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Tailoring fear appeals to lower-educated adolescents

The influence of modality and type of threat

Keywords: fear appeal, adolescents, peer pressure, message modality, socio-economic status

Research on smoking behavior suggests that less well-educated adolescents are most susceptible to taking up smoking. This paper reports on an experiment that investigates the effects of adapting fear appeals to this target group. Threats were manipulated in terms of content (long-term health versus short-term cosmetic effects) and form (image versus text). Results demonstrated that, for long-term health fear appeals, text was considered as easier, and was better understood and evaluated, than image. These results illustrate the advantage of using fear texts over fear images when targeting less well-educated adolescents and the importance of adapting anti-smoking advertisements to this group.

Introduction

Smoking kills or *Smoking causes deadly lung cancer* are some examples of mandatory warning texts that have been published on the packs of tobacco products. In previous years, many national governments have taken precautions to reduce the number of people who smoke, which include an increase of taxes on cigarettes, a ban on smoking advertising, and a mandatory inclusion of

warning labels on cigarette packs (WHO, 2009). Data on smoking shows that these measures bear fruit: for example, the percentage of the Dutch population that smokes decreased from 59% in 1970 to 28% in 2008 (Stivoro, 2009). Although this data is promising, socio-economic differences in smoking behavior did increase in the last decade (De Korte et al., 2010). This trend was most visible for youths aged between 15 to 24. Whilst smoking prevalence amongst more highly educated Dutch youth decreased between 1988 to 2008, smoking prevalence amongst less well-educated youth increased slightly (De Korte et al., p. 11).¹ Furthermore, more highly educated smokers (31.5%) than less well-educated smokers (23.5%) tried to quit smoking (De Korte et al., p. 12).

This data shows the need for a specific focus for anti-smoking campaigns on less well-educated adolescents (LEA). According to EU regulations, tobacco products are obliged to carry a label to warn smokers against the dangers of smoking (European Commission, n.d.). Recently, however, Dutch health organizations such as the Dutch Cancer Society and anti-smoking organization Stivoro argued for a doubling of the price of cigarette packs in the Netherlands, because anti-smoking measures were not very successful (“Prijns pakje sigarettten moet naar 10 euro”, 2011). This means that it is of great practical relevance to investigate how these anti-smoking warnings can be made as effective as possible. While

most empirical research on fear appeals focuses on either more highly educated youth (e.g., Das, De Wit, & Stroebe, 2003) or on a diversified audience (e.g., Slater, Karan, Rouner, & Walters, 2002; Smith & Stutts, 2003; Wong & Capella, 2009), little is known about the effectiveness of fear appeals on less well-educated adolescents. This study takes the design of fear appeals into account and investigates whether the effectiveness of fear appeals may increase if they are adapted to LEA.

In tailoring fear appeals to LEA, a distinction is made between the content and the form of the fear appeal. In terms of content, Smith and Stutts (2003) demonstrated a difference in the effectiveness of long-term health and short-term cosmetic fear appeals in anti-smoking ads. They found that fear appeals that focused on long-term health problems like lung cancer or strokes were more effective for females, while males were more susceptible to short-term fear appeals about cosmetic problems on which peers might comment negatively, such as bad breath or yellow teeth. Furthermore, the effectiveness of fear appeals may depend on other characteristics than gender. Previous research (e.g., Crone et al., 2003; De Vries, 1998) has shown that less well-educated youths are very susceptible to social pressure and peer influence in making the decision to start and continue to smoke. This paper thus proposes that this high sensitivity towards social and peer influences may increase the effectiveness of short-term cosmetic appeals, because they emphasize negative consequences of smoking that are directly visible and noticeable in social life.

In addition, adapting the form of fear appeals can be influential. In order to show a warning on a cigarette pack, it is possible to use two different modalities: text and image. The WHO (2009) recommends that for adolescents, warnings should be comprehensible to be effective. Verhoeven and Vermeer (2008) show a positive relation between socio-economic status and reading literacy, which may indicate that textual warnings are

less comprehensible and thus less effective for less well-educated than for more highly educated adolescents. In order to investigate these issues, this paper presents an experiment about the effectiveness of adapting both substance (short term cosmetic versus long term health) and style (image versus text) of fear appeals to less well-educated adolescent youths. Should health professionals adapt their health campaigns to LEA or can a one-size-fits-all approach suffice?

