

Adolescents perceived effectiveness of the proposed European graphic tobacco warning labels

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Background: Graphical tobacco product labelling is a prominent source of health information and has an important position among tobacco control initiatives. However, little is known about its effectiveness among adolescents. With this above in mind, we aimed to research into how adolescents perceive the proposed EU graphic tobacco product warning labels as an effective means of preventing smoking initiation in comparison to the current EU text-only warning labels. **Methods:** Five hundred seventy four adolescents (13–18, 54% male) from Greece were privately interviewed, with the use of a digital questionnaire and randomly shown seven existing EU text-only and proposed EU graphic warning labels. Non-smoking respondents were asked to compare and rate the warnings effectiveness in regard to preventing them from smoking on a 1–5 Likert type scale. **Results:** Irrespective of the warning category shown, on all occasions, non-smoking adolescents rated the suggested EU graphic labels as more effective in preventing them from smoking in comparison to the existing EU text-only warnings. Controlling for gender, age, current smoking status and number of cigarettes smoked per month, younger adolescents were found to opt for graphic warnings more often, and also perceive graphic warning labels as a more effective means of preventing them from smoking, in comparison to their elder peers ($P < 0.001$). **Conclusions:** The proposed EU graphic warning labels may play an important role in preventing of smoking initiation during the crucial years of early adolescence when smoking experimentation and early addiction usually take place.

Keywords: product labeling, smoking, prevention, health policy, public health adolescents, tobacco.

Introduction

The cigarette package is a critical communication device for creating and reinforcing brand imagery, and is the link between other forms of tobacco advertising and the uptake of the addictive drug nicotine from a cigarette.¹ Using striking colors, distinctive fonts and carefully crafted materials, cigarette packaging is defined to be highly attractive, especially among young people.²

On the other hand, cigarette pack warnings are able to disrupt brand imagery, an important factor for tobacco trial and use. This reality is acknowledged by the tobacco industry, which vigorously opposes such measures.^{1,3} Package warnings are unique among tobacco control initiatives implemented to educate smokers and prevent smoking initiation as they cost little to produce and can be integrated with larger interventions such mass media campaigns. Reminders from health providers to their patients about the hazards of smoking and the benefits of quitting have been found to reduce smoking, and cigarette pack warnings can work in a similar way, even among populations in which language is a barrier.^{4,5} Large comprehensive graphic warnings—that combine a picture embedded with a text message relevant to the depicted picture—are effective in increasing adult awareness of the

dangers of smoking, aiding smoking cessation and are more likely to be noticed and rated as effective by adult smokers in comparison to plain text-only messages, while their size and emotional impact also play a vital role in their effectiveness.^{6–10}

The WHO Framework Convention on Tobacco Control (FCTC) calls for large clear health warnings on tobacco packages that ‘may be in the form of or include pictures or pictograms’ and cover at least 30% of the principal display areas.¹¹ Currently, country members in the 27-member European Community have the option of introducing the readily available 42 different graphic warnings that cover 14 different themes (from vivid fear arousing images to counseling advice) which have been prepared by the European Commission (EU Directive 2003/641/EC).¹² These warnings are substantially larger than the existing EU text-only warnings, and cover 43% of the front and 53% of the back of the cigarette packets (for unilingual countries) in comparison to the 30% and 40%, respectively of the current EU text-only messages (EU Directive 2001/37/EC).¹³

Since research concerning the salience and persuasive power of text-only warnings has documented that adolescent smokers are virtually unaffected by the presence of text-only labels and stressing the fact that smoking experimentation and consequent nicotine dependence commence mainly during adolescence, it is of utmost importance in policy planning that the adolescents’ perceptions and reactions be taken into account.^{14–16}

In line with the above, we evaluated the reactions and perceptions of Greek adolescents to the proposed EU graphic warning labels in comparison to the current EU text-only warning labels and investigated into how they perceive the graphic warning labels as both a source of information and as an effective means of preventing them from initiating smoking.

