

BMJ Open Young people's perceptions of tobacco packaging: a comparison of EU Tobacco Products Directive & Ireland's Standardisation of Tobacco Act

Kate Babineau, Luke Clancy

To cite: Babineau K, Clancy L. Young people's perceptions of tobacco packaging: a comparison of EU Tobacco Products Directive & Ireland's Standardisation of Tobacco Act. *BMJ Open* 2015;5:e007352. doi:10.1136/bmjopen-2014-007352

► Prepublication history and additional material is available. To view please visit the journal (<http://dx.doi.org/10.1136/bmjopen-2014-007352>).

Received 3 December 2014
Revised 2 March 2015
Accepted 14 April 2015



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TobaccoFree Research
Institute Ireland, DIT Focas
Institute, Dublin 8, Ireland

Correspondence to
Kate Babineau;
kbabineau@tri.ie

ABSTRACT

Objectives: To measure young people's perceptions of tobacco packaging according to two current pieces of legislation: The EU Tobacco Products Directive (TPD) and Ireland's Public Health (Standardisation of Tobacco Products) Act.

Design: Within-subject experimental cross-sectional survey of a representative sample of secondary school students. School-based pen and paper survey.

Setting: 27 secondary schools across Ireland, randomly stratified for size, geographic location, gender, religious affiliation and school-level socioeconomic status. Data were collected between March and May 2014.

Participants: 1378 fifth year secondary school students aged 16–17 in Ireland.

Main outcome measures: Young people's perceptions of attractiveness, health risk and smoker characteristics of packs according to EU and Irish branding and packaging guidelines.

Results: Packs with more branding elements were thought to be healthier than standardised packs for Silk Cut ($\chi^2=158.58$, $p<0.001$), Marlboro ($\chi^2=113.65$, $p<0.001$), and Benson and Hedges ($\chi^2=137.95$, $p<0.001$) brands. Generalized estimating equation binary regressions found that gender was a significant predictor of pack attractiveness for Silk Cut, with females being more likely to find the EU packs attractive ($\beta=-0.45$, $p=0.007$). Gender was a significant predictor for females with regards to the perceived popularity of the Silk Cut brand ($\beta=-0.37$, $p=0.03$).

Conclusions: The removal of brand identifiers, including colour, font and embossing, reduces the perceived appeal of cigarette packs for young people across all three tested brands. Packs standardised according to Irish legislation are perceived as less attractive, less healthy and smoked by less popular people than packs which conform to the EU TPD 2014 guidelines.

INTRODUCTION

Over the past few decades, policymakers in many countries have begun to limit the

Strengths and limitations of this study

- This is the first study to compare young people's perceptions of tobacco packs according to *current* regulatory standards established by the EU Tobacco Products Directive and Ireland's Standardisation of Tobacco Products Act. This makes it extremely topical in the on-going public discussion surrounding these legislative actions.
- Draws on a nationwide, representative sample of young people aged 16–17 in Ireland.
- Provides applicable, up-to-date evidence on the tobacco packaging debate.
- The study relies on a within-subject design rather than a between-subject design.
- Does not explore perceptions of roll-your-own packs, only for manufactured cigarette packs.

accessibility of tobacco advertising. The ability to advertise on television, radio, in magazines and on billboards has been incrementally revoked since the 1970s in many parts of the world. As mass media advertising became more restricted, tobacco companies redirected their efforts to points of sale (POS) displays with a goal of securing dominance in the retail setting.¹ Tobacco companies stretched regulations by providing financial incentives to encourage retailers to promote their products through in-store displays, signage and advertising and product promotion. In 2001, POS displays were first banned in Iceland, followed by Thailand, Canada, Ireland, Australia, Norway, Russia, the UK, Panama, Kosovo and other countries.^{2–4} The incremental tightening of the tobacco industry's advertising capabilities led to the investment of billions of dollars into increasingly creative packaging.⁴ Today, brand packaging remains one of the industry's sole methods of promotion and marketing.⁵ The size, shape, colour and font on cigarette packs serve to differentiate brands

and to promote a certain image associated with the given cigarette package.⁵⁻⁷

Many studies in recent years have tested the association between pack standardisation and peoples' attitudes, behaviours and perceptions of tobacco packaging. These studies have been performed in dozens of countries and draw on a variety of different research methodologies including quantitative surveys,^{7 8} semistructured qualitative interviews,⁹⁻¹¹ focus groups^{12 13} and experimental designs.^{14 15} Outcome measures are also highly varied including cognitive measures such as pack appeal and perceptions of users,^{7 8 14} naturalistic experiments where smokers replace branded packs with standardised packs in everyday settings,^{9 16 17} quasi-experiments including pack choice¹⁸ and scientific experiments including eye movement measurement.^{19 20} In spite of the widely varied methods, measures and contexts, the studies have markedly similar findings: when colour, imagery and fonts are removed from packs, standardised packs are perceived very differently from branded packs.²¹ Specifically, the packs are thought to be less attractive and associated with less positive characteristics; the health warnings are more salient and smokers report feelings of wanting to smoke less when using standardised packs.

