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Frightfully funny: combining threat and humour in health messages for men and women

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Objective: It is imperative for public health to investigate what factors may reduce defensive responses and increase the effectiveness of health information. The present research investigated gender differences in responses to threatening health-promoting information communicated with humour.

Design: Male and female participants were exposed to a health message stressing the negative consequences of binge drinking (Experiment 1; $N = 209$) or caffeine consumption (Experiment 2; $N = 242$), that did or did not contain a funny visual metaphor (Experiment 1) or a slapstick cartoon (Experiment 2).

Main Outcome Measures: Message evaluation, message attention, and attitudes and intentions towards the behaviour were measured.

Results: Results showed that health messages were more persuasive when communicated with humour, although humour played a different role for men and women. Whereas men responded more in line with message goals when the message combined high threat with humour, women preferred the low threat humour messages.

Conclusion: By uncovering the moderating role of gender as a key audience characteristic, this research contributes to designing effective future health campaigns and provides important insights for future studies investigating the underlying mechanisms responsible for the different effects of threat and humour appeals for men and women.

Keywords: threat; humour; gender; health campaigns; alcohol consumption; caffeine use

Many people engage in unhealthy conduct, such as cigarette smoking, excessive caffeine consumption and alcohol abuse (e.g. Bonnet & Arand, 1992; Mokdad, Marks, Stroup, & Gerberding, 2004; Thacker et al., 2006). To discourage these unhealthy behaviours and to stimulate people to adopt a more healthy lifestyle, health campaigns aim to communicate the risks and negative consequences of unhealthy conduct. Unfortunately, however, information about health risks is often considered threatening to the self and health-promoting messages are frequently met with a defensive response (Van 't Riet & Ruiter, 2011). Since defensive reactions generally impede the adoption of

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health-conducive behaviour (e.g. Tanner, Hunt, & Eppright, 1991; Witte, 1994), it is a challenge to design health campaigns that are capable of conveying important health risks while overcoming defensive responses.

Psychologists and health communication scholars show a growing interest in the role of humour in health campaigns, as a means to make people more accepting of aversive information. Several studies have indeed shown that people respond more positively to threatening information when it is communicated with humour (e.g. Blanc & Brigaud, 2014; Conway & Dubé, 2002; Lee, Slater, & Tchernev, 2015; Mukherjee & Dubé, 2012; Nabi, 2016; Yoon, 2015; Yoon & Tinkham, 2013). However, only a limited number of these studies directly investigated the interaction between threat and humour, testing at what levels of threat humour is most likely to be persuasive (Mukherjee & Dubé, 2012; Yoon & Tinkham, 2013). Moreover, the studies that did test an interaction effect between threat and humour mainly focused on marketing outcomes (e.g. attitude towards an advertised brand of sunscreen), with only one study focusing on personal health outcomes (i.e. intention to use sunscreen; Mukherjee & Dubé, 2012). To successfully implement humour in health campaigns on threatening topics, more research is needed on the combined use of threat and humour in persuading people to engage in healthy conduct.

Furthermore, it is important to know to what extent the interaction between threat and humour in health communication is dependent on key audience characteristics such as gender. Whereas there is reason to suggest that combining threat and humour in health campaigns may differentially affect a male and female audience (e.g. Conway & Dubé, 2002; Lewis, Watson, & Tay, 2007), there is no empirical evidence to support this notion. Therefore, the present research aims to shed more light on the effects of the combined use of threat and humour in health campaigns on message adoption by both men and women. Considering the importance and difficulty of convincing people to adopt healthier lifestyles (e.g. Hornik, Jacobsohn, Orwin, Piesse, & Kalton, 2008; Snyder & Blood, 1992), investigating how to facilitate communication about threatening health issues is imperative for public health.

Defensive responses to threatening health messages

Health campaigns usually present people with the aversive outcomes related to unhealthy behaviours, in an attempt to elicit desirable attitudinal and behavioural changes (Witte & Allen, 2000). Whereas some studies have shown that such threatening health messages (often called *fear appeals*) may indeed produce self-protective actions (e.g. Dillard & Peck, 2000; Slater, Karan, Rouner, & Walters, 2002), ample empirical work shows less desirable effects of threatening health information. Specifically, in line with Protection Motivation Theory (Rogers, 1975) and the Extended Parallel Process Model (Witte, 1994), multiple studies have demonstrated that health messages inducing feelings of threat or fear may elicit undesirable defensive responses, such as avoidance or denial of the message (Lee & Ferguson, 2002). For example, in the context of anti-alcohol campaigns, Brown and Locker (2009) revealed that increased feelings of fear led to more defensive responses against anti-alcohol messages, such as message avoidance. In addition, a meta-analysis by Witte and Allen (2000) confirmed that high levels of fear can lead to decreased message persuasion and less healthy conduct if certain conditions are not met. Given the often inherently threatening nature of health

messages, an important task for scholars is to investigate what factors may reduce defensive responses and increase the effectiveness of health information.

Combining threat and humour in health messages

A promising strategy to reduce defensive responses to threatening health information could be to convey the message with humour. Public health campaigns frequently adopt this strategy (e.g. Cohen, Shumate, & Gold, 2007), and research has indeed suggested that humour can function as an emotional or cognitive buffer when confronted with threatening or negative stimuli. For example, a study by Ventis, Higbee, and Murdock (2001) on arachnophobia (i.e. fear for spiders) revealed that humour was an effective strategy to desensitise fearful participants after seeing a tarantula. Additionally, Strick, Holland, van Baaren, and van Knippenberg (2009) demonstrated that humour cognitively distracts from negative emotions (for similar findings in the context of message persuasion, see Eisend, 2009, 2011; Moyer-Gusé, Mahood, & Brookes, 2011).

