*	Silk Cut Mean *SD*	P value*	Mayfair Mean *SD*	Marlboro Mean *SD*	P value	Mayfair Mean *SD*	Pall Mall Mean *SD*	P value
Unattractive (1) / Attractive (5)	1.92 *1.11*	2.13 *1.56*	<0.001	1.92 *1.11*	2.06 *1.23*	<0.001	1.92 *1.11*	2.32 *1.38*	<0.001
Not eye-catching (1) / Eye-catching (5)	2.04 *1.27*	2.38 *1.41*	<0.001	2.04 *1.27*	2.23 *1.35*	<0.001	2.04 *1.27*	2.72 *1.53*	<0.001
Not cool (1) / Cool (5)	1.60 *1.04*	1.85 *1.22*	<0.001	1.60 *1.04*	1.82 *1.22*	<0.001	1.60 *1.04*	1.83 *1.22*	<0.001
Very harmful (1) / Not at all harmful (5)	1.62 *1.04*	1.72 *1.14*	<0.001	1.62 *1.04*	1.58 *1.02*	0.045	1.62 *1.04*	1.69 *1.11*	<0.001
Boring (1) / Fun (5)	1.69 *0.98*	1.97 *1.21*	<0.001	1.69 *0.98*	1.85 *1.14*	<0.001	1.69 *0.98*	2.02 *1.26*	<0.001
Not worth looking at (1) / Worth looking at (5)	1.55 *0.98*	1.74 *1.15*	<0.001	1.55 *0.98*	1.67 *1.09*	<0.001	1.54 *0.98*	1.74 *1.13*	<0.001
Not meant for someone like me (1) / Meant or someone like me (5)	1.34 *0.77*	1.42 *0.89*	<0.001	1.34 *0.76*	1.34 *0.82*	0.658	1.34 *0.76*	1.44 *0.92*	<0.001
Grown-up (1) / Childish (5)	2.06 *1.31*	2.23 *1.37*	<0.001	2.06 *1.31*	2.08 *1.31*	0.596	2.06 *1.31*	2.39 *1.39*	<0.001
Puts me off (1) / Tempts me to smoke (5)	1.62 *1.06*	1.67 *1.08*	0.002	1.62 *1.06*	1.63 *1.08*	0.678	1.62 *1.06*	1.67 *1.10*	0.001
I dislike this pack (1) / I like this pack (5)	1.81 *1.14*	2.10 *1.29*	<0.001	1.81 *1.14*	1.97 *1.24*	<0.001	1.81 *1.14*	2.17 *1.36*	<0.001
I would not like to have this pack (1) / I would like to have this pack (5)	1.43 *0.92*	1.51 *1.00*	<0.001	1.43 *0.92*	1.50 *1.01*	<0.001	1.43 *0.92*	1.54 *1.05*	<0.001

*Wilcoxon signed rank test for significant differences

For peer review only

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l'Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

Table 3 Mean ratings on response to 'plain' pack versus 'regular' and 'novelty' packs

	Plain Vs regular pack A (Mayfair)			Plain Vs novelty pack B (Silk Cut Superslims)			Plain Vs novelty pack C (Marlboro Bright Leaf)			Plain Vs novelty pack D (Pall Mall)		
	Plain Mean *SD*	Mayfair Mean *SD*	P value*	Plain Mean *SD*	Silk Cut Mean *SD*	P value	Plain Mean *SD*	Marlboro Mean *SD*	P value	Plain Mean *SD*	Pall Mall Mean *SD*	P value
Unattractive (1) / Attractive (5)	1.48	1.91	<0.001	1.48	2.13	<0.001	1.48	2.05	<0.001	1.48	2.31	<0.001
	0.94	*1.11*		*0.94*	*1.25*		*0.94*	*1.23*		*0.94*	*1.38*	
Not eye-catching (1) / Eye-catching (5)	1.56	2.03	<0.001	1.56	2.37	<0.001	1.56	2.23	<0.001	1.56	2.72	<0.001
	1.01	*1.26*		*1.01*	*1.41*		*1.01*	*1.35*		*1.01*	*1.53*	
Not cool (1) / Cool (5)	1.34	1.60	<0.001	1.34	1.85	<0.001	1.34	1.82	<0.001	1.34	1.83	<0.001
	0.80	*1.04*		*0.80*	*1.22*		*0.80*	*1.22*		*0.80*	*1.22*	
Very harmful (1) / Not at all harmful (5)	1.50	1.62	<0.001	1.50	1.73	<0.001	1.50	1.58	<0.001	1.50	1.69	<0.001
	0.98	*1.04*		*0.98*	*1.14*		*0.98*	*1.02*		*0.98*	*1.11*	
Boring (1) / Fun (5)	1.34	1.68	<0.001	1.34	1.97	<0.001	1.33	1.85	<0.001	1.34	2.02	<0.001
	0.74	*0.98*		*0.74*	*1.21*		*0.74*	*1.14*		*0.74*	*1.26*	
Not worth looking at (1) / Worth looking at (5)	1.31	1.55	<0.001	1.31	1.74	<0.001	1.31	1.67	<0.001	1.31	1.74	<0.001
	0.76	*0.98*		*0.76*	*1.15*		*0.76*	*1.09*		*0.76*	*1.13*	
Not meant for someone like me (1) / Meant or someone like me (5)	1.24	1.34	<0.001	1.24	1.41	<0.001	1.24	1.34	<0.001	1.24	1.44	<0.001
	0.68	*0.76*		*0.68*	*0.89*		*0.68*	*0.82*		*0.68*	*0.92*	
Grown-up (1) / Childish (5)	1.99	2.06	0.006	1.98	2.23	<0.001	1.98	2.08	0.003	1.99	2.39	<0.001
	1.32	*1.31*		*1.31*	*1.37*		*1.32*	*1.31*		*1.32*	*1.40*	
Puts me off (1) / Tempts me to smoke (5)	1.48	1.62	<0.001	1.48	1.67	<0.001	1.48	1.63	<0.001	1.48	1.67	<0.001
	1.01	*1.06*		*1.01*	*1.08*		*1.01*	*1.08*		*1.01*	*1.10*	
I dislike this pack (1) / I like this pack (5)	1.51	1.82	<0.001	1.51	2.10	<0.001	1.51	1.97	<0.001	1.51	2.18	<0.001
	0.98	*1.14*		*0.98*	*1.29*		*0.98*	*1.24*		*0.98*	*1.36*	
I would not like to have this pack (1) / I would like to have this pack (5)	1.33	1.43	<0.001	1.33	1.51	<0.001	1.32	1.50	<0.001	1.33	1.54	<0.001
	0.87	*0.92*		*0.87*	*1.00*		*0.87*	*1.01*		*0.87*	*1.05*	

*Wilcoxon signed rank test for significant differences

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l'Enseignement Superieur (ABES) .

Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

Association between pack appraisal and susceptibility

Eight percent (*n* = 90) indicated positive appraisal of the 'regular' Mayfair pack. For the 'novelty' packs, 14% (*n* = 141) indicated positive appraisal for Marlboro Bright Leaf, 18% (*n* = 176) for Silk Cut Superslims and 21% (*n* = 209) for Pall Mall. Three percent (*n* = 34) had a positive appraisal score for the plain pack.

For each pack, logistic regression analysis, controlling for smoking related and demographic variables, was conducted to examine the relationship between pack appraisal and susceptibility. For the 'regular' and each of the 'novelty' packs positive appraisal was significantly associated with susceptibility. Those with a positive appraisal of the 'regular' Mayfair pack were twice as likely to be susceptible as those giving a non-positive appraisal (*AOR* = 2.05, 95% *CI* 1.29 to 3.25, *p* = 0.002. This was even more pronounced for each of the novelty packs. Participants with a positive appraisal of the smaller Silk Cut Superslims pack were more than twice as likely to be susceptible (*AOR* = 2.20, 95% *CI* 1.55 to 3.14, *p* < 0.001) and participants with a positive appraisal of the brightly coloured Pall Mall pack were almost 2.5 times as likely to be susceptible (*AOR* = 2.45, 95% *CI* 1.76 to 3.43, *p* < 0.001). This association was strongest for the innovative Marlboro Bright Leaf pack, whereby susceptibility was 2.51 times higher for participants expressing a positive appraisal of the pack (*AOR* = 2.51, 95% *CI* 1.71 to 3.67, *p* < 0.001, see Table 4). There was no association between positive appraisal of the plain pack and susceptibility (*AOR* = 1.04, 95% *CI* 0.48 to 2.26, *p* = 0.914).

For peer review only

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

Table 4 Logistic regression of association between susceptibility to smoke and pack appraisal of the 'novelty' Marlboro Bright Leaf pack

Dependent variable : Susceptibility, 1 = Susceptible, 0=Non-susceptible	*n* = 968	*AOR*	95% *CI* Lower	95% *CI* Upper	P value
Block 1					
Close friends smoking					
Most do not smoke	815	1.00			0.401
Majority smoke	46	1.48	0.77	2.83	0.240
Do not know/not stated	107	1.19	0.76	1.88	0.444
Sibling smoking					
No siblings smoke	807	1.00			<0.001
Any siblings smoke	134	2.39	1.60	3.57	<0.001
Do not know/not stated	27	1.99	0.89	4.44	0.093
Parental smoking					
Neither parent smokes	544	1.00			0.054
Either parent smokes	367	1.89	1.06	3.39	0.032
Not sure/not stated/no mum/dad	57	1.29	0.94	1.78	0.113
Block 2					
Gender					
Male	497	1.00			
Female	471	0.86	0.64	1.15	0.301
Socio-economic group					
ABC1	448	1.00			
C2DE	520	0.79	0.59	1.06	0.120
Age	968	1.06	0.97	1.16	0.223
Block 3					
Packaging appraisal of Marlboro Bright Leaf					
Not positive appraisal	828	1.00			
Positive appraisal	140	2.51	1.71	3.67	<0.001
Model summary at each block					
	Test of model coefficients				Nagelkerke *R*
	χ^2	*Df*	*p*		
Block 1	24.761	6	<0.001		0.036
Block 2	7.819	3	0.050		0.047
Block 3	21.700	1	<0.001		0.078
Final model	54.279	10	<0.001		0.078

AOR = Adjusted odds ratio. Nine hundred and sixty-eight cases analysed, 57 cases with missing values. Cases correctly classified = 72.3%. 97.1% of non-susceptible never smokers and 10.1% of susceptible never smokers were correctly classified.

Association between pack receptivity and susceptibility

Four percent (*n* = 35) indicated being receptive to the 'regular' Mayfair pack. For the 'novelty' packs, five percent (*n* = 50) were receptive to Marlboro Bright Leaf, six percent (*n* = 61) to Silk Cut Superslims and seven percent (*n* = 71) to Pall Mall. For the plain pack, three percent (*n* = 27) indicated being receptive to this pack.

For each pack, logistic regression analysis, controlling for demographic and smoking related variables, was used to examine the relationship between pack receptivity and smoking susceptibility. Receptivity to the three 'novelty' pack styles was positively associated with susceptibility. Participants receptive to the Pall Mall pack were more than 3.5 times as likely to be susceptible (*AOR* = 3.69, 95% *CI* 2.21 to 6.19, $p < 0.001$) and those receptive to the Marlboro Bright Leaf pack almost 2.5 times as likely to be susceptible (*AOR* = 2.42, 95% *CI*

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) .
Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

1.32 to 4.44, $p = 0.004$), compared to participants not receptive to these packs. Participants receptive to the Silk Cut Superslims pack were more than four times as likely to be susceptible compared with those who were not receptive (*AOR* = 4.42, 95% *CI* 2.50 to 7.81, $p < 0.001$, see Table 5). No significant association was observed between susceptibility and receptivity to the 'regular' Mayfair pack (*AOR* = 1.97, 95% *CI* 0.96 to 4.03, $p = 0.064$) or the plain pack (*AOR* = 0.92, 95% *CI* 0.38 to 2.27, $p = 0.863$).