Branded packs are found to be significantly more 'attractive' than standardised packs.²²⁻²⁴ When asked to complete questionnaire items regarding pack visual appeal, branded packs unilaterally out-perform standardised packaging in all studies.²⁵ Branded packs are more attention grabbing and more likely to entice purchase²² while standardised packs illicit descriptors such as 'ugly', 'dark' and 'sad'.²² Regarding health warnings, the tobacco industry often argues that the mandatory inclusion of warnings on packs (as currently required by law in Europe and many countries all over the world) provides sufficient information on the health risks associated with smoking.²⁶ However, the removal of brand elements has been proven to increase the salience of health warnings and decrease misperceptions regarding the harm of smoking.²⁷⁻²⁹ Moreover, branded packs are universally perceived to be consumed by individuals with more appealing personality/character traits. Some of the most common characteristics tested include: 'cool', popular, sophisticated, trendy, glamorous and stylish,^{15 30} all of which are associated with branded packs. These findings hold true for adult and adolescent populations,^{12 18 21} and for the manufactured and roll-your-own (RYO) cigarettes.¹⁶ Indirect pack-based marketing is also effective at targeting-specific subgroups. For example, the inclusion of certain colours such as pink or purple along with key words such as 'slim' or 'light' may act as targeted marketing devices for women or more 'health conscious' smokers.^{17 31-34} Women have been found to rate 'feminine' packaging more appealing than standardised packs as well as other non-feminine branded packs.³⁰

Research targeting adolescents and young people under the age of 18 has uncovered similar findings to

those described above: young people find branded packs to be more attractive, healthier and 'cooler' than standardised packs.^{7 12 18 33} One study, using an experimental design to test pack perception among young people aged 14-17, found that as branded elements including font, colour and imagery were progressively removed, adolescents found the packs less attractive, rated attributes of a typical smoker of the pack less positively, and had more negative expectations surrounding the pack's taste.¹⁵ Another study found that adolescents aged 11-18 believed packs, including descriptors such as 'smooth', were less harmful.¹⁷ As with adult populations, the removal of brand identifiers increases the salience and visibility of health warnings on packs.²⁰ The implications of this body of research are clear: removing branding elements on cigarette packs reduces the appeal of cigarettes among adolescents at a time where risk for smoking initiation is at its highest.

Australia became the first country in the world to implement legislation based on empirical research surrounding the impact of tobacco packaging in 2012. Research monitoring the effect of the Australian law is on-going, with studies now suggesting a subsequent change in attitudes and behaviours. Recent findings indicate that since the introduction of standardised packs, the number of calls made to quitlines has increased and many smokers find their cigarettes to be less satisfying and appealing.^{8 35 36} Research suggests that introductory effects of the new legislation are consistent with intended outcomes, including strong emotional, cognitive and avoidant responses to standardised packs.³⁷

The existing body of research on tobacco packaging coupled with the success of Australia's standardised packaging initiative has resulted in the implementation of several critical pieces of tobacco packaging regulation. In Europe, the EU Tobacco Products Directive 2014/40/EU (TPD) came into force in May 2014.³⁸ This directive focuses on increased regulation of tobacco branding and labelling, and includes picture and text warning covering 65% of the packages. In June 2014, Ireland's cabinet approved the Public Health Act 2014 which provides for the complete standardisation of all tobacco packaging.³⁹ This act is modelled on the Australian legislation and involves the removal of colours, fonts, embossing and other branded features. However, it differs with regards to size and content of the warnings in that Ireland will feature size and content warnings of 65% in conformity with the EU TPD compared with 80-95% coverage currently used in Australia. Furthermore, Australian legislation allows for no bevelled edges, whereas this would be permitted under the Irish act. In January 2015, the UK also announced plans to move ahead with standardised packaging, allowing a free vote to MPs in May 2015 with the possibility of legislation enactment prior to the upcoming general election in mid-2015.⁴⁰ In anticipation of these laws, it is important to pre-emptively gather evidence on the potential

impact of standardised packaging on young people's perceptions, particularly in comparison with the EU TPD.

This study is the first on young people's perceptions of standardised tobacco packaging to be conducted in Ireland. With a long history of active tobacco control reform, including the introduction of the Smokefree Workplace Ban in 2004, prevalence among young people in Ireland remains a concern with 7.9% of 15–17-year-old smoking at least one cigarette a week.⁴¹ This figure is lower than that in many European countries, but still remains approximately double that of others such as Australia.⁴² As such, gathering information on young people's perceptions of standardised packaging in the Irish context is worthy in its own right. More central, however, is that this is the first study to examine the impact of the packs proposed by the EU TPD against packs proposed by Ireland's Public Health Act.^{38 39} As policymakers deliberate on the standardisation of tobacco products, the need for valid, up-to-date data on the subject is critical.

This research focuses on young people's attitudes in relation to two aspects of tobacco packaging:

- ▶ The type of brand;
- ▶ The level of branding/standardisation of the tobacco packaging.