In the domain of health communication, the effects of threat and humour have been explored separately, in comparison to each other (e.g. Dillard & Peck, 2000; Lee & Shin, 2011), or by comparing the effects of threatening health messages with or without humour (Blanc & Brigaud, 2014; Nabi, 2016; Yoon, 2015). Only two studies to date have investigated how threat and humour interact, combining different threat levels with or without humour in controlled experimentation (Mukherjee & Dubé, 2012; Yoon & Tinkham, 2013). These studies found that adding a humorous element to an advertisement for a brand of sunscreen protecting against skin cancer significantly increased the persuasiveness of the ad, but only when the ad was highly threatening. These findings provide the first tentative evidence that threat and humour may interact to make people more accepting of aversive health information.

Gender differences in responses to threat and humour in health communication

Whereas the two aforementioned studies by Mukherjee and Dubé (2012) and Yoon and Tinkham (2013) suggest that people are most likely to be persuaded when a message is both highly threatening as well as humorous (as opposed to less threatening and/or without humour), the robustness of this effect in the domain of health communication requires further investigation. In addition, from a practical perspective, taking key audience characteristics into account that may affect responses to the combined use of humour and threat is likely to facilitate implementation and effectiveness of health campaigns. Since communication-based interventions are most likely to profit from distinguishing key audience characteristics that can easily be reckoned with when developing campaign messages, the present research will focus on gender.

Investigating the potentially moderating role of gender is also relevant from a theoretical perspective. Several studies have shown that persuasive messages containing either threat or humour are differentially received by a male and female audience. For example, a study by Lewis et al. (2007) on safe driving practices revealed that threatening persuasive messages resulted in stronger intentions to drive safely for women, but not for men. With respect to humour, Madden and Weinberger (1982) showed that men preferred humour in ads more than women did. Furthermore, Conway and Dubé (2002)

tested the influence of people's sex role orientation on the effects of humour in a health campaign promoting condom use, and showed that participants high in masculinity (a typical male trait; Eisler & Blalock, 1991) were more likely to use a condom when the message used humour. This effect was especially pronounced when the media context in which the appeal was embedded was moderately threatening (as compared to low in threat). Given these findings, it seems eligible to investigate whether the effects of combining humour and threat in health messages depend on gender.

Men and women may differentially respond to different combinations of threat and humour in health communication, because research has consistently shown that men and women differ in how they cope with negative affect or distress (e.g. Conway, DiFazio, & Bonneville, 1991; Conway, Giannopoulos, & Stiefenhofer, 1990; Nolen-Hoeksema, 1987). Whereas women are more likely than men to invest cognitive resources in ruminating on (the causes of) their affective state, men are more likely than women to avoid distress, and seek to alleviate their negative affect by distracting themselves, such as exposing themselves to positive stimuli and engaging in rewarding behaviours (e.g. Conway et al., 1990, 1991; Masters, Ford, & Arend, 1983; Nolen-Hoeksema, 1987).

Because of these gender differences in how people cope with distress, we expect men and women to respond differently to health messages that combine threat and humour. In line with previous research (Conway & Dubé, 2002; Conway et al., 1991; Masters et al., 1983; Nolen-Hoeksema, 1987), we expect that for men, who are more likely than women to alleviate distress by seeking out distracting positive stimuli, a humour appeal may provide a successful distraction and may function as an emotional and cognitive buffer. That is, by using humour, threatening information is communicated through a 'playful lens' (cf. Yoon & Tinkham, 2013), providing a 'safe context' (cf. Mukherjee & Dubé, 2012) that cognitively facilitates message processing and is likely to change attitudes and intentions in line with the advocated behaviour. In line with Conway and Dubé (2002), we expect this buffering effect of humour for men only to occur when the message is highly threatening (as compared to low in threat).

For women, on the other hand, we expect threat and humour to interact differently in a health message. Yoon and Tinkham (2013) found that compared to individuals that are likely to avoid threatening information (which is assumed for men), for individuals who were less avoidant and had a greater motivation and capacity to process distressing information, humour *decreased* instead of increased the persuasiveness of a health message that was highly threatening. Yoon and Tinkham argued that since high threat messages already provide substantive value to less distress-avoidant individuals, humour distracts them from the message. Since women are more likely to ruminate on (the causes of) their affective state in response to distress (Nolen-Hoeksema, 1987), we expect that humour may only distract them from this cognitive process when confronted with a highly threatening message. However, Yoon and Tinkham found that for less avoidant individuals, humour did increase the persuasive power of a *low threat* message. That is, for individuals motivated to process threatening information, a low threat message may lack substantive value, offering not much of a cognitive challenge, and humour may increase message engagement. Although speculative, we expect the beneficial effect of humour for women to occur when a health message is *low* instead of high in threat.

The present research

In sum, the goal of the present research is to investigate whether the combined use of threat and humour in health campaigns has different persuasive effects for men and women. We conducted two experiments to test the following hypotheses:

H1a. For men, a *high threat* health message (as compared to a low threat health message) results in more positive message evaluations and more healthy behavioural determinants when humour is present than when humour is absent.