Table 5: Logistic regression of association between susceptibility to smoke and packaging receptivity to Silk Cut Superslims

Dependent variable : Susceptibility, 1 = Susceptible, 0=Non-susceptible	***n* = 970**	***AOR***	**95% *CI* Lower**	**95% *CI* Upper**	***p***
Block 1					
Close friends smoking					
Most do not smoke	814	1.00			0.948
Majority smoke	47	1.12	0.57	2.20	0.744
Do not know/not stated	109	1.00	0.64	1.59	0.985
Sibling smoking					
No siblings smoke	810	1.00			<0.001
Any siblings smoke	132	2.22	1.483	3.32	<0.001
Do not know/not stated	28	2.23	1.023	4.88	0.044
Parental smoking					
Neither parent smokes	550	1.00			0.010
Either parent smokes	362	2.05	1.149	3.67	0.015
Not sure/not stated/no mum/dad	58	1.46	1.064	2.01	0.019
Block 2					
Gender					
Male	501	1.00			
Female	469	0.879	0.656	1.18	0.384
Socio-economic group					
ABC1	447	1.00			
C2DE	523	0.85	0.63	1.14	0.270
Age	970	1.05	0.96	1.15	0.305
Block 3					
Packaging receptivity to Silk Cut Superslims					
Not receptive	912	1.00			
Receptive	58	4.42	2.50	7.81	<0.001
Model summary at each block					
	Test of model coefficients				Nagelkerke *R*
	χ^2	*df*	*p*		
Block 1	27.947	6	<0.001		0.041
Block 2	4.824	3	0.185		0.048
Block 3	26.640	1	<0.001		0.085
Final model	59.411	10	<0.001		0.085

AOR = Adjusted odds ratio. Nine hundred and seventy cases analysed, 55 cases with missing values. Cases correctly classified = 72.7%. 96.3% of non-susceptible never smokers and 13.1% of susceptible never smokers were correctly classified.

For peer review only

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

DISCUSSION

This study examines never smokers' responses to three different styles of cigarette packaging: *'novelty'* (branded packs designed to incorporate unique and distinctive features), *'regular'* (branded packs with no special design features) and *'plain'* (a brown pack with a standard shape and opening and all branding removed, aside from brand name). Responses to all three types of pack were negative across all survey items. However, ratings of *novelty* packs, with a distinctive shape, opening style or bright colour, were significantly less negative than the *regular* pack on most items, and both styles of packaging were rated less negatively than the *plain* pack on all items. For example, the bright pink Pall Mall and tall and narrow Silk Cut Superslims packs were rated higher than a regular blue king size pack (Mayfair) on all survey items. The Marlboro Bright Leaf pack, with its unique 'Zippo' style opening was rated higher than Mayfair on most items. For the three distinctive styles, logistic regressions, controlling for factors known to influence youth smoking, showed that susceptibility was associated with positive appraisal and also receptivity. For example, those receptive to the innovative Silk Cut Superslims pack were more than four times as likely to be susceptible to smoking, compared with participants who were not receptive to this pack. For the regular pack, an association was found between positive appraisal and susceptibility but not with receptivity and susceptibility. For the plain pack, no association was found between pack appraisal or receptivity and susceptibility.

The study benefits from a national sample of adolescents. Given that smoking prevalence is in line with national data,[22] the sample is likely to be representative of the wider adolescent population in the UK. In addition, the main outcome measure of susceptibility is a well validated measure of smoking intentions.[1] There are, however, a number of potential limitations. The cross-sectional nature of the survey does not enable causal relationships to be drawn about packaging and future smoking behaviour. The interviews were conducted in-home, where a family member may be present. In this instance participants may be worried about having positive perceptions surrounding tobacco and socially desirable responses may have provided lower ratings. Finally, despite concealing brand names and identifiers, prior brand knowledge may have influenced pack responses, especially for the '*regular'* Mayfair pack which is a common youth brand.

Despite these limitations, the findings are consistent with the growing body of evidence that on-pack branding - especially when accompanied by innovative and distinctive design features - makes cigarette packs more appealing to young people, and removing these does the reverse.[11, 29-34] It supports previous research which has found 'slim' packs particularly appealing to young females,[43] and innovative methods of openings to young adults[38] and adolescents.[11] This replicates tobacco industry research findings that young people are attracted to something 'new'.[44, 45] The study adds to this literature by demonstrating a significant association between novel and distinctive pack designs and susceptibility to smoking in the future. It also provides a measure for pack appraisal and receptivity, both of which were independently associated with susceptibility.

This study provides the first direct evidence that the attractiveness of cigarette packaging is associated with susceptibility to smoke. This suggests that mandating plain packaging may reduce youth smoking. Differences among the packaging styles highlight the influence of innovative and unique branding elements on adolescents' future smoking intentions. Despite marketing restrictions on advertising and POS displays, children continue to be influenced by tobacco companies through packaging design. The study confirms the need for policymakers to control this powerful type of marketing and countries considering plain packaging should

For peer review only

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

be urged to follow Australia's lead. Furthermore it supports the draft European Commission Tobacco Products Directive which recommends the need for partial pack standardisation. Such measures would prohibit the use of compact 'slimmer' packs in that they are misleading in terms of harm.

This is a cross-sectional study which depends on (albeit well validated) measures of future smoking intentions. There is a need, therefore, to follow up young people over time to provide additional confirmation of the findings. That packaging design is driven by creative and technological industries provides a challenge for tobacco control. The tobacco industry is increasingly finding new ways to use the pack as a means of promoting the product. Within the pack, inlays and innerliners extend its promotional ability.[46] Outside the pack, printed tear tapes,[47] "soft-look" and easy open films,[48] and special coatings to produce "surface-feel effects",[13] aim to enhance the tobacco brand experience. These developments should be monitored.

For peer review only

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

Acknowledgements We would like to thank our late colleague Dr Lynn MacFadyen for her contribution to the development and design of the YTPS, and FACTS International for undertaking the fieldwork.

Contributors AF designed data collection tools, analysed the data, drafted and revised the paper. AF is the guarantor. AMM and GH devised the study. AMM designed data collection tools and advised on the data analyses. GH, CM and AMM offered guidance on the initial drafting of the paper and helped revise the paper. All authors read and approved the final manuscript. All authors had access to and can take responsibility for the data and analysis.

Funding This work was supported by a grant from Cancer Research UK (C312/A8721). The UK Centre for Tobacco Control Studies contributed to the funding of Allison Ford and Gerard Hastings. The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

Competing Interests None Declared

Ethics Approval The study obtained ethics approval from the ethics committee of the Institute for Socio-Management at the University of Stirling. Participants provided informed consent before participating.

Data sharing statement There is no additional data available.

For peer review only

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) .
Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

REFERENCES

1 Pierce J, Choi WS, Gilpin EA, et al. Validation of susceptibility as a predictor of which adolescents take up smoking in the United States. *Health Psychol* 1996;**15**:355–61.

2 DiFranza JR, Wellman RJ, Sargent JD, et al. Tobacco promotion and the initiation of tobacco use: Assessing the evidence for causality. *Pediatrics* 2006;**117**:e1237–48.

3 National Cancer Institute. Tobacco Control Monograph 19: The role of the media in promoting and reducing tobacco use. Bethesda, MD: National Cancer Institute, 2008.

4 Lovato C, Watts A, Stead LF. Impact of tobacco advertising and promotion on increasing adolescent smoking behaviours. *Cochrane Database of Systematic Reviews* 2011, Issue 10. Art. No.: CD003439.

5 Paynter J, Edwards R. The impact of tobacco promotion at the point of sale: A systematic review. *Nicotine Tob Res 2009*;**11**:322–8.

6 Mackintosh AM, Moodie C, Hastings G. The association between point-of-sale displays and youth smoking susceptibility. *Nicotine Tob Res* 2012;**14**:616–20.

7 Spanopoulos D, Britton J, McNeill A, et al. Tobacco display and brand communication at the point of sale: implications for adolescent smoking behaviour. *Tob Control* Published Online First: 28 February 2013. doi:10.1136/tobaccocontrol-2012-050765

8 Wakefield M, Morley C, Horan JK, et al. The cigarette pack as image: new evidence from tobacco industry documents. *Tob Control* 2002;11:(Suppl 1):i73-i80.

9 Freeman B, Chapman S, Rimmer M. The case for plain packaging of tobacco products. *Addiction* 2008;**103**:580-90.

10 Moodie C. Hastings G. Making the pack the hero, tobacco industry response to marketing restrictions in the UK: Findings from a long-term audit. *Int J Ment Health Addict* 2011;**9**:24-38.

11 Centre for Tobacco Control Research. *The packaging of tobacco products*. Stirling: Centre for Tobacco Control Research, University of Stirling, 2012.

12 Moodie C. Angus K. Ford A. The importance of cigarette packaging in a dark market: The 'Silk Cut' experience. *Tob Control* Published Online First: 14 November 2012. doi:10.1136/tobaccocontrol-2012-050681

13 Glogan T. Tightening legislation in tobacco packaging – innovation blossoms! *Tobacco Journal International* 2013. http://www.tobaccojournal.com/Tightening_legislation_in_tobacco_packaging___innovation_blossoms.51660.0.html (accessed 3 May 2013).

14 Helk A. Appealing to all the senses. *Tobacco Journal International* 2006. http://www.tobaccojournal.com/Appealing_to_all_the_senses.47923.0.html (accessed 3 May 2013).

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

15 Kotnowski K, Hammond D. The impact of cigarette pack shape size and opening: Evidence from tobacco company documents. *Addiction* Published Online First: 22 April 2013. DOI: 10.1111/add.12183

16 M&C Saatchi. *Contact Report*. M&C Saatchi, 2000. http://www.tobaccopapers.com/PDFs/0500-0599/0533.pdf (accessed 3 May 2013).

17 Helk A. "The last bastion of masculinity has fallen". *Tobacco Journal International* 2007. http://www.tobaccojournal.com/The_last_bastion_of_masculinity_has_fallen.48422.0.html (accessed 3 May 2013)

18 Perry CL. The tobacco industry and underage youth smoking: Tobacco industry documents from the Minnesota litigation. *Arch Pediatr Adolesc Med 1999;***153**;935-41.

19 Hastings GB, MacFadyen L. *Keep smiling. No one's going to die: An analysis of internal documents from the tobacco industry's main UK advertising agencies*. Centre for Tobacco Control Research and Tobacco Control Resource Centre. London: British Medical Association, 2000.

20 Cummings KM, Morley CP, Horan JK, et al. Marketing to America's youth: Evidence from corporate documents. *Tob Control 2002*;**11**:(Suppl 1);i5-i17.

21 Department of Health. *Consultation on standardised packaging of tobacco products*. Department of Health, 2012. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/170568/dh_133575.pdf (accessed 3 May 2013).

22 Fuller, E. *Smoking, drinking and drug use among young people in England in 2011*. London: NatCen Social Research, 2012

23 DiFranza JR, Savageau JA, Fletcher K, et al. Measuring the loss of autonomy over nicotine use in adolescents: the DANDY (Development and Assessment of Nicotine Dependence in Youths) study. *Arch Pediatr Adolesc Med* 2002;**156**;397-403.

24 Gervais A, O'Loughlin J, Meshefedjian G, et al. Milestones in the natural course of cigarette use onset in adolescents. *Can Med Assoc J* 2006;**175**;255-61.