Specifically, the study aims to measure the impact of the branding and standardisation on young people's perceptions of a given pack with regard to three factors:

1. Perceived health risk;
2. Attractiveness;
3. Perceived popularity of a typical smoker of a given pack.

METHODOLOGY

Recruitment strategy

Young people in their fifth year of secondary school, aged 16–17, were chosen as the target population. This is an age with a high level of smoking initiation among young people in Ireland and adolescents are known targets of the tobacco industry.^{43 44} Also, students in this 'class' of secondary school are more accessible than those immediately below and above them due to a 'transition year' that is built into the Irish school system, where students are given the opportunity to leave campus and undertake work experience or community service activities. The study aimed to gather a representative sample to compensate for the fact that much of the existing youth-based research on the topic is gathered from non-representative, convenience samples.^{15 18 21} A representative sample of secondary schools from around the country was selected for participation. The schools were stratified on the basis of several factors: (A) geographic location, (B) school size, (C) type of school (boys, girls, co-ed), (D) religious affiliation (according to the three categories of public education in Ireland: Catholic, Church of Ireland, interdenominational) and

(E) socioeconomic status (schools designated 'disadvantaged' by the state vs non-disadvantaged schools). After stratification according to the sampling criteria, a total of 30 individual schools were randomly selected for inclusion. In each school, all students in the fifth year were asked to participate in the research. Twenty-seven schools consented, leaving us with a school-response rate of 90%. A summary table of participating schools is included in online supplementary appendix D.

Survey administration

School principals were initially contacted with a written letter asking for their support in conducting this research. These letters were followed with phone calls a few days later, explaining the research process and the protocol for participation. After arranging a time with the principal and participating teachers, a researcher travelled to the school to administer the questionnaire to participating students. To facilitate the individual needs of each school, researchers adopted a flexible approach to survey administration. Depending on the number of participating students and the school's available space, surveys were administered either in individual classrooms or in a large, shared space (auditorium, lunch room, etc). Surveys were administered in a self-completion, 'pen and paper' format. All students were reminded that their participation in the survey was voluntary, confidential and anonymous. They were also informed that this was not a test and there were no 'right' or 'wrong' answers. They were encouraged to answer all questions as honestly as possible and were informed that they could ask questions at any time.

Data collection occurred across Ireland from March to May 2014.

Ethical issues

When conducting research with young people, there are a number of ethical considerations to be taken on board. Prior to administering the survey, information sheets and consent forms were distributed to all students and parents in participating schools. Active consent was received from all participating students. Parental consent was obtained through an 'opt out' method, meaning that parents could give 'non-consent' to their children taking part in the research. All students were informed that the research was voluntary, anonymous, and if students posed any questions, they were answered honestly and directly by the researchers present.

Sample

Considering the total number of enrolled fifth year students in Ireland (37 415), we established a minimum sample size of 652—with a confidence level of 99% and a margin of error of 5%—to proceed with the research. This figure was established with the help of Raosoft statistical software.⁴⁵ In the end, we approached 1412 students. A total of 28 students were unwilling to take part in the survey and an additional 6 left their survey

completely blank on the day of administration leaving us with a final sample of 1378 and a response rate of 97.5%. This very high response rate can be attributed to the fact that researchers had full school and teacher cooperation throughout the course of the project and surveys were administered in the school, during class time, with the researcher present along with the supervisory administrative staff. Students were provided with ample time to complete the short, 15 min survey. The average age of participants was 16.6 years, with 767 males (55.7%), 602 females (43.7%) and 9 participants identifying as ‘other’ (0.7%). A total of 413 (30%) were enrolled in a socio-economically disadvantaged school, while 965 (70%) were attending a non-disadvantaged school. The majority of students (1091, 79.2%) were born in Ireland, with an additional 194 (14%) from the UK/Europe and 93 (6.8%) who were born outside of Europe.

Measures

A questionnaire was constructed for the specific study drawing on existing tobacco measures recommended by the WHO and the Centre for Disease Control and Prevention.⁴⁶ A within-subject experimental design was constructed, in which the appearance of the cigarette pack was manipulated based on three levels of *tobacco packaging*:

- ▶ **Current:** Branded packs under current regulations in Ireland, including a written warning on one side and a pictorial warning on the other. Branded fonts and colours are retained.
- ▶ **EU:** Proposed packs as per the EU TPD 2014, including larger, dual-sided text and pictorial health warnings covering 65% of the pack. Branded fonts and colours are retained.³⁸
- ▶ **Standardised:** Standardised packs with brand identifiers, including font, colour and embossing removed, as per Ireland’s Public Health (Standardised Packaging of Tobacco) Act 2014. Packs are of a brown matte colour and contain dual-sided text and pictorial warnings covering 65% of the pack.³⁹

Examples of the three levels of packaging are included in [figure 1](#). The images were developed by a graphic

designer according to the guidelines laid out by the two pieces of legislation, including selection of images, wording, colour and size of warning. Brand selection was aligned with the top three brands smoked by the target age group in Ireland.⁴⁴

Participants were given pen and paper surveys. Each page contained one pair of packs featuring the same brand, but a different level of standardisation—that is, two packs, one of which portrayed EU TPD guidelines and one portraying Irish standardised packaging guidelines. They then were asked to select a preferred pack for a series of outcome questions. Comparisons were conducted between all levels of standardisation for each brand, but not between brands. Participants were informed that they could leave the item blank if they thought that there was no difference or if they did not know. The items were drawn from a similar, peer-reviewed study of youth perceptions of packaging in the UK, with consent from the author.¹⁸ The current measure was piloted and tested with 42 students in two secondary schools to ensure that question format, wording, and layout were straight forward, age appropriate and conducive to data collection in the Irish context. Minor changes were made to the questionnaire prior to full-scale implementation. A full presentation of pack images used is included in online supplementary appendix A and a sample of pack presentation and questions used is included in online supplementary appendix B.