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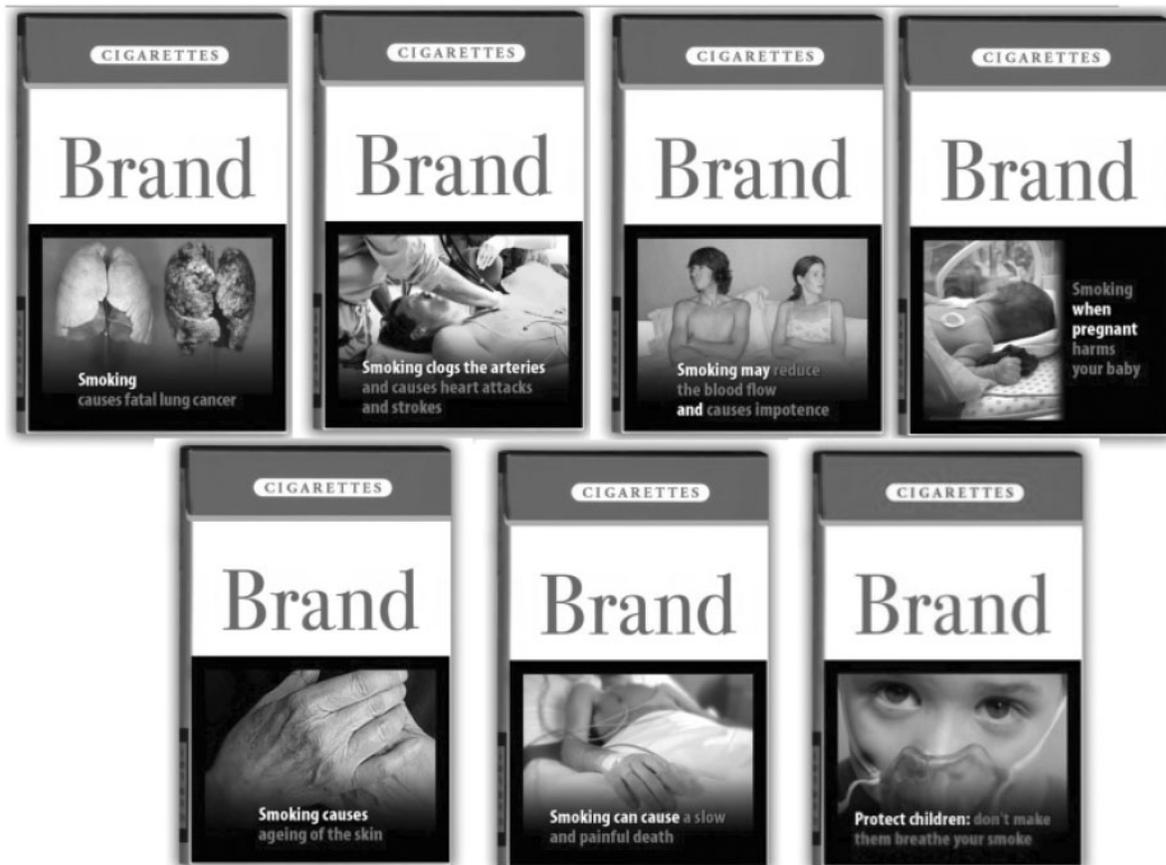


Figure 1 The seven different pictorial warning categories and specific packages used

Methods

Sampling methodology—ethical considerations

The study was conducted in mid-2007 after approval by the Ethics committee of the University Hospital of Crete (6755/2007) and with support from the Health Promotion Office of the Department of Secondary Education of Heraklion, Greece. A convenience sample of 574 adolescents currently enrolled in middle and high schools in Crete, Greece participated in the study. As both middle and high school students were enrolled, their ages ranged between 12- and 18-years old (mean age 15, $SD=1.5$, of which 54% were female). The school teachers and principals were briefed and gave verbal consent while written consent was obtained from both the participating adolescents and their parents after having received a written invitation and an explanatory letter. All invited adolescents in the schools on the investigation dates were included in the study and participated. Adolescents were allowed to discontinue the study, if they found it distressing or uncomfortable (none did) and all subjects were extensively debriefed after their participation, during an interactive class workshop on the negative health effects of active and passive smoking.