The effectiveness of fear appeals

One of the most often-used models to predict the effects of fear appeals is the Extended Parallel Processing Model (EPPM) (Witte, 1992, 1994). The EPPM proposes that the effectiveness of a fear appeal depends on two distinct processes: threat appraisal and coping appraisal. In the first process (threat appraisal), people who are exposed to a fear appeal should appraise the threat as severe and see themselves as susceptible to the danger the fear appeal warns against. Suppose that somebody is exposed to a fear appeal to warn against driver fatigue (e.g., driver fatigue can kill). According to the EPPM, for this fear appeal to work, recipients should first of all assess the threat (in this case, impending death) as highly undesirable. In addition, recipients should regard themselves as susceptible to the danger. If recipients were to believe that, in contrast to other people's, their driving skills were not impaired by fatigue, the fear appeal would not be effective. Only when an individual acknowledges both that the consequences of an impaired driving ability are highly undesirable and that his or her driving abilities are negatively influenced by fatigue, would it be possible for the fear appeal to be effective.

A second precondition for the effectiveness of the fear appeal is related to coping appraisal. Besides seeing a specific threat as severe, recipients should believe that they are able to combat the threat successfully.

This implies believing that a certain action is an effective counter-measure against the threat (the perceived response efficacy). In addition, they should believe that they are able to carry out the proposed measure successfully (self-efficacy) (Witte, 1992, 1994).

According to the EPPM, one of the factors that determines the effectiveness of fear appeals is the level of fear that is induced. Witte and Allen (2000) show that the threat needs to be strong enough for the fear appeal to produce a persuasive effect. Although the EPPM pre-supposes that this level of fear is determined by the threat's severity and the recipient's perceived susceptibility to the threat, it is unclear how or when recipients actually regard a certain threat to be severe. For instance, some cross-cultural research on fear appeals shows that different cultural orientations could cause different fear messages to be effective.

In a South African context, Jansen, Hoeken, Ehlers, and Van der Slik (2008) show a difference in the assessment of fear beliefs on the subject on HIV/Aids between Western- and African-oriented participants. South African adolescents with an African orientation were, for instance, more afraid of displeasing their ancestors and being rejected by their family than Western-oriented adolescents. In contrast, Western-oriented youths were more afraid that they would have to discuss sexual matters with medical personnel and that other people would not want to touch them (Jansen et al., 2008, p. 120). These examples demonstrate that people with different cultural orientations are scared by different types of threats. It may thus be possible that different fear appeals focusing on different threats may be effective for these two different groups.

In the US, Murray-Johnson et al. (2001) show that cultural orientation is an important predictor of the level of fear aroused by a fear appeal. They argue that people with an individualistic orientation experience more fear when they are exposed to fear appeals that threaten

them personally than fear appeals that threaten their family. In contrast, people with a collectivistic orientation experience more fear when exposed to appeals that threaten their family than appeals that threaten themselves. However, the general validity of Murray-Johnson et al.'s conclusion that the threats in fear appeals should be tailored to their target group was contested by Jansen, Van Baal, and Bouwmans (2006). In an experimental study, Jansen et al. failed to replicate Murray-Johnson et al.'s findings. Given these conflicting results, it is important to investigate further how and when tailoring of fear appeals to different target groups is effective.

Smith and Stutts (2003) present a distinction between different types of fears (long-term health and short-term cosmetic fear) which may be relevant to LEA. Long-term health appeals focus on negative consequences that a specific behavior can have on a person's health in the long run. For anti-smoking advertising, these long-term health consequences can include lung cancer, respiratory problems, and infertility. In contrast, short-term cosmetic fear appeals focus on issues that may not have a lasting impact on a person's health, but which may have a negative influence on their social status. Short-term cosmetic problems that are relevant for anti-smoking advertisements may include bad breath, yellow teeth, and smelly clothes.