Perceptions of tobacco packaging

For each pack pair, several questions were asked related to their perception of the packs. In this paper, three variables will be tested for each pack pair: (1) attractiveness (“which, if either, of the cigarette packs do you think is more attractive”); (2) health risk (“which, if either, of the cigarettes do you think carries less of a health risk”) and (3) attributes of a typical smoker (“which, if either, of the cigarettes do you think is typically smoked by someone who is popular or well-liked”). Each pair of packs included labels for ‘pack A’ and ‘pack B’. Participants were informed that they could leave the question blank if they felt that the answer was ‘no difference’ or ‘I don’t know’. All three levels of

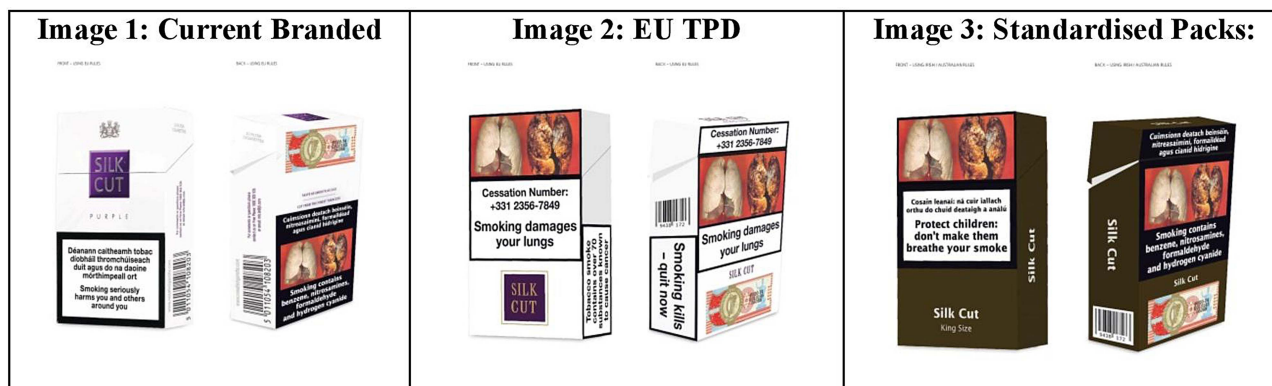


Figure 1 Three levels of packaging for Silk Cut cigarettes.

packaging (current branded, EU TPD, and standardised) were compared across all three included brands.

Pack preference task

All students were provided with a pack preference question, where they were presented with 6 pack images and an option of 'No Pack/None of the Above' on one page. For each brand of cigarette included in the study, a branded and a standardised pack were presented. They were then asked, "Given the choice between these packs, which one would you choose?" A variable was then created to indicate if the student chose a branded pack, a standardised pack, or no pack.

Personal and family tobacco use

Participants were asked if they had ever smoked a cigarette and if currently smoking, how frequently (*everyday; at least once a week; at least once a month; tried smoking once or twice but don't smoke now; used to smoke but quit; never smoked*). Responses were recoded into 'Current Smokers' (those who smoke at least once a month), 'Ever Smokers' (those who have tried smoking once or twice or those who used to smoke but have quit), and 'Never Smokers' (those who have never tried cigarettes). Participants were also asked about the smoking habits of their immediate family members. A dichotomous variable was created to distinguish between those who had an immediate family member (mother, father, siblings) who smoked and those who did not.

Sociodemographic information

Sociodemographic variables included age, gender, country of birth and school-level socioeconomic status. Country of birth was coded into those born in Ireland and those born outside of Ireland. School-level socioeconomic status was dichotomised into students attending a socioeconomically disadvantaged school Delivering Equality of Opportunity in Schools (DEIS) as designated by the state and those not attending a socioeconomically disadvantaged school. Post-stratification data weighting was applied to adjust for an over-representation of DEIS students in our sample, based on numbers provided by the Department of Education's statistics office.

Analyses

χ^2 Tests were conducted to compare the probability that participants would select the branded, the EU, or the standardised cigarette pack for each outcome variable. Generalised estimating equation (GEE) regression models with exchangeable correlation matrixes were then conducted to explore the impact of demographic and smoking-related factors on individuals' perceptions of packaging. GEE allowed us to account for the correlation between individual participants' scores when rating different packs and also for correlations that may appear due to the clustered nature of the classroom.^{47–49} This approach has been used previously in studies measuring perceptions of standardised packaging with similar items.⁵⁰

A large amount of data were generated through the 9 pair pack comparisons (brand of cigarette \times level of standardisation). For the current paper we focus, in depth, on the comparison between packs adhering to the EU TPD and packs adhering to Ireland's Public Health Act (standardised packaging). Analyses that include current branded packs were also conducted. While these findings are relevant and worthy in their own right, nearly all empirical studies on the topic have already found very similar results.^{7 12 15 18 21 34} In this study, we feel it is more critical to test for differences on the basis of the upcoming EU TPD and Irish standardised pack legislation as it has never been explored in prior research and as it is of utmost importance in light of recent political actions. As such, the findings pertaining to the current branded packs have been included in online supplementary appendix C for those researchers who are interested in additional information on comparisons between branded packs and standardised packs. This paper goes on to look specifically at the EU TPD packs and the Irish standardised packs in detail.