Procedure—questionnaires

For the purpose of this project a two-section questionnaire was developed and pilot tested. The first collected demographic information, such as age and gender, as well as information on their current smoking habits, their age of first experimentation with cigarettes, their current cigarette consumption, possible past smoking or quitting attempts, their knowledge of the harmful effects of smoking and their intention to quit or

intention to commence smoking in the next year or the next 5 years.

For the second part of the questionnaire, mock text-only and graphic warning label cigarette packets were image processed on a computer. The current EU text-only warnings were created to the exact dimensions and style as presently used in most EU countries (EU Directive 2001/37/EC, 2001) and the proposed EU graphic warning labels (text plus picture warning) were image processed using the available EU graphic warnings (EU Directive 2003/641/EC, 2003). Both types of warnings were image processed onto a photo of a mock cigarette pack with the word 'brand' where the tobacco company logo would usually be. The seven categories of the selected graphic warnings were: 'Smoking clogs the arteries and causes heart attack and stroke', 'Smoking causes fatal lung cancer', 'Smoking can cause a slow and painful death', 'Smoking causes ageing of the skin', 'Smoking may reduce the blood flow and cause impotence', 'Smoking when pregnant harms your baby' and 'Protect children: Do not make them breathe your smoke' as seen in figure 1.

During the next section of the survey, the adolescents were shown in random order the seven different warning categories. For each category they were shown simultaneously the two types of warning labels (text-only and the equivalent graphic warning together), and were initially asked to choose between the text-only or the graphic warning label (for means of comparison) and select the one more effective in preventing them from smoking. Subsequently, they were asked to rate this self reported effectiveness (only of the *one* warning they selected previously: text-only or graphic) on a 1–5 Likert type scale (from 1 = very weak message to 5 = very strong message).

Initially they were asked 'Which warning is more likely to prevent you from smoking?' (Answer: text-only or graphic

Table 1 Descriptive characteristics of the study population

	Total, n (%)	Male, n (%)	Female, n (%)	P-value
Gender	100 (574)	46.0 (264)	54.0 (310)	<i>N/a</i>
Mean age in years	15.1	14.9	15.2	<i>N/a</i>
Ever smoked				
Yes	40.4 (231)	40.5 (107)	40.1 (124)	0.72
No	59.6 (341)	59.5 (157)	59.9 (184)	
Age of first experimentation				
<10	19.5 (45)	20.6 (22)	18.5 (23)	0.094
10–13	30.3 (70)	37.4 (40)	24.2 (30)	
14–15	35.1 (81)	28.0 (30)	41.1 (51)	
16+	15.2 (35)	14.0 (15)	16.1 (20)	
Current Smoker >1 Day last month				
Yes	19.4 (111)	17.4 (46)	21.1 (65)	0.258
No	80.6 (462)	82.6 (219)	78.9 (243)	
Intention to smoke in the next year				
Definitely/probably not	81.6 (468)	85.6 (226)	78.4 (242)	0.022
Definitely/probably yes	18.3 (105)	14.4 (38)	21.7 (67)	
Intention to smoke in 5 years				
Definitely/probably not	79.9 (458)	83.3 (220)	77.0 (238)	0.055
Definitely/probably yes	20.1 (115)	16.7 (44)	22.9 (71)	

warning), 'How effective would this warning be in preventing you from smoking?' (Answer: 1–5 on the Likert scale), 'Which warning makes you think more of the effect smoking has on one's health' (Answer: text-only or graphic warning) and finally 'how effective is this warning in making you think of the consequences smoking has on one's health' (Answer: 1–5 on the Likert scale).

To ensure that the participants' responses regarding their current smoking status were sincere, they were interviewed privately, ensured that their responses were strictly confidential and were also informed that their levels of cotinine (the main metabolite of nicotine) would be derived from saliva samples for verification of their smoking status. Additionally, the random viewing of both warning styles and warning categories controlled for any possible selection bias.

