

CHAPTER 6

The scarier, the better?

Effects of adding images to verbal warnings on cigarette packages

Carel Jansen, Mariet van den Berg, Chèr Buurman
and Martine Smits

Radboud University Nijmegen

An experiment with 214 participants compared the effects of existing verbal anti-smoking warnings with new photo warnings on tobacco packaging as proposed by the EU. A distinction was made between photos showing the harmful effects of smoking on the body in highly explicit fashion and photos doing so indirectly and metaphorically. In smokers, the new warnings did not increase their expectation that they would change their smoking behavior, but smokers indicated that they would shield themselves more actively from the warnings when these incorporate fear-evoking photos. In non-smokers, the new warnings did increase their expectation that they would not start smoking, but they too show an even stronger tendency to display conscious defensive behavior against the EU-proposed visual warnings. These effects are mainly due to confrontation with visual warning versions that explicitly depict smoking-induced damage to the body.

Keywords: images, tobacco packages, warnings, fear appeals

Background

On 22 October 2004, David Byrne, the European Commissioner for Health and Consumer Protection, held a press conference to launch his plans for enhancing the effectiveness of health warnings on cigarette packages and other tobacco products. It was his intention, he explained, to add images that underscore the severity of the risks involved in smoking to the warning labels that have been mandatory on tobacco product packaging for several years now in as many EU countries as possible. The pictures the European Union intends

to have printed on cigarette packages are highly graphic. To quote Byrne's own words at the press conference:

People need to be shocked out of their complacency about tobacco. I make no apology for the pictures we are using. The true face of smoking is disease, death and horror – not the glamour and sophistication the pushers in the tobacco industry try to portray. The EU must hammer home this message to young people in its media campaign and to smokers via their cigarette packs. (press release distributed throughout the European Union on 22 October 2004)

To illustrate the sort of images and labels he was alluding to, Byrne referred to a database with concrete proposals available on the Internet.¹ The proposed new health warnings have been made available in all official languages spoken in Europe. What is especially striking on this web site, however, is that the images fall into two specific categories. On the one hand, there are highly explicit pictures of the physical damage incurred by smoking, such as a photograph of a tumor-infested throat. On the other, there are pictures that point to the hazards involved in smoking indirectly and metaphorically, such as a photograph of a young woman with an empty baby carriage.

The information supplied by Brussels so far has failed to make clear what kind of research has preceded the launch of this new approach to health warnings on cigarette packages. The press release states that “the Commission's database has been created by a communications agency and the images in it pre-tested in focus groups across the 25 EU Member States” but fails to elucidate how these tests were designed and implemented, on what theoretical model they were based, and what their outcomes were. There is just a brief reference – without acknowledging its source – to Canada, where “experience [with] picture warnings [that] have been used for several years suggests that they can help reduce smoking.”

Literature review

This would seem to be an insubstantial foundation for a measure that is to be implemented on such a wide scale, all the more so if we take into consideration the observations health psychology researchers have been making for years now on the matter of intensifying health warnings on cigarette packages. For instance, Kok and Ruiter – both from Maastricht University – wrote in the 12 December 2002 edition of the Dutch newspaper *NRC Handelsblad* that em-

phasizing the negative consequences of smoking is the worst possible way of inducing people to quit smoking and that mentioning quitlines and web sites supporting those who choose to stop smoking is much more effective. Kok and Rutter, therefore, advised policymakers “to discontinue displaying those scary labels [...]” Das and Fennis (2004) recently offered empirical support for Kok and Rutter’s proposition that, for health warnings on cigarette packages to be successful, receivers of the information should not just be frightened but should be presented with explicit on-pack behavioral guidelines that might be effective from the receivers’ point of view.

The theoretical framework used by Das and Fennis in their research is that of fear appeal models. These do indeed offer the kind of hold needed to grasp possibly relevant variables in the processing and the ultimate effect of fear-evoking health warnings, like those on cigarette packages. Das and Fennis have actually done something remarkable, for, curiously enough, international research into the effects of anti-smoking warnings on cigarette packages is not always founded on explicit theoretical models. After presenting an extensive literature survey of empirical studies on the effects of warning labels on cigarette packages, Strahan, White, Fong, Fabrigar, Zanna, and Cameron (2002) arrive at the following somewhat disconcerting conclusion: “We did not find any articles that cast their findings in terms of [...] social psychological principles.” Nevertheless, social psychological research does provide, as Strahan et al. (2002) show, such principles and underlying theories and models. Drawing on research into fear appeal messages would then be the most obvious course to take here.