GEE binary logistic models were conducted to explore factors related to preference for level of pack branding (EU TPD vs Irish) for three leading cigarette brands: Silk Cut, Marlboro and Benson and Hedges. Cases with missing data were omitted from analyses. Individual regressions were run for each brand for each of the three outcomes: attractiveness, perceived health risk and smokers' popularity. Four covariates were included in the GEE models: (A) gender, (B) school-level socioeconomic status, (C) country of birth (Ireland vs elsewhere) and (D) personal tobacco use (current smoker, ever smoker, non-smoker). Age was omitted as all participants were in the 16–17 age range. Interaction effects for all included variables were also explored and entered into an additional model. Pack preference in each model was analysed through a binary variable. Analyses were conducted using SPSS, V.21 (IBM, Illinois, USA).

RESULTS

A valid sample of 1378 was included in the analyses. [Table 1](#) presents the demographic characteristics of the sample.

Smoking prevalence

Current tobacco use (at least once a month) among the sample measured 17.2% (236). An additional 30.5% (419) had tried tobacco in the past, but are not current tobacco users. More young people reported using RYO cigarettes (163, 11.8%) rather than manufactured cigarettes (150, 10.9%).

Perceptions of branded versus standardised packs within brand pairs

χ^2 Tests were conducted to examine the probability of participants selecting an 'EU' or 'Standardised' pack within each pair. Proportions for EU TPD versus standardised packs are included in [table 2](#).

Table 1 Descriptives of the sample*

Demographic variable	Response categories	Frequency	Valid %
Gender	Male	767	55.7
	Female	602	43.7
	Other	9	0.7
Socioeconomic status	Attending disadvantaged school	413	30.0
	Attending non-disadvantaged school	965	70.0
Geographic region	Urban/town	999	72.5
	Rural	379	27.5
Birth country	Ireland	1090	79.1
	Elsewhere	288	20.9
Personal tobacco use	Never tried smoking	719	52.3
	Tried once or twice but not regularly	361	26.3
	Used to smoke but given up	58	4.2
	Smokes at least once a month	53	3.9
	Smokes at once a week	42	3.1
	Smokes everyday	141	10.3
Personal tobacco use (shortened)	'Never' smoker	719	52.3
	'Ever' smoker	419	30.5
	'Current' smoker	236	17.2
Type of tobacco product used	Manufactured cigarettes	150	10.9
Family tobacco use	Rollies (roll your own)	163	11.8
	Pipes/shisha	10	0.7
	Cigars	10	0.7
	Other	10	0.7
	Smoker in family	640	46.4
	No smoker in family	720	52.2

*Unweighted data.

Table 2 shows that for Marlboro, and Benson and Hedges brands, EU TPD packs were thought to be more attractive, healthier and smoked by more 'popular' individuals than standardised packs. Frequencies demonstrate that among these two brands, endorsements for EU TPD brands out-rank standardised packs nearly two to one. However, the preference for Silk Cut EU packs over standardised packs was by a much narrower margin and there was no significant difference for attractiveness between EU TPD and standardised packs in this brand ($p=0.093$). This was the only variable with a non-significant comparison. Regression analyses were then run to examine possible predictors for pack preference for all three brands.

Perceived health risk

GEE binary regression analyses were conducted to explore sociodemographic and smoking-related

predictor variables for the pack preference task. EU packs were thought to carry less of a health risk than standardised packs for Silk Cut ($\chi^2=158.58$, $p<0.001$), Marlboro ($\chi^2=113.65$, $p<0.001$) and Benson and Hedges ($\chi^2=137.95$, $p<0.001$) brands. GEE binary regressions found no significant predictors across the brands for perceived health risk. Tests for interaction effects were also insignificant.

Pack attractiveness

EU packs were thought to be significantly more attractive than standardised packs for Marlboro ($\chi^2=158.88$, $p<0.001$), and Benson and Hedges ($\chi^2=163.47$, $p<0.001$). However, there was no significant effect for attractiveness for Silk Cut brand ($\chi^2=2.82$, $p=0.08$). GEE binary regressions found that gender was a significant predictor of pack attractiveness for the Silk Cut brand, with females being more likely to find the EU packs attractive ($\beta=-0.45$, $p=0.007$). No significant predictors or interaction effects were identified in the models.

Smokers' characteristics

It was thought that EU packs were significantly more likely than standardised packs to be smoked by someone who was popular or well liked for all 3 brands (Silk Cut ($\chi^2=19.24$, $p<0.001$), Marlboro ($\chi^2=158.58$, $p<0.001$) and Benson and Hedges ($\chi^2=166.37$, $p<0.001$). Gender was a significant predictor for the Silk Cut brand, with females being more likely than males to associate the brand with popularity ($\beta=-0.37$, $p=0.03$). There were no significant predictors or interaction effects for Marlboro Reds or Benson and Hedges.

Preferred pack task







When given the option to choose between a branded pack, a standardised pack, and no pack, more than half of the participants (724, 52.5%) selected a branded pack, 34.4% (474) selected no pack and 13.1% (180) selected a standardised pack. No significant differences emerged along the lines of gender, birth country or school-level socioeconomic status. χ^2 Tests determined significant differences based on individual smoking status ($\chi^2(4, 1267)=108.32$, $p<0.001$). A total of 72% of current smokers and 63% of ever smokers selected a branded pack, as did 44% of never-smokers.

