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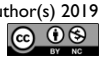

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The story against smoking: An exploratory study into the processing and perceived effectiveness of narrative visual smoking warnings

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Abstract

Objectives: This study compared the effects of two types of health warnings on cigarette packages: 'narrative visual warnings', showing an image portraying people plus a corresponding slogan that could evoke a story-like interpretation, and 'non-narrative visual warnings' with non-narrative content (i.e. body parts). Moreover, the mechanisms underlying the effects of these health warnings were explored.

Design: A within-participants experiment was conducted comparing narrative and non-narrative visual warnings. Path analyses were performed to investigate the relationship between the narrative concepts transportation and identification, the emotions evoked by the health warning and the perceived effectiveness of the message.

Method: Participants ($N = 200$) were presented with one narrative warning and one non-narrative warning. After each warning, they answered questions on narrative perception, transportation, identification, emotions and perceived effectiveness.

Results: The narrative warnings were seen as more story-like than the non-narrative warnings. There was a statistical trend for narrative warnings to be perceived as more effective than the non-narratives. The narrative warnings caused more transportation, fear, sadness, compassion and anger; the non-narrative warnings evoked more disgust and surprise. For the narrative warnings, both narrative concepts of transportation and identification were directly related to perceived effectiveness, and also indirectly via sadness. For the non-narrative warnings, transportation was related to perceived effectiveness, both directly and indirectly via disgust.

Conclusion: Seeing a story in a still picture with a slogan helps to increase the effectiveness of the antismoking message. Both narrative and non-narrative visual warnings may persuade receivers directly, but also by the evoking of emotions, although the specific emotions responsible for the persuasive effects may differ.

Keywords

Effectiveness, emotions, fear appeals, health warnings, narratives, pictures, smoking, textual, visual

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Introduction

In the course of the last few decades, stories or 'narratives' have become a popular research topic in the field of persuasive communication. Narratives can have a positive impact on people's beliefs, attitudes, intentions and behaviours (Braddock and Dillard, 2016; De Graaf et al., 2016), which is one reason there is a strong interest in researching narratives in health contexts. Narratives can be distinguished from other means of persuasion by 'the suggestion of a character or characters and the representation of an event or events' (Bilandzic and Busselle, 2013: 201). A great variety of narratives have been studied, ranging from short public service announcements to more elaborate written stories, movies and television series. Most studies so far have looked at persuasive stories in a written format (cf. Shen et al., 2015), possibly because written texts are easy to manipulate and therefore practical to use in experiments.

However, in real life, images seem to be used in health communication at least as often as texts. Health warnings on cigarette packages used to consist of only a confronting message, but an increasing number of countries have now added images. There is ample evidence that pictorial health warnings are more effective than text-only warnings (Hammond, 2011; Noar et al., 2015), but it remains unclear which type of pictorial warning is most effective (Gendall et al., 2018; Sutton et al., 2019). Some cigarette packages display yellow teeth or black lungs, while other packages show people in a specific context, for instance, a mourning couple next to a small coffin (see Figure 1, left). This image may prime receivers to think about what may have preceded the sad scenario that is presented there. In combination with the text 'Smoking can kill your unborn child', receivers may likely figure out that the two people concerned were expecting a baby and that the baby died because the mother or father was a smoker. A single picture can tell a whole story because, as Abbott (2002) states, 'our narrative perception stands ready to be activated in order to give us a frame or context for even the most static and uneventful scenes' (p. 11). Bilandzic and Busselle (2013: 201) also argue that a single still picture can be perceived as a narrative, but so far as we know, this claim has not yet been empirically tested. Earlier research (e.g. Brennan et al., 2017; Sutton et al., 2019) has identified warnings as narratives or testimonials when they contain photographs of real people whose health has been affected, but it remains unclear if participants in their studies also perceived the warnings as narratives. That is why, in this study, we included a manipulation check in which we tested if our 'narrative' visual warnings, consisting of a short text line and an image portraying two or more people in a specific context, were indeed perceived as more narrative than our 'non-narrative' visual warnings that displayed content that is unlikely to be seen as narrative (e.g. body parts).

In addition to establishing whether narrative images are indeed perceived as narratives, this study also tested whether narrative and non-narrative health warnings on cigarette packages differ in persuasive effects. Furthermore, we wanted to find out to what extent any persuasive effect is then achieved via transportation, emotions, and in the case of narrative warnings also through identification. Below, we elaborate on the specific dependent measures we used and discuss the concepts involved in narrative processing.