Statistical analysis

Non-parametric tests were used, including Pearson's chi-square and Fisher's exact test where necessary. All *P*-values are based on two-sided tests and *P*-values < 0.05 defined the level of statistical significance level. Continuous variables are presented as mean ± standard deviation, while qualitative variables were depicted with the use of frequencies. Multivariate logistic regressions were performed with age, gender, previous smoking experimentation, current smoking status, cessation attempts and intention to smoke in the next 12 months used as independent variables. Where applicable 95% confidence intervals are provided. Likert scale variables were regarded as ordinal so no means or standard deviations were extracted. The analysis was conducted using SPSS 16.0 for windows (SPSS Inc. 2006).

Results

The descriptive characteristics of the study population can be seen in Table 1. Current smoking prevalence among the study population was estimated at 19.4%, while 39% stated that they had tried a cigarette in the past. Of those adolescents who had experimented smoking, 49.8% (58% of male and 42.7% of female) first tried a cigarette under the age of 13. The participants gender did not affect the majority of the demographic/smoking history characteristics of the population, other than the self reported tendency to commence smoking in the next year, to which 21.8% of female vs.

14.3% of male participants answered definitely/probably yes (*P* = 0.022). In general almost one in five participants stated that they would initiate smoking within the next 1 year (18.3%).

Smoking prevention and health education

When randomly shown the seven different graphic warning labels next to their equivalent text-only warnings and asked to compare the two in regards to their relative effectiveness in preventing them from smoking, up to 96.1% of current non-smoking adolescents opted for the graphic warning label (for the 'smoking causes fatal lung cancer' warning), with high ratings given also for the majority of the selected warnings as seen in table 2. Similar results were also noted in regards to the question 'Which warning makes you think more of the consequences smoking has on one's health?' for which the responses (from all participants, smokers and non-smokers) ranged between 71.6% and 90.1%, depicting the self rated effectiveness of the graphic warnings as a mean of health education, as also seen in table 2.

As for the graphic warnings rated effectiveness in preventing smoking, given by the reported score on a Likert type 1–5 scale (from 1 = very weak effect to 5 = very strong effect in preventing smoking), up to 84% of interviewed adolescents (among non-smokers only) reported that graphic warning labels would be much more effective (rating them with 4 or 5 on the Likert scale) in preventing them from initiating smoking in comparison to existing EU text-only warning labels. The graphic warning 'Smoking causes fatal lung cancer' was given the highest rating, followed by 'Smoking when pregnant harms your baby'. In general, the graphic warnings 'Skin ageing' and 'Impotence' although found to have a lower appeal (most likely due to the fact that they are not deemed as important health problems during adolescence), were still rated higher than their equivalent text-only warnings.

Controlling for age and current smoking habits, gender differences were prominent when investigating into the rated effectiveness of each warning type in preventing adolescent smoking. Amongst the adolescents who selected graphic warnings and rated them as more effective in preventing them from smoking (with a score of 4–5), adolescent girls rated the 'Smoking when pregnant harms your baby' and the 'Protect children: Do not make them breath your smoke' warnings, higher than boys with a noted statistical significance

Table 2 Proposed EU Pictorial vs. current EU text warnings: selection in regards to smoking prevention and health education for each of the 7 warning categories shown

Pictorial warning category	Which warning is more effective in preventing you from smoking? (Non current smokers only)		Which warning makes you think more of the effect smoking has on health (all participants)	
	Graphic, n (%)	Text, n (%)	Graphic, n (%)	Text, n (%)
'Smoking causes fatal lung cancer'	96.1 (444)	3.9 (18)	90.1 (517)	9.9 (57)
'Smoking can cause a slow and painful death'	95.5 (441)	4.5 (21)	85.5 (491)	14.5 (83)
'Smoking when pregnant harms your baby'	93.3 (431)	6.7 (31)	89.0 (511)	11.0 (63)
'Protect children: Do not make them breath your smoke'	91.1 (421)	8.9 (41)	88.5 (508)	11.5 (66)
'Smoking clogs the arteries and causes heart attack and stroke'	88.7 (410)	11.5 (52)	84.5 (485)	15.5 (89)
'Smoking causes aging of the skin'	79.2 (366)	20.8 (96)	80.5 (462)	19.5 (112)
'Smoking may reduce the blood flow and cause impotence'	72.1 (333)	27.9 (129)	71.6 (441)	28.4 (163)