DISCUSSION AND CONCLUSION

The present study is the first to directly explore young people's perceptions of tobacco packaging according to the EU TPD and Ireland's Standardisation of Tobacco Packaging Act.^{38 39} Rather than abstractly assess various elements of packaging, this study presented images based on the regulations established by the two pieces of legislation to generate results that are representative and applicable.

The current study underscores the impact of tobacco packaging and branding on young people's perceptions.

Table 2 Comparison of EU versus standardised packs

	Silk cut			Marlboro			Benson hedges		
	 Pack A	 Pack B	No pack	 Pack A	 Pack B	No pack	 Pack A	 Pack B	No pack
Less of a health risk (%)	56.7	25.9*	17.4	54.3	28.1*	17.6	55.3	26.7*	18.0
More attractive (%)	48.7	44.0	7.3	62.4	30.2*	7.4	62.6	29.6*	7.7
Smoked by someone popular/well liked (%)	49.9	38.4*	11.7	60.0	28.0*	12.0	59.8	27.3*	12.9

*Significant at $p < 0.001$.

Even with the inclusion of larger, dual-sided text and pictorial warnings as mandated by EU TPD guidelines, branded packs are thought to be more attractive, contain healthier cigarettes, and used by more popular people than the standardised packs.^{9 15 18 28} The ability of subtle branding elements to target-specific subgroups has been further established, with female teenagers significantly more likely to think that Silk Cut EU packs, inclusive of pink and purple colours and white background, are more attractive and smoked by more popular people than standardised packs.^{30 32–34} The non-significant difference in attractiveness between Silk Cut EU TPD and Standardised packs among the full sample is more likely due to male participants reacting adversely to the ‘feminine’ characteristics of the branded packs and selecting the darker, ‘more masculine’ standardised pack instead. Rather than a specific preference for standardised packaging, this further demonstrates the subtle ability of pack colouring and branding elements to influence perceptions and an accepted notion among young people that certain brands are intended for certain subgroups (ie, genders). As male participants likely identified the lighter, purple/pink packaging with female consumers, they opted for standardised pack when given only these two choices. Both pack attractiveness and characteristics of typical consumers are commonly used by tobacco industry when testing marketing for new brands⁵ and are important predictors in young people’s decision to start smoking, as indicated by the scientific research and tobacco industry marketing professionals.^{4 6} These findings suggest that these constructed marketing tactics are resonating strongly with young people under the age of 18.

Overall, this study further establishes that the removal of brand imagery from tobacco products reduces the appeal, attractiveness and misperceptions of reduced health risk for many young people.^{18 21} More topically, the findings reinforce the packaging legislation in Australia^{35–37} and provide further supporting evidence for the implementation of Ireland’s Public Health Act 2014 (Standardisation of Tobacco Packaging) and the UK’s upcoming standardised packaging statute. Groups linked to the tobacco companies argue that larger warnings are a viable alternative to standardised packaging.²⁶

However, these findings demonstrate unequivocally that this measure is not as effective as standardised packaging in reducing the appeal of cigarettes to young people under the age of 18. Marketing in the form of pack branding is retained as a tool to increase cigarette appeal under EU TPD regulation.

Strengths and limitations

This study had several methodological strengths, including a large, representative national sample of young people with high rates of response. Many existing studies on young people’s perceptions of standardised packaging relied on convenience samples^{15 18 21 30} and thus, the diversity and representativeness of this sample stand out as an advantage. Another strength lies in the comparison of packs according to current legislative measures, making the findings directly applicable to on-going policy discussions. However, the study also has its limitations. Most notably, findings are drawn from a cross-sectional survey of one age group in one country. While we took every effort to ensure a diverse and representative sample, the study would have benefited from the inclusion of another age group. Furthermore, the research design relied on a pen-and-paper survey and school-based administration, which made the construction of a between-subject design to be too cumbersome to effectively implement. By relying on in-school computers, we could have administered a between-subject experimental design which would have made our analyses more robust, but this was not feasible. This study used premium cigarette brands for pack comparisons. After collecting our data, we discovered that students in our sample were more likely to smoke RYO cigarettes than manufactured cigarettes. This came as a surprise, as this was not the case in other recent Irish studies.⁴⁴ The use of manufactured packs in this survey could have impacted on our findings, though there is no way to concretely determine if this indeed occurred. Finally, there was an oversight in the development of pack images. While the visual warnings were consistent across packs, the written warnings varied according to the list of permitted EU TPD warnings. This should have been kept the same throughout all images and written

messages on the side of packs should also have been included.

Future directions:

Future research on the relationship between individual attitudes (ie, pack preference) and personal behaviours (ie, tobacco use) would clarify elements of this complicated issue. The current study could have benefited from the inclusion of additional items related to brand smoked (for current smokers) as well as total number of cigarettes smoked a day and the desire to start smoking. Further research in this area should consider the inclusion of these items. Future studies may also consider exploring additional packaging strategies such as inclusion of cessation information or the impact of variant names on tobacco packaging. Exploring the impact of other packaging elements will allow for the improvement and tightening of upcoming adaptations of standardised packaging legislation. Most importantly, research must be conducted on youth smoking rates in the years following the implementation of standardised packaging to determine the real-world impact of legislation on young people and smoking initiation.