Perceived effectiveness

Recent research into the effects of narrative pictorial warnings compared to non-narrative pictorial warnings has elicited mixed results. Brennan et al. (2017) investigated the effects of testimonial warnings on emotional responses, a set of intention measures and self-reported behaviour changes among smokers. As testimonial warnings, they used images of a real person, sometimes

Figure 1. Narrative health warnings.

accompanied by personal details. As non-narratives, they used staged images of persons or body parts. No differences were found between the two conditions with regard to negative emotions and intentions to quit smoking. The testimonial warnings did generate more quitting activity than the non-testimonials, but this difference was not statistically significant. Brennan et al. (2018) examined whether the effectiveness of testimonial pictorial warnings, consisting of a statement and an image of a real person, could be increased by adding more information about that person. Their results showed that additional information did not increase effectiveness of the testimonial warnings. While Brennan et al. (2018) again showed that testimonial warnings are more effective than text-only warnings, they did not test non-testimonial images. From a content analysis of the features within smoking warnings, Sutton et al. (2019) conclude that graphic depictions of diseases, testimonials and photographs seem to be most effective, compared to messages without these features.

While the studies of Brennan et al. (2017, 2018) and Sutton et al. (2019) were conducted among people who smoked, the warning labels presented on cigarette packages are also meant to discourage young people to take up smoking (Directive 2014/40/EU). Ideally, researchers are interested in finding out whether smokers actually stop smoking after seeing the smoking warnings, and whether nonsmokers do not start smoking. However, due to practical constraints, many researchers use more indirect measures of persuasion such as attitudes and behavioural intentions. However, quitting smoking and not taking up smoking are two very different behaviours, making attitudes and behavioural intentions hard to compare. By using the notion of 'perceived effectiveness', this problem is circumvented, as this dependent measure applies equally to smokers and nonsmokers. Although perceived effectiveness is still an indirect measure of behaviour, a meta-analysis of Dillard et al. (2007) indicated that there is a substantial association (a corrected-for-attenuation correlation of .41) between it and the actual effectiveness of persuasive messages in general. More recently, such support has also been established for antismoking messages in particular. Multiple studies (Bigsby et al., 2013; Brennan et al., 2014; Davis et al., 2013) found that perceived effectiveness was associated with actual effectiveness, such that antismoking advertisements that were perceived to be effective were more likely to produce a change in smokers' attitudes, intentions and behaviours related to the message content.

In this study, we use perceived effectiveness as the outcome measure. In accordance with the European Commission (n.d.) statement that tobacco control measures 'aim to help smokers to quit or not to start in the first place', we included both smokers and nonsmokers as participants. Although evidence regarding the effectiveness of testimonial warnings is inconclusive, Brennan et al. (2017, 2018) do recommend testimonial warnings over non-testimonial ones. Therefore, we proposed the following hypothesis:

H1. Narrative visual warnings lead to a higher level of perceived effectiveness in comparison to non-narrative visual warnings.

In addition to studying the effectiveness of narrative pictorial warnings compared to non-narrative pictorial warnings, we also wanted to establish the mechanisms through which such warnings can be effective. In particular, narrative visual warnings may be processed through the same mechanisms that underlie the effectiveness of text-based narratives.

Transportation, identification and emotions

Narrative persuasion is the result of audience involvement with the storyline and characters (Moyer-Gusé, 2008). Among the various ways in which audiences can connect with narratives, the most studied ones that have also been found to be highly influential, are *transportation* (Green and Brock, 2000) and *identification* (Cohen, 2001; De Graaf et al., 2012). Green and Brock (2000) define transportation as 'a convergent process, whereby all mental systems and capacities become focused on events occurring in the narrative' (p. 701). Identification, on the other hand, is 'a process that consists of increasing loss of self-awareness and its temporary replacement with heightened emotional and cognitive connections with a character' (Cohen, 2001: 251). Both terms refer to the degree of involvement in the story, but transportation relates to the story as a whole, while identification relates to the story's characters (Tal-Or and Cohen, 2010).