Participants in the Smith and Stutts (2003) experiment responded differently to short-term cosmetic than to long-term health fear appeals. Their experiment showed that these differences were gender-related: long-term health fear appeals were more effective for females, whilst short-term cosmetic fear appeals were more effective for males. Timmers and Van der Wijst (2007) also suggest that short-term cosmetic fear appeals may be more effective amongst adolescents than amongst adults, because their adolescent respondents scored higher on fear beliefs related to short-term cosmetic threats than to long-term health threats. One explanation for this result

may be found in the susceptibility of adolescents to peer pressure.

In addition, De Vries (1995) demonstrated that peer pressure plays an important role in smoking behavior of adolescents with a lower socio-economic status (LES). LES participants in this study reported that they saw smoking as a way to meet new people, and associated more positive norms with smoking than participants with a higher socio-economic status (HES) did. In addition, LES adolescents claimed that they felt more social pressure to take up smoking, in particular from friends and peers, than HES adolescents did. Crone et al.'s (2003) intervention study among LEA provides additional empirical evidence for this claim, because they found that peer group pressure was an important factor in the onset of smoking in this group.

Based on these studies, it can be assumed that peer pressure may not only be influential in the onset of smoking, but that it can be an effective means for smoking prevention or cessation as well. Since LEA may be more susceptible to peer pressure than to health threats in the long run, it is expected that long-term health and short-term cosmetic fear appeals will generate different responses amongst this target group. This leads to our first hypothesis.

H1. Short-term cosmetic fear appeals (a) score more highly on perceived susceptibility and (b) are perceived as more significant than long-term health fear appeals among lower-educated adolescents.

Besides the specific content of a fear appeal (i.e., the focus on either short-term cosmetic or long-term health consequences), the way in which a fear appeal is presented may also evoke different responses. Academics interested in multimodality point towards the need for investigating how different modalities like text and image generate meaning (cf. Forceville & Urios-Aparisi, 2009). Many fear-appeal academics also acknowledge that fear

appeals can be presented both textually and visually, but they investigate the use of fear either in only one of the two modalities (e.g., Koval, Aubut, Pederson, O'Hegarty, and Chan, 2005; Moodie, MacKintosh, & Hammond, 2009) or in a combination of both (e.g., Kempf & Harmon, 2006; Slater et al., 2002).

Research on text and image comprehension suggests that choosing one of the two modalities could lead to different outcomes, because of the claim that information from these two modalities is processed differently (e.g., Chun & Plass, 1997; Schnotz, 2005). These authors suggest that textual information is typically processed in a set sequence: people read from the beginning of the text to its end. Images, in contrast, are processed differently. Chun and Plass (p. 64) argue that images "convey their information by means of a visuo-spatial structure (i.e., the spatial arrangements of the components of the picture), and thus represent the subject matter by employing an analogy based on common structural properties". Since these two modalities are processed differently, it is possible that the processing of information presented in one modality leads to different results than the processing of the same information in another modality.

This difference in text and image processing is particularly relevant because recent studies have found a positive relation between socio-economic status and reading literacy (cf. Verhoeven & Vermeer, 2008). These studies typically operationalize reading literacy by looking at the processing of written text. Since images may be processed differently from text (e.g., Chun & Plass, 1997; Schnotz, 2005), this may imply that presenting a specific threat in the form of text may lead to different results than presenting the same threat in the form of an image. It may be possible that LEA find it easier to process images than text.

Research on fear appeals has also found different effects on how fear text and fear images are appraised.

To assess the opinion of British adolescents on fear texts, Moodie et al. (2009) conducted a large-scale survey which found that most British adolescents thought fear text to be easy to understand and very believable. About one-third of participants even stated that the fear messages actually deterred them from having a cigarette in the month before the study was conducted. Moodie et al. (2009) thus concluded that fear text can be persuasive. In contrast, Koval et al. (2005) conducted a large-scale survey amongst Canadians in their early twenties to assess the impact of fear images. Their results showed that many Canadians thought that visual warnings might be an effective means to help youths to stop smoking. Vardavas, Connolly, Karamanolis, and Kafatos (2009) conducted a similar study in Greece and found that a large majority (i.e., > 95%) of participants thought that an advertisement with a fear image would be more effective in persuading their peers not to smoke than an advertisement with text only. From the results of these studies, it is clear that a fear appeal might work in both modalities, but not in which modality a fear appeal would be most effective.