25 Goldberg ME, Liefeld J, Kindra G, et al. *When packages can't speak: Possible impacts on plain and generic packaging of tobacco products*. Expert Panel Report Prepared for Health Canada. Ottawa: Health Canada, 1995.

26 McCool J, Webb L, Cameron LD, et al. Graphic warning labels on plain cigarette packs: Will they make a difference to adolescents? *Soc Sci Med* 2012;**74**:1269-73.

27 Pechey R, Spiegelhalter D, Marteau TM. Impact of plain packaging of tobacco products on smoking in adults and children: and elicitation of international experts' estimates. *BMC Public Health* 2013;**13**:18

28 Moodie C, Stead M, Bauld L, et al. *Plain tobacco packaging: A systematic review*. London: Public Health Research Consortium, 2012.

For peer review only

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

29 Centre for Health Promotion. *Effects of plain packaging on the image of tobacco products among youth*. Toronto: Centre for Health Promotion, University of Toronto, 1993.

30 Rootman I, Flay BR. *A study on youth smoking: plain packaging, health warnings, event marketing and price reductions.* Toronto: Centre for Health Promotion, University of Toronto, 1995.

31 Bondy SJ, Paglia A, Kaiserman MJ. Tobacco purchasing and marketing. In: Stephens T, Morin M, eds. *Youth smoking survey, 1994: Technical report*. Ottawa: Minister of Supply and Services Canada, 1996:153-79.

32 Hammond D, Dockrell M, Arnott D, et al. Cigarette pack design and perceptions of risk among UK adults and youth. *Eur J Public Health* 2009;**19**:631-7.

33 Germain D, Wakefield MA, Durkin SJ. Adolescents' perceptions of cigarette brand image: does plain packaging make a difference? *J Adolesc Health* 2010;**46**:385-92.

34 Moodie C, Ford A, Mackintosh AM, et al. Young people's perceptions of cigarette packaging and plain packaging: An online survey. *Nicotine Tob Research* 2012;**14**:98-105.

35 Beede P, Lawson R. The effect of plain packages on the perception of Cigarette health warnings. *Public Health* 1992;**106**:315-22.

36 Environics Research Group. *Consumer research on the size of health warning messages – Quantitative study of Canadian youth*. Prepared for Health Canada. Toronto: Environics Research Group, 2008.

37 Borland R, Savvas S, Sharkie F, et al. The impact of structural packaging design on young adult perceptions of tobacco products. *Tob Control* 2013;**22**:97-102.

38 Moodie C, Ford A. Young adult smokers' perceptions of cigarette pack innovation, pack colour and plain packaging. *Australasian Marketing Journal* 2011;**19**:174-80.

39 Gallopel-Morvan K, Moodie C, Hammond D, et al. Consumer perceptions of cigarette pack design in France: a comparison of regular, limited edition and plain packaging. *Tob Control* 2012;**21**:502-6.

40 Doward J. No 10 accused of 'caving in' to cigarette lobby as plain packs put on hold. *The Observer* 2013. http://www.guardian.co.uk/society/2013/may/04/cigarette-lobby-plain-packs (accessed 15 May 2013).

41 Brown A, Moodie C. The influence of tobacco marketing on adolescent smoking intentions via normative beliefs. *Health Educ Res* 2009;**24**:721-33.

42 Moodie C, MacKintosh AM, Brown A, et al. The effect of tobacco marketing awareness on youth smoking susceptibility and perceived prevalence, before and after the introduction of a tobacco advertising ban. *Eur J Public Health* 2008;**18**:484-90.

43 Hammond D, Daniel S, White CM. The Effect of Cigarette Branding and Plain Packaging on Female Youth in the United Kingdom. *J Adolesc Health,* 2013;**52**:151-57.

For peer review only

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

44 Philip Morris. Marketing New Products in a Restrictive Environment. Philip Morris. 1990. Bates No. 2044762173/2364. http://legacy.library.ucsf.edu/tid/vra81c00 (accessed 7 May 2013).

45 Philip Morris (1992). Opportunities in packaging innovation. Philip Morris. 1992. Bates No. 2048976191/6208. http://legacy.library.ucsf.edu/tid/hwe36e00 (accessed 7 May 2013).

46 McEwen W. From riches to rags? *Tobacco Journal International* 2011. http://www.tobaccojournal.com/From_riches_to_rags.50411.0.html (accessed 16 May 2013).

47 McEwen W. New technologies drive tear tape opportunities. *Tobacco Journal International* 2011. http://www.tobaccojournal.com/New_technologies_drive_tear_tape_opportunities.50668.0.html (accessed 16 May 2013).

48 Glogan T. Seeing the trends in brands. *Tobacco Journal International* 2010. http://www.tobaccojournal.com/Seeing_the_trends_in_the_brands.49866.0.html (accessed 16 May 2013.

For peer review only

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) .
Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

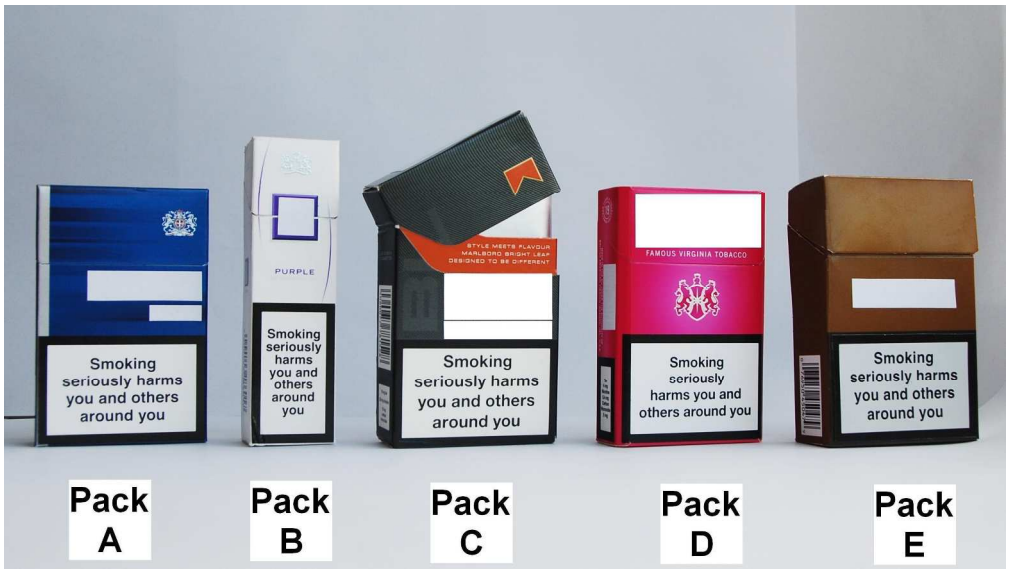

Image 1 Visual stimuli shown to participants: Pack A = 'regular' pack (Mayfair), Pack B = 'novelty' pack with innovative slim shape and size (Silk Cut Superslims), Pack C = 'novelty' pack with innovative method of opening (Marlboro Bright Leaf), Pack D = 'novelty' pack with distinctive and unique colour (Pall Mall), Pack E = 'plain' pack
741x417mm (96 x 96 DPI)

eview only

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No	Recommendation
Title and abstract	1✓	(*a*) Indicate the study's design with a commonly used term in the title or the abstract
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found
Introduction		
Background/rationale	2✓	Explain the scientific background and rationale for the investigation being reported
Objectives	3✓	State specific objectives, including any prespecified hypotheses
Methods		
Study design	4✓	Present key elements of study design early in the paper
Setting	5✓	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection
Participants	6✓	(*a*) *Cohort study*—Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up *Case-control study*—Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls *Cross-sectional study*—Give the eligibility criteria, and the sources and methods of selection of participants
		(*b*) *Cohort study*—For matched studies, give matching criteria and number of exposed and unexposed *Case-control study*—For matched studies, give matching criteria and the number of controls per case
Variables	7✓	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable
Data sources/ measurement	8✓	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group
Bias	9✓	Describe any efforts to address potential sources of bias
Study size	10✓	Explain how the study size was arrived at
Quantitative variables	11✓	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why
Statistical methods	12✓	(*a*) Describe all statistical methods, including those used to control for confounding
		(*b*) Describe any methods used to examine subgroups and interactions
		(*c*) Explain how missing data were addressed
		(*d*) *Cohort study*—If applicable, explain how loss to follow-up was addressed *Case-control study*—If applicable, explain how matching of cases and controls was addressed *Cross-sectional study*—If applicable, describe analytical methods taking account of sampling strategy
		(*e*) Describe any sensitivity analyses

Continued on next page

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

Results		
Participants	13✓	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed
		(b) Give reasons for non-participation at each stage
		(c) Consider use of a flow diagram
Descriptive data	14✓	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders
		(b) Indicate number of participants with missing data for each variable of interest
		(c) *Cohort study*—Summarise follow-up time (eg, average and total amount)
Outcome data	15✓	*Cohort study*—Report numbers of outcome events or summary measures over time
		Case-control study—Report numbers in each exposure category, or summary measures of exposure
		Cross-sectional study—Report numbers of outcome events or summary measures
Main results	16✓	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included
		(*b*) Report category boundaries when continuous variables were categorized
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses
Discussion		
Key results	18✓	Summarise key results with reference to study objectives
Limitations	19✓	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias
Interpretation	20✓	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence
Generalisability	21✓	Discuss the generalisability (external validity) of the study results
Other information		
Funding	22✓	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

Title

Cigarette Pack Design and Adolescent Smoking Susceptibility: A Cross-sectional Survey

Authors

Allison Ford[1,2], Anne Marie MacKintosh[1], Crawford Moodie[1], Sol Richardson[3], Gerard Hastings[1,2]

Addresses and affiliations

[1]Institute for Social Marketing, University of Stirling, Stirling, FK9 4LA, UK

[2] UK Centre for Tobacco Control Studies, University of Stirling, Stirling, FK9 4LA, UK

[3] UK Centre for Tobacco Control Studies, Division of Epidemiology and Public Health, University of Nottingham, Clinical Sciences Building, Nottingham City Hospital, Nottingham, NG5 1PB, UK

Author Positions

Allison Ford *Postgraduate Research Student*

Anne Marie MacKintosh *Senior Researcher*

Crawford Moodie *Senior Research Fellow*

Sol Richardson, *Research Assistant*

Gerard Hastings *Professor*

Corresponding author

Allison Ford, Institute for Social Marketing, University of Stirling, FK9 4LA, UK.
Tel: +44 (0) 1786 467390. Fax: +44 (0) 1786 467400. Email: a.j.ford@stir.ac.uk

Keywords

Smoking, cigarette packaging, plain packaging, youth

Word count

~~3753~~4465

For peer review only

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) .
Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

ABSTRACT

Objectives: To compare adolescents responses to three different styles of cigarette packaging: *'novelty'* (branded packs designed with a distinctive shape, opening style or bright colour), *'regular'* (branded pack with no special design features) and *'plain'* (brown pack with a standard shape and opening and all branding removed, aside from brand name).
Design: Cross sectional in-home survey.
Setting: United Kingdom.
Participants: Random location quota sample of 1025 never smokers aged 11-16 years.
Main outcome measures: Susceptibility to smoking and composite measures of pack appraisal and pack receptivity derived from eleven survey items.
Results: Mean rResponses to the three pack types were negative for all survey items. However, 'novelty' packs were rated significantly less negatively than the 'regular' pack on most items, and the novelty and regular packs were rated less negatively than the 'plain' pack. For the novelty packs, logistic regressions, controlling for factors known to influence youth smoking, showed that susceptibility was associated with positive appraisal and also receptivity. For example, those receptive to the innovative Silk Cut Superslims pack were more than four times as likely to be susceptible to smoking than those not receptive to this pack (*AOR* = 4.42, 95% *CI* 2.50 to 7.81, $p < 0.001$). For the regular pack, an association was found between positive appraisal and susceptibility but not with receptivity and susceptibility. There was no association with pack appraisal or receptivity for the plain pack.
Conclusion: Pack structure and colour is independently associated, not just with appreciation of and receptivity to the pack, but also with susceptibility to smoke. In other words, those who think most highly of novelty ~~innovative or brightly coloured~~ cigarette packsaging are also the ones who indicate that they are most likely to go on to smoke. Plain packaging, in contrast, was found to directly reduce the appeal of smoking to adolescents.