An influential fear appeal model is Witte’s Extended Parallel Process Model (EPPM) (see, for example, Witte 1998; Witte & Allen 2000; Murray-Johnson, Witte, Liu, Hubbell, & Morrison 2001). According to the EPPM, fear appeal messages increase the likelihood of receivers displaying the recommended behavior if several preconditions have been met. Firstly, receivers should experience true fear. They will do so if both the perceived severity of the threat and their perceived susceptibility to this threat are great enough. If the receivers are not frightened enough, fear appeal messages have no effect according to the EPPM. Receivers will then disregard the message and fail to take the proposed measure into consideration. If the receivers are frightened enough, there are two possibilities. If the perceived effectiveness of the proposed measure (perceived response efficacy) and their perceived self-efficacy are great enough, the frightened receivers will start making attempts to avert the threatening danger (danger control mode), which is exactly what the sender of the fear appeal message was hoping to achieve. However, if the perceived self-efficacy and the

perceived response efficacy are inadequate, the frightened receivers will attempt to subdue their feelings of fear without fighting the danger (fear control mode). In this case, they will not start defending themselves against the danger but against the feelings of fear that have been aroused, and they will make a conscious and active effort to shield themselves from the communication that brought about these feelings of fear (defensive avoidance).

To our knowledge, there is only one study comparing the effect of visual warnings on cigarette packages with the effect of verbal warnings: Searle, Hoek, and Maubach (2004).² Searle et al. (2004) presented 300 participants from New Zealand between ages 18–23 (150 smokers and 150 non-smokers) each two out of six cigarette packages with different warnings, deriving from anti-smoking campaigns in the US and Canada. In five cases, these were combined photo and label warnings, such as a badly stained set of teeth with the question “Fancy kissing this?” or a limp cigarette with the statement “Hard men don’t smoke.” The sixth case presented a label-only warning (“Smoking kills”), which, incidentally, had not been used in any of the other five warnings.

As the statistical analysis in Searle et al. (2004) is not advanced and because they did not use a theoretical model allowing appropriate interpretation of the data, this study barely allows us to draw firm conclusions on differences in efficacy among the six warnings. The fact that the text of the only purely verbal warning was not also used in conjunction with an image makes it even harder to assess the added value of images on the basis of this study. However, the mean scores on the five-point scales that were used for participants to indicate how frightening they found the warnings and – especially for the smokers – how encouraged they felt to quit, suggest that the warning with the picture of the badly stained teeth showed the best results (on the frightening scale, rated 3.7 and on the encouraging to quit scale, rated: 3.2). The purely verbal warning scored considerably lower³ (frightening: 2.35; encouraging to quit: 2.20). The limp cigarette, which was only presented to male participants, was even less successful (frightening: 1.95; encouraging to quit: 2.0). In their conclusions, Searle et al. (2004) state that “not all images functioned as hypothesised” and that “further research is required to clarify smokers’ perception of these images.” In the experiment described below, we tried to answer this call.

Research questions

The aim of our study was to gain a better understanding of the effects of combining the purely verbal warnings on cigarette packages with images, as

proposed by the European Union. More particularly, we were interested in their effects on a number of variables which, according to the Extended Parallel Process Model, are relevant in determining behavior and which might be influenced by adding images that address the following: perceived severity, perceived susceptibility, and fear, and the behavioral intentions in danger control mode and in fear control mode. We distinguished between two types of warnings: warnings in which the images show the harmful effects of smoking on the body in a highly explicit fashion, as in the badly stained teeth (in line with the EU proposal); and warnings in which the images refer to the harmful effects of smoking in an indirect, metaphorical way, as in the limp cigarette as a metaphor for impending impotence. Our research questions were the following:





1. Are there any differences in effect between purely verbal anti-smoking warnings and the same anti-smoking warnings combined with images, as proposed by the EU, with regard to perceived severity, perceived susceptibility, fear, in danger control mode, and in fear control mode?
2. Do any possible differences in effect occur both when explicit images are combined with verbal anti-smoking warnings and when metaphorical images are combined with these warnings?

Method

Materials

The EU database with anti-smoking warnings (see Note 1) comprises 42 proposed designs, all verbal warnings in current use, now illustrated with photographs. We selected four proposed designs from this database. Two of these represented explicit images: a tumor-infested throat (warning 1) and a badly stained set of teeth (warning 2). The other two images were metaphorical: a female with an empty baby carriage (warning 3) and a limp cigarette (warning 4). We prepared two same-size (8 cm wide and 6.5 cm high) versions of each of these four warnings: a verbal version, conforming to current practice on cigarette packages in content and style, including the standard black frame; and a visual version, comprising the color photograph as found on the Web site, including the label from the words version of the warning. See Table 1.