The studies mentioned above only show a relationship between modality and an increase of fear. In order to infer causality and to state that a difference in modality causes an increase of fear, other experiments have been conducted. Many experiments that deal with the modality in which a fear appeal is presented contrast a fear appeal that uses one modality (i.e., text) with a fear appeal that uses both text and image to present a threat. In one such study, Jansen, Van den Berg, Buurman, and Smits (2006) showed that explicit visual warnings that depicted negative consequences for the body generally generated strong defensive tendencies in participants. In contrast, other studies (e.g., Gallopel-Morvan, Gabriel, LeGall-Ely, Rieunier, & Urien, 2011; Kempf & Harmon, 2006; O'Hegarty et al., 2006; Slater et al., 2002; Thrasher et al., 2007) demonstrated that fear appeals combining

both modalities were more effective than fear appeals that used text without images. However, these studies did not make it clear if this increase in effectiveness was caused purely by the visual domain or by an interplay of the textual and visual domains.

To address this controversy in the fear appeal literature, this study experimentally compares the way in which a fear text is understood to the way in which a fear image is understood. The fact that our target group of respondents might have fewer difficulties in understanding images than in understanding text, and that previous research has demonstrated that fear appeals with a fear image were considered to be better than fear appeals without a fear image, leads to the second hypothesis.

H2. An appeal with a fear image is (a) perceived as less complex, (b) better understood, and (c) evaluated more highly than an appeal with a fear text.

Finally, a number of studies have shown that the perceived complexity of a text is related to its evaluation: texts that were perceived as less complex were appreciated more (e.g., Van Enschot, Hoeken, & Van Mulken, 2010; Van Mulken, Van Enschot, & Hoeken, 2005). In order to test this hypothesis, a causal model should be used. The type of model we tested for is called a mediation model. In such a model, a predictor variable (in this case, message modality) has an indirect effect on an outcome variable: the predictor has an effect on the outcome variable (in this case, evaluation of the fear appeal) through an intervening variable (in this case, perceived complexity) (Hayes, 2009). This is a causal relationship: *because* an appeal with a fear image is perceived as less complex, this appeal will be liked better. This leads to our third hypothesis.

H3. The effect of modality of the threat on the evaluation of the fear appeal is mediated by its perceived complexity.

Method

Participants and design

120 participants were recruited at a Dutch VMBO school (i.e., the lowest level of secondary education in the Netherlands) from the Western part of the country. They were randomly and evenly distributed in a 2 x 2 between-subjects design (type of fear appeal: long-term health vs. short-term cosmetic) x (modality of the threat: fear text vs. fear image). The average age of respondents was 14.82 years ($SD=1.16$). A small majority of participants (56.7%) was male. Except for one participant, all participants had Dutch nationality. One third of participants (33.3%) reported smoking at least once a month. A majority of these participants (60%) even smoked on a daily basis. No differences were found between the experimental groups on gender, age, or smoking behavior (all $F_s < 1$), which shows that the groups were comparable in terms of demographic characteristics.

Materials

Four versions of an anti-smoking print advertisement from the fictitious *Dutch Health Organization* were created. In these advertisements, the efficacy message (cf. Witte, 1992, 1994) was kept constant in all versions of the fear appeal, because all participants saw the same message (“Live healthy and quit smoking!”).

In the long-term health fear appeal condition, participants were warned that smoking might cause respiratory problems. In the advertisements with a textual version, this warning was expressed as “smoking makes breathing more difficult”. In the visual version, participants saw an adult male in a hospital bed connected to a respirator. In the short-term cosmetic fear appeal condition, participants were warned that smoking might cause yellow teeth. In the version with a fear text, this warning was “smoking causes yellow teeth”. In the version with a fear

image, participants saw an adolescent male with yellow teeth. The materials can be found in Appendix A.

To assess whether the images in the advertisements indeed displayed the problems they were supposed to, a small, qualitative pre-test ($N=10$) was conducted. In this pre-test, participants were asked to describe the threat that was displayed in the images. Since 80% of participants reported the specific threat correctly, the images were considered fit for the experiment.