H1b. For women, a *low threat* health message (as compared to a high threat health message) results in more positive message evaluations and more healthy behavioural determinants when humour is present than when humour is absent.

To increase the generalisability of our findings, our experiments used different message formats promoting different health behaviours. In Experiment 1, students were exposed to a campaign poster stressing the negative consequences of excessive alcohol consumption. Binge drinking is especially common among adolescents and young adults, and is related to many individual and societal problems (e.g. severe physical consequences such as brain damage, and involvement in fights and harassments; Crews, Braun, Hoplight, Switzer, & Knapp, 2000; Hughes, Anderson, Morleo, & Bellis, 2008; Wechsler, Davenport, Dowdall, Moeykens, & Castillo, 1994). In Experiment 2, Dutch citizens were exposed to an information leaflet listing the negative consequences of (excessive) caffeine use (e.g. insomnia and restlessness, and increased risk to develop cardiovascular diseases, Block & Williams, 2002; Bonnet & Arand, 1992; Chou, 1992).

Experiment 1

Participants and design

A total of 209 students at a Dutch University (143 women, 66 men; most between 16 and 25 years) participated in this study in exchange for course credit or a chocolate bar. Each participant had a chance to win a cinema coupon. The study used a 2 (low threat vs. high threat) \times 2 (humour absent vs. humour present) \times 2 (men vs. women) between-subjects design.

Procedure and materials

Participants were recruited online or at the university. The study took place at the university, where participants provided informed consent, were seated behind a computer, and were randomly shown one of four campaign posters, stressing the negative consequences of excessive alcohol consumption. Next, participants filled out a questionnaire addressing the dependent variables, after which they were debriefed, thanked and rewarded for their participation.

Threat and humour manipulations

The health campaign posters designed for this study aimed to warn young people about the health risks of binge drinking. In all four conditions, the poster depicted a young man lying unconsciously on an apartment floor. The bottom of the poster displayed the following message (based on the Think Before You Drink campaign in the UK, 2014–2015): ‘Think before you drink. Last year over 1800 people were hospitalized due to alcohol poisoning’. In the high threat condition, to additionally stress the severity of health consequences of excessive alcohol consumption, an additional slogan was presented in the middle of the poster, stating: ‘His funeral was a week later’. The low threat condition did not contain this slogan. In the humour-absent condition, the young man on the poster lies on the floor next to some beer bottles, whereas on the humorous poster the man’s body shape is entirely surrounded by beer cans (i.e. similar to a crime-scene).¹

Dependent variables

Attitude towards the message

Attitude towards the anti-alcohol poster was measured as the mean of six statements ($\alpha = .73$) on seven-point scales (1 = *most certainly not*; 7 = *most certainly*): ‘I think the advertisement is interesting/nice/relevant/catchy/attractive/important’ (adjusted from Henthorne, Latour, & Natarajan, 1993).

Perceived believability of the message

Believability of the health message was measured as the mean of three statements ($\alpha = .86$) on seven-point scales (1 = *completely disagree*; 7 = *completely agree*): ‘This ad is believable’, ‘The ad message is credible’ and ‘I believe this campaign’ (adjusted from Dillard, Shen, & Vail, 2007).

Attention for the message

Attention for the poster was measured as the mean of four statements ($\alpha = .87$) on seven-point scales (1 = *completely disagree*; 7 = *completely agree*): ‘When I would walk down the street, the ad would draw my attention’, ‘The ad as a whole draws my attention’, ‘The image of the ad strongly attracts my attention’ and ‘The ad message strongly attracts my attention’ (e.g. in line with Chaffee & Schleuder, 1986).

Attitude towards binge drinking

In line with Dutch guidelines, binge drinking was defined at the beginning of the questionnaire as ‘four or more alcoholic drinks per occasion for women, and six or more alcoholic drinks per occasion for men’. Participants’ attitude towards binge drinking was measured as the mean of four statements ($\alpha = .85$): ‘Binge drinking is fun/damaging (reverse-coded)/sociable/enjoyable’. Agreement was given on seven-point scales (1 = *completely disagree*; 7 = *completely agree*).

Intention to engage in binge drinking

Participants' intention to engage in binge drinking was measured as the mean of three statements ($\alpha = .97$) on seven-point scales (1 = *very unlikely*; 7 = *very likely*): 'I intend to engage in binge drinking within the next two weeks', 'I expect to binge drink within the next two weeks' and 'I will binge drink within the next two weeks'. The attitude and intention measures were based on Ajzen (1991) and Norman and Conner (2006).

Manipulation checks

Finally, serving as a manipulation check of threat and humour, participants responded to the following questions (cf. Martin & Gray, 1996; Peters, Kashima, & Clark, 2009) on seven-point scales (1 = *most certainly not*; 7 = *most certainly*): 'I think the ad is frightening', 'The ad scares me', 'The ad frightens me', and 'I think the ad is scary' ($\alpha = .87$) and 'I find the ad humorous', and 'I think the ad is funny' ($r = .92$, $p < .001$).

Results and Discussion

Manipulation checks

T-tests showed that our manipulations were successful. Participants perceived the high threat message as significantly more frightening ($M = 3.32$, $SD = 1.19$) than the low threat message² ($M = 2.62$, $SD = 1.24$), $t(207) = 4.18$, $p < .001$, $d = 0.58$. Moreover, the humorous message was considered to be significantly more funny ($M = 3.38$, $SD = 1.74$) than the non-humorous message³ ($M = 2.62$, $SD = 1.51$), $t(207) = 3.40$, $p = .001$, $d = 0.47$.