Table 1. The anti-smoking warnings investigated in this study

| | | Verbal version | Visual version |
|-----------------------------------|-------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Visual Version Explicit | Warning 1: Tumor-infested throat | Smoking can cause a slow and painful death |  |
| | Warning 2: Badly stained set of teeth | Smoke contains benzene, nitrosamines, formaldehyde and hydrogen cyanide |  |
| Visual Version Metaphorical | Warning 3: Woman with empty baby carriage | Smoking can damage the sperm and decreases fertility |  |
| | Warning 4: Limp cigarette | Smoking may reduce the blood flow and causes impotence |  |

Design and participants

Each participant was presented either with the verbal versions of the four warnings only or with the visual versions of the same warnings only. Versions were randomly distributed over the participants (verbal: N = 102; visual: N = 112). The sequence in which participants were confronted with the four warnings was systematically alternated to avoid sequencing effects. There were 214 par-

participants: 93 men and 120 women (missing value: 1); 97 participants were from the Netherlands, 111 were from Flanders, and 2 from elsewhere (missing values: 4); 64 smokers and 149 non-smokers (missing value: 1). Participants' mean age was 21.3 years ($SD = 6.5$). Most participants were students from Nijmegen (92) or from Antwerp (111). Occupations of the remaining participants (11) ranged from secondary education to retirement.

Questionnaire

The first four pages of the questionnaire consisted of a warning (text always in Dutch), followed by eleven questions, also in Dutch, that were the same for all warnings. The first five questions required responses on a five-point semantic differential scale, and the remaining six questions were to be answered on a five-point Likert scale.

The first three questions concerned the perceived severity of the health warnings: "I find the health warning above serious – not serious, scary – not scary, frightening – not frightening." For all warnings collectively, Cronbach's α was .86, and for the separate warnings: warning 1 $\alpha = .79$; warning 2 $\alpha = .90$; warning 3 $\alpha = .86$; warning 4 $\alpha = .97$.

The next two questions concerned the fear variables: "This health warning makes me anxious – not anxious, frightened – not frightened." For all warnings collectively Cronbach's α was .95 here, and for the separate warnings: warning 1 $\alpha = .89$; warning 2 $\alpha = .96$; warning 3 $\alpha = .95$; warning 4 $\alpha = .93$.

This was followed by a question on perceived susceptibility: "There is a considerable likelihood that what I'm being warned against here will happen to me. Strongly agree – Strongly disagree." Two subsequent questions then verified whether the participant expected to get into danger control mode in consequence of the warnings concerned: "Due to this warning, I would cut down / not start smoking. Strongly agree – Strongly disagree" and "My smoking behavior will be influenced by this health warning. Strongly agree – Strongly disagree." For all health warnings collectively, Cronbach's α was .85 here, and for the separate warnings: warning 1 $\alpha = .81$; warning 2 $\alpha = .76$; warning 3 $\alpha = .76$; warning 4 $\alpha = .77$.

Finally, three questions verified whether the participant expected to get into fear control mode in consequence of the health warning concerned: "I prefer to buy cigarette packages without this health warning. Strongly agree – Strongly disagree"; "I would prefer to put this cigarette package in a package cover. Strongly agree – Strongly disagree"; and "I would be ashamed to be carrying this package around. Strongly agree – Strongly disagree." For all health

warnings collectively, Cronbach's α was .81 here, and for the separate warnings: warning 1 $\alpha = .80$; warning 2 $\alpha = .83$; warning 3 $\alpha = .80$; warning 4 $\alpha = .76$.

For the sake of the accessibility of the results section, all answer scales were renumbered: not serious, not scary, strongly disagree were consistently given the lowest value, and serious, scary, strongly agree were consistently given the highest value. The questionnaire concluded⁴ with some questions about demographics, such as age, sex, nationality, and native language. Participants were also asked about their smoking behavior.

Procedure

Most participants (201) viewed the warnings and completed the questionnaire during a lecture at the University of Antwerp or at the Radboud University Nijmegen. The remaining participants (11) did so in their home environments. Participants were informed that this was a research project of the Professional Communication program at the Radboud University Nijmegen, dealing with health warnings on cigarette packages. Participants were requested to answer questions for themselves only and page by page. They were not offered any prospective rewards.