Measures

Participants were asked about their perceived susceptibility to the threat, the perceived severity of the threat, the perceived complexity of the advertisement, comprehension, and their evaluation of the advertisement. To measure participants’ perceived susceptibility to the dangers of smoking, six 5-point Likert-scale items (1 = totally disagree to 5 = totally agree) were presented in which the dangers of smoking were projected onto the participants – for example, “When I smoke, I can get respiratory problems” (cf. Ethier & Deaux, 1990; $\alpha=.73$). The perceived severity of the consequences of smoking was measured with six Likert-type items (1=totally disagree to 5=totally agree) such as “Smoking is addictive” (reverse-coded, $\alpha=.68$).

The perceived complexity of the advertisement was measured with two items (cf. Burgers, Van Mulken & Schellens, 2012). Using 5-point Likert-type scales ranging from 1=totally disagree to 5=totally agree, participants were asked to assess how clear and easy they found the advertisement to understand ($\alpha=.80$). Actual comprehension was measured by an open question which asked participants to paraphrase the main claim of the advertisement (cf. Burgers et al., 2012). The advertisement was considered to be understood if participants mentioned that it wanted them to quit smoking or when they mentioned the specific threat in the advertisement.

Finally, participants were asked to evaluate the advertisement by giving a grade from 1-10 (with 10 as the highest grade). This is the common method of grading in the Dutch school system and was thus considered an appropriate way to assess participants' evaluation of the advertisement.

Procedure

The experiment was conducted in class as a paper-and-pencil experiment. Participation consent from the responsible school authority was received. Additionally, two weeks before the experiment was conducted, the parents of potential participants were given a letter that included some basic information about the study and an information form for participation. This form gave parents the opportunity to object to their son or daughter taking part in the experiment. None of the parents objected.

In class, participants were randomly assigned to one of the four conditions. All four conditions were equally distributed within classes. In total, students came from six different classes (range = 13-27 students per class). A chi-square analysis shows that the four conditions were equally distributed among the six classes ($\chi^2(15)=1.052$, $p=1.00$). All materials were administered in Dutch. In

the questionnaire, participants first filled in some socio-demographic information. Thereafter, they were exposed to one of the four versions of the fear appeal. Subsequently, they answered questions related to perceived susceptibility and severity, and perceived complexity, comprehension, and evaluation of the advertisement. Upon completion, participants were debriefed and thanked for their participation.

Results

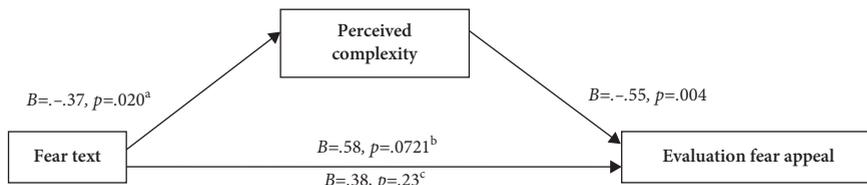
The first hypothesis was concerned with the influence of the type of fear appeal on perceived susceptibility and perceived severity. Table 1 shows the average scores and standard deviations of these variables per type of fear appeal by modality condition.

With regard to H₁, the type of fear appeal had no influence on perceived susceptibility or perceived severity (all $F_s < 1$). Modality also had no influence on perceived susceptibility ($F < 1$) or perceived severity ($F < 1$). The interaction between the type of fear appeal and modality was also non-significant for both perceived susceptibility ($F(1, 116)=1.89$, $p=.17$) and perceived severity ($F < 1$). This means that the first hypothesis should be rejected.

With regard to H₂, modality had no influence on comprehension ($F < 1$), but did have an influence on

Table 1. Means (and SDs) of perceived susceptibility (1 = low perceived susceptibility, 5 = high perceived susceptibility), perceived severity (1 = low perceived severity, 5 = high perceived severity), perceived complexity of the ad (1 = low perceived complexity, 5 = high perceived complexity), comprehension (0 = ad not understood, 1 = ad understood) and evaluation of the advertisement (1 = very negative evaluation, 10 = very positive evaluation), by condition.