Table 3 The role of the participants age in the self rated effectiveness of each graphic warning in preventing smoking

Pictorial warning category	O.R ^a	95% CI	P-value ^b
'Smoking clogs the arteries and causes heart attack and stroke'	1.40	1.15–1.72	0.001
'Smoking causes fatal lung cancer'	1.30	1.05–1.64	0.017
'Smoking can cause a slow and painful death'	1.30	1.06–1.56	0.008
'Smoking causes aging of the skin'	1.28	1.09–1.52	0.003
'Smoking may reduce the blood flow and cause impotence'	1.25	1.04–1.49	0.015
'Smoking when pregnant harms your baby'	1.13	0.88–1.45	0.327
'Protect children: Do not make them breath your smoke'	1.20	1.00–1.47	0.053

a: Multivariate Logistic regression controlled for age, gender, previous smoking experimentation, current smoking status, cessation attempts and tendency to smoke in the next 12 months

b: P-values <0.05 were indicated as statistically significant

of $P=0.008$ and $P=0.032$, respectively. No other gender differences were noted.

During the analysis of the data, a multiple logistic regression analysis was performed. Controlling for gender, previous smoking experimentation, current smoking status, cessation attempts and the tendency to smoke in the next 12 months, the participants' age was found to play an important role in perceiving the warnings as more effective. When dichotomising the ratings according to the reported effectiveness (low score 1–3 vs. high score 4–5), the statistical analysis indicated that the younger the adolescent, the more likely he/she was to rate the proposed EU graphic warning labels as more effective in preventing him/her from smoking and this likelihood decreased with as the respondents' age increased (OR = 1.4, 95% CI = 1.15–1.72 $P < 0.001$ for the 'smoking clogs the arteries and causes heart attack and stroke' warning), as depicted in table 3.

Overall comparison between the graphic warnings

When asked to select the strongest anti-tobacco message of the seven proposed EU graphic warning categories shown, the warning category 'Smoking causes fatal lung cancer' was rated as the strongest (38.0%), followed by the option 'all are equally strong' (30.1%), 'Smoking when pregnant harms your baby' (11.7%) and 'Protect children: Do not make them breath your smoke' (6.6%). The other health oriented messages followed with smaller percentages. Significant gender differences were noted with: 44.7% of boys vs 32.3% of girls found to have selected the 'Smoking causes fatal lung cancer' warning ($P=0.002$) while 5.7% of boys vs 16.8% of girls the 'Smoking when pregnant harms your baby' warning.

Discussion

Main findings

Irrespective of the warning category shown, adolescents rated the proposed EU graphic warning labels as more effective in preventing them from smoking, and more effective in informing them about the health effects of smoking, in comparison to the existing EU text-only warnings. It is of importance that we stress the fact that younger adolescents, up to 14 years of age, were found not only to opt for graphic warnings more often, but were also more likely to rate them higher, in comparison to their elder peers (15+).

Although the brief level of exposure to the graphic warning labels during the interview possibly could have increased their salience (noticing and reading the warnings), this too is an important aspect of health communication, as warnings have to be rotated and renewed over time so as to avoid becoming stagnant.¹⁷ When the current text-only EU warning labels were introduced, research indicated their significant impact of cessation attempts and the inclination to purchase cigarettes, as they were more noticeable than the one it replaced and had the strength to motivate smokers to quit.^{18,19} Over the years though, and especially among Southern European countries the effectiveness of the current EU text-only warnings has reduced.¹⁹ Research has indicated that larger, more vivid warnings that combine a text and pictorial message (such as the currently proposed EU graphic warnings) have been found to maintain their effectiveness over time in comparison to less prominent warnings.¹⁰ Additionally, it is interesting to note that only a limited decline in salience was noted among Canadian adults (exposed to graphic warning labels), with their impact remaining high even 4 years after their implementation.²⁰ Our finding that adolescents perceived that graphic warnings would be more effective in discouraging them from starting to smoke are similar with results from

other studies, in which graphic warning labels were rated as more effective in discouraging people from starting to smoke.⁸