CONCLUSION

In the past several decades, prevalence rates have shown an international trend of tobacco reduction and denormalisation of smoking among young people. This is due in large part to legislative efforts, including ban of tobacco advertising, enactment of SmokeFree spaces, banning of POS displays, and many other formal tobacco control efforts. In line with international findings, this study indicates that standardised packing has the ability to become the next step in the tobacco control movement for minimising the tobacco industry's ability to market to young people through branding, colours and images. Increased textual and visual warnings on packs inline with the EU TPD guidelines are not as effective as standardised packaging in reducing pack attractiveness and highlighting health risks associated with smoking.

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Acknowledgements The authors would like to thank the students, teachers and principals who gave their time to this research project. The authors also thanks to Dr David Hammond and Dr Martin Dockrell for their feedback and consultation in the early stages of the research design. The authors also thank Sheila Keogan, Annette Burns and Keisha Taylor for their invaluable contribution to this project at all stages. The authors also like to thank Clever Cat Design for their assistance in creating pack images.

Contributors LC conceptualised the research project and design and secured funding for the project. KB and LC designed the project and materials and fieldwork structure and collected data in the field and contributed to the authoring and revision of the paper. KB wrote the analysis plan and analysed the data.

Funding This project was funded by a Department of Health National Lottery Grant.

Competing interests KB and LC have received funding from the National Lottery Grant Scheme of Ireland for the submitted work.

Patient consent Obtained.

Ethics approval The study received ethical clearance from Dublin Institute of Technology's Research Ethics Board.

Provenance and peer review Not commissioned; externally peer reviewed.

Data sharing statement All data generated by this project will be made available to other researchers by request to the TFRI following the publication and dissemination of research findings. The data set includes raw, anonymised data on pack preferences, as well as smoking prevalence data and secondhand smoke exposure. Data will be maintained by the TFRI for a minimum of 20 years in our database. There are no security, licensing, or ethical issues related to the data and all data used in the project was generated directly as a result of the project without any pre-existing data being used.

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REFERENCES

- Lavack AM, Toth G. Tobacco point-of-purchase promotion: examining tobacco industry documents. *Tob Control* 2006;15:377–84.
- McNeill A, Lewis S, Quinn C, *et al*. Evaluation of the removal of point-of-sale tobacco displays in Ireland. *Tob Control* 2011;20:137–43.
- 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* 2014;23:64–9.
- World Health Organization. *WHO report on the global tobacco epidemic, 2013: enforcing bans on tobacco advertising, promotion and sponsorship*. World Health Organization, 2013.
- 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):173–80.
- Cummings KM, Morley CP, Horan JK, *et al*. Marketing to America's youth: evidence from corporate documents. *Tob Control* 2002;11(Suppl 1):15–17.
- 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.
- Wakefield MA, Hayes L, Durkin S, *et al*. Introduction effects of the Australian plain packaging policy on adult smokers: a cross-sectional study. *BMJ Open* 2013;3:pil: e003175.
- Moodie C, Mackintosh AM, Hastings G, *et al*. Young adult smokers' perceptions of plain packaging: a pilot naturalistic study. *Tob Control* 2011;20:367–73.
- Hoek J, Gifford H, Pirikahu G, *et al*. How do tobacco retail displays affect cessation attempts? Findings from a qualitative study. *Tob Control* 2010;19:334–7.
- Hoek J, Gendall P, Gifford H, *et al*. Tobacco branding, plain packaging, pictorial warnings, and symbolic consumption. *Qual Health Res* 2012;22:630–9.
- Scheffels J, Sæbø G. Perceptions of plain and branded cigarette packaging among Norwegian youth and adults: a focus group study. *Nicotine Tob Res* 2013;15:450–6.
- Moodie C, Hastings G, Joossens L. Young adult smokers' perceptions of illicit tobacco and the possible impact of plain packaging on purchase behaviour. *Eur J Public Health* 2012;22:251–3.
- Wakefield M, Germain D, Durkin S. How does increasingly plainer cigarette packaging influence adult smokers' perceptions about brand image? An experimental study. *Tob Control* 2008;17:416–21.
- 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.
- Gallopel-Morvan K, Moodie C, Eker F, *et al*. Perceptions of plain packaging among young adult roll-your-own smokers in France: a naturalistic approach. *Tob Control* 2015;24:e39–44.
- Moodie C, Bauld L, Ford A, *et al*. Young women smokers' response to using plain cigarette packaging: qualitative findings from a naturalistic study. *BMC Public Health* 2014;14:812.