	Short-term cosmetic		Long-term health	
	Fear text	Fear image	Fear text	Fear image
Perceived susceptibility	3.86 (.85)	4.08 (.69)	4.12 (.77)	3.94 (.86)
Perceived severity	2.14 (.64)	2.18 (.80)	2.21 (.87)	2.31 (.63)
Perceived complexity	4.03 (.83)	4.07 (.82)	3.62 (.52)	4.32 (1.10)
Comprehension	.83 (.38)	.93 (.25)	.97 (.18)	.80 (.41)
Evaluation	6.23 (1.43)	6.50 (1.70)	7.00 (1.29)	5.57 (2.29)



a = the *B*-value indicates the direction of the effect of, in this case, the fear text on perceived complexity. The negative denominator indicates a negative relation: the use of a fear text decreases the perceived complexity of the fear appeal (compared to a fear image).

b = indirect effect of message modality on evaluation of the fear appeal without perceived complexity as a mediator

c = indirect effect of message modality on evaluation of the fear appeal with perceived complexity as a mediator

Figure 1. Indirect effect analysis of perceived complexity as a mediator of the effect of message modality on evaluation of the fear appeal.

perceived complexity ($F(1,116)=5.68, p<.05, \eta_p^2=.05$) and a marginally significant influence on the evaluation of the ad ($F(1,116)=3.46, p=.065, \eta_p^2=.03$). Contrary to expectations, however, participants considered the fear text as less complex than the fear image and evaluated the fear text more highly than the fear image. The type of fear appeal had no influence on perceived complexity, comprehension, or evaluation of the ad (all $F_s < 1$). The interaction between the type of fear appeal and modality was significant for perceived complexity ($F(1,116)=4.69, p<.05, \eta_p^2=.04$), comprehension ($F(1,116)=5.24, p<.05, \eta_p^2=.05$), and evaluation of the ad ($F(1,116)=7.35, p<.01, \eta_p^2=.05$). Pairwise comparisons showed that, for short-term cosmetic fear appeals, no differences in perceived complexity ($p=.88$), comprehension ($p=.24$), or evaluation of the ad ($p=.51$) were observed between the fear text and fear image. For the long-term health fear appeal, however, the fear image was considered as more complex ($p<.01$), was less well understood ($p<.05$), and evaluated lower ($p<.01$) than the fear text. These results show that H2 should be rejected as well.²

The third hypothesis stated that perceived complexity mediated the effect of the modality of the fear appeal on the evaluation of the fear appeal. In other words, this hypothesis subsumes the hypothesis that the modality of the fear appeal has an effect on the outcome variable (in this case, the evaluation of the appeal) via an interven-

ing variable (in this case, perceived complexity). Such an effect is referred to as an indirect effect. In order to investigate this hypothesis, we used the method outlined by Preacher and Hayes (2008) and applied their procedure by using the SPSS macro to estimate the size of the indirect effect by generating a confidence interval. The confidence interval was set at 95%: if the 95% confidence interval does not include zero, it can be said with 95% certainty that an indirect effect exists. Our analysis indeed showed an indirect effect of perceived complexity (indirect effect = .200, 95% CI = .024, .594, 10,000 bootstrap samples). In turn, this means that the third hypothesis can be accepted.³

Conclusion and discussion

Conclusion and theoretical implications

This paper investigated the effectiveness of long-term health and short-term cosmetic fear appeals in both text and image on LEA. The first hypothesis was that short-term cosmetic fear appeals would score more highly on perceived susceptibility and be seen as having more impact than long-term health fear appeals among LEA. Results showed that this hypothesis should be rejected. The second hypothesis claimed that an appeal with a fear image would be perceived as less complex, and be better

understood and better evaluated, than an appeal with a fear text. Like the first hypothesis, the second hypothesis should be rejected.

Analyses showed that the modality of the fear appeal played an important role in participant responses. In general, fear texts were considered as less complex and were evaluated as better than fear images. The third hypothesis, which proposed that the effect of the modality on the evaluation of the ad would be mediated by its perceived complexity, was confirmed. This means that the perceived complexity of the fear appeal is an important predictor of the participant's attitude towards it. Because the EPPM makes the assumption that attitude change is an important outcome of fear appeals (cf. Witte, 1992) and that the attitude towards advertisements (in this case the fear appeal) is found to be an important predictor of intentions (cf. Brown & Stayman, 1992), this is an important result.