Results

To answer the research questions, a series of univariate analyses of variance were performed, each time using warning version and smoking behavior as independent variables, and perceived severity, fear, perceived susceptibility, danger control mode, and fear control mode as dependent variables. Analyses of variance were first performed for the four warnings collectively, and then for the explicit and metaphorical warnings separately. The statistical power of the F tests was consistently .74 at medium effect size ($f = .25$) and $>.99$ at large effect size ($f = .40$) at $\alpha = .05$ (Cohen 1977:312).

Table 2 shows that in all four warnings collectively, presentation of the various versions (visual versus verbal) resulted in a number of statistically significant main effects. Presentation of the visual warnings led to an increased perception that these concerned a serious danger (perceived severity), to a decreased perception that participants were susceptible to this danger (perceived susceptibility), to a stronger tendency to let their smoking behavior be influenced in the desired direction (danger control mode), and also to a stronger tendency to make a conscious effort to shield themselves from the

Table 2. Main and interaction effects of warning versions and smoking behavior: all warnings

| | main effect version: visual (N = 112) versus verbal (N = 101) | main effect smoking behavior: smokers (N = 64) versus non-smokers (N = 149) | interaction effect: version × smoking behavior |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|
| <i>perceived severity</i> | visual: M = 3.60, SD = .78 verbal: M = 3.31, SD = .70 F(1,212) = 5.44 p = .021; $\eta^2 = .02$ | smokers: M = 3.23, SD = .77 non-smokers: M = 3.56, SD = .73 F(1,209) = 10.24 p = .002; $\eta^2 = .047$ | F(1,209) = 1.63 n.s. |
| <i>perceived susceptibility</i> | visual: M = 2.14, SD = 1.02 verbal: M = 2.39, SD = 1.15 F(1,209) = 4.33 p = .039; $\eta^2 = .02$ | smokers: M = 2.80, SD = .98 non-smokers: M = 2.02, SD = 1.05 F(1,209) = 28.17 p < .001; $\eta^2 = .12$ | F(1,209) = .073 n.s. |
| <i>fear</i> | visual: M = 2.68, SD = .94 verbal: M = 2.59, SD = .87 F(1,209) = .20 n.s. | smokers: M = 2.45, SD = .84 non-smokers: M = 2.72, SD = .92 F(1,209) = 3.61 n.s. | F(1,209) = .79 n.s. |
| <i>danger control mode</i> | visual: M = 2.97, SD = 1.08 verbal: M = 2.62, SD = .96 F(1,209) = 6.61 p = .011; $\eta^2 = .03$ | smokers: M = 2.39, SD = 1.01 non-smokers: M = 2.98, SD = 1.00 F(1,209) = 17.81 p < .001; $\eta^2 = .08$ | F(1,209) = .35 n.s. |
| <i>fear control mode</i> | visual: M = 2.86, SD = .99 verbal: M = 2.25, SD = .88 F(1,209) = 20.50 p < .001; $\eta^2 = .09$ | smokers: M = 2.38, SD = .99 non-smokers: M = 2.65, SD = .98 F(1,209) = 5.88 p = .016; $\eta^2 = .03$ | F(1,209) = .02 n.s. |

n.s. not significant ($\alpha = .05$)

anti-smoking warnings (fear control mode). No significant main effect, however, of warning on fear arousal was found. See Table 2.

As is shown in Table 3, similar main effects of warning version as presented in Table 2 were manifest when the analysis was restricted to just those two warnings that explicitly showed the damage smoking can do to the body (the tumor-infested throat and the badly stained set of teeth). In this case, there was also a significant main effect of the variable fear in the desired direction: the explicit visual warnings turned out to arouse more fear than their verbal counterparts.

When the analysis was restricted to just those two warnings whose images represented the harmful effects of smoking in an indirect, metaphorical way (the woman with the empty baby carriage and the limp cigarette), only two main effects remained, which, strikingly enough, were both in the direction not desired by the champions of visual versions. The metaphorical visual warnings turned out to lead to a decreased perception that these concerned a serious danger and to less fear than the verbal versions of the same warnings. See Table 4.

As shown in Tables 2, 3 and 4, the influence of smoking behavior proved to be consistent. Compared to the non-smokers, the smokers rated the threatening dangers as less serious, considered themselves more susceptible, were less frightened in the case of the explicit warnings, were less inclined to let their smoking behavior be influenced in the desired direction, and were less disposed to make a conscious effort to shield themselves from the anti-smoking warnings on the cigarette packages. In none of the analyses, interaction effects of warning version and smoking behavior were found.