It has been suggested that transportation and identification affect attitudes and intentions by evoking (strong) emotional responses (Cohen, 2001; Green and Brock, 2000). Empirical evidence (e.g. Banerjee and Greene, 2012; Ooms et al., 2017) shows that emotions mediate the relationships between transportation and identification on the one hand, and attitudes and intentions on the other hand. In a study into the effects of vividness manipulations in warning labels, Ophir et al. (2017) also found that testimonial warnings can lead to increased emotional engagement, which in turn was associated with intentions to quit smoking. In addition, in a smoking context, Sutton et al. (2019) found that negative emotions mediated the relationship between warnings labels and perceived effectiveness.

It is still unclear, however, which specific emotions play a role in persuasion (Popova et al., 2017). As both the narrative and non-narrative images on cigarette packages show the negative consequences of the undesired behaviour of smoking, the most likely emotion to be evoked is fear (cf. Witte, 1992). However, smoking warnings can also evoke other emotional responses such as anger, disgust or sadness (Brennan et al., 2018; Popova et al., 2017). Based on the above, we propose the following hypotheses:

H2. Narrative visual warnings lead to a higher level of transportation in comparison to non-narrative visual warnings.

H3. Emotions mediate the relationship between transportation and identification on the one hand, and perceived effectiveness on the other hand.

Figure 2. Non-narrative health warnings.

As it is unclear via which specific emotions persuasive effects may be achieved, we also asked the following:

RQ1. Which emotions are related to the perceived effectiveness of narrative and non-narrative visual warnings?

To test these hypotheses and answer the research question, we conducted a within-participants experiment in which participants were presented with both a narrative and a non-narrative health warning. After each health warning, the participants responded to a number of questions regarding narrative perception, transportation, identification, perceived effectiveness and the emotions they felt while looking at the images.

Method

Materials

Materials were selected from the warnings for cigarette packages that are prescribed by the Directive 2014/40/EU of the European Parliament. We randomly chose Set 1 as a basis for our stimuli. Two narrative health warnings portraying people (see Figure 1), and two non-narrative health warnings (see Figure 2) were used. One narrative warning showed a picture of two mourning people standing above a small coffin, accompanied by the text 'Smoking can kill your unborn child'. As argued above, this image, in combination with the text, implies that these two people, presumably a couple, were expecting a baby, but that it had died before it was born because the mother (and/or the father) smoked. The other narrative warning displayed a woman and a child sitting next to a man lying in a hospital bed, accompanied by the text 'Quit smoking – stay alive for those close to you'. This combination of picture and text suggests that the man, presumably the husband and father, got sick because he smoked. As the original European picture only shows the family from some distance, we replaced it by a picture from one of Brazil's health warnings. In this new picture (see Figure 1, right), the faces of the mother and child are more clearly visible, and it

Table 1. Experimental groups.

1	Nar1	Non-nar1
2	Nar2	Non-nar1
3	Nar1	Non-nar2
4	Nar2	Non-nar2
5	Non-nar1	Nar1
6	Non-nar2	Nar1
7	Non-nar1	Nar2
8	Non-nar2	Nar2

Nar1: 'dead baby'; Nar2: 'sick father'; Non-nar1: 'teeth'; Non-nar2: 'lungs'.

is more clearly shown that the man is in hospital, as he is connected to a breathing tube. Based on Bilandzic and Busselle's (2013) definition of a narrative, both warnings could be considered as narratives: each one shows more than one person and each represents an event.

The non-narrative warnings did not show persons but only diseased body parts. The first warning showed decaying teeth accompanied by the text 'Smoking damages your teeth and gums', while the second non-narrative warning displayed black lungs accompanied by the text 'Smoking causes 9 out of 10 lung cancers'. All the warnings were presented on screen in the original size and format of a cigarette package (colour photograph with textual warning).

Participants, design and procedure

Participants were 200 students from the University of Groningen in the Netherlands. Their mean age was 21.41 ($SD = 2.33$) years, 46% were men and 54% women, and 7.0% identified as a smoker, 18.5% said they smoked occasionally and 74.5% did not smoke. After signing a written consent form, each participant completed the study individually in a university computer laboratory. A within-subjects design was used, as in such an experimental design random differences that exist between the experimental conditions are kept to a minimum (Field, 2013: 17). Each participant was exposed to one of the two narrative warnings and one of the two non-narrative warnings. To prevent order effects, we counterbalanced the order of presentation of the two types of warnings, which resulted in eight groups (see Table 1). We used the online survey tool *Qualtrics* to randomly assign the participants to one of the groups. There were 25 or 26 participants in each group. Men versus women, and smokers versus nonsmokers were equally distributed over the eight groups, $\chi^2(7) = 6.06$, $p = .53$ and $\chi^2(7) = 8.91$, $p = .26$, respectively.