In contrast to the study of Smith and Stutts (2003), no main effects were found for the differences between long-term health and short term cosmetic fear appeals. However, a number of interactions between modality and the type of fear appeal were found: for long-term health fear appeals, the fear text was considered as less complex, better understood and more highly evaluated than the fear image. These results point towards a recommendation to use text rather than image to address LEA, if the threat is only presented in one modality. The strength of the text-plus-graphic labels found in earlier studies (Gallopel-Morvan et al., 2011; Kempf and Harmon, 2006; O'Hegarty et al., 2006; Slater et al., 2002) seems to come from the interplay between words and images rather than from the strength of the visual modality alone.

The effectiveness of the interplay between words and images in fear appeals can be explained by the concept of verbal anchoring, which is often used in advertising studies (cf. Forceville, 1996; Phillips, 2000).

These authors argue that images are often more open to different interpretation than words. This means that to ensure an image is understood correctly, it is necessary to include a directive headline that steers the advertisement's audience in the right direction. The studies of Gallopel-Morvan et al. (2011), Kempf and Harmon (2006), O'Hegarty et al. (2006), and Slater et al. (2002) did just that: their fear appeal included an image anchored by a verbal headline, whereas our stimulus material contained only an image without such a headline. Our results thus suggest that the inclusion of fear images may only be successful for LEA when they are accompanied by a directive verbal headline. Images may only serve to make a textual headline more comprehensible, rather than increasing comprehension on their own.

Practical implications

Demographic data on smoking shows that the number of people who smoke has decreased substantially over the last decades (Stivoro, 2009). However, socio-economic differences in smoking behavior have actually increased in this same period of time. This is particularly the case for adolescents. Slightly more adolescents from lower socio-economic backgrounds reported smoking in 2008 than in 1988. So whilst smoking behavior in general has declined over the last decades, smoking behavior amongst LEA has slightly increased (De Korte et al., 2010). This data implies that the reduction of smoking behavior amongst LEA presents one of the future challenges for anti-smoking campaigns. This study has some important practical implications in this respect.

Firstly, the interaction between the type of fear appeal and the modality in which the threat was presented was significant. This result may imply that LEA respond differently to different types of fear appeals. According to current EU regulations, tobacco products are obliged to carry a label that warns potential smokers about the

dangers of smoking. An inspection of the different types of warnings that are used (European Commission, n.d.) shows that all but one of these warnings are long-term health fear appeals, such as “smoking can cause a slow and painful death”. In order to increase the effectiveness of these warnings amongst LEA, it may be worthwhile to vary the type of claim and also include warnings that play into short-term cosmetic threats.

Our data also showed that LEA found it easier to understand a threat correctly when it was purely verbal rather than purely visual. Thus, even though adolescents use more visual media like computers than older people (cf. Huysmans & De Haan, 2010), this does not imply that they find it easy to understand images as stand-alone communications. Indeed, some have argued that schools should offer additional education in visual literacy because of the growing importance of pictures in our current society (Schönborn & Andersen, 2005). Until this has happened, practitioners who are thinking about developing an anti-smoking campaign for this target group may be well advised not to use purely visual information. If they do want to use images in an anti-smoking campaign, the effectiveness of the campaign may be increased if they also include a directive verbal headline.

Limitations and recommendations for future research

Some caveats about our findings should be noted. First of all, the study used self-report measures. These may have caused some of our students to give socially desirable answers. If possible, it may also be worthwhile to replicate the study with an online measure (e.g., reaction times or eye tracking) or a behavioral measure (such as actual smoking behavior) to see if a change in the fear appeals also influences processing strategies or actual smoking behavior.

This study also demonstrates that the claims of the

EPPM (Witte, 1992, 1994) can be made more specific by focusing on the textual characteristics of the threat. The type of fear appeal that is used and the modality in which the threat is presented may lead to different responses among participants. More insight into how these different types of fear appeals can generate different responses may help in predicting which fear appeals will or will probably not be effective. Future studies may, for instance, include other aspects of the threat, such as a direct comparison between text, images, and images anchored by verbal text, the directness of the threat, and the type of evidence that is presented in support of the threat. This may help health practitioners to tailor fear appeals effectively to their intended target group.