To get a more accurate grasp of the differences in behavioral intentions induced by the visual and verbal versions, t-tests (two-tailed; $\alpha = .05$) were performed for the smokers and non-smokers groups separately with warning version as independent variable, for those cases in which the analyses of variance had shown significant effects for the dependent variables danger control mode and fear control mode. In smoker comparisons, the statistical power of the t-tests was .78 at medium to large effect size ($d = .70$) and .88 at large effect size ($d = .80$). In non-smoker comparisons, the statistical power was .85 at medium effect size ($d = .50$) and $>.99$ at large effect size ($d = .80$) (Cohen 1977:36–37). The results of the t-tests are presented in Table 5.

The dependent variables in Table 5 are those variables that are most relevant for the purposes of a health campaign: the degree to which smokers and non-smokers expected that their future smoking behavior would be influenced in the desired direction by the warnings (or: get into danger control mode) and

Table 3. Main and interaction effects of warning versions and smoking behavior: warnings 1 and 2 (explicit visual versions)

| | main effect version: visual (N = 112) versus verbal (N = 101) | main effect smoking behavior: smokers (N = 64) versus non-smokers (N = 149) | interaction effect: version × smoking behavior |
|---------------------------------|------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|
| <i>perceived severity</i> | visual: M = 4.27, SD = .78 verbal: M = 3.06, SD = .76 F(1,209) = 104.18 p < .001; $\eta^2 = .33$ | smokers: M = 3.56, SD = 1.01 non-smokers: M = 3.75, SD = .96 F(1,209) = 7.31; p = .007; $\eta^2 = .03$ | F(1,209) = 2.30 n.s. |
| <i>perceived susceptibility</i> | visual: M = 2.15, SD = 1.20 verbal: M = 2.44, SD = 1.21 F(1,209) = 4.59 p = .033; $\eta^2 = .02$ | smokers: M = 2.80, SD = 1.04 non-smokers: M = 2.06, SD = 1.21 F(1,209) = 20.04 p < .001; $\eta^2 = .09$ | F(1,209) = .003 n.s. |
| <i>fear</i> | visual: M = 3.09, SD = 1.20 verbal: M = 2.42, SD = 0.92 F(1,209) = 14.14 p < .001; $\eta^2 = .06$ | smokers: M = 2.55, SD = 1.03 non-smokers: M = 2.87 SD = 1.15 F(1,209) = 5.03 p = .026; $\eta^2 = .02$ | F(1,209) = 2.48 n.s. |
| <i>danger control mode</i> | visual: M = 3.18, SD = 1.25 verbal: M = 2.45, SD = .95 F(1,209) = 18.02 p < .001; $\eta^2 = .08$ | smokers: M = 2.42, SD = 1.10 non-smokers: M = 3.02, SD = 1.16 F(1,209) = 15.98 p < .001; $\eta^2 = .07$ | F(1,209) = 2.59 n.s. |
| <i>fear control mode</i> | visual: M = 3.25, SD = 1.13 verbal: M = 2.15, SD = .88 F(1,209) = 49.24 p < .001; $\eta^2 = .19$ | smokers: M = 2.62, SD = 1.15 non-smokers: M = 2.78, SD = 1.17 F(1,209) = 3.09 n.s. | F(1,209) = .59 n.s. |

n.s. not significant ($\alpha = .05$)

Table 4. Main and interaction effects of warning versions and smoking behavior: warnings 3 and 4 (metaphorical visual versions)

| | main effect version: visual (N = 112) versus verbal (N = 101) | main effect smoking behavior: smokers (N = 64) versus non-smokers (N = 149) | <i>interaction effect: version × smoking behavior</i> |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|
| <i>perceived severity</i> | visual: M = 2.92, SD = 1.05 verbal: M = 3.58, SD = .87 F(1,209) = 20.54 p<.001; $\eta^2 = .09$ | smokers: M = 2.89, SD = 1.01 non-smokers: M = 3.38, SD = .99 F(1,209) = 7.52 P = .007; $\eta^2 = .03$ | F(1,209) = .56 n.s. |
| <i>perceived susceptibility</i> | visual: M = 2.12, SD = 1.05 verbal: M = 2.34, SD = 1.29 F(1,209) = 2.58 n.s. | smokers: M = 2.81, SD = 1.12 non-smokers: M = 1.97, SD = 1.10 F(1,209) = 26.33 p<.001; $\eta^2 = .11$ | F(1,209) = .31 n.s. |
| <i>fear</i> | visual: M = 2.26, SD = .92 verbal: M = 2.77, SD = 1.05 F(1,209) = 10.49 P = .001; $\eta^2 = .05$ | smokers: M = 2.35, SD = 1.01 non-smokers: M = 2.57, SD = 1.01 F(1,209) = 1.13 n.s. | F(1,209) = .005 n.s. |
| <i>danger control mode</i> | visual: M = 2.77, SD = 1.11 verbal: M = 2.78, SD = 1.16 F(1,209) = .21 n.s. | smokers: M = 2.36, SD = 1.11 non-smokers: M = 2.95, SD = 1.12 F(1,209) = 12.89 p<.001; $\eta^2 = .06$ | F(1,209) = .25 n.s. |
| <i>fear control mode</i> | visual: M = 2.47, SD = 1.09 verbal: M = 2.35, SD = 1.01 F(1,209) = 1.50 n.s. | smokers: M = 2.15, SD = 1.01 non-smokers: M = 2.53, SD = 1.05 F(1,209) = 6.84 P = 0.10; $\eta^2 = .03$ | F(1,209) = .27 n.s. |