For peer review only

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

ARTICE SUMMARY

Article Focus

- To examine how adolescents respond to three different styles of cigarette packaging: 'regular', 'novelty', and 'plain'.

Key Messages

- Ratings for 'novelty' packs were significantly less negative than for the 'regular' pack. Ratings for the plain pack were significantly more negative than for the 'regular' pack and each of the 'novelty' packs.

- Pack structure and colour was independently associated, not just with appreciation of and receptivity to the pack, but also with susceptibility to smoke.

- Plain cigarette packaging was found to directly reduce the appeal of smoking to adolescents.

Strengths and Limitations

- The study allows an insight into how adolescents respond to novelty cigarette packaging that is available in the UK and other markets.

- This is the first study to examine how the attraction of cigarette packaging plays out in terms of smoking susceptibility using a sample size that supports robust statistical analysis.

- The cross-sectional nature of the survey does not enable causal relationships to be drawn about packaging and future smoking behaviour.

For peer review only

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) .
Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

INTRODUCTION

It is now firmly established that children are influenced by different modes of tobacco marketing. Observational and longitudinal studies have consistently demonstrated a robust association between exposure to, and appreciation of, tobacco advertising and promotions and smoking susceptibility - a predictor of future tobacco use[1] - among adolescents.[2-4] More recently, a similar association has been found with point-of-sale (POS) displays.[5-7] This evidence has helped to inform tobacco control policy, resulting in advertising, promotions and POS display bans in the UK and elsewhere, to protect young people from the harmful influence of these types of marketing. Young people, however, continue to be exposed to tobacco packaging, a key promotional tool.[8, 9]

Audits of recent trends in tobacco pack design have shown increasingly frequent redesign of packs and rising numbers of limited-edition packs and innovative pack shapes, textures and methods of openings.[10-12] Tobacco industry analysts report new packaging developments, particularly those pertaining to new pack structures and technological printing advancements as "*ingenious innovations to keep the cigarette or cigar pack as an effective means, indeed the only means, to market the product*",[13] while "*a more playful and easy approach to new designs, shapes and colours"* means *"young consumers feel more catered for*".[14] Tobacco industry documents have revealed the appeal of innovative slim, oval, octagonal, and booklet pack shapes to young people.[15] Bright colours have also been used to communicate with this group.[16, 17] While tobacco companies are careful to name young adults as a key target market,[18-20] designers working alongside the tobacco industry have outlined the inevitable knock-on effect of tailoring designs for this audience. In 2007, for instance, an updated black and pink pack design for Camel No 9 was said to have a "*Britney Spears Factor...If you want to attract younger women with your design, it will most likely also appeal to underage girls*".[17]

The debate on plain packaging - which involves standardisation of pack size, shape, texture, method of opening, base colour and font – often~~typically~~ focuses on the potential benefits to young people most at risk of smoking uptake.[21] In England, 27% of 11 to 15 year olds have tried smoking[22]. Experimentation has been shown to result in a loss of autonomy over tobacco use and can quickly lead to nicotine dependence.[23, 24] Plain packaging studies indirectly conclude that plain packaging is likely to reduce youth smoking uptake.[25, 26] A recent study eliciting the opinions of tobacco control experts on the likely impact on smoking rates of plain packaging, estimated that two years after its introduction there would be a three percentage point decline for children compared with a one percentage point decline for adults.[27] A systematic review of plain packaging studies has outlined three main benefits of plain packaging.[28] Within each of these areas there is evidence of the benefit for children. Observational and experimental studies have shown plain packaging can: reduce appeal,[29-34] increase the salience of health warnings,[25, 30, 33, 35] and reduce false beliefs about the harmfulness of tobacco products.[32-34, 36] However, little is known outside the tobacco industry about how consumers respond to novel packaging such as limited editions,[37] or innovative pack shapes and openings,[11, 34, 38, 39] and only two studies have focused on children; a small exploratory qualitative study[11] and an internet survey which only assessed perceptions of plain packs.[34] Furthermore, no association between pack innovation and susceptibility has been explored.

This study compares young people's responses to three different styles of cigarette packaging: *'novelty'* (branded packs with either an innovative shape, style of opening or distinctive colour), *'regular'* (branded blue pack with a standard shape and opening) and

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

'plain' (a brown pack with a standard shape and opening and all branding removed, aside from brand name). It also investigates any link between these responses and susceptibility. This study is particularly relevant given the debate on plain packaging continues. New Zealand has announced its intent to implement plain packaging and follow Australia's lead, where plain packaging was introduced in December 2012. In the UK, the Government announced in July 2013 that they will wait for evidence from Australia before making a final decision on plain packaging ~~remains under consideration even though policy makers remain cautious about adopting this tobacco control measure~~.[40]

METHODS

Survey

Data were collected between July and September 2011 as part of Wave 6 of the Youth Tobacco Policy Survey (YTPS). The YTPS is a long running, repeat cross-sectional study examining the impact of tobacco policies on young people.[6, 41, 42] FACTS International, a market research company, recruited participants and conducted the survey. The fieldwork comprised in-home face-to-face interviews, accompanied by a self-completion questionnaire to gather more sensitive information on smoking behaviour. Ethical approval was obtained from the Institute for Socio-Management ethics committee at the University of Stirling prior to commencing the study.

Sampling strategy

Random location quota sampling was used to generate a sample of 11-16 year olds from households across the United Kingdom. Sampling involved random selection of 92 electoral wards, stratified by Government Office Region and A Classification Of Residential Neighbourhoods (ACORN) classification (a geo-demographic classification system that describes demographic and lifestyle profiles of small demographic areas) to ensure coverage of a range of geographic areas and socio-demographic backgrounds. Wards covering the islands, areas north of the Caledonian Canal, or with fewer than three urban/sub-urban Enumeration Districts, were excluded from the sampling frame for cost and practicality reasons. In each selected ward a quota sample, balanced across gender and age groups, was obtained. The narrow age group targeted in this survey and the random location quota methodology make this a difficult sample to locate, particularly as some of the randomly selected areas have a very low proportion of young people. Response rate details are not available as recording the number of contacts and participation and refusal rates becomes impractical when using this sampling methodology. A total sample of 1373 was achieved. Comparative census data for England and Wales in 2011 indicates the achieved sample was in line with national figures for gender and age.[43] In the 2011 census, 51% of 11-16 year olds were male and 49% were female. Thirty-two percent of 11-16 year olds were aged 11-12, 33% were 13-14, and 34% were 15-16. This compares with the achieved sample which was 50% male and 50% female, and comprised 33% 11-12 year olds, 35% 13-14, and 32% 15-16.To examine the influence of pack design on susceptibility, this paper focuses exclusively on the 1025 never smokers in the sample. As the survey is part of a repeat cross-sectional survey, taking several measures at different time points, sample size was determined on the basis of enabling within survey sub-group analyses in addition to between wave analyses. The survey aims for a minimum of 1150 per wave, with a corresponding sampling error of approximately +/- 3% and has the potential to detect changes in proportions of approximately 6% between waves with 80% power, alpha = 0.05. At each wave, the sample provides a sub-group sample of approximately 100 per age, within gender, to allow sub-group analyses.

For peer review only

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

Development of the survey items and testing
A number of stages between April and July 2011 informed the development and refinement of the 11 survey items. Initially, a set of eight exploratory qualitative focus groups with 15 year olds generated understanding about how young people think about and respond to cigarette packaging. Ideas for survey items, question styles, and visual prompts were examined in a further six focus groups, segmented by gender and age (11-12, 13-14, 15-16 year olds). A draft questionnaire was then piloted with 12 participants aged 11-16 years. A professional interviewer administered the questionnaire, observed by a researcher. On completion of the questionnaire the interviewer left the room to enable the researcher to conduct a cognitive interview to assess participant understanding, ease of responding, relevance of questions and ability to respond.

Selection of Packages
Informed by the exploratory focus groups, five cigarette packs were selected to reflect a range of design features (Image 1). Pack A (Mayfair), a popular and familiar brand, represented an everyday pack without any notable design features, other than the blue colour and was often referred to as 'standard'. It therefore provided the potential for use as a benchmark 'regular' pack against which other packs could be compared. Three packs (packs B-D) were selected to represent a range of 'novelty' packs, with innovative and distinctive designs and a range of colours. Pack B (Silk Cut Superslims) was an innovative, smaller and slimmer than usual pack shape with elegant and feminine aspects. Pack C (Marlboro Bright Leaf) provided an example of innovative opening, resembling a flip top cigarette lighter, more masculine features and dark colouring. Pack D (Pall Mall) represented a classic pack style but with a striking and unique bright pink colour. Pack E (a plain brown pack) represented a pack that was void of all design features.

Procedure
Parental permission and participant consent were secured prior to each interview. The interviews were conducted by trained professional researchers. Participants viewed one~~an~~ image which displayed all five cigarette packs, and were asked to rate each pack on 11 items. The brand name of each pack was concealed in an attempt to reduce prior brand knowledge informing pack ratings. To maximise privacy, should anyone else be in the room where the interview was taking place, questions were displayed on showcards to enable participants to read responses from the card and give the number corresponding to their answer. Participants sealed their self-completed questionnaires in an envelope before handing back to the interviewer.

Measures
General information
Demographic information (age, gender) and smoking by parents, siblings and close friends was obtained. Socioeconomic status was determined by the occupation of the chief income earner within the participant's household.

Smoking susceptibility
Never smokers were categorised as those who had 'never tried smoking, not even a puff or two'. Susceptibility, defined by the absence of a firm decision not to smoke[1] was assessed across three items. Never smokers were classified as non-susceptible if they answered 'definitely not' to the questions "If one of your friends offered you a cigarette, would you smoke it?" and "Do you think you will smoke a cigarette at any time during the next year?" and to the likelihood that "you will be smoking cigarettes at 18 years old". Participants who

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) .
Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

answered anything other than 'definitely not' to any of the three items were classified 'susceptible'.

Pack Responses

Eleven items assessed young people's responses to packaging across the five different pack designs. Participants were asked: "Can you tell me the number that best describes each pack?" and were assessed via scales: (a)Attractive/Unattractive; (b) Eye-Catching/Not eye-catching; (c) Cool/Not Cool; (d) Not at all harmful/Very harmful; (e) Fun/Boring; (f) Worth looking at/Not worth looking at; (g) Meant for someone like me/Not meant for someone like me; (h) Grown-up/Childish; (i) Puts me off smoking/Tempts me smoke; (j) I dislike this pack/I like this pack; and (k) I would not like to have this pack/I would like to have this pack. Responses were provided on five-point semantic scales (e.g. 1 = 'Attractive' to 5 = 'Unattractive'). Prior to analysis, items (a – g) were reverse coded to make a low score (1) indicative of a negative rating and a high score (5) indicative of a positive pack rating.