Main analyses

To test our expectation that men and women differentially respond to the interaction between threat and humour in health messages, we conducted separate three-way ANOVAs with attitude towards the message, perceived believability of the message, attention for the message, binge drinking attitude and binge drinking intention as a function of threat condition (low threat vs. high threat), humour condition (humour absent vs. humour present) and gender (men vs. women). The analyses revealed no main effects of threat and humour on all dependent variables (all F s < 2.01 , all p $> .158$). The main effect of gender, however, appeared to be significant on all but one of our dependent variables. Women found the health message more credible ($M = 4.97$, $SD = 1.37$), and reported more attention for the message ($M = 5.04$, $SD = 1.11$) than men ($M = 4.34$, $SD = 1.52$; $F(1, 201) = 7.32$, $p = .007$, $d = 0.44$; $M = 4.58$, $SD = 1.36$; $F(1, 201) = 6.67$, $p = .011$, $d = 0.37$, respectively). Moreover, women reported a more negative attitude towards binge drinking ($M = 3.11$, $SD = 1.36$), and were less likely to engage in binge drinking in the near future ($M = 2.50$, $SD = 1.87$), than men ($M = 3.97$, $SD = 1.33$; $F(1, 201) = 19.06$, $p < .001$, $d = 0.64$; $M = 3.66$, $SD = 2.34$; $F(1, 201) = 14.23$, $p < .001$, $d = 0.55$, respectively). Women and men did not differ significantly in their attitude towards the message, $F(1, 201) = 2.36$, $p = .126$.

The analyses did not show any significant two-way interactions on any of the dependent variables (all F s < 3.65 , all p $> .057$), and there were no significant three-way

interactions on participants' attitude towards binge drinking, or intention to engage in binge drinking (both $F_s < 1$). However, the analyses did show the expected three-way interaction between threat condition, humour condition and gender on attitude towards the message ($F(1, 201) = 6.21, p = .014, \eta^2 = .029$), believability of the message ($F(1, 201) = 3.72, p = .055, \eta^2 = .017$, marginally significant) and attention for the message ($F(1, 201) = 6.66, p = .011, \eta^2 = .031$). For men, simple main effect tests did not show significant effects of humour (present vs. absent) in either the high or low threat conditions, on attitude towards the message and attention for the message (both $F_s < 1.91$, all $p > .169$). Thus, Hypothesis 1a, which stated that for men, humour may increase the effectiveness of a highly threatening message could not be supported. Men also did not find the humorous high threat message more believable than the non-humorous high threat message ($F < 1$), but they found the non-humorous low threat message more credible than the humorous low threat message, $F(1,201) = 4.97, p = .027, d = 0.75$. Although inspection of the means (see Table 1) suggests that men are overall most appreciative of the humorous high threat message, additional planned comparisons demonstrated that this condition did not significantly differ from the other three conditions on attitude towards the message, believability of the message, and attention for the message (all $F_s < 1.31$, all $p > .258$).

For women, on the other hand, we expected humour to increase the effectiveness of a low threat health message (Hypothesis 1b). Simple main effect tests indeed showed that humour (as compared to no humour) resulted in a significantly more positive attitude towards the message and more attention for the message (marginally significant) when combined with low threat, $F(1, 201) = 5.84, p = .017, d = 0.66$; $F(1,201) = 3.24, p = .073, d = 0.52$, respectively (see Table 1), but not when combined with high threat, $F(1, 201) = 1.54, p = .216$; $F < 1$. Simple main effect tests on believability of the message were not significant (both $F_s < 2.28, p > .133$). Additional planned comparisons revealed that for women, the humorous low threat poster differed significantly from the other three conditions on attitude towards the message, $F(3, 139) = 5.34, p = .022, \eta^2 = .036$. Although the means are in the expected direction, women did not report significantly more attention for the humorous low threat poster ($F(3, 139) = 2.78$,

Table 1. Attitude towards the ad, believability of the ad and attention for the ad as a function of experimental condition and gender.

Experimental condition	Gender	Attitude Ad M(SD)	Believability Ad M(SD)	Attention Ad M(SD)
Low threat and Humour absent	Men	4.09(.85)	5.00 _a (1.39)	4.78(1.32)
	Women	3.99 _a (.99)	4.70(1.42)	4.80 _a (1.10)
High threat and Humour absent	Men	3.99(1.34)	4.46(1.58)	4.31(1.68)
	Women	4.36(.83)	5.14(1.36)	5.15(.98)
Low threat and Humour present	Men	3.76(1.16)	3.94 _b (1.43)	4.32(1.47)
	Women	4.56 _b (.72)	5.23(1.11)	5.32 _b (.89)
High threat and Humour present	Men	4.26(1.09)	4.16(1.61)	4.91(.94)
	Women	4.08 _a (1.00)	4.78(1.54)	4.90(1.38)

Notes: Means in the same column that do not share subscripts differ at $p < .05$. For women, the difference between the low threat and humour absent and low threat and humour present conditions on ad attention was marginally significant ($p = .073$).

$p = .098$), and did not perceive this health message as significantly more believable ($F(3, 139) = 1.57, p = .21$) than the other three health posters.

The analyses provide initial support for our expectation that the combined use of threat and humour in health messages is differentially persuasive for men and women. Whereas women were most appreciative of the health poster that combined *low threat* with humour (in line with Hypothesis 1b), the poster which combined *high threat* with humour seemed to be most persuasive for men (in line with Hypothesis 1a). These effects were found on message responses, and only reached significance for women. Binge drinking attitude and intention were not significantly affected by the interaction between threat condition, humour condition and gender. With a sample of 66 men (as compared to 143 women), the present study was underpowered in men, and we therefore conducted a second experiment to test our expectations using a larger sample with a more equal distribution of men and women. In addition, in this second experiment we used a different manipulation of humour. Men perceived the humour manipulation of our first study as more humorous than women, which may be due to the fact that the type of humour used could have been interpreted as dark humour (laughing at a friend's misfortune), which men appreciate more than women do (Aillaud & Piolat, 2012). In Experiment 2, we therefore manipulated humour by using a cartoon that was related to the health issue, but unrelated to the health threats mentioned in the message. Moreover, for the purpose of generalisation, we tested our expectations with a message addressing a different health issue (the potential risks of caffeine consumption), using a different message format (a leaflet), assessing participants' attitude towards decreasing their caffeine intake, as well as their intention to lower their caffeine consumption.

Experiment 2

Participants and design

A convenience sample of 247 Dutch citizens participated in this study. Participants could win a 20 Euro gift voucher. To ensure that the health message was relevant, only people who indicated to consume caffeinated drinks (e.g. coffee, tea or energy drinks; cf. van Koningsbruggen, Das, & Roskos-Ewoldsen, 2009) were allowed to participate in the study. Five participants were excluded because they indicated to never consume any caffeinated drinks, leaving a sample of 242 participants to be included in the analyses (108 women, 134 men, $M_{\text{age}} = 30.29, SD_{\text{age}} = 12.95$). Like Experiment 1, the study used a 2 (low threat vs. high threat) \times 2 (humour absent vs. humour present) \times 2 (men vs. women) between-subjects design.⁴

Procedure and materials

The study and recruitment took place online. After providing informed consent, participants were randomly presented with one of four information leaflets listing the negative consequences of caffeine consumption. Participants subsequently filled out a questionnaire addressing the dependent variables, after which they were debriefed and thanked for their participation.

Threat and humour manipulations

The information leaflets designed for this study were supposedly distributed by a Dutch medical centre and aimed to convince Dutch consumers to lower their caffeine intake (cf. Block & Williams, 2002; van Koningsbruggen et al., 2009). The text on each leaflet was equal in length and lay-out, and started with the same header ('What everybody should know about caffeine'), followed by an identical introductory text listing products known to contain caffeine (e.g. coffee, tea and energy drinks). In the high threat condition, the leaflet subsequently informed about potentially severe health problems related to caffeine consumption (e.g. cardiovascular disease), whereas the low threat leaflet described relatively mild health risks of caffeine intake (e.g. nervousness and insomnia). In the humour-absent condition, the leaflet contained a neutral picture of a cup of coffee, whereas the humour condition contained a similar-sized slapstick cartoon (cf. Conway & Dubé, 2002; Mukherjee & Dubé, 2012; Zhang, 1996). The cartoon (consisting of one frame) showed a man drinking an enormous cup of coffee, while reassuring his wife that he is taking his doctor's advice to drink a maximum of one cup of coffee per day.⁵

Dependent variables

Attitude towards adopting the advocated behaviour

Participants' attitude towards lowering their caffeine consumption was measured as the mean of four statements ($\alpha = .81$) adapted from Block and Williams (2002): 'Decreasing my caffeine consumption is important for my health', 'This message convinced me to decrease my caffeine consumption', 'It is important for me to decrease my caffeine consumption to prevent the health problems described in the message' and 'This message convinced me that a high level of caffeine consumption leads to the described health problems' (seven-point scales; 1 = *strongly disagree*; 7 = *strongly agree*).

Intention to adopt the advocated behaviour

Next, participants' intention to lower their caffeine consumption was measured as the mean of two statements ($r = .83$, $p < .001$) based on Block and Williams (2002): 'I intend to decrease my caffeine consumption', and 'I will try to reduce my caffeine intake' (seven-point scales; 1 = *strongly disagree*; 7 = *strongly agree*).

Manipulation checks

Participants subsequently indicated how threatening, frightening and alarming they perceived the health risks of caffeine consumption stated in the leaflet (cf. Das, de Wit, & Stroebe, 2003; seven-point scale, 1 = *not at all*; 7 = *very much*; $\alpha = .93$). Finally, perceived humour of the picture on the leaflet was measured as the mean of five seven-point semantic differential scales ($\alpha = .92$) adopted from Zhang (1996): not humorous-humorous, not funny-funny, not playful-playful, not amusing-amusing and not dull-dull (reverse coded).

Results and discussion

Manipulation checks

T-tests showed that our manipulations were successful. Participants perceived the high threat message as marginally significantly more threatening ($M = 3.86$, $SD = 1.30$) than the low threat message⁶ ($M = 3.55$, $SD = 1.43$), $t(240) = 1.79$, $p = .075$, $d = 0.23$. Moreover, the cartoon was considered to be significantly more humorous ($M = 4.38$, $SD = 1.45$) than the neutral picture⁷ ($M = 3.07$, $SD = 1.24$), $t(240) = 7.58$, $p < .001$, $d = 0.97$.

Main analyses

To test our expectation that the interaction between threat and humour depends on gender, we conducted two separate three-way ANOVAs with either participants' attitude or intention towards decreasing their caffeine consumption as a function of threat condition (low threat vs. high threat), humour condition (humour absent vs. humour present) and gender (men vs. women). The analyses neither revealed significant main effects of threat, humour or gender on attitude (all F s < 2.83 , all p $> .094$) or intention (all F s < 1.37 , all p $> .243$), nor any significant two-way interactions between humour condition and threat condition, or between humour condition and gender (all F s < 1). However, the analyses did show significant two-way interactions between threat condition and gender on attitude ($F(1, 234) = 9.83$, $p = .002$, $\eta^2 = .038$) and intention ($F(1, 234) = 4.32$, $p = .039$, $\eta^2 = .017$), which were qualified by the expected three-way interactions between threat condition, humour condition and gender on both attitude ($F(1, 234) = 7.30$, $p = .007$, $\eta^2 = .028$) and intention ($F(1, 234) = 7.04$, $p = .009$, $\eta^2 = .028$). In line with Hypothesis 1a, simple main effect tests showed that men were more willing to decrease their caffeine consumption when a high threat message was combined with humour (vs. no humour), $F(1, 234) = 3.59$, $p = .059$ (marginally significant), $d = 0.43$, but not when a low threat message was combined with humour (vs. no humour), $F < 1$ (see Table 2). Humour (vs. no humour) did not result in a more positive attitude towards either the high or low threat message (both F s < 2.29 , all p $> .131$). In addition, in line with the results of Experiment 1, inspection of the means (see Table 2)

Table 2. Attitude and intention towards decreasing caffeine consumption as a function of experimental condition and gender.

Experimental condition	Gender	Attitude <i>M</i> (<i>SD</i>)	Intention <i>M</i> (<i>SD</i>)
Low threat and Humour absent	Men	3.85(<i>1.04</i>)	3.25(<i>1.56</i>)
	Women	4.09 _a (<i>1.44</i>)	3.47 _a (<i>1.69</i>)
High threat and Humour absent	Men	4.17(<i>1.32</i>)	3.41 _c (<i>1.66</i>)
	Women	4.26(<i>1.33</i>)	3.88(<i>1.69</i>)
Low threat and Humour present	Men	3.34 _c (<i>1.35</i>)	3.16 _c (<i>1.58</i>)
	Women	4.79 _b (<i>1.41</i>)	4.37 _b (<i>1.72</i>)
High threat and Humour present	Men	4.59 _d (<i>1.40</i>)	4.17 _d (<i>1.87</i>)
	Women	3.99 _a (<i>1.47</i>)	3.30(<i>1.63</i>)

Notes: Means in the same column that do not share subscripts (a vs. b for women, c vs. d for men) differ at $p < .06$.

showed that men appeared to be most persuaded by the humorous *high threat* message. Planned comparisons revealed that this condition differed significantly from the other three conditions on attitude ($F(3, 130) = 10.34, p = .002, \eta^2 = .070$) and intention to decrease caffeine consumption ($F(3, 130) = 7.77, p = .006, \eta^2 = .056$).

In line with Hypothesis 1b, women were more positive towards and more willing to decrease their caffeine consumption when a *low threat* message was combined with humour (vs. no humour), $F(1, 234) = 3.80, p = .052$ (marginally significant), $d = 0.49$; $F(1, 234) = 4.02, p = .046, d = 0.53$, respectively; but not when a high threat message was combined with humour (vs. no humour), $F < 1$; $F(1, 234) = 1.45, p = .230$, respectively (see Table 2). Additional planned comparisons revealed that for women, the humorous *low threat* condition differed significantly from the other three conditions on attitude ($F(3, 104) = 4.50, p = .036, \eta^2 = .041$) and intention to decrease caffeine consumption ($F(3, 104) = 4.61, p = .034, \eta^2 = .042$).

Taken together, the results from Experiment 2 support our expectation that the combined use of threat and humour in a health message is differentially persuasive for men and women. Supporting Hypotheses 1a and 1b, and in line with the results from Experiment 1, our second study confirms that a *high threat* message with humour is most persuasive for men, whereas women are most persuaded by a humorous *low threat* message.

General discussion

The goal of the present research was to investigate whether combining threat and humour in health campaigns has different persuasive effects for men and women. Confirming our expectations, our studies show that a male audience responds more in line with message goals when the health message combines high threat with humour, as compared to a low threat message with or without humour. Women, on the other hand, are more persuaded by a humorous low threat message, as compared to a high threat message with or without humour. We demonstrated these effects across two different health issues (binge drinking and caffeine consumption) among students and a more general population sample, using two different message formats (a poster and a leaflet) with different manipulations of humour (a funny visual metaphor and a slapstick cartoon), employing various measures of message effectiveness.

The present findings contribute to science and practice in two key ways. First, whereas previous studies suggested that humour may be successfully applied to communicate about threatening health information (e.g. Mukherjee & Dubé, 2012), studies directly investigating the interaction between threat and humour on health outcomes (e.g. intention to adopt more healthy behaviours) have been limited. Our findings contribute to the growing body of knowledge on the role of humour in health campaigns, confirming humour's beneficial effects. Second, although gender seemed highly likely to affect audience responses to the combined use of humour and threat in health communication (cf. Conway & Dubé, 2002), existing studies did not take this audience characteristic into account. Our finding that the interaction between threat and humour depends on gender is highly relevant from both a theoretical as well as a practical point of view.

Before discussing the implications of our findings, we would like to point out that Experiments 1 and 2 showed some inconsistent results. In line with our expectations,

Experiment 2 showed interaction effects of humour, threat and gender on participants' attitudes and intentions towards caffeine use. However, Experiment 1 did not reveal these effects on participants' attitudes and intention towards binge drinking. A possible explanation for this discrepancy is that alcohol consumption is a behaviour that is strongly subjected to social norms, and attitudes and intentions towards such behaviour may be harder to change by communication-based interventions than attitudes and intentions towards caffeine consumption (Beck et al., 2008; Pavis, Cunningham-Burley, & Amos, 1997). Alternatively, the discrepancy between the findings of Experiments 1 and 2 could be related to the way attitudes were measured in these studies. Whereas the measurement of attitudes in Experiment 1 solely focused on how participants felt about binge drinking, the measurement of attitudes in Experiment 2 was based on Block and Williams (2002), and also focused on whether the *message* convinced participants of the dangers of caffeine consumption. The latter measurement therefore may have also captured attitudes towards the message and perceived effectiveness of the message. In Experiment 1, we did find the expected interaction of threat, humour and gender on message responses (e.g. attitude towards the message), which implies that the findings of Experiments 1 and 2 may not be as inconsistent as they appear on first sight.

Theoretical implications and future research

Our finding that male participants report more healthy attitudes and intentions after exposure to a humorous high threat message corresponds with and extends the findings of Conway and Dubé (2002), who showed that individuals high in masculinity (a typical male trait) preferred the use of humour (over no humour) when confronted with a highly threatening ad. In addition, our studies reveal that the most effective combination of threat and humour is different for women, who also responded positively to messages with humour, but showed more healthy attitudes and intentions when humour was incorporated into a low threat health message. Since the focus of the present research was on testing the persuasive effects of threat and humour for men and women, we can only speculate about the mechanisms responsible for these effects. We argue that men and women might differentially respond to threatening information, because men have been shown to be more distress avoidant, and more likely to alleviate distress by seeking distraction than women (Conway & Dubé, 2002; Conway et al., 1990, 1991; Masters et al., 1983; Nolen-Hoeksema, 1987). For men, humour may therefore function as a cognitive or emotional buffer (cf. Mukherjee & Dubé, 2012; Yoon & Tinkham, 2013). Women, on the other hand, show a tendency to ruminate in response to distressing information (Nolen-Hoeksema, 1987), and humour may only distract from this cognitive process. However, humour was suggested to increase the appeal of a low threat message for women. Future research should try to tap into these possible underlying mechanisms to further explain the effects of combined humour and fear appeals.

Specifically, future research is needed to investigate what a 'buffer effect' of humour exactly entails. In line with the findings of Mukherjee and Dubé (2012), men may respond most favourably to a humorous high threat message because humour decreased the need to respond defensively, thereby causing more positive message-related thoughts, as well as increased perceived vulnerability to the reported health threats. Indicative of this process could be our finding that in Experiment 1, men perceived the

high threat message as more frightening when it was combined with humour, than when it was not combined with humour.

For women, we argued that humour might play a different role than it does for men. Women may be less in need of a 'playful lens' to be able to process threatening health information and humour may even distract and draw elaboration away from ruminating on the threatening information (Nolen-Hoeksema, 1987). However, humour may increase the value of low threat information that could otherwise be lacking in persuasive power (cf. Yoon & Tinkham, 2013). Indicative of this process could be our finding that in Experiment 1, women reported to perceive the low threat message more frightening when it was combined with humour, than when it was not combined with humour.

Similar to the supposed 'buffer effect' of humour for men, it remains to be investigated whether women were indeed less distress-avoidant than men and therefore more motivated to process our highly threatening health messages. However, our results from Experiment 1 do seem to corroborate this notion, showing that women in general reported more attention for the anti-alcohol posters and generally considered the health message more credible than men. As compared to men, women also reported a more negative attitude towards binge drinking, as well as less intentions to engage in binge drinking in the near future. Although women could consider the topic of binge drinking intrinsically more important than men, these findings could also imply that women were less defensive than men and more motivated to process threatening information.

To gain a better understanding of the processes underlying our findings, future research could provide useful insights into participants' perceptions, thoughts and emotions in response to health messages combining threat and humour. In particular, we suggest that in addition to using explicit measures, research on the underlying mechanisms of humour and threat effects could especially benefit from using implicit measures. Individuals' thoughts and feelings in response to both humour and threat may reflect an experiential process that may be difficult to tap into with explicit self-reports (Conway & Dubé, 2012; Paulhus & Vazire, 2007). Future research could for example measure the accessibility of threat-related cognitions with a lexical decision task (cf. van Koningsbruggen et al., 2009). Based on our findings, we would expect humour to increase the accessibility of threatening cognitions that are otherwise suppressed (as expected to occur for men in the high threat conditions) or not paid significant attention to (as expected in the low threat conditions for women).

Future research may also profitably use implicit measures of attention, such as eye tracking, to explore the way men and women look at the different elements of a health message. For example, it would be interesting to expose participants to combined humour and threat messages, and investigate the order in which they look at the elements containing either humour or threat, how long they fixate on these elements, whether gaze order or duration affects experienced emotions or persuasion, and whether these effects differ between men and women. Answering such questions may help to gain more insight in the underlying mechanisms of the effects of humour and threat, thereby allowing communication professionals to develop more effective health messages for both a male and female audience.

Limitations

Although the present research revealed important and relevant findings, some limitations must be noted. First, in both experiments we compared high threat with low threat health messages, by manipulating the severity of negative consequences of unhealthy behaviours. Although the high threat messages were perceived by participants as more threatening and frightening than the low threat messages (and this relative difference was key to the present research), the high threat messages were not perceived as extremely threatening, scoring below midpoint of the scale on threat. A similar remark can be made with respect to humour. An interesting avenue for future research could be to investigate how high threat levels can become before a message becomes too threatening for humour to buffer, and at what point a message becomes 'too humorous' that it may be considered inappropriate in the context of health-promoting communication.

In addition, not all *types* of humour may be equally appropriate or persuasive for each health issue, medium, or message format. In line with other scholars investigating the role of humour in health communication, we feel that our findings should be interpreted with care, since more research is needed to determine the generalisability of our findings to other types of humour, other health issues, and other message formats. Furthermore, future research could distinguish between different types of humour and their appreciation by a male and female audience in the context of health communication. Although research on gender differences in humour appreciation suggests that gender differences mainly occur when the type of humour is related to these differences (i.e. sexual humour; Henkin & Fish, 2010), men and women may respond differently to different types of humour (e.g. satire, irony) when used in the context of health issues.

Practical implications

Notwithstanding these limitations, revealing gender as a moderator of the effects of threat and humour in health campaigns provides communication professionals with relevant knowledge for the design of health messages for male and female audiences. Based on the current results, we argue that gender is a key audience characteristic to take into account when a campaign message uses humour to communicate about threatening health information. When men are the target group of a campaign, it would be advisable to combine a threatening message with an element of humour, whereas women may best be persuaded by a message that combines humour with low threat. Even when a health campaign does not distinguish between male and female target groups, one may consider developing different campaign messages for men and women.

In addition, as previously suggested by Nabi (2016), an advantage of using humour in health campaigns is that humour may trigger online sharing and interpersonal communication about campaign messages. That is, Berger and Milkman (2012) and Berger (2011) showed that people are more likely to share online content when it is emotionally arousing (either positively or negatively). The ability of humorous messages to spark social sharing and interpersonal communication can result in a larger distribution of the message than their less humorous counterparts (cf. Katz, 1957; Rogers, 1983). To what extent different combinations of humour and threat in health messages influence online sharing and interpersonal communication could be a fruitful avenue for future research.

Conclusion

In sum, the present research has demonstrated that the persuasive effects of combining threat and humour in health messages are different for men and women. That is, men responded more in line with message goals when high threat was combined with humour, whereas women seemed to prefer a humorous low threat message. Uncovering the moderating role of gender as a key audience characteristic may contribute to designing effective future health campaigns. Moreover, our research paves the way for future studies investigating the underlying mechanisms responsible for the different effects of combining threat and humour on message adoption by men and women.

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Notes

1. The four posters were selected based on an extensive pilot study among students from the same population ($N = 40$), addressing emotional responses to a larger set of anti-alcohol messages (i.e. by answering questions that were used as manipulation checks in the present study, such as 'The ad scares me' and 'I think the ad is funny'). The four posters used in the present study were most successful in eliciting the intended emotions. That is, the high threat posters were found most scary, and the humorous posters were evaluated as most funny.
2. In addition, a three-way ANOVA with perceived threat as a function of threat condition (low threat vs. high threat), humour condition (humour absent vs. humour present) and gender (men vs. women), showed that participants perceived the non-humorous message as less frightening ($M = 2.86$, $SD = 1.30$) than the humorous message ($M = 3.09$, $SD = 1.21$), $F(1, 201) = 5.47$, $p = .020$, $d = 0.18$, and men perceived the messages as less frightening ($M = 2.45$, $SD = 1.13$) than women ($M = 3.22$, $SD = 1.25$), $F(1, 201) = 19.25$, $p < .001$, $d = 0.65$. There were no significant two-way interactions (all $F_s < 1.29$, all $p > .257$). However, a significant Threat \times Humour \times Gender interaction was found, $F(1, 201) = 9.76$, $p = .002$, $\eta^2 = .039$. Simple main effect analyses demonstrated that men perceived the low threat messages with and without humour as equally frightening ($M_{\text{humour present}} = 2.12$, $SD = 1.06$ vs. $M_{\text{humour absent}} = 2.33$, $SD = 1.35$), $F < 1$, but they perceived the high threat message with humour as more frightening ($M = 3.29$, $SD = .96$) than the high threat message without humour ($M = 2.04$, $SD = .58$), $F(1, 201) = 8.86$, $p = .003$, $d = 1.58$. In contrast, women perceived the high threat messages with and without humour as equally frightening ($M_{\text{humour present}} = 3.51$, $SD = 1.04$ vs. $M_{\text{humour absent}} = 3.57$, $SD = 1.30$), $F < 1$, but they perceived the low threat message with humour as more frightening ($M = 3.18$, $SD = 1.30$) than the low threat message without humour ($M = 2.55$, $SD = 1.09$), $F(1, 201) = 5.03$, $p = .026$, $d = 0.53$.
3. In addition, a three-way ANOVA with perceived humour as a function of threat condition (low threat vs. high threat), humour condition (humour absent vs. humour present), and gender (men vs. women), showed that participants perceived the high threat message as less humorous ($M = 