18. Hammond D, White C, Anderson W, *et al.* The perceptions of UK youth of branded and standardized, 'plain' cigarette packaging. *Eur J Public Health* 2014;24:537–43.
19. Munafò MR, Roberts N, Bauld L, *et al.* Plain packaging increases visual attention to health warnings on cigarette packs in non-smokers and weekly smokers but not daily smokers. *Addiction* 2011;106:1505–10.
20. Maynard OM, Munafò MR, Leonards U. Visual attention to health warnings on plain tobacco packaging in adolescent smokers and non-smokers. *Addiction* 2013;108:413–19.
21. Moodie C, Stead M, Bauld L, *et al.* Plain tobacco packaging: a systematic review. 2012. Retrieved from: <http://eprints.ioe.ac.uk/16381/>
22. 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.
23. Hoek J, Wong C, Gendall P, *et al.* Effects of dissuasive packaging on young adult smokers. *Tob Control* 2011;20:183–8.
24. Thrasher J, Rousu M, Hammond D, *et al.* Estimating the impact of pictorial health warnings and "plain" cigarette packaging: evidence from experimental auctions among adult smokers in the United States. *Health Policy* 2011;102:41–8.
25. Bansal-Travers M, Hammond D, Smith P, *et al.* The impact of cigarette pack design, descriptors, and warning labels on risk perception in the US. *Am J Prev Med* 2011;40:674–82.
26. John Player and Imperial Tobacco. A response to the Oireachtas Joint Committee and Health and Children's Consultation on Public Health (Standardised Packaging of Tobacco) Bill 2013. 15 Jan 2014. Retrieved from: http://www.oireachtas.ie/parliament/media/committees/healthandchildren/Vol-2-Final-2-04-14_Part2.pdf
27. Freeman B, Chapman S, Rimmer M. The case for the plain packaging of tobacco products. *Addiction* 2008;103:580–90.
28. Wakefield M, Germain D, Durkin S, *et al.* Do larger pictorial health warnings diminish the need for plain packaging of cigarettes? *Addiction* 2012;107:1159–67.
29. Hammond D. "Health warning messages on tobacco products: a review." *Tobacco control* (2011): tc-2010.
30. Doxey J, Hammond D. Deadly in pink: the impact of cigarette packaging among young women. *Tob Control*. 2011;20:353–60.
31. Carpenter CM, Wayne GF, Pauly JL, *et al.* New cigarette brands with flavors that appeal to youth: tobacco marketing strategies. *Health Affairs* 2005;24:1601–10.
32. Hammond D, Doxey J, Daniel S, *et al.* Impact of female-oriented cigarette packaging in the United States. *Nicotine Tob Res* 2011;13:579–88.
33. 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;52:151–7.
34. White CM, Hammond D, Thrasher JF, *et al.* The potential impact of plain packaging of cigarette products among Brazilian young women: an experimental study. *BMC Public Health* 2012;12:737.
35. Swift E, Borland R, Cummings KC, *et al.* Australian smokers' support for plain or standardised packs before and after implementation: findings from the ITC Four Country Survey. *Tob Control*. Published Online First: 10 Nov 2014. doi: 10.1136/tobaccocontrol-2014-051880.
36. Young JM, Stacey I, Dobbins TA, *et al.* Association between tobacco plain packaging and Quitline calls: a population-based, interrupted time-series analysis. *Med J Aust* 2014;200:29–32.
37. Dunlop SM, Dobbins T, Young JM, *et al.* Impact of Australia's introduction of tobacco plain packs on adult smokers' pack-related perceptions and responses: results from a continuous tracking survey. *BMJ Open* 2014;4:e005836.
38. European Parliament and Council (EN) 2014/40/EU of 3 Apr 2014 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 and repealing Directive 2001/37/EC [2003] OJ L295/1
39. Government of Ireland. *Public health (standardised packaging of tobacco) bill*. Dublin: Stationary Office, 2014.
40. BBC. Cigarette package law to be voted on by MPs before election. 25 Jan 2015. <http://www.bbc.com/news/uk-politics-30926973>
41. Hickey P, Evans D. Smoking in Ireland 2014: synopsis of key patterns. Heath Services Executive 2015. <http://www.hse.ie/eng/about/Who/TobaccoControl/Research/smokinginireland2014.pdf>
42. AIHW. *Australia's health 2014. Australia's health series no. 14. Cat. no. AUS 178*. Canberra: AIHW, 2014.
43. Oh DL, Heck JE, Dresler C, *et al.* Determinants of smoking initiation among women in five European countries: a cross-sectional survey. *BMC Public Health* 2010;10:74.
44. Department of Health and Human Services Ireland. Smoking Prevalence Data 2013. Retrieved on 12 Sep 2014. <http://www.hse.ie/eng/about/Who/TobaccoControl/Research/>
45. Raosoft Statistical Sample Size Calculator. 2007. <http://www.raosoft.com/samplesize.html?nosurvey>
46. Global Adult Tobacco Survey Collaborative Group. *Tobacco questions for surveys: a subset of key questions from the global adult tobacco survey (GATS)*. 2nd edn. Atlanta, GA: Centres of Disease Control and Prevention, 2011.
47. Hanley JA, Negassa A, Forrester JE. Statistical analysis of correlated data using generalized estimating equations: an orientation. *Am J Epidemiol* 2003;157:364–75.
48. Hardin JW. *Generalized estimating equations (GEE)*. John Wiley & Sons, Ltd, 2005.
49. Zeger SL, Liang KY, Albert PS. Models for longitudinal data: a generalized estimating equation approach. *Biometrics* 1988;44:1049–60.
50. Ford A, MacKintosh AM, Moodie C, *et al.* Cigarette pack design and adolescent smoking susceptibility: a cross-sectional survey. *BMJ Open* 2013;3:e003282.