Statistical Analysis

~~All data were analysed using SPSS version 19.~~ The analysis focused on never smokers only. Paired t-tests were used to produce mean scores of the 11 items for: a) the 'regular' pack (Mayfair) relative to the mean scores for each of the three 'novelty' packs (Silk Cut Superslims, Marlboro Bright Leaf and Pall Mall); and b) the plain pack relative to the mean scores of each of the other four packs. As the data resulting from the five point scales is ordinal, the Wilcoxon signed rank test, a non-parametric procedure suited to paired data, was used to test for significant differences between the ratings.

For each pack, a principal components analysis was conducted on the eleven items, to explore the potential for reducing these 11 items to a smaller number of composite measures. Principal components were extracted using varimax rotation with the criteria of eigenvalues greater than 1, consideration of the scree plot and component loadings >.4. Two composite measures were derived from nine of the 11 items. Five items combined to form a composite *pack appraisal* measure (Cronbach's a>.8 for each pack): (a) Unattractive/Attractive; (b) Not eye-Catching/Eye-catching; (c) Not cool/Cool; (e) Boring/Fun; (f) Not worth looking at/Worth looking at. Four items combined to form a composite *pack receptivity* measure (Cronbach's a>.7 for each pack): (g) Not meant for someone like me/Meant for someone like me; (i) Puts me off smoking/Tempts me smoke; (j) I dislike this pack/I like this pack; (k) I would not like to have this pack/I would like to have this pack. Composite scores for each pack were derived by combining the pack ratings, with scores ranging from 5-25 for pack appraisal and 4-20 for pack receptivity. These scores were re-coded into binary variables to enable comparison of participants giving positive pack appraisal scores with those who gave non-positive appraisal scores and comparison of those who were receptive with those not receptive. As 15 was the midpoint for the composite pack appraisal score, a score of 16 or over was considered reflective of an average positive response. Participants were classified as having a 'positive pack appraisal' (coded '1') if they scored 16 or more on the composite pack appraisal measure and 'non-positive pack appraisal' (coded '0') if they scored 15 or less. As 12 was the midpoint for the composite pack receptivity score, a score of 13 or over was considered reflective of an average positive response. Participants were classified as 'receptive' (coded '1') to a pack if their composite receptivity score was 13 or more and 'not receptive' if their score was 12 or less (coded '0').

Analyses were carried out using generalised estimating equations (GEE) for binary outcomes with an independent correlation structure in order to generate the likelihood of 1) positive

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

appraisal and 2) receptivity for each pack. This method allowed us to account for the correlation between individual participants' scores when rating different packs.[44] The quasi-information criterion (QIC) was used to select the most appropriate working correlation structure. In addition, we used cluster robust standard errors to calculate variances. Finally, fFor each of the five packs, two hierarchical binary logistic regression models were constructed to examine whether any association existed between 1) positive pack appraisal and susceptibility and 2) receptivity to the pack and susceptibility. Both GEE and logistic regression models ~~Each model~~ controlled for the potential influence of demographic and smoking-related factors identified in past research as influencing youth smoking. These independent variables were entered in blocks. In each model, block one controlled for whether the majority of close friends smoke, any siblings smoke, and either parent smokes. Block two controlled for gender, socio-economic group, and age. The analyses using GEE were carried out in STATA 11.2 for Windows, SPSS version 19 was used for all other analyses.

RESULTS

Sample

A total of 1373 interviews were completed. Excluding cases that were missing for smoking status (n = 3), 75% (n = 1025) were never smokers. Among these 1025 never smokers, 99% (n = 1019) provided information on smoking intentions, with 72% (n = 733) classified as non-susceptible and 28% (n = 286) susceptible (Table 1). Comparative national figures for 11-15 year olds indicate that smoking prevalence is in line with national data. In the 'Smoking, drinking and drug use among young people in England in 2011' survey[22], 75% of 11-15 year olds were never smokers, and 25% were ever smokers. This compares with 79% never smokers, and 21% ever smokers among 11 to 15 year olds in this sample.

Table 1 Gender, age and social grade of never smokers

	Never smoker *n*=1025 N (%)	Non-susceptible *n*=733 N (%)	Susceptible *n*=286 N (%)
Gender			
Male	528 (51.5)	373 (51)	152 (53)
Female	497 (48.5)	360 (49)	134 (47)
Age			
11	215 (21)	171 (23)	43 (15)
12	204 (20)	146 (20)	56 (20)
13	206 (20)	138 (19)	67 (23)
14	176 (17)	119 (16)	55 (19)
15	132 (13)	86 (12)	46 (16)
16	92 (9)	73 (10)	19 (7)
Social Grade			
ABC1	462 (46)	330 (46)	132 (47)
C2DE	548 (54)	391 (54)	151 (53)

Pack responses

For the 11 survey items, the mean ratings of r~~R~~esponses to all five cigarette packs were negative, with no mean scores on the positive end of the scale (>3). While the mean scores for all packs were ~~rated~~ negative~~ly~~, mean scores for the three 'novelty' packs were significantly less negative than for the 'regular' Mayfair pack (Pack A) (Table 2). Mean

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

scores for Silk Cut Superslims (Pack B), with its innovative slim shape and size, and the bright pink Pall Mall pack (Pack D), were significantly higher for all 11 items. Mean scores for the Marlboro Bright Leaf pack (Pack C) were significantly higher for 7 of the 11 items, except for "meant for someone like me", "childish" and "tempts me to smoke". This pack was also rated more harmful ($p = 0.045$) than the 'regular' Mayfair pack (Pack A).

By contrast, ratings for the plain pack (Pack E) were significantly more negative than for the 'regular' Mayfair pack (pack A) and each of the 'novelty' packs (Packs B to D) ~~(see Table 3)~~. Mean scores for the plain pack ranged from 1.24 to 1.99, which were significantly lower for all 11 items when compared with each of the other four packs (all $p < 0.01$).

For peer review only

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) .
Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

Table 2 Mean ratings on response to 'regular' pack (Mayfair) versus 'novelty' and 'plain' packs

	Mayfair Vs novelty pack B (Silk Cut Superslims)			Mayfair Vs novelty pack C (Marlboro Bright Leaf)			Mayfair Vs novelty pack D (Pall Mall)			Mayfair Vs plain pack		
	M'fair Mean *SD*	Silk Cut Mean *SD*	P value*	M'fair Mean *SD*	M'boro Mean *SD*	P value	M'fair Mean *SD*	Pall Mall Mean *SD*	P value	M'fair Mean *SD*	Plain Mean *SD*	P value
Individual items												
Unattractive (1) / Attractive (5)	1.92 *1.11*	2.13 *1.56*	<0.001	1.92 *1.11*	2.06 *1.23*	<0.001	1.92 *1.11*	2.32 *1.38*	<0.001	1.91 *1.11*	1.48 *0.94*	<0.001
Not eye-catching (1) / Eye-catching (5)	2.04 *1.27*	2.38 *1.41*	<0.001	2.04 *1.27*	2.23 *1.35*	<0.001	2.04 *1.27*	2.72 *1.53*	<0.001	2.03 *1.26*	1.56 *1.01*	<0.001
Not cool (1) / Cool (5)	1.60 *1.04*	1.85 *1.22*	<0.001	1.60 *1.04*	1.82 *1.22*	<0.001	1.60 *1.04*	1.83 *1.22*	<0.001	1.60 *1.04*	1.34 *0.80*	<0.001
Very harmful (1) / Not at all harmful (5)	1.62 *1.04*	1.72 *1.14*	<0.001	1.62 *1.04*	1.58 *1.02*	0.045	1.62 *1.04*	1.69 *1.11*	<0.001	1.62 *1.04*	1.50 *0.98*	<0.001
Boring (1) / Fun (5)	1.69 *0.98*	1.97 *1.21*	<0.001	1.69 *0.98*	1.85 *1.14*	<0.001	1.69 *0.98*	2.02 *1.26*	<0.001	1.68 *0.98*	1.34 *0.74*	<0.001
Not worth looking at (1) / Worth looking at (5)	1.55 *0.98*	1.74 *1.15*	<0.001	1.55 *0.98*	1.67 *1.09*	<0.001	1.54 *0.98*	1.74 *1.13*	<0.001	1.55 *0.98*	1.31 *0.76*	<0.001
Not meant for someone like me (1) / Meant or someone like me (5)	1.34 *0.77*	1.42 *0.89*	<0.001	1.34 *0.76*	1.34 *0.82*	0.658	1.34 *0.76*	1.44 *0.92*	<0.001	1.34 *0.76*	1.24 *0.68*	<0.001
Grown-up (1) / Childish (5)	2.06 *1.31*	2.23 *1.37*	<0.001	2.06 *1.31*	2.08 *1.31*	0.596	2.06 *1.31*	2.39 *1.39*	<0.001	2.06 *1.31*	1.99 *1.32*	0.006
Puts me off (1) / Tempts me to smoke (5)	1.62 *1.06*	1.67 *1.08*	0.002	1.62 *1.06*	1.63 *1.08*	0.678	1.62 *1.06*	1.67 *1.10*	0.001	1.62 *1.06*	1.48 *1.01*	<0.001
I dislike this pack (1) / I like this pack (5)	1.81 *1.14*	2.10 *1.29*	<0.001	1.81 *1.14*	1.97 *1.24*	<0.001	1.81 *1.14*	2.17 *1.36*	<0.001	1.82 *1.14*	1.51 *0.98*	<0.001
I would not like to have this pack (1) / I would like to have this pack (5)	1.43 *0.92*	1.51 *1.00*	<0.001	1.43 *0.92*	1.50 *1.01*	<0.001	1.43 *0.92*	1.54 *1.05*	<0.001	1.43 *0.92*	1.33 *0.87*	<0.001
Composite Measures												
Pack appraisal	8.81 *4.22*	10.09 *5.05*	<0.001	8.81 *4.21*	9.64 *4.80*	<0.001	8.80 *4.21*	10.66 *5.18*	<0.001	8.80 *4.21*	7.03 *3.29*	<0.001
Pack receptivity	6.20 *2.84*	6.68 *3.07*	<0.001	6.19 *2.83*	6.44 *3.02*	<0.001	6.20 *2.84*	6.83 *3.21*	<0.001	6.20 *2.84*	5.57 *2.53*	<0.001

*Wilcoxon signed rank test for significant differences

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l'Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

Table 2 Mean ratings on response to 'regular' pack (Mayfair) versus 'novelty' packs

	Mayfair Vs Silk Cut Superslims			Mayfair Vs Marlboro Bright Leaf			Mayfair Vs Pall Mall		
	Mayfair Mean *SD*	Silk Cut Mean *SD*	P-value*	Mayfair Mean *SD*	Marlboro Mean *SD*	P-value	Mayfair Mean *SD*	Pall Mall Mean *SD*	P-value
Unattractive (1) / Attractive (5)	1.92 *1.11*	2.13 *1.56*	<0.001	1.92 *1.11*	2.06 *1.23*	<0.001	1.92 *1.11*	2.32 *1.38*	<0.001
Not eye-catching (1) / Eye-catching (5)	2.04 *1.27*	2.38 *1.41*	<0.001	2.04 *1.27*	2.23 *1.35*	<0.001	2.04 *1.27*	2.72 *1.53*	<0.001
Not cool (1) / Cool (5)	1.60 *1.04*	1.85 *1.22*	<0.001	1.60 *1.04*	1.82 *1.22*	<0.001	1.60 *1.04*	1.83 *1.22*	<0.001
Very harmful (1) / Not at all harmful (5)	1.62 *1.04*	1.72 *1.14*	<0.001	1.62 *1.04*	1.58 *1.02*	0.045	1.62 *1.04*	1.69 *1.11*	<0.001
Boring (1) / Fun (5)	1.69 *0.98*	1.97 *1.21*	<0.001	1.69 *0.98*	1.85 *1.14*	<0.001	1.69 *0.98*	2.02 *1.26*	<0.001
Not worth looking at (1) / Worth looking at (5)	1.55 *0.98*	1.74 *1.15*	<0.001	1.55 *0.98*	1.67 *1.09*	<0.001	1.54 *0.98*	1.74 *1.13*	<0.001
Not meant for someone like me (1) / Meant or someone like me (5)	1.34 *0.77*	1.42 *0.89*	<0.001	1.34 *0.76*	1.34 *0.82*	0.658	1.34 *0.76*	1.44 *0.92*	<0.001
Grown-up (1) / Childish (5)	2.06 *1.31*	2.23 *1.37*	<0.001	2.06 *1.31*	2.08 *1.31*	0.596	2.06 *1.31*	2.39 *1.39*	<0.001
Puts me off (1) / Tempts me to smoke (5)	1.62 *1.06*	1.67 *1.08*	0.002	1.62 *1.06*	1.63 *1.08*	0.678	1.62 *1.06*	1.67 *1.10*	0.001
I dislike this pack (1) / I like this pack (5)	1.81 *1.14*	2.10 *1.29*	<0.001	1.81 *1.14*	1.97 *1.24*	<0.001	1.81 *1.14*	2.17 *1.36*	<0.001
I would not like to have this pack (1) / I would like to have this pack (5)	1.43 *0.92*	1.51 *1.00*	<0.001	1.43 *0.92*	1.50 *1.01*	<0.001	1.43 *0.92*	1.54 *1.05*	<0.001

*Wilcoxon signed rank test for significant differences

For peer review only

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l'Enseignement Superieur (ABES) .

Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

Table 3 Mean ratings on response to 'plain' pack versus 'regular' and 'novelty' packs

	Plain Vs regular pack A (Mayfair)			Plain Vs novelty pack B (Silk Cut Superslims)			Plain Vs novelty pack C (Marlboro Bright Leaf)			Plain Vs novelty pack D (Pall Mall)		
	Plain Mean *SD*	Mayfair Mean *SD*	P value*	Plain Mean *SD*	Silk Cut Mean *SD*	P value	Plain Mean *SD*	Marlboro Mean *SD*	P value	Plain Mean *SD*	Pall Mall Mean *SD*	P value
Unattractive (1) / Attractive (5)	1.48 *0.94*	1.91 *1.11*	<0.001	1.48 *0.94*	2.13 *1.25*	<0.001	1.48 *0.94*	2.05 *1.23*	<0.001	1.48 *0.94*	2.31 *1.38*	<0.001
Not eye-catching (1) / Eye-catching (5)	1.56 *1.01*	2.03 *1.26*	<0.001	1.56 *1.01*	2.37 *1.41*	<0.001	1.56 *1.01*	2.23 *1.35*	<0.001	1.56 *1.01*	2.72 *1.53*	<0.001
Not cool (1) / Cool (5)	1.34 *0.80*	1.60 *1.04*	<0.001	1.34 *0.80*	1.85 *1.22*	<0.001	1.34 *0.80*	1.82 *1.22*	<0.001	1.34 *0.80*	1.83 *1.22*	<0.001
Very harmful (1) / Not at all harmful (5)	1.50 *0.98*	1.62 *1.04*	<0.001	1.50 *0.98*	1.73 *1.14*	<0.001	1.50 *0.98*	1.58 *1.02*	<0.001	1.50 *0.98*	1.69 *1.11*	<0.001
Boring (1) / Fun (5)	1.34 *0.74*	1.68 *0.98*	<0.001	1.34 *0.74*	1.97 *1.21*	<0.001	1.33 *0.74*	1.85 *1.14*	<0.001	1.34 *0.74*	2.02 *1.26*	<0.001
Not worth looking at (1) / Worth looking at (5)	1.31 *0.76*	1.55 *0.98*	<0.001	1.31 *0.76*	1.74 *1.15*	<0.001	1.31 *0.76*	1.67 *1.09*	<0.001	1.31 *0.76*	1.74 *1.13*	<0.001
Not meant for someone like me (1) / Meant or someone like me (5)	1.24 *0.68*	1.34 *0.76*	<0.001	1.24 *0.68*	1.41 *0.89*	<0.001	1.24 *0.68*	1.34 *0.82*	<0.001	1.24 *0.68*	1.44 *0.92*	<0.001
Grown-up (1) / Childish (5)	1.99 *1.32*	2.06 *1.31*	0.006	1.98 *1.31*	2.23 *1.37*	<0.001	1.98 *1.32*	2.08 *1.31*	0.003	1.99 *1.32*	2.39 *1.40*	<0.001
Puts me off (1) / Tempts me to smoke (5)	1.48 *1.01*	1.62 *1.06*	<0.001	1.48 *1.01*	1.67 *1.08*	<0.001	1.48 *1.01*	1.63 *1.08*	<0.001	1.48 *1.01*	1.67 *1.10*	<0.001
I dislike this pack (1) / I like this pack (5)	1.51 *0.98*	1.82 *1.14*	<0.001	1.51 *0.98*	2.10 *1.29*	<0.001	1.51 *0.98*	1.97 *1.24*	<0.001	1.51 *0.98*	2.18 *1.36*	<0.001
I would not like to have this pack (1) / I would like to have this pack (5)	1.33 *0.87*	1.43 *0.92*	<0.001	1.33 *0.87*	1.51 *1.00*	<0.001	1.32 *0.87*	1.50 *1.01*	<0.001	1.33 *0.87*	1.54 *1.05*	<0.001

*Wilcoxon signed rank test for significant differences

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l'Enseignement Superieur (ABES) .
Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.
For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

Positive pack appraisal

Eight percent (n = 90) indicated positive appraisal of the 'regular' Mayfair pack. For the 'novelty' packs, 14% (n = 141) indicated positive appraisal for Marlboro Bright Leaf, 18% (n = 176) for Silk Cut Superslims and 21% (n = 209) for Pall Mall. Three percent (n = 34) had a positive appraisal score for the plain pack.

The results of the GEE analysis show that, after controlling for demographic and family and peer smoking variables, participants were more likely to give the brightly coloured Pall Mall (*AOR* = 2.34, 95% *CI* 1.95 to 2.80, $p < 0.001$, Table 3), the Marlboro Bright Leaf (*AOR* = 1.56, 95% *CI* 1.29 to 1.88, $p < 0.001$) and the Silk Cut Superslims pack (*AOR* = 1.93, 95% *CI* 1.63 to 2.31, $p < 0.001$) a positive appraisal score compared to the regular Mayfair pack. In addition, the plain pack was significantly less likely to receive a positive appraisal score (*AOR* = 0.54, 95% *CI* 0.43 to 0.67, $p < 0.001$). The final model also showed that positive pack appraisal among never smokers was more likely with increasing age but did not vary by gender or smoking related variables.

Table 3 General estimating equations for binary outcomes: Pack appraisal

Dependent variable: Pack appraisal 1 = Positive apprasial (score ≥16) 0 = Negative appraisal (score<16)	***n* = 1001**	***AOR***	**95% *CI* Lower**	**95% *CI* Upper**	**P value**
Block 1					
Close friends smoking					
Most do not smoke	842	1.00			
Majority smoke	47	0.87	0.49	1.54	0.622
Do not know/not stated	112	1.11	0.74	1.66	0.599
Sibling smoking					
No siblings smoke	836	1.00			
Any siblings smoke	137	0.85	0.56	1.29	0.439
Do not know/not stated	28	0.60	0.24	1.50	0.277
Parental smoking					
Neither parent smokes	567	1.00			
Either parent smokes	375	0.83	0.62	1.10	0.202
Not sure/not stated/no mum/dad	59	1.13	0.68	1.89	0.631
Block 2					
Gender					
Male	515	1.00			
Female	486	0.97	0.74	1.25	0.794
Socio-economic group					
ABC1	461	1.00			
C2DE	540	1.12	0.86	1.45	0.406
Age	1001	1.17	1.08	0.28	<0.001
Block 3					
Pack					
Mayfair	1001	1.00			
Silk Cut Superslims	1001	1.93	1.63	2.31	<0.001
Marlboro Bright Leaf	1001	1.56	1.29	1.88	<0.001
Pall Mall	1001	2.34	1.95	2.80	<0.001
Plain	1001	0.54	0.43	0.67	<0.001

Model summary at each block	Test of model coefficients Wald χ^2	*df*	*p*	QIC
Block 1	4.99	6	0.546	7080.07
Block 2	17.03	3	<0.001	6808.46
Block 3	178.59	5	<0.001	6772.13
Final model	193.55	14	<0.001	6638.04

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

Positive pack receptivity

Four percent (n = 35) indicated being receptive to the 'regular' Mayfair pack. For the 'novelty' packs, five percent (n = 50) were receptive to Marlboro Bright Leaf, six percent (n = 61) to Silk Cut Superslims and seven percent (n = 71) to Pall Mall. For the plain pack, three percent (n = 27) indicated being receptive to this pack.

The GEE analysis showed participants were significantly more likely to be receptive to the three 'novelty' packs compared to the 'regular' Mayfair pack. Participants were over 1.6 times as likely to be receptive to the Pall Mall pack (*AOR* = 1.63, 95% *CI* 1.31 to 2.02, $p <$ 0.001, Table 4), over 1.4 times as likely to be receptive to the Silk Cut Superslims pack (*AOR* = 1.41, 95% *CI* 1.13 to 1.76, p = 0.002), and over 1.2 times as likely to be receptive to the Marlboro Bright Leaf pack (*AOR* = 1.27, 95% *CI* 1.03 to 1.57, p = 0.027). There was no significant difference between the plain pack and regular Mayfair pack in terms of the likelihood of being receptive (AOR = 0.85, 95% CI 0.68 to 1.07, p = 0.171). Older participants were more likely to assign positive receptivity scores.

Table 4 General estimating equations for binary outcomes: Receptivity

Dependent variable: Pack receptivity 1 = Receptive (score≥13) 0 = Not receptive (score<13)	***n* = 1001**	***AOR***	**95% *CI* Lower**	**95% *CI* Upper**	**P value**
Block 1					
Close friends smoking					
Most do not smoke	842	1.00			
Majority smoke	47	1.65	0.84	3.22	0.142
Do not know/not stated	112	1.12	0.63	1.98	0.693
Sibling smoking					
No siblings smoke	836	1.00			
Any siblings smoke	137	1.17	0.68	2.00	0.573
Do not know/not stated	28	0.08	0.01	0.60	0.014
Parental smoking					
Neither parent smokes	567	1.00			
Either parent smokes	375	0.86	0.58	1.27	0.436
Not sure/not stated/no mum/dad	59	0.76	0.32	1.78	0.522
Block 2					
Gender					
Male	515	1.00			
Female	486	0.77	0.53	1.13	0.182
Socio-economic group					
ABC1	461	1.00			
C2DE	540	1.19	0.80	1.75	0.392
Age	1001	1.20	1.06	1.36	0.005
Block 3					
Pack					
Mayfair	1001	1.00			
Silk Cut Superslims	1001	1.41	1.13	1.76	0.002
Marlboro Bright Leaf	1001	1.27	1.03	1.57	0.027
Pall Mall	1001	1.63	1.31	2.02	<0.001
Plain	1001	0.85	0.68	1.07	0.171
Model summary at each block	Test of model coefficients				QIC
	Wald χ^2	*df*	*p*		
Block 1	12.68	6	0.049		5148.46
Block 2	12.50	3	0.006		5099.46
Block 3	38.70	5	<0.001		5317.10
Final model	57.43	14	<0.001		4935.06

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

Association between pack appraisal and susceptibility

~~Eight percent (*n* = 90) indicated positive appraisal of the 'regular' Mayfair pack. For the 'novelty' packs, 14% (*n* = 141) indicated positive appraisal for Marlboro Bright Leaf, 18% (*n* = 176) for Silk Cut Superslims and 21% (*n* = 209) for Pall Mall. Three percent (*n* = 34) had a positive appraisal score for the plain pack.~~

For each pack, logistic regression analysis, controlling for smoking related and demographic variables, was conducted to examine the relationship between pack appraisal and susceptibility. For the 'regular' and each of the 'novelty' packs, positive appraisal was significantly associated with susceptibility. Those with a positive appraisal of the 'regular' Mayfair pack were twice as likely to be susceptible as those giving a non-positive appraisal (*AOR* = 2.05, 95% *CI* 1.29 to 3.25, $p = 0.002$. This was even more pronounced for each of the novelty packs. Participants with a positive appraisal of the smaller Silk Cut Superslims pack were more than twice as likely to be susceptible (*AOR* = 2.20, 95% *CI* 1.55 to 3.14, $p < 0.001$) and participants with a positive appraisal of the brightly coloured Pall Mall pack were almost 2.5 times as likely to be susceptible (*AOR* = 2.45, 95% *CI* 1.76 to 3.43, $p < 0.001$). This association was strongest for the innovative Marlboro Bright Leaf pack, whereby susceptibility was 2.51 times higher for participants expressing a positive appraisal of the pack (*AOR* = 2.51, 95% *CI* 1.71 to 3.67, $p < 0.001$, Table 5). There was no association between positive appraisal of the plain pack and susceptibility (*AOR* = 1.04, 95% *CI* 0.48 to 2.26, $p = 0.914$).