Measures

As the participants answered each question twice (after the narrative warning and after the non-narrative warning, in random order), Cronbach's alphas are reported for each of these measurements. Seven-point Likert-type scales were used unless noted otherwise.

Narrative perception was measured with two items: 'The image on the antismoking warning shows a story' and 'I recognised a story in the antismoking warning' (r measurement I = .84; r measurement II = .92). These questions were answered on 7-point Likert-type scale, ranging from 'completely disagree' to 'completely agree'. Furthermore, two open-ended questions checked if participants had interpreted the image correctly: 'What did you see on the image?' and 'According to you, what preceded this situation?' Based on the responses to these questions, data from two participants had to be excluded because they could not tell what happened.

Perceived effectiveness was measured with the statement 'In my opinion, this warning is', followed by three semantic differentials taken from Chen et al. (2017): 'persuasive', 'effective' and 'convincing' (α measurement I = .80; α measurement II = .83).

Several specific emotions were measured: fear, sadness, anger, surprise, compassion and disgust. These emotions were measured by presenting the statement 'While reading the story, I felt . . .', followed by three items per emotion. The response scale ranged from 1 ('not emotion word') to 7 ('emotion word'). Emotion words were derived from Dillard et al. (1996): 'afraid', 'scared' and 'worried' for fear (α measurement I = .94; α measurement II = .96); 'sad', 'dreary' and 'dismal' for sadness (α measurement I = .97; α measurement II = .96); 'irritated', 'angry' and 'annoyed' for anger (α measurement I = .92; α measurement II = .92); and 'surprised', 'startled' and 'astonished' for surprise (α measurement I = .93; α measurement II = .93). Based on Oliver et al. (2012), we used the emotion words 'pity', 'compassion' and 'sympathy' to measure compassion (α measurement I = .94; α measurement II = .94). Following Heath et al. (2001), disgust was measured by asking how much the participants felt 'disgust', 'distaste' and 'revolted' (α measurement I = .96; α measurement II = .96).

Transportation items were based on Green and Brock's (2000) Transportation Scale but adapted in such a way that they could be used for both narrative and non-narrative warnings. This resulted in the following four items: 'The warning affected me emotionally', 'I could picture myself in the situation shown on the warning', 'My attention was fully captured by the warning' and 'While I was viewing, I did not notice any activity going on in the room around me' (α measurement I = .73; α measurement II = .79).

Identification was only measured in participants who had been presented with the narrative warnings. The items 'While viewing the warning, I could feel the emotions X portrayed' and 'During viewing, I could really get inside X's head' were based on Tal-Or and Cohen (2010), and 'I identified with X' was based on Dillard and Main (2013). The items were repeated for each character that was shown in the narrative warning, resulting in questions on identification with the man next to coffin (α = .81), woman next to coffin (α = .81), sick man in bed (α = .80), woman next to bed (α = .84) and child next to bed (α = .85). All the items were presented in Dutch. The items are available from the first author on request.

Ethics approval

The study was approved by the Research Ethics Committee (CETO) of the Faculty of Arts at the University of Groningen.

Results

Effects of narrative and non-narrative images

To test our hypotheses, we conducted a repeated measures analysis of variance (ANOVA) with type of image (narrative vs non-narrative) as within-participants factor. Content of non-narrative images ('teeth' vs 'lungs') and content of narrative images ('dead baby' vs 'sick father') were included as between-participants factors. There were no significant interactions between type of image, content of narrative images and content of non-narrative images on any of the dependent variables (all p values $> .05$). For this reason, in subsequent analyses, data from the two narrative warnings were taken together, as were data from the two non-narrative warnings. Adding smoking behaviour (smokers vs nonsmokers) as between-subjects factor also did not reveal any interaction effects on the main dependent variables (narrative perception: $p = .26$; perceived effectiveness:

Table 2. Means, standard deviations and test statistics for all dependent variables, measured on a 7-point scale.