n.s. not significant ($\alpha = .05$)

Table 5. Mean scores (on five-point scales) for effects of warning variety (visual versus verbal) on behavioral intentions of smokers and non-smokers

| | all warnings smokers | non-smokers | visual versions explicit smokers | non-smokers |
|----------------------------|--------------------------------|--------------------------------|-------------------------------------|--------------------------------|
| <i>danger control mode</i> | visual: M = 2.51, SD = 1.06 | visual: M = 3.23, SD = 1.01 | visual: M = 2.59, SD = 1.23 | visual: M = 3.50, SD = 1.15 |
| | verbal: M = 2.21, SD = 0.91 | verbal: M = 2.75, SD = 0.94 | verbal: M = 2.16, SD = 0.79 | verbal: M = 2.55, SD = 0.98 |
| | t(62) = 1.15 | t(147) = 2.96 | t(62) = 1.70 | t(147) = 5.45 |
| | n.s. | p = .004; $\eta^2 = .06$ | n.s. | p < .001; $\eta^2 = .17$ |
| <i>fear control mode</i> | visual: M = 2.63, SD = 0.99 | visual: M = 2.99, SD = 0.97 | visual: M = 3.00, SD = 1.13 | visual: M = 3.39, SD = 1.12 |
| | verbal: M = 2.01, SD = 0.88 | verbal: M = 2.33, SD = 0.87 | verbal: M = 2.03, SD = 0.92 | verbal: M = 2.19, SD = 0.87 |
| | t(62) = 2.57 | t(147) = 4.35 | t(62) = 3.590; | t(147) = 7.33 |
| | p = .013; $\eta^2 = .10$ | p < .001; $\eta^2 = .11$ | p = .001; $\eta^2 = .13$ | p < .001; $\eta^2 = .27$ |

n.s. not significant ($\alpha = .05$)

the degree to which, after seeing the warnings, they expected they would make a conscious effort to shield themselves from such warnings in the future (or: get into fear control mode).

For the smokers, there appeared to be no significant effects of adding visual to verbal warnings on cigarette packages, as intended by the EU. Only the non-smokers would be significantly more influenced by the visual than by the verbal versions in the direction desired by the EU, though this effect was not found when metaphorical images were used in these visual versions (see Table 4).

Both for smokers and non-smokers, Table 5 shows significant effects on their expectation that they would henceforth make a conscious effort to shield themselves from the warnings. The non-smokers' defensive responses to the added images were more negative here than those of the smokers. This increase in non-smokers' defensive responses is also more pronounced than the increase in positive effects in consequence of adding the images. Once again, no significant effects at all were found when metaphorical images were used in these visual versions.

The data presented so far do not provide any indication of the degree to which the two metaphorical warnings with the empty baby carriage, which mainly targets women, and the limp cigarette, which mainly targets were suc-