Warning labels are a prominent source of health information and previous research has indicated that adolescents believe that warnings should provide information, be visible and graphic to be effective.²¹ Indeed our study population of adolescents found the proposed EU graphic warning labels to be an effective means of health communication. By inquiring into how the adolescents perceived that the warning labels would make them think of the negative effect smoking has on someone's health (thus investigating into the 'third person effect') we were able to avoid possible misreporting, as people hold the belief that they are less likely to be persuaded by a message than others.²²

Debate exists whether graphic warnings may be too fear arousing to be effective, as smokers may opt to get rid of the fear and not the threat itself.^{23,24} On the other hand, fear appeals, accompanied by an equally high efficacy (or greater) message, motivate attitude, intention, and behaviour changes and can be quite useful when implied in public health policy actions.²⁵ The proposed EU graphic warnings take this into account, and will rotate emotional messages with health efficacy messages on quit lines—emphasizing that quitting is a beneficial option. Providing the above relationship between the emotional and health efficacy content of messages, recent evidence supports the fact that negative emotional reactions are actually associated with a greater effectiveness.^{16,26} Recent research among Canadian adolescents has indicated that adolescents had a more favourable attitude towards the warnings that depicted a loss in health in comparison to those that depicted the possible health benefits of quitting,²⁷ while investigations among European adult smokers indicated that self affirmed smokers were able to tolerate higher levels of stress in response to the images and to report stronger intentions to cut down, without evidence though of a dose response relationship between emotional stress and the outcome.²⁸

Irrelevant of the effect graphic warning labelling has on smoking cessation, the role of fear arousal and health education on smoking prevention (which was our primary aim in this study) is significant, as has been shown by anti-tobacco messages and TV advertisements.^{29,30}

We must declare that the noted adolescents' perceptions on the effectiveness of the graphic warnings do not imply that by solely adopting the proposed EU graphic warning labels, the European adolescents stance towards smoking initiation will alter, but this study provides an insight into their possible reactions, as the relationship between behaviour and behavioural intentions among adolescents has been well documented.³¹ Because it is difficult to conduct an experimental research study, a time-series study design is needed and would provide a stronger certainty in relation to the information that our study implicates. Such a study could also investigate into the relationship between the implementation of graphic warning labels and smoking cessation during adolescence, and is thus warranted.

As the adolescents of our study sample are from Crete, Greece our results may not be generalizable to the entire Greek adolescent population. Even though their reported beliefs may not be exactly comparable to those of their peers in Western or Northern European countries, we must acknowledge the fact that Greek adolescents are at an elevated risk of initiating smoking in comparison to their European peers, as the population has the highest per capita cigarette consumption globally, one of the highest smoking prevalence, exposure to rampant tobacco advertising and a loath to comply to smoke free legislation.^{32,33}

It also may be possible that the adolescents opted for the graphic warning labels due to their novelty, colourfulness and vividness, but these factors would also contribute to their efficacy in the community, highly due to the attention they receive, which is a significant aspect of their role in informing and educating adolescents. To our knowledge there is limited scientific evidence within the published literature, on the necessity and potential effectiveness of the proposed EU graphic warnings, a background needed when planning European public health policy.

Conclusions

Conclusively, the proposed EU graphic warning labels, supported by other tobacco control policy interventions such as smoke-free environments, advertising bans and price increases, may play an important role in de-normalizing smoking and preventing smoking initiation, especially during the crucial years of early adolescence when smoking experimentation and early addiction take place.³⁴

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C.I.V participated in study design, data collection and interpretation and had the main role in the methodological approach and the drafting the manuscript. C.G conceived the idea and with A.K participated in study design, data interpretation and manuscript preparation, while K.K perform the necessary statistical analysis, data cleaning/processing and help draft the manuscript. We have no competing interests to declare.

Conflicts of interest: None declared.

Key points

- The proposed EU graphic warning labels were rated as more effective than the current EU text-only messages on all occasions.
- Younger adolescents rated the EU graphic warnings as more effective in comparison to their elder peers; indicating their importance as a mean of health education among youth.
- The mandatory use of graphic warning labels on cigarette packs throughout the EU could play an important role in preventing smoking initiation among European youth.

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