	Narrative health warning	Non-narrative health warning	*F* value	*p* value	partial η^2
Narrative perception	5.34 (1.35)	3.54 (1.66)	199.02	.000	.506
Perceived effectiveness	4.75 (1.43)	4.53 (1.47)	3.06	.082	.015
Fear	2.77 (1.57)	2.49 (1.53)	8.98	.003	.043
Disgust	3.49 (1.79)	4.99 (1.58)	112.56	.000	.359
Anger	3.21 (1.81)	2.83 (1.73)	10.77	.001	.051
Sadness	3.35 (1.78)	2.27 (1.51)	110.82	.000	.355
Compassion	3.75 (1.68)	2.19 (1.34)	162.29	.000	.447
Surprise	2.43 (1.41)	2.67 (1.58)	5.81	.017	.028
Transportation	2.88 (1.29)	2.60 (1.22)	8.86	.003	.042

$p = .44$; transportation: $p = .10$); hence, data from both frequent and occasional smokers and from nonsmokers were taken together. Table 2 shows the means, standard deviations and test statistics for the two image types.

As a manipulation check, we first tested if our narrative images lead to higher scores on narrative perception than our non-narrative images. The ANOVA showed that our narrative images ($M = 5.34$, $SD = 1.35$) were indeed perceived more as a story than our non-narrative images ($M = 3.54$, $SD = 1.66$): $F(1, 198) = 186.05$, $p < .000$, partial $\eta^2 = .484$. Although the narrative images were perceived more as a story than the non-narrative images, participants also saw some narrative structure in the non-narrative (see Table 2).

H1 assumed that narrative images would lead to a higher level of perceived effectiveness in comparison to non-narrative images. On average, participants rated the narrative health warnings higher on perceived effectiveness compared to the non-narrative warnings. This effect was marginally significant: $F(1, 194) = 3.06$, $p = .082$, partial $\eta^2 = .015$.

H2 assumed that narrative images would lead to a higher level of transportation in comparison to non-narrative images. In conformity with H2, narrative warnings scored higher on transportation than non-narrative warnings. With regard to emotions, narrative warnings aroused significantly more fear, anger, sadness and compassion than non-narrative warnings. Non-narrative warnings evoked more disgust and surprise.

Table 3 shows the means for identification, which was measured only after the narrative warnings. Because there is more than one person in each narrative image, there are multiple measures of identification per participant. We chose to use for each participant the highest, or *maximum*, score of these identification measures (overall $M = 3.98$, $SD = 1.66$, $\alpha = .88$).

Mechanisms underlying effectiveness

H3 assumed that emotions mediate the relationship between transportation and identification on the one hand, and perceived effectiveness on the other hand. RQ1 asked which emotions are related to perceived effectiveness. To test H3 and answer RQ1, we performed path analyses in AMOS 25.0. As identification could only be measured in case of narrative warnings, identification was excluded in the analysis for the non-narrative warnings. We tested whether transportation, and in case of the narrative warnings also identification, influenced perceived effectiveness directly or indirectly via the emotions that were measured (see Figure 3). Model fit was considered appropriate when the following criteria from Kline (2005) were met: (a) the model chi-square divided by

Table 3. Means (and standard deviations) of identification for both narrative warnings, measured on a 7-point scale.

	Narrative 1: Dead baby	Narrative 2: Sick father
Identification with:		
• The man	3.11 (1.49)	2.01 (1.05)
• The woman	2.96 (1.46)	3.94 (1.62)
• The child	NA	4.31 (1.63)

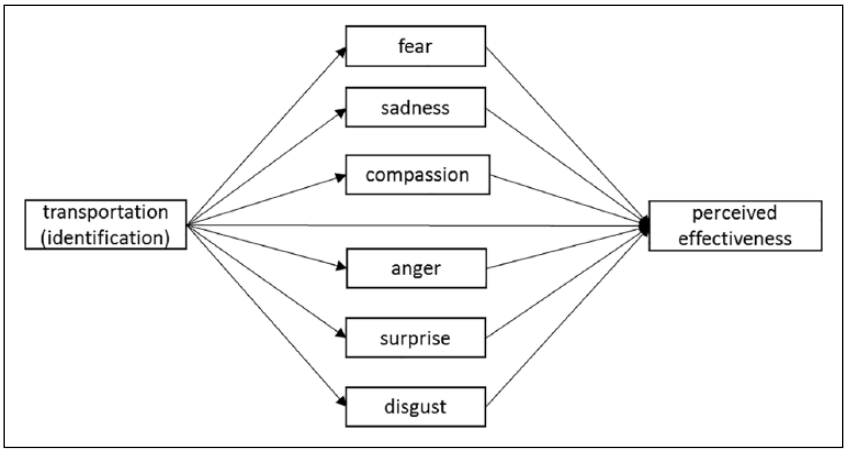

Figure 3. Initial model.