Table 6. Main and interaction effects of warning version and smoking behavior for warning 3, for women only

| warning 3 (woman with empty baby carriage); female participants only | | | |
|----------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|--------------------|
| | main effect version: visual (N = 60) versus verbal (N = 60) | main effect smoking behavior: smokers (N = 37) versus non-smokers (N = 83) | interaction effect |
| <i>danger control mode</i> | n.s. | n.s. | n.s. |
| <i>fear control mode</i> | visual: M = 2.72, SD = 1.11 verbal: M = 2.32, SD = 1.09 F(1,116) = 5.255; P = .024; $\eta^2 = .028$ | n.s. | n.s. |

n.s. not significant ($\alpha = .05$)

successful with these target groups separately. For either of the metaphorical warnings, therefore, analyses of variance were carried out for the most relevant target group only: for female participants exclusively (N = 120) in version 3 (woman with empty baby carriage), and for male participants exclusively (N = 93) in warning 4 (limp cigarette). The statistical power of the F-tests was now .87 (warning 3) and .77 (warning 4) at a large effect size ($f = .40$) and $\alpha = .05$ (Cohen 1977: 311). For the male participants no statistically significant effects were found of the version of the limp cigarette warning they were presented. For the female respondents, however, presentation of the visual version of the empty baby carriage warning did lead to an increased tendency to shield themselves from confrontation with this warning. However, the intended smoking behavior of women was not significantly influenced by the warning version they were presented. See Table 6.

The results presented in Table 6 justify the expectation that adding the picture of a woman with an empty baby carriage to the warning “Smoking can damage the sperm and decreases fertility” will only cause women to show a stronger tendency to shield themselves from this kind of health communication.

Discussion and conclusions

The aim of this study was to gain a better understanding of the effects of adding images to warnings on cigarette packages, as was proposed by the European Union late 2004. We distinguished between warnings in which the images show the harmful effects of smoking on the body in a highly explicit fashion and warnings in which the images refer to the harmful effects of smoking in an indirect, metaphorical way.

The results show that, with the exception of the variable of fear, adding pictures leads to significant effects on the dependent variables: increased perceived severity, increased danger control mode, and increased fear control mode, but also decreased perceived susceptibility. Further analysis demonstrates that the principal intended effect, that is, the effect on the behavioral intention of danger control mode, is found for the non-smokers only. They are the only ones to be significantly more influenced by the visual versions than by the verbal versions in the direction desired by the EU. Furthermore, adding the EU-advocated images proves to increase the behavioral intention of fear control mode in both smokers and non-smokers. In the non-smokers, this effect is distinctly stronger than the effect on danger control mode.

To put this in a nutshell: confronting smokers with the new warnings does not increase their willingness to cut down smoking, but they do expect they will more actively shield themselves from the warnings. For instance, people might slip the packages into pack covers more often. In the non-smokers, the new warnings do actually produce an increased expectation that they will not start smoking, but they also show a more pronounced tendency to display conscious defensive behaviors against this kind of communication.

The results also show that the differences in effectiveness we found only occurs if the anti-smoking warnings are combined with images that explicitly show the physical damage that may be incurred by smoking, such as a tumor-infested throat or badly stained teeth. In these types of warnings, the visual versions also prove to arouse more fear than their verbal counterparts.

However, if the current anti-smoking warnings are combined with images of a metaphorical nature, such as a woman with an empty baby carriage or a limp cigarette, they are only likely to produce an effect that is not desired by the EU. The metaphorical visual warnings lead to a decreased perception that they represent a serious danger. They also arouse less fear than the verbal versions of the same warnings. When the warning label "Smoking can damage the sperm and decreases fertility" is combined with the photograph of a woman with an empty baby carriage, this addition also causes women to

show a clearly increased tendency to shield themselves from this kind of health communication. However, this image has no effect on the intended smoking behavior of women.

On the basis of these findings, our advice to those national governments that will be making decisions based on European commissioner Byrne's proposals is that anti-smoking warnings on cigarette packages should not be combined with metaphorical images. If these kinds of visual warnings produce any intended behavioral change at all, they will not affect smoking behavior itself but merely cause increased defensive behaviors against the health communication concerned. Adding explicit images to the current label warnings on cigarette packages, however, is a viable option worth consideration. More attention, however, should be paid to susceptibility. Pretests should be carried out to find pictures that are not only perceived as a severe danger, but that also make people feel that what is depicted could happen to them when they start, or do not stop smoking.⁵

It may be rather disappointing for the advocates of the new warnings that the explicit warnings predominantly have a positive effect on the intended behavior of non-smokers and that no significant effects were found for smokers. For, as European commissioner Byrne declared, "the EU must hammer home this message [...] to smokers via their cigarette packs."

