Dissuasive cigarettes: which cues are the most effective at deterring young people from smoking?

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ABSTRACT

Objectives
In order to counter the attractiveness of cigarettes, Article 11 of the Framework Convention on Tobacco Control provides for the possibility of including warnings on cigarettes. The objective of our research was to explore perceptions of cigarettes designed to be dissuasive (either displaying the warning 'Smoking kills' in uppercase or lowercase, a 'skull and crossbones' pictogram, unattractive shades of brown or dark green, or a combination of all these negative cues).

Study design
In-depth interviews were conducted with 31 people in France aged 15-25 (10 daily smokers, 10 occasional smokers, 11 non-smokers; 15 females, 16 males).

Methods
Participants were shown different dissuasive cigarettes (displaying the warning 'Smoking kills', a 'skull and crossbones' pictogram, unattractive shades of brown or dark green, or a combination of all three), and current branded ones. Open-ended questions were asked about the attractiveness of the cigarettes, perception of risk, the image of the smoker, and influence on the desire to quit or not to start. Discussions were audio-recorded and transcribed.

Results
The different dissuasive cues were found to increase negative health perceptions (e.g., increase risk), reduce positive smoker image and the perceived pleasure of smoking (e.g., embarrassment of smoking in front of friends), decrease the desire to start smoking and increase the desire to quit. The most dissuasive cigarette was an unattractively dark-coloured cigarette which displayed both the warning 'smoking kills' and a 'skull and crossbones' pictogram.

Conclusion
This study highlights the importance of the appearance of cigarettes and suggests that dissuasive cigarettes may be an innovative tobacco control measure for governments.

KEYWORDS: tobacco, dissuasive cigarette, warnings.

INTRODUCTION

Tobacco kills around six million people in the world every year.[1] To combat this, the World Health Organization proposed different measures in the Framework Convention for Tobacco Control (FCTC) as ways for countries to reduce prevalence. Article 11 of the FCTC mandates large pictorial warnings on packs and plain packaging (no brand logos, colour schemes, etc.).[2] In response to this measure, which is being implemented in more and more countries,[3] the tobacco industry (TI) is developing marketing on individual cigarettes.[4] As on tobacco packages, in recent years it has launched a wide range of attractive sticks that target women, teens, etc.[5-7] They have been shown to positively influence consumers: slim cigarettes are perceived as cool, fancy, feminine, less harmful, cleaner (because of the white colour of the cigarette),[8,9] they generate connotations of slimness,[10] and are perceived as weaker in taste compared to 'regular' cigarettes (white stick with a cork tip).[11]

To prevent branding on sticks, Article 11 of the FCTC recommends in guidelines the introduction of measures requiring '*health warnings and messages to be printed on the filter overwrap portion of cigarettes and/or on other related materials such as packages of cigarette tubes, filters and papers […]*' (p.3).[2] In spite of this recommendation, little research has explored how to design the appearance of cigarettes in a way that decreases their attractiveness and promotes cessation.[12] Hoek and Robertson and Gallopel-Morvan et al. have explored unattractive coloured cigarettes. The former paper revealed that dark green and brown sticks were perceived very negatively by young female smokers, making smoking appear dirty, reducing social acceptability, as well as the experience and identity they sought.[10] The latter paper found that compared to branded 'regular', slim or pink sticks, a grey cigarette was evaluated as less appealing, more harmful and less/more likely to motivate teenagers to smoke/smokers to reduce consumption or quit.[13]

Beyond colour, warnings printed on cigarettes have also been tested. Hassan and Shiu explored the effect of five words indicating the presence of toxic constituents (arsenic, benzene, formaldehyde, pesticides and tar) and a reference to 'minutes of life' lost due to smoking.[14] Compared to a 'regular' stick, the 'minutes of life' one reduced the attractiveness of the cigarette and increased quitting intentions among adult smokers. Moodie et al. highlighted that the on-cigarette warning 'smoking kills' put off teens aged 11-16 from starting.[15] Hoek et al. evaluated the impact of unattractive coloured sticks (slimy green, faecal yellow-brown) and on-cigarette warnings ('smoking kills', '15 minutes of life lost').[16] Compared to a 'regular' stick, the dissuasive cigarettes were less favoured by adult smokers and rated as less appealing, and the cigarette with the 'minutes of life' message was the most aversive of all the cigarettes. Moodie et al. tested two forms of dissuasive cigarettes (a green one and a stick displaying 'smoking kills'), and both were rated less attractive and less likely to encourage trial for young smokers and non-smokers compared to 'regular' ones.[17]

These findings suggest that the cigarette itself can be an effective prevention tool as it reduces the appeal and positive image of tobacco products and influences behavioural intentions. Our research suggests going further by exploring innovative ways to make cigarettes dissuasive.