its degrees of freedom (χ^2/df) should be less than 3.0, (b) the comparative fit index (CFI) should exceed 0.90 and (c) the root mean square error of approximation (RMSEA) should be lower than 0.08. To achieve good model fit, we deleted the paths with non-significant parameters (cf. Byrne, 2001) and consulted the modification indices.

Narrative warnings. First, we fitted the data from the narrative health warnings. The initial model had a poor fit: $\chi^2/df = 20.87$, CFI = .602, RMSEA = .314. We deleted the non-significant paths and then consulted the modification indices. These suggested that the model fit would improve by adding paths between some of the emotions. Because earlier research (e.g. Dillard and Nabi, 2006; Dillard et al., 1996; Ooms et al., 2017) has shown that messages can arouse multiple emotions related to each other, we decided to allow the suggested paths between emotions that would result in the largest improvement in model fit. The following paths were added: sadness to fear: $\beta = .44$; anger to fear: $\beta = .17$; anger to sadness: $\beta = .26$; anger to surprise: $\beta = .38$; anger to disgust: $\beta = .53$; surprise to fear: $\beta = .19$; surprise to sadness: $\beta = .24$; and disgust to compassion: $\beta = -.19$.

These changes resulted in good model fit: $\chi^2/df = 2.01$, CFI = .978, RMSEA = .071. Figure 4 shows the final model with only significant paths. Both transportation and identification are related to perceived effectiveness not only directly but also indirectly via the emotion of sadness.

Non-narrative warnings. Next, we fitted the data from the non-narrative warnings. The initial model had poor fit: $\chi^2/df = 16.37$, CFI = .526, RMSEA = .277. Again, we deleted the paths with non-significant parameters and added paths between emotions as suggested by the modification

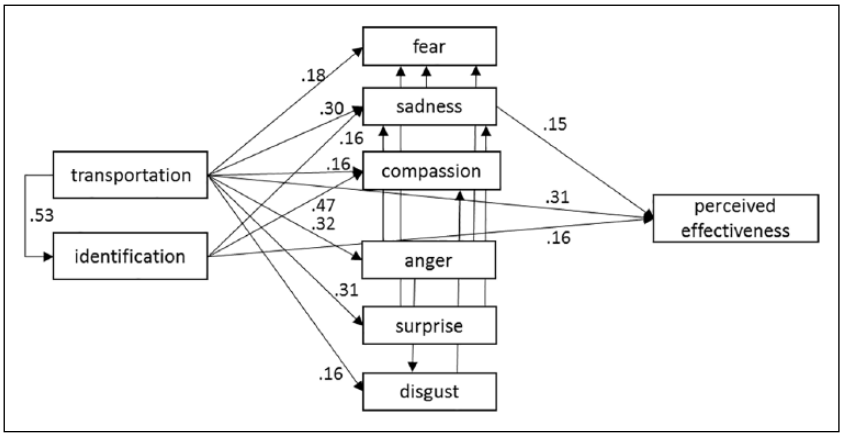

Figure 4. Final model for *narrative* warnings (standardised estimates, $p \leqslant .05$).