Another qualifying comment is warranted here: measures must be taken to prevent receivers from chiefly attempting to shield themselves from such warnings.⁶ Fear appeal theory, and the EPPM in particular, shows how this can be done. A practical measure should be proposed that is actually effective and practicable from the receivers' point of view (see also Das & Fennis 2004). Strahan et al. (2002) point to the advantages of the approach taken in Canada, where, in addition to fear-evoking warnings on the outside of cigarette packages, the inside also presents information on practical measures smokers can take to shed their addiction and avert the threatening dangers they have just been confronted with on the outside. These may be general messages aiming to improve perceived self-efficacy (of the type "You can quit smoking and reduce your risk of lung cancer") or messages encouraging smokers not to lose heart ("Smokers who quit tended to try a number of times before they succeeded, so keep trying!"). According to Strahan et al. (2002), however, it is also vital to include specific information that helps to enhance perceived response efficacy: advice for smokers who want to quit and references to quitlines and web sites offering practical support.

Adequate provisions should also be made to forestall wearout, the phenomenon well-known in advertising⁷ whereby overexposure to the same com-

municative message is characterized by a brief period of mounting impact of the message, followed by plummeting attention levels. In this context, one may think of printing varying, and frequently renewed visual warnings – both in terms of substance and style – on the exteriors of packages. The advisory messages on the interiors also require regular alternation and renewal. What other measures may help to prevent wearout of anti-smoking warnings deserves further investigation (see also Strahan et al. 2002). It is to be hoped that EU and the national governments will be undertaking such initiatives with due dispatch. The seriousness of the communication issues and, even more so, the health issues involved would warrant such expedition.

Acknowledgements

We would like to thank the participants in this research project and also prof. dr. Van Waes from the University of Antwerp, who kindly put us in touch with the Belgian participants. We are also grateful to the editors of this anthology, and to dr. Van Mulken and prof. dr. Hoeken from the Radboud University Nijmegen for their comments on a draft of this article.

A report in Dutch about this study was published in *Tijdschrift voor Communicatiewetenschap*, 33, 4 (2005).

Notes

1. See <http://europa.eu.int/comm/mediatheque/photo/select/tabac> and http://europa.eu.int/comm/health/ph_determinants/life_style/Tobacco/ev_20041022_en.htm
2. The effects of verbal warnings have been the subject of several studies (for an overview, see Mitchell 1999). There has also been a study into the effects of just the new warnings as these are currently being used in Canada (Hammond, Fong, McDonald, Cameron, Brown 2003). An experiment comparing the effects of warnings with and without images, however, has only been reported in Searle et al. (2004).
3. It remains unclear if this difference is statistically significant. No statistical tests are reported pertaining to the differences found between the responses to the six warnings.
4. Between the question pertaining to the four warnings and those about personal particulars, we inserted another question with 27 sub-items, a subset of Schwartz's (1992) value list, translated into Dutch. Its aim was to collect information on differences in value hierarchies in order for us to be able to establish relations between those value hierarchies and the participants' nationalities. In the present paper, this subject has been left out of consideration.

5. When deciding which pictures should be used, benefit may be gained from studies into the effects of various types of anti-smoking warnings, not on cigarette packs but in other media. Smith & Stutts (2003), for instance, exposed high school children to anti-smoking advertisements (television commercials, print advertisements and internet banner advertisements), over a five-month period. The effectiveness was tested of short term cosmetic versus long-term health fear appeals in preventing or reducing smoking. Short term cosmetic fear appeals (yellow teeth, for instance) turned out to be more effective for males, while long-term health fear appeals (lung cancer, for instance) proved to be more effective for females. As a possible explanation for the finding that females are more impressed by the long-term fear appeals, Smith and Stutts suggest that females are traditionally seen as the 'caregivers' in relationships and hence may be more influenced by health-related appeals. The outcome that males are more impressed by short term cosmetic appeals is explained by "some degree of role reversal among today's adolescents", making boys more afraid to be rejected based on their on their physical attractiveness (p. 172).

6. In November 2004, the Belgian Minister for Public Health Rudy Demotte announced that, in his country, the sale of fun boxes that hide on-pack warnings will be banned at the same time that the new photo warnings will be introduced (www.gezondheid.be, Federaal plan ter bestrijding van het tabaksgebruik). The effectiveness of this measure may be questioned, not only because in the EU it is easy to import all kinds of articles that are forbidden from other European countries where they are allowed, but even more because a more fruitful approach would be to change the warnings in such a way that the receivers of the messages go into *danger control mode* and not into *fear control mode* that urges them to hide the message on the tobacco package.

7. See Pechmann and Stewart (1988) and Stewart (1999).

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About the authors

Carel Jansen is professor of Business Communication at the Radboud University Nijmegen. Mariet van den Berg, Chèr Buurman, and Martine Smits are graduate students in the Master's Program in Business Communication at this university. The first author is corresponding author.

Contact: c.jansen@let.ru.nl

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