First, previous studies have shown that unattractive colours used on filters and sticks negatively influence perceptions,[18] and that white-coloured cigarettes positively influence representations.[10] In line with these results, we will explore whether the extent of unattractive colouring on sticks can be a cue that decreases attractiveness. Cigarettes with unattractive coloured filters and a white stick vs. unattractive coloured filters and sticks will be compared. Particularly, the effect of the dark green colour used on plain packs in Australia, the UK, France, etc. will be tested on sticks (this colour has never been tested before).

Second, beyond colours, two innovative ways for decreasing the attractiveness of cigarettes will be explored. Previous studies have tested text-only messages on sticks ('smoking kills', etc.). However, research on tobacco packs has underlined that graphic warnings are more effective than text-only warnings at catching attention, motivating smokers to quit, helping people memorise cigarette-related health risk information etc.[19] As it is difficult to display photos on sticks, symbols will be tested, and since positive symbols displayed by the TI on sticks have been shown to increase the attractiveness of cigarettes, perceived quality and taste compared to sticks without symbols, [11] we will explore whether negative on-cigarette symbols can achieve the opposite.

Third, research in psychology and marketing suggests that letter properties such as uppercase versus lowercase can influence perceptions. Xu et al. highlighted that in a commercial context, consumers feel closer to lowercase wordmarks (which increase perceptions of brand friendliness) compared with uppercase.[20] We will therefore test whether lowercase vs. uppercase warning displays on cigarettes can influence people.

To our knowledge, no research has explored how the current colour of plain tobacco packaging, the extent of unattractive colour, on-cigarette symbols or tobacco warning letter properties can decrease the attractiveness of tobacco sticks.

METHODS

To explore the suitability of these new ways to design deterrent cigarettes (the extent of unattractive colouring, negative symbol, uppercase or lowercase for warnings, and combinations of all these cues), in-depth individual interviews were conducted with 31 French people aged 15-25 (parental consent was obtained for minors). This age group was selected because tobacco prevalence is high among them in France: in 2016, 35.7% of males and 25.2% of females aged 15-24 were daily smokers.[21] As a consequence, young people are an important target for the French government.[22] Thus it is necessary to come up with prevention tools that could be effective in decreasing their smoking behaviours.

Participants were recruited by a market research agency. They were members of its panel, and they were sent an email invitation explaining that a survey was being conducted by public health actors on tobacco prevention messages. They were asked questions about their age, smoking status, tobacco consumption, etc. Ten daily smokers, 10 occasional smokers, 11 non-smokers (15 females and 16 males) were recruited for this research (Table 1).

[Table 1 here]

Interviews were conducted in three different cities (Rennes, Angers and Nantes) before the introduction of plain packaging in France (January 2017). They lasted around one hour. Participants were first asked questions on tobacco in general (smoking status, consumption, etc.) and on different branded cigarettes sold in France (these results are not presented due to space constraints). They were then exposed to 10 real cigarettes (Table 2): 1/ five 'regular' shaped cigarettes: a current Marlboro stick (white stick with a cork tip), two sticks with an unattractive green or brown filter (and a white stick), two green or brown fully coloured sticks; 2/ five slim cigarettes with the same characteristics as the 'regular' shaped ones. The eight dissuasive cigarettes were made by us and the two branded ones were bought in shops.

[Table 2 here]

3

Following this, participants were exposed to another 18 cigarettes (Table 3): 1/ nine 'regular' shaped cigarettes: a current Marlboro stick, four green-coloured sticks (a fully green stick bearing the warning 'Smoking kills' in combination with a 'skull and crossbones' pictogram, a white stick with a green tip and the same two cues, two white sticks with green tips and 'smoking kills' 'warnings' in lowercase or uppercase), and four dark brown-coloured sticks with the same characteristics as the green ones; 2/ nine slim cigarettes with the same characteristics as the 'regular' shaped ones.