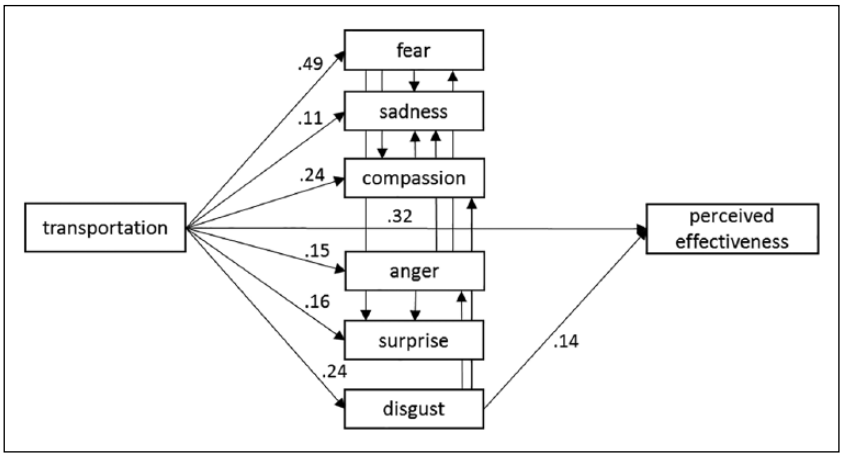

Figure 5. Final model for *non-narrative* warnings (standardised estimates, $p \leqslant .05$).

indices: fear to sadness: $\beta = .47$; fear to compassion: $\beta = .38$; fear to surprise: $\beta = .29$; compassion to sadness: $\beta = .14$; anger to fear: $\beta = .26$; anger to sadness, $\beta = .32$; anger to surprise: $\beta = .18$; disgust to compassion: $\beta = -.14$; and disgust to anger: $\beta = .21$.

The resulting model had good model fit: $\chi^2/df = 1.48$, CFI = .989, RMSEA = .049. As can be seen in Figure 5, transportation is related to perceived effectiveness not only directly but also indirectly via the emotion of disgust.

Discussion

In this study, we investigated the persuasive effects of narrative versus non-narrative visual health warnings on cigarette packages. A within-participants experiment was conducted in which health warnings on cigarette packages that could be interpreted as stories were compared with health warnings with non-narrative content (i.e. body parts). In addition, we investigated

whether the mechanisms underlying the processing of the narrative visual warnings were similar to the processing of text-based narratives.

First, results showed that the health warnings portraying people in a specific context were indeed seen as more story-like than the non-narrative warnings, providing support for the claim that single, still pictures can evoke a narrative interpretation (Abbott, 2002; Bilandzic and Busselle, 2013). Participants were able to not only identify a narrative in the narrative warnings but also tell what the underlying story could be, as shown by their answers to the two open questions on narrative perception ('What did you see on the image?' and 'According to you, what preceded this situation?'). For health campaigners, this means that they can use well-chosen visuals to tell a story, instead of long, wordy texts for which there is no space on cigarette packages anyway. Second, the narrative warnings we used tended to be perceived as more persuasive than non-narrative warnings, which supports the findings of Brennan et al. (2017). In addition, our narrative warnings caused more transportation, fear, sadness, compassion and anger than the non-narrative warnings. As could be expected in view of their explicit content (i.e. diseased body parts), the non-narrative warnings provoked more disgust than the narratives; they also aroused more surprise. Because the warnings used in our study represent real cigarette packages, images are combined with text, which makes it difficult to claim that the image alone is responsible for the found differences and not the (interaction with the) corresponding textual slogan. Future research should investigate under what conditions the threatening, general statement is necessary for the effects of narrative warnings.

With regard to the mechanisms underlying narrative persuasion, we found that transportation had not only a direct but also an indirect influence – via the evocation of emotions – on perceived effectiveness of both narrative and non-narrative warnings. More specifically, we found that for the narrative images *sadness* mediated the effects of transportation and identification on perceived effectiveness, while for non-narrative warnings the only significant mediating emotion was *disgust*. Our findings therefore underline the importance of distinguishing specific emotions, as was argued for by Popova et al. (2017), instead of grouping them together as positive or negative emotions. This way, we were able to specify the outcomes of Cho et al. (2018), who also found evidence for a role of negative emotions in motivating behaviour change. The finding that narrative and non-narrative warnings lead to roughly the same effects, but via different emotions, suggests that in practice both warning types may be used. In a content analysis of smoking warnings, Sutton et al. (2019) found that warnings that contain graphic depictions of diseases (comparable to our non-narrative warnings) and testimonials (comparable to our narrative warnings) increase the emotionality of smoking warnings and their perceived effectiveness, in comparison to warnings without these features. Perhaps the two warning types can be combined on cigarette packages, for example, a sadness-evoking narrative image on the front and a disgust-evoking non-narrative image on the back. So far as we know, all smoking products now have the same image on the front and the back. Combining sadness-evoking narrative images with disgust-evoking non-narrative images may also fit in the policy of plain packaging, which an increasing number of countries is now implementing. According to this policy, all packages must have the same shape and colour, and may only contain the name of the manufacturer, along with health warnings and photos. This makes it possible to enlarge the size of the pictures, which can further increase the effectiveness of smoking warnings. Earlier research has found that warnings that are larger in size are more effective than smaller warnings (Hammond, 2011; Wakefield et al., 2015).