The EPPM (Witte, 1992, 1994) presupposes that, besides arousing a sufficient level of fear, an efficacy message is necessary for the effectiveness of a fear appeal. Since this study mainly focused on arousing fear in adolescents, future research may also focus on efficacy. It may be the case that the modality or the way in which an efficacy message is presented can also have an effect on a fear appeal's effectiveness. In addition, in future research, participants may also be selected according to their smoking status: a comparison between smokers and non-smokers may also elucidate some of the findings of this experiment.

In this paper, we investigated experimentally the effects of adapting fear appeals to less well-educated adolescents. More specifically, we manipulated different types of threats (long-term health versus short-term cosmetic) and threats in different modalities (image versus text). Our results demonstrated that, for long-term health fear appeals, the fear text was considered as easier, was better understood, and evaluated more positively than the image. These results point towards a recommendation to avoid purely visual threats when designing fear appeals aimed at less well-educated adolescents.

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Notes

1. De Korte et al. (2010) do not give specific figures, but plot these data in a longitudinal regression analysis for smoking behavior per year. This regression analysis shows a B that is slightly higher than 1 (1.01) for lower-educated adolescents which indicates that smoking behavior has slightly increased for this target group. For higher-educated adolescents, De Korte et al. (2010) report a B that is slightly lower than 1 (0.99) which indicates that smoking behavior has slightly decreased for this target group (see De Korte et al., 2010, p. 31, Table 6).

2. Since various studies (e.g., Jansen, Van den Berg et al., 2006) show that smoking behavior is also an important predictor for the effectiveness of anti-smoking fear appeals, we also ran the analyses for a second time with smoking behavior included. These analyses show that smoking behavior had an influence on perceived susceptibility ($F(1,115)=4.24, p<.05, \eta_p^2=.04$) and perceived severity ($F(1,115)=84.36, p<.001, \eta_p^2=.42$). Results indicate that non-smokers ($M=4.15, SD=.74$) thought themselves to be more susceptible for the dangers mentioned in the fear appeal than smokers did ($M=3.83, SD=.79$), whilst smokers ($M=2.71, SD=.70$) judged the threat to be more severe than non-smokers did ($M=1.77, SD=.42$). No influence of smoking behavior was found for comprehension ($F<1$), perceived complexity ($F(1,115)=1.49, p=.22$) and evaluation of the fear appeal ($F(1,115)=1.68, p=.20$).

3. According to the well-known logic of Baron and Kenny (1986), mediation can only occur when the independent variable has a direct effect on the dependent variable. In the current experiment, the independent variable has a marginally significant effect on the dependent variable. However, Hayes (2009) has recently argued against this assumption of mediation analysis in the classical Baron and Kenny way. Instead, Hayes states that mediation can also be found in the absence of a direct effect of the independent on the dependent variable (see Hayes, pp. 413-415 and references therein). To distinguish between the classical mediation analysis advocated by Baron and Kenny and this

type of mediation analysis, the term "indirect effect" is used to describe the effect of the independent variable x as the mediator on the dependent variable.

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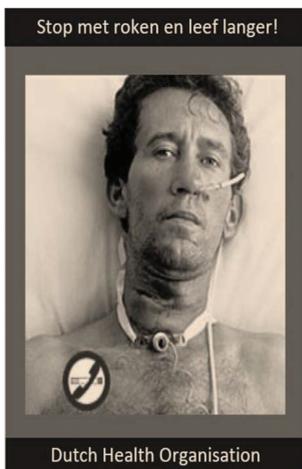
Appendix A - Materials used in this study



A. Long-term health fear appeal text: “smoking causes asthma”*



B. Short-term cosmetic fear appeal text: “smoking causes yellow teeth”*



C. Long-term health fear appeal image: picture shows male figure on breathing aid*



D. Short-term cosmetic fear appeal image: picture shows male figure with yellow teeth*

* The efficacy message was kept constant in the different versions of the material and can be translated as “Live healthy and quit smoking!”.

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