For peer review only

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) .
Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

Table 5 Logistic regression of association between susceptibility to smoke and pack appraisal of the 'novelty' Marlboro Bright Leaf pack

Dependent variable: Susceptibility, 1 = Susceptible, 0=Non-susceptible	*n* = 968	*AOR*	95% *CI* Lower	95% *CI* Upper	P value
Block 1					
Close friends smoking					
Most do not smoke	815	1.00			0.401
Majority smoke	46	1.48	0.77	2.83	0.240
Do not know/not stated	107	1.19	0.76	1.88	0.444
Sibling smoking					
No siblings smoke	807	1.00			<0.001
Any siblings smoke	134	2.39	1.60	3.57	<0.001
Do not know/not stated	27	1.99	0.89	4.44	0.093
Parental smoking					
Neither parent smokes	544	1.00			0.054
Either parent smokes	367	1.89	1.06	3.39	0.032
Not sure/not stated/no mum/dad	57	1.29	0.94	1.78	0.113
Block 2					
Gender					
Male	497	1.00			
Female	471	0.86	0.64	1.15	0.301
Socio-economic group					
ABC1	448	1.00			
C2DE	520	0.79	0.59	1.06	0.120
Age	968	1.06	0.97	1.16	0.223
Block 3					
Packaging appraisal of Marlboro Bright Leaf					
Not positive appraisal	828	1.00			
Positive appraisal	140	2.51	1.71	3.67	<0.001

Model summary at each block	Test of model coefficients χ^2	*df*	*p*	Nagelkerke *R*
Block 1	24.761	6	<0.001	0.036
Block 2	7.819	3	0.050	0.047
Block 3	21.700	1	<0.001	0.078
Final model	54.279	10	<0.001	0.078

AOR = Adjusted odds ratio. Nine hundred and sixty-eight cases analysed, 57 cases with missing values. Cases correctly classified = 72.3%. 97.1% of non-susceptible never smokers and 10.1% of susceptible never smokers were correctly classified.

Association between pack receptivity and susceptibility

~~Four percent (*n* = 35) indicated being receptive to the 'regular' Mayfair pack. For the 'novelty' packs, five percent (*n* = 50) were receptive to Marlboro Bright Leaf, six percent (*n* = 61) to Silk Cut Superslims and seven percent (*n* = 71) to Pall Mall. For the plain pack, three percent (*n* = 27) indicated being receptive to this pack.~~

For each pack, logistic regression analysis, controlling for demographic and smoking related variables, was used to examine the relationship between pack receptivity and smoking susceptibility. Receptivity to the three 'novelty' pack styles was positively associated with susceptibility. Participants receptive to the Pall Mall pack were more than 3.5 times as likely to be susceptible (*AOR* = 3.69, 95% *CI* 2.21 to 6.19, $p < 0.001$) and those receptive to the Marlboro Bright Leaf pack almost 2.5 times as likely to be susceptible (*AOR* = 2.42, 95% *CI* 1.32 to 4.44, $p = 0.004$), compared to participants not receptive to these packs. Participants receptive to the Silk Cut Superslims pack were more than four times as likely to be

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

susceptible compared with those who were not receptive (*AOR* = 4.42, 95% *CI* 2.50 to 7.81, $p < 0.001$, Table 6). No significant association was observed between susceptibility and receptivity to the 'regular' Mayfair pack (*AOR* = 1.97, 95% *CI* 0.96 to 4.03, $p = 0.064$) or the plain pack (*AOR* = 0.92, 95% *CI* 0.38 to 2.27, $p = 0.863$).

Table 6 Logistic regression of association between susceptibility to smoke and packaging receptivity to Silk Cut Superslims

Dependent variable: Susceptibility, 1 = Susceptible, 0=Non-susceptible	***n* = 970**	***AOR***	**95% *CI* Lower**	**95% *CI* Upper**	**P value**
Block 1					
Close friends smoking					
Most do not smoke	814	1.00			0.948
Majority smoke	47	1.12	0.57	2.20	0.744
Do not know/not stated	109	1.00	0.64	1.59	0.985
Sibling smoking					
No siblings smoke	810	1.00			<0.001
Any siblings smoke	132	2.22	1.48	3.32	<0.001
Do not know/not stated	28	2.23	1.02	4.88	0.044
Parental smoking					
Neither parent smokes	550	1.00			0.010
Either parent smokes	362	2.05	1.15	3.67	0.015
Not sure/not stated/no mum/dad	58	1.46	1.06	2.01	0.019
Block 2					
Gender					
Male	501	1.00			
Female	469	0.879	0.66	1.18	0.384
Socio-economic group					
ABC1	447	1.00			
C2DE	523	0.85	0.63	1.14	0.270
Age	970	1.05	0.96	1.15	0.305
Block 3					
Packaging receptivity to Silk Cut Superslims					
Not receptive	912	1.00			
Receptive	58	4.42	2.50	7.81	<0.001

Model summary at each block	Test of model coefficients			Nagelkerke *R*
	χ^2	*df*	*p*	
Block 1	27.947	6	<0.001	0.041
Block 2	4.824	3	0.185	0.048
Block 3	26.640	1	<0.001	0.085
Final model	59.411	10	<0.001	0.085

AOR = Adjusted odds ratio. Nine hundred and seventy cases analysed, 55 cases with missing values. Cases correctly classified = 72.7%. 96.3% of non-susceptible never smokers and 13.1% of susceptible never smokers were correctly classified.

For peer review only

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

DISCUSSION

This study examines never smokers' responses to three different styles of cigarette packaging: *'novelty'* (branded packs designed to incorporate unique and distinctive features), *'regular'* (branded packs with no special design features) and *'plain'* (a brown pack with a standard shape and opening and all branding removed, aside from brand name). The mean ratings of rResponses to all three types of pack were negative across all survey items. However, ratings of 'novelty' packs, with a distinctive shape, opening style or bright colour, were significantly less negative than the 'regular' pack on most items, and both styles of packaging were rated less negatively than the 'plain' pack on all items. For example, the bright pink Pall Mall and tall and narrow Silk Cut Superslims packs were rated higher than a regular blue king size pack (Mayfair) on all survey items. The Marlboro Bright Leaf pack, with its unique 'Zippo' style opening was rated higher than Mayfair on most items. General estimating questions for binary outcomes also indicated that both positive pack appraisal and receptivity to the pack were more likely with the three 'novelty' packs relative to the 'regular' Mayfair pack. Positive appraisal was less likely with the plain pack compared with the 'regular' pack. For the three distinctive styles, logistic regressions, controlling for factors known to influence youth smoking, showed that susceptibility was associated with positive appraisal and also receptivity. For example, those receptive to the innovative Silk Cut Superslims pack were more than four times as likely to be susceptible to smoking, compared with participants who were not receptive to this pack. For the regular pack, an association was found between positive appraisal and susceptibility but not with receptivity and susceptibility. For the plain pack, no association was found between pack appraisal or receptivity and susceptibility.

The study benefits from a national sample of adolescents. Given that gender, age and smoking prevalence is in line with national data,[22, 43] the sample is likely to be representative of the wider adolescent population in the UK. In addition, the main outcome measure of susceptibility is a well validated measure of smoking intentions.[1] There are, however, a number of potential limitations. The cross-sectional nature of the survey does not enable causal relationships to be drawn about packaging and future smoking behaviour. The interviews were conducted in-home, where a family member may be present. In this instance participants may be worried about having positive perceptions surrounding tobacco and socially desirable responses may have provided lower ratings. Finally, despite concealing brand names and identifiers, prior brand knowledge may have influenced pack responses, especially for the '*regular'* Mayfair pack which is a common youth brand.

Despite these limitations, the findings are consistent with the growing body of evidence that on-pack branding - especially when accompanied by innovative and distinctive design features - makes cigarette packs more appealing to young people, and removing these does the reverse.[11, 29-34] It supports previous research which has found 'slim' packs particularly appealing to young females,[45] and innovative methods of openings to young adults[38] and adolescents.[11] This replicates tobacco industry research findings that young people are attracted to something 'new'.[46, 47] The study adds to this literature by demonstrating a significant association between novel and distinctive pack designs and susceptibility to smoking in the future. It also provides a measure for pack appraisal and receptivity, both of which were independently associated with susceptibility.

This study provides the first direct evidence that the attractiveness of cigarette packaging is associated with susceptibility to smoke. Differences among the packaging styles highlight the influence of innovative and unique branding elements on adolescents' future smoking

For peer review only

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

intentions. Despite marketing restrictions on advertising and POS displays, children continue to be influenced by tobacco companies through packaging design. The study confirms the need for policymakers to control this powerful type of marketing and countries considering plain packaging should be urged to follow Australia's lead. Furthermore it supports the proposal for a revised European Commission Tobacco Products Directive (TPD) which recommended the need for partial pack standardisation.[48] Although this recommendation appears to have been omitted from the revised draft TPD,[49] such measures would prohibit the use of compact 'slimmer' packs in that they are misleading in terms of harm.

This is a cross-sectional study which depends on (albeit well validated) measures of future smoking intentions. There is a need, therefore, to follow up young people over time to provide additional confirmation of the findings. Australia could provide a real world context to further examine if exposure to plain packaging translates into reduced pack appeal and receptivity among adolescents, and whether the absence of regular and novelty packs leads to reduced susceptibility. That packaging design is driven by creative and technological industries provides a challenge for tobacco control. The tobacco industry is increasingly finding new ways to use the pack as a means of promoting the product. Within the pack, inlays and innerliners extend its promotional ability.[50] Outside the pack, printed tear tapes,[51] "soft-look" and easy open films,[52] and special coatings to produce "surface-feel effects",[13] aim to enhance the tobacco brand experience. These developments should be monitored as this study has highlighted the relationship between positive evaluation of novelty packaging and adolescent smoking susceptibility.

For peer review only

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

Acknowledgements We would like to thank our late colleague Dr Lynn MacFadyen for her contribution to the development and design of the YTPS, and FACTS International for undertaking the fieldwork.