Remarkably, in our study, the emotion of fear was not a significant predictor of effectiveness, neither for narrative images nor for non-narrative images. This finding contrasts with the conclusion reached in Tannenbaum et al.'s (2015) meta-analysis that fear appeals messages can positively influence attitudes, intentions and behaviours, in comparison to messages designed to depict relatively lower levels of fear. Perhaps the images on cigarette packages do not really scare people

anymore, as the pictorial health warnings were introduced in the Netherlands (where this study was conducted) as far back as 2016. The low mean scores on fear, fluctuating around 2.5 on a 7-point scale, support this idea. Another reason for the rather low scores of fear may be that the warnings did not fully resonate with the relatively young participants. Our non-narrative warnings showed the traditional cancerous lungs and yellow teeth, but young people seem to believe that such negative longer term outcomes will not happen to them (Gendall et al., 2018). The narrative warnings also portrayed situations (two mourning people above a small coffin, respectively a woman and a child next to a man lying in a hospital) that many young people might not feel a close affinity with because they will not have experienced, or expect to experience in the near future, such situations themselves. Thus, for both the non-narrative and narrative warnings, the susceptibility for the presented risks might be perceived as not very high, which can result in a rather low level of perceived fear (cf. Witte, 1992).

Although we found that different emotions were involved in the processing of narrative versus non-narrative stimuli, which is in line with the discrete emotion approach (cf. Dillard and Peck, 2000; Myrick, 2015), we also found that the emotions were related to each other. The direction of the emotion paths is rather unclear, and it thus seems likely that the relationship between emotions may be reciprocal instead of causal. In general, it must be noted that our data were measured at one point in time, and hence causality claims cannot be made. However, the directed paths in our mediation models were motivated by multiple empirical studies (cf. Ophir et al., 2017; Sutton et al., 2019).

Surprisingly, transportation also played a role in the processing of non-narrative stimuli, as it directly and positively influenced perceived effectiveness of non-narrative images. Apparently, receivers can also be transported into non-narratives (cf. Green and Brock, 2000). The mean scores of transportation were not very high (below midpoint of the scale) for both warning types, which may be the case because viewing an image goes faster than reading a story or watching a video, resulting in less time to fully experience transportation. The rather low scores might also have been caused by the way we measured transportation: We used a subset of the items that are normally used to measure transportation because only few were actually suitable for both warning types. We did, however, cover all three elements of transportation according to Green and Brock (2000): imagery, affect and attentional focus. In future research, it would be helpful if we could find engagement measures specifically meant for both narratives and non-narratives.

A final remark concerns the measure of effectiveness. Measuring perceived effectiveness allowed us to use the same measure for both smokers and nonsmokers instead of measuring behavioural intentions to quit smoking and not start smoking. While it has been argued in several studies (e.g. Bigsby et al., 2013; Dillard et al., 2007) that perceived effectiveness can be seen as an antecedent of actual effectiveness, a recent study of O'Keefe (2018) suggests that measures of perceived effectiveness matched those of actual effectiveness in 58% of the comparisons. More research is needed in which actual smoking behaviour is measured.

In conclusion, our study shows that (student) audience members are able to conjure up a story from still pictures plus a short text line. The processing of such narrative messages seems to be comparable to that of purely textual narratives. We found that transportation and identification influenced perceived effectiveness of such narrative stimuli both directly and also indirectly (via the emotion of sadness). Transportation was also positively related to the perceived effectiveness of non-narrative warnings, both directly and indirectly via the emotion of disgust. Narrative and non-narrative health warnings alike can thus persuade receivers through emotion, although the specific emotion that is responsible for the persuasive effects was shown to differ. It is possible that warnings that arouse both sadness and disgust, or cigarette packages with a sadness-evoking image on the front and a disgust-evoking image on the back of a cigarette package, will turn out to be the

most effective combination. More research is recommended to determine which combination of smoking warnings can best be used in health communication.

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