[Table 3 here]

For both sets of cigarettes, open-ended questions were put to participants asking for their opinion on the perceived attractiveness, risk and quality of the cigarettes, and their perceived influence on the smoker's image, smoking pleasure and on the desire to smoke, quit or not to start.

Brown was chosen because it had been shown to be unattractive in previous research on plain tobacco packaging.[23] Dark green ('Pantone 448C') is the current colour of plain tobacco packs in Australia, France and the UK. The 'skull and crossbones' symbol was selected because it conventionally represents the 'poisonous' concept and is well-known to communicate toxic product dangers and hazards.

At the end of the interview, data was collected on age, place of residence, level of education and occupation. Participants received a €20 gift card for their participation and signed a consent form to allow us to use their data. The interviews were audio-recorded and transcribed using a word processor. The data was manually analysed using thematic content analysis.

RESULTS

Partial vs. full colouring in green or brown

Both colours seem to make cigarettes more dissuasive: for most participants, dark green or brown sticks were judged less attractive than current ones.
Dark green generated negative but also positive reactions, while dark brown generated mostly negative reactions. Dark brown was associated with dangerous products and negative evocations (e.g., combustion, tar, lungs, blood, petrol) but also reminded participants of the colour of cigars. Dark green was less associated with tobacco products than dark brown, elicited negative thoughts (e.g., rubbish bins, tar, drugs, algae) but also positive thoughts such as 'natural products, organic, plants, leaves, fresher, and less strong tobacco':

- *'The green colour actually reminds me of plants. Whereas brown seems more dangerous […]. Green is more natural and therefore more reassuring, unlike brown.'* (female occasional smoker, 24).

The full colouring had a strong effect on participants. These cigarettes created doubts for smokers about the composition of what they are smoking, which leads to distrust. Compared to just coloured tips, they were perceived as more dangerous, stronger, more chemical and more repulsive because participants felt that they would be inhaling the dissuasive colour:

- *'I feel that the coloured cigarettes are stronger than the white ones.'* (female non-smoker, 20)

- *'The colour makes me wonder what is inside, as though you are in direct contact with what's inside the cigarette.'* (male non-smoker, 20)

Because of these negative perceptions, around half the participants would consider quitting, reducing their tobacco consumption, or not starting if only coloured cigarettes were available on the market:

- *'I admit that I would seriously consider whether I should continue smoking and I would think about quitting. Coloured cigarettes don't seem natural.'* (female daily smoker, 23)

Coloured cigarettes combined with warnings

Warnings displayed on cigarettes (text-only message and pictogram) combined with dissuasive colours generated numerous negative reactions (more than coloured cigarettes alone).

Cigarettes that displayed warnings were perceived as the most dangerous (compared to just coloured and to the two branded sticks) and made respondents think more about the dangers of smoking. Particularly, the 'skull and crossbones' symbol (which all participants recognised) generated thoughts of 'death, disease, toxicity, chemical products and poison' for almost all respondents and provoked fear:

- *'With the picture of a skull and crossbones, I get the feeling I'm smoking something toxic. Well, it's already toxic, just more so.'* (male occasional smoker, 20)

- *'It's already difficult, but with the skull and crossbones as well, it's scary.'* (male non-smoker, 20)

These cigarettes also made participants think of the dangers of passive smoking:

- *'It's as though the smoker is killing us all. Smokers are showing everyone that they are putting themselves as well as others in danger.'* (female daily smoker, 23)

Interestingly, the pictogram triggered an immediate feeling of danger:

- *'I get the feeling that I will die on the spot if I smoke something like that.'* (male daily smoker, 24)

Cigarettes that only displayed "smoking kills" were less associated with danger. Most participants said this message made them think that the cigarettes were more dangerous than the two branded ones, but they thought that this effect would not last because of wear-out and because people regularly see this message on tobacco products:

- *'We associate the pictogram more with risk than the phrase 'smoking kills' on its own. Because 'smoking kills' is just words that we are used to seeing.'* (male non-smoker, 23)

Beyond perceived dangers, the presence of warnings on cigarettes was evaluated as bad for smokers' image. For two-thirds of participants, it would be embarrassing to smoke such cigarettes in public places:

- *'I imagine myself on a terrace with my friends smoking that, with the words 'smoking kills' hanging out of our mouths; it's too ridiculous.'* (female occasional smoker, 21)

- *'But that will stain the smoker's image even further, they'll become even more withdrawn: 'oh look he or she will die young'.'* (male daily smoker, 24)

According to some participants, the forced and repeated exposure to on-cigarette warnings ('smoking kills' and/or the pictogram) could provoke stress and guilt while smoking and would reduce the pleasure and relaxation linked to smoking:

- *'That would be a permanent source of stress and would make people feel guilty […]. However, I am already aware of the risks, but that would spoil the pleasure and relaxation, it would spoil everything.'* (female daily smoker, 23)

Whether in uppercase or lowercase, the 'smoking skills' warning generated fewer reactions than the 'skull and crossbones' symbol. One-third of participants considered that the uppercase letters increased the visibility of the warning and the perceived danger of tobacco:

- *'With large writing, it's pretty visible.'* (male daily smoker, 17)

- *'When the phrase is written in capitals, it portrays more danger than when it's in small letters.'* (male non-smoker, 15)

The cigarettes most effective at attracting/deterring young people from smoking

The current branded 'regular' Marlboro stick and the slim white Vogue cigarette were positively evaluated by almost all young people in both sets of cigarettes (compared to all dissuasive sticks). They were judged to be of better quality, tastier, less dangerous (especially the slim white stick), more attractive (especially the Marlboro stick), and less strange than the dissuasive cigarettes:

- *'They look like they are better quality, also you can see the brand [on the cigarette].'* (female occasional smoker, 24)

Consequently, the branded sticks were evaluated as more likely to stimulate the desire to smoke (especially the Marlboro stick):

- *'Branded cigarettes would increase the desire to smoke compared to those ones* [the dissuasive ones].*'* (male occasional smoker, 17)

In contrast, almost all participants considered that the cigarettes most effective at making them quit, reducing tobacco consumption, or preventing them from starting were those that displayed the 'skull and crossbones' symbol and 'smoking kills' and those with full brown or green colouring (brown was most often cited as unattractive):

- *'Quit smoking, perhaps not, but I would smoke less.'* (male daily smoker, 24)

- *'The writing is directly on the cigarette so that would lessen the likelihood of starting.'* (female non-smoker, 16)

- *'Well I think no one would want to smoke anymore with that.'* (female daily smoker, 24)

Very few subjects (only three) felt that the sticks with the 'skull and crossbones' symbol and/or the 'smoking kills' warning would have no effect at all on their behaviour.

DISCUSSION

An advertising agency suggested to Philip Morris in 1989: *'Why not brand the cigarette? […] Colours and designs could be carried through to the cigarette itself – a visible extension of the personality of the brand (and the user)'.*[24] Our research reveals that the removal of all the branding elements and the presence of negative cues on sticks reduce the appeal of cigarettes. It shows that the degree of colouring in dark green (the colour of plain packaging) or brown, the presence of warning displays on sticks (text and pictogram), and of warnings written in uppercase (vs. lowercase) may be effective at deterring young people from smoking.

Finally, the results of this research indicate that a combination of several negative cues is the most effective way to deter young people from smoking (full coloured sticks, a pictogram warning, and 'smoking kills' written in uppercase). Each one plays a specific role in the persuasion process (visibility, perceived danger, harm to smoker image, etc.) and their effects seem to increase and cumulate when used together.

These results can be explained in several ways.

First, most negative reactions were obtained at the thought of inhaling the smoke from an unattractive cigarette. This can be considered to fall under the principle of incorporation, usually used to explain eating behaviour.[25] This is the mental representation by which food, when eaten, transforms the person who absorbs the food's real or imagined characteristics. Our research reveals that the symbol or value that consumers attribute to food seems to apply to cigarettes, which could explain the potential for dissuasion.

Second, similar to reactions observed towards tobacco warnings,[19] displaying pictorial symbols on cigarettes increases salience, affective reactions, and behavioural reactions. Our research is the first to test this on-cigarette warning. It reveals that a pictogram is more effective at influencing people and deterring young people from smoking than a text-only message. This is possibly due to the specific 'skull and crossbones' warning symbol tested in this study, which evokes a high perception of hazardousness.[26]

Third, our research re-emphasises the importance of colours in products. It is well documented in the food and marketing literature that colour can alter perceptions of product attributes, price, quality and taste expectations, can influence emotions, preferences, and predict future purchasing behaviour.[27,28] In particular, it has been shown that white generates

positive images of purity and happiness,[29] calm, peacefulness and gentleness.[30] Our research confirms that when associated with cigarettes, white also generates positive reactions which may attract young people to smoking (the cigarettes are considered more attractive, less dangerous etc.). As a consequence, it would be better for public health if unattractive, dark colours were used instead.

Fourth, the typography of warnings also influences individuals. This has been shown in contexts other than public health: uppercase letters are perceived to have more strength than lowercase letters.[31] That is why uppercase lettering is often used in specific situations where attention is particularly required, such as for emphasis, reminders and warnings.[32] As with the colour and format of the warnings, the typology of text-only warnings displayed on cigarettes is also important in order to amply its effect.

Despite encouraging results, there are several limitations to our study. This research is exploratory. An experimental study on a larger sample would be useful to highlight the most effective negative cues with a view to influencing perceptions and behaviours among young smokers (colour, pictograms, typology etc.). In addition, behavioural intentions were evaluated rather than real behaviours.

This study also points to further lines of research. One interesting question would be whether other cigarette colours or other pictograms displayed on sticks could generate more reactions of repulsion, and whether, beyond using uppercase letters, lettering styles (serif *vs.* sans serif typefaces, etc.) can influence persuasion. Moreover, it would be interesting to determine which type of on-cigarette warnings are more effective across different countries, as Anshari et al. demonstrates with pictorial tobacco health warnings.[33] Lastly, it would be interesting to analyse the effect of unattractive cigarettes tested in this research combined with plain packs of the same colour as the sticks and displaying graphic warnings and to explore if such a combination increases the impact of the different elements.

In spite of these limitations, our research presents innovative and more effective methods to combat tobacco use that can be useful for public health actors. In particular, it shows that by colouring the 'consumed' part of the cigarette (rather than leaving it white as with most branded cigarettes), participants felt they would be inhaling the negative connotations that the unattractive colour generated and would be smoking a more dangerous tobacco. Warnings displayed on cigarettes (especially the 'skull and crossbones' pictogram) appear to affect the perceived danger, damage the image of the smoker, and reduce the pleasure of smoking. The warning formats provoked different reactions: the symbol format ('skull and crossbones') generated more negative responses (e.g., hostility and fear) in comparison to the textual warning 'smoking kills'. The way in which the latter is written is also important: in uppercase, it was considered by respondents as more aggressive and more visible than in lowercase.

These findings suggest that the introduction of unattractive cigarettes should be considered by public health actors,[34] as it is being done in Canada.[35] Contrary to dissuasive and plain tobacco packs, it is worth noting that dissuasive cigarettes cannot be hidden while they are being smoked: they are seen by smokers and those around them. Thus, unattractive cigarettes are more visible than tobacco packs. This is particularly true in countries where cigarettes are sold individually (Africa, Latin America) and where packs are less visible to consumers.[36] In addition, dissuasive cigarettes seem useful for preventing young people from smoking as they affect image (as smokers bring the cigarette to their mouth). Previous research has shown that the reasons for starting tobacco consumption are image (in the eyes of other young people) and the need to increase self-confidence.[37] Breaking this positive image of the smoker by imposing dissuasive cigarettes could contribute to a reduction in tobacco consumption among

young people and dissuade them from taking it up. Moreover, our research highlights that regular cigarettes currently sold in many countries (white sticks with cork tips; slim white sticks and tips) mislead young people regarding their perceived danger: the Marlboro and Vogue cigarettes we tested were perceived as less dangerous and more attractive than the dissuasive cigarettes. These results call for stronger measures to regulate cigarette design. Some countries that have introduced plain packaging (UK, Norway, France, Australia, New-Zealand) have also limited the appearance of cigarette sticks by requiring them to be white only, with a tan or white filter tip. The cigarette paper cannot contain any markings other than the brand variant name (for the first three countries) or an alphanumeric code (for the last two). Our research underlines that such regulations are not sufficient, because these sticks are misleading and still attractive for young people. Countries should go further and propose unattractive colours and on-stick warnings.

AUTHOR STATEMENTS

Ethical approval
The research design was approved by the Ethics Committee of the French National Cancer Institute.

Competing interests
None

Authors contribution
All authors participated to the conception and design of the study, participated to the acquisition of data, analysis and interpretation of data, participated to the analysis and interpretation of data, helped drafting the article or revising it critically for important intellectual content.
All authors have approved the final approval of the version to be submitted.

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Table 1: Sample profile

Participant number & code	Gender	Age	Smoking status	Occupation
1. A	Male	22	Daily smoker (manufactured cigarettes, around 10 per day)	Student (management)
2. B	Female	25	Occasional smoker (manufactured cigarettes)	Student (biology and management)
3. C	Male	17	Occasional smoker (roll-your-own (RYO) cigarettes)	Secondary school student
4. D	Male	17	Daily smoker (RYO cigarettes, 7-8 per day)	Secondary school student
5. E	Male	22	Daily smoker (RYO cigarettes, around 20 per day)	Student (cinema studies)
6. F	Male	24	Non-smoker (former smoker)	Technician
7. G	Female	22	Daily smoker (manufactured cigarettes, around 12 per day)	Student (radiology)
8. H	Male	20	Non-smoker (former smoker)	Student (English)
9. I	Female	24	Non-smoker	Temporary worker
10. J	Female	18	Daily smoker (RYO cigarettes, around 5 per day)	Secondary school student
11. K	Female	20	Non-smoker	Student (veterinary assistant)
12. L	Female	16	Non-smoker	Secondary school student
13. M	Male	16	Non-smoker	Secondary school student
14. N	Male	20	Occasional smoker (manufactured cigarettes)	Student (insurance)
15. O	Male	22	Non-smoker	Student (3D animation)
16. P	Female	24	Daily smoker (manufactured cigarettes, 3-10 per day)	Student (architecture)
17. Q	Female	16	Non-smoker	Secondary school student
18. R	Male	17	Daily smoker (RYO cigarettes, around 10 per day)	Secondary school student
19. S	Male	15	Non-smoker	Secondary school student
20. T	Female	25	Occasional smoker (manufactured	Student (biology)

			cigarettes)	
21. U	Male	20	Daily smoker (RYO cigarettes, around 14 per day)	Student (electrical engineering)
22. V	Male	17	Occasional smoker (manufactured cigarettes)	Student (management)
23. W	Female	23	Non-smoker	Student (biology and management)
24. X	Female	18	Occasional smoker (manufactured cigarettes)	Student (management)
25. Y	Female	17	Occasional smoker (manufactured cigarettes)	Student (management)
26. Z	Female	23	Daily smoker (manufactured cigarettes, around 4 per day)	Student (marketing and information technology)
27. A1	Female	24	Occasional smoker (manufactured cigarettes)	Student (web marketing)
28. B1	Male	21	Occasional smoker (manufactured cigarettes)	Student (computer science)
29. C1	Female	21	Occasional smoker (manufactured cigarettes)	Student (trade and negotiation)
30. D1	Male	24	Daily smoker (both cigarette types, around 10 per day)	Student (marketing and information technology)
31. E1	Male	23	Non-smoker	Student (biology and management)

Table 2: First set of cigarettes: current vs. different degrees of unattractive colours

Five 'regular' shaped sticks	Current stick (Marlboro)	
	Dark green/brown filter and white sticks	
	Dark green/brown fully coloured sticks	
Five slim sticks	Current stick (Vogue)	
	Dark green/brown filter and white sticks	
	Dark green/brown fully coloured sticks	

Table 3: Second set of cigarettes: current vs. unattractive colours and warnings

Nine 'regular' shaped sticks	Current stick (Marlboro)	
	Four dark green sticks displaying the warning 'Smoking kills' alone (in lowercase or uppercase) or in combination with a 'skull and crossbones' pictogram	
	Four dark brown sticks displaying the warning 'Smoking kills' alone (in lowercase or uppercase) or in combination with a 'skull and crossbones' pictogram	
Nine slim sticks	Current stick (Vogue)	
	Four slim dark green sticks displaying the warning 'Smoking kills' alone (in lowercase or uppercase) or in combination with a 'skull and crossbones' pictogram	
	Four slim dark brown sticks displaying the warning 'Smoking kills' alone (in lowercase or uppercase) or in combination with a 'skull and crossbones' pictogram	