Contributors AF designed data collection tools, analysed data, drafted and revised the paper. AF is the guarantor. AMM and GH devised the study. AMM designed data collection tools and advised on the data analyses. GH, CM and AMM offered guidance on the initial drafting of the paper and helped revise the paper. SR conducted the GEE analysis and drafted these sections of the paper. All authors read and approved the final manuscript. All authors had access to and can take responsibility for the data and analysis.

Funding This work was supported by a grant from Cancer Research UK (C312/A8721). The UK Centre for Tobacco Control Studies contributed to the funding of Allison Ford and Gerard Hastings. The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

Competing Interests None Declared

Ethics Approval The study obtained ethics approval from the ethics committee of the Institute for Socio-Management at the University of Stirling. Participants provided informed consent before participating.

Data sharing statement There is no additional data available.

For peer review only

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

REFERENCES

1 Pierce J, Choi WS, Gilpin EA, et al. Validation of susceptibility as a predictor of which adolescents take up smoking in the United States. *Health Psychol* 1996;**15**:355–61.

2 DiFranza JR, Wellman RJ, Sargent JD, et al. Tobacco promotion and the initiation of tobacco use: Assessing the evidence for causality. *Pediatrics* 2006;**117**:e1237–48.

3 National Cancer Institute. Tobacco Control Monograph 19: The role of the media in promoting and reducing tobacco use. Bethesda, MD: National Cancer Institute, 2008.

4 Lovato C, Watts A, Stead LF. Impact of tobacco advertising and promotion on increasing adolescent smoking behaviours. *Cochrane Database of Systematic Reviews* 2011, Issue 10. Art. No.: CD003439.

5 Paynter J, Edwards R. The impact of tobacco promotion at the point of sale: A systematic review. *Nicotine Tob Res 2009*;**11**:322–8.

6 Mackintosh AM, Moodie C, Hastings G. The association between point-of-sale displays and youth smoking susceptibility. *Nicotine Tob Res* 2012;**14**:616–20.

7 Spanopoulos D, Britton J, McNeill A, et al. Tobacco display and brand communication at the point of sale: implications for adolescent smoking behaviour. *Tob Control* Published Online First: 28 February 2013. doi:10.1136/tobaccocontrol-2012-050765

8 Wakefield M, Morley C, Horan JK, et al. The cigarette pack as image: new evidence from tobacco industry documents. *Tob Control* 2002;11:(Suppl 1):i73-i80.

9 Freeman B, Chapman S, Rimmer M. The case for plain packaging of tobacco products. *Addiction* 2008;**103**:580-90.

10 Moodie C. Hastings G. Making the pack the hero, tobacco industry response to marketing restrictions in the UK: Findings from a long-term audit. *Int J Ment Health Addict* 2011;**9**:24-38.

11 Centre for Tobacco Control Research. *The packaging of tobacco products*. Stirling: Centre for Tobacco Control Research, University of Stirling, 2012.

12 Moodie C. Angus K. Ford A. The importance of cigarette packaging in a dark market: The 'Silk Cut' experience. *Tob Control* Published Online First: 14 November 2012. doi:10.1136/tobaccocontrol-2012-050681

13 Glogan T. Tightening legislation in tobacco packaging – innovation blossoms! *Tobacco Journal International* 2013. http://www.tobaccojournal.com/Tightening_legislation_in_tobacco_packaging___innovation_blossoms.51660.0.html (accessed 3 May 2013).

14 Helk A. Appealing to all the senses. *Tobacco Journal International* 2006. http://www.tobaccojournal.com/Appealing_to_all_the_senses.47923.0.html (accessed 3 May 2013).

For peer review only

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

15 Kotnowski K, Hammond D. The impact of cigarette pack shape size and opening: Evidence from tobacco company documents. *Addiction* Published Online First: 22 April 2013. DOI: 10.1111/add.12183

16 M&C Saatchi. *Contact Report*. M&C Saatchi, 2000. http://www.tobaccopapers.com/PDFs/0500-0599/0533.pdf (accessed 3 May 2013).

17 Helk A. "The last bastion of masculinity has fallen". *Tobacco Journal International* 2007. http://www.tobaccojournal.com/The_last_bastion_of_masculinity_has_fallen.48422.0.html (accessed 3 May 2013)

18 Perry CL. The tobacco industry and underage youth smoking: Tobacco industry documents from the Minnesota litigation. *Arch Pediatr Adolesc Med 1999;***153**;935-41.

19 Hastings GB, MacFadyen L. *Keep smiling. No one's going to die: An analysis of internal documents from the tobacco industry's main UK advertising agencies*. Centre for Tobacco Control Research and Tobacco Control Resource Centre. London: British Medical Association, 2000.

20 Cummings KM, Morley CP, Horan JK, et al. Marketing to America's youth: Evidence from corporate documents. *Tob Control 2002*;**11**:(Suppl 1);i5-i17.

21 Department of Health. *Consultation on standardised packaging of tobacco products*. Department of Health, 2012. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/170568/dh_133575.pdf (accessed 3 May 2013).

22 Fuller, E. *Smoking, drinking and drug use among young people in England in 2011*. London: NatCen Social Research, 2012

23 DiFranza JR, Savageau JA, Fletcher K, et al. Measuring the loss of autonomy over nicotine use in adolescents: the DANDY (Development and Assessment of Nicotine Dependence in Youths) study. *Arch Pediatr Adolesc Med* 2002;**156**;397-403.

24 Gervais A, O'Loughlin J, Meshefedjian G, et al. Milestones in the natural course of cigarette use onset in adolescents. *Can Med Assoc J* 2006;**175**;255-61.

25 Goldberg ME, Liefeld J, Kindra G, et al. *When packages can't speak: Possible impacts on plain and generic packaging of tobacco products*. Expert Panel Report Prepared for Health Canada. Ottawa: Health Canada, 1995.

26 McCool J, Webb L, Cameron LD, et al. Graphic warning labels on plain cigarette packs: Will they make a difference to adolescents? *Soc Sci Med* 2012;**74**:1269-73.

27 Pechey R, Spiegelhalter D, Marteau TM. Impact of plain packaging of tobacco products on smoking in adults and children: and elicitation of international experts' estimates. *BMC Public Health* 2013;**13**:18

28 Moodie C, Stead M, Bauld L, et al. *Plain tobacco packaging: A systematic review*. London: Public Health Research Consortium, 2012.

For peer review only

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

29 Centre for Health Promotion. *Effects of plain packaging on the image of tobacco products among youth*. Toronto: Centre for Health Promotion, University of Toronto, 1993.

30 Rootman I, Flay BR. *A study on youth smoking: plain packaging, health warnings, event marketing and price reductions.* Toronto: Centre for Health Promotion, University of Toronto, 1995.

31 Bondy SJ, Paglia A, Kaiserman MJ. Tobacco purchasing and marketing. In: Stephens T, Morin M, eds. *Youth smoking survey, 1994: Technical report*. Ottawa: Minister of Supply and Services Canada, 1996:153-79.

32 Hammond D, Dockrell M, Arnott D, et al. Cigarette pack design and perceptions of risk among UK adults and youth. *Eur J Public Health* 2009;**19**:631-7.

33 Germain D, Wakefield MA, Durkin SJ. Adolescents' perceptions of cigarette brand image: does plain packaging make a difference? *J Adolesc Health* 2010;**46**:385-92.

34 Moodie C, Ford A, Mackintosh AM, et al. Young people's perceptions of cigarette packaging and plain packaging: An online survey. *Nicotine Tob Research* 2012;**14**:98-105.

35 Beede P, Lawson R. The effect of plain packages on the perception of Cigarette health warnings. *Public Health* 1992;**106**:315-22.

36 Environics Research Group. *Consumer research on the size of health warning messages – Quantitative study of Canadian youth*. Prepared for Health Canada. Toronto: Environics Research Group, 2008.

37 Gallopel-Morvan K, Moodie C, Hammond D, et al. Consumer perceptions of cigarette pack design in France: a comparison of regular, limited edition and plain packaging. *Tob Control* 2012;**21**:502-6.

38 Borland R, Savvas S, Sharkie F, et al. The impact of structural packaging design on young adult perceptions of tobacco products. *Tob Control* 2013;**22**:97-102.

39 Moodie C, Ford A. Young adult smokers' perceptions of cigarette pack innovation, pack colour and plain packaging. *Australasian Marketing Journal* 2011;**19**:174-80.

40 Sparrow A. UK plans for plain cigarette packaging to be shelved. *The Guardian* 2013. http://www.guardian.co.uk/society/2013/jul/12/plans-plain-cigarette-packaging-shelved?INTCMP=SRCH (accessed 12 July 2013)

41 Brown A, Moodie C. The influence of tobacco marketing on adolescent smoking intentions via normative beliefs. *Health Educ Res* 2009;**24**:721-33.

42 Moodie C, MacKintosh AM, Brown A, et al. The effect of tobacco marketing awareness on youth smoking susceptibility and perceived prevalence, before and after the introduction of a tobacco advertising ban. *Eur J Public Health* 2008;**18**:484-90.

For peer review only

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) .
Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

43 Office for National Statistics. *Table P01 2011 Census: Usual resident population by single year of age and sex, England and Wales*. Office for National Statistics, 2012. http://www.ons.gov.uk/ons/publications/re-reference-tables.html?edition=tcm%3A77-257414 (accessed 9 July 2013).

44 Zeger SL, Liang KY, Albert PS. Models for Longitudinal Data: A Generalized Estimating Equation Approach. *Biometrics* 1988:44:1049-60.

45 Hammond D, Daniel S, White CM. The Effect of Cigarette Branding and Plain Packaging on Female Youth in the United Kingdom. *J Adolesc Health* 2013;**52**:151-57.

46 Philip Morris. Marketing New Products in a Restrictive Environment. Philip Morris. 1990. Bates No. 2044762173/2364. http://legacy.library.ucsf.edu/tid/vra81c00 (accessed 7 May 2013).

47 Philip Morris (1992). Opportunities in packaging innovation. Philip Morris. 1992. Bates No. 2048976191/6208. http://legacy.library.ucsf.edu/tid/hwe36e00 (accessed 7 May 2013).

48 European Commission. *Proposal for a directive of the European parliament and of the council on the approximation of the laws, regulations and administrative provisions of the member states concerning the manufacture, presentation and sale of tobacco and related products*. Brussels: European Commission, 2012.

49 Council of the European Union. *Council agrees its position on revised EU tobacco directive*. Council of the European Union, 2012. http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/lsa/137571.pdf (accessed 25 June 2013).

50 McEwen W. From riches to rags? *Tobacco Journal International* 2011. http://www.tobaccojournal.com/From_riches_to_rags.50411.0.html (accessed 16 May 2013).

51 McEwen W. New technologies drive tear tape opportunities. *Tobacco Journal International* 2011. http://www.tobaccojournal.com/New_technologies_drive_tear_tape_opportunities.50668.0.html (accessed 16 May 2013).

52 Glogan T. Seeing the trends in brands. *Tobacco Journal International* 2010. http://www.tobaccojournal.com/Seeing_the_trends_in_the_brands.49866.0.html (accessed 16 May 2013.

For peer review only

BMJ Open: first published as 10.1136/bmjopen-2013-003282 on 19 September 2013. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

Correction

Ford A, MacKintosh AM, Moodie C, *et al*. Cigarette pack design and adolescent smoking susceptibility: a crosssectional survey. *BMJ Open* 2013;3:e003282. In the 'Statistical analysis' section of this article, the occurrence of '>.44' should have been '>.4'. The corrected sentence is as follows:

'Principal components were extracted using varimax rotation with the criteria of eigenvalues greater than 1, consideration of the scree plot and component loadings >.4.'

We apologise for this error.

BMJ Open 2013;**3**:e003282corr1. doi:10.1136/bmjopen-2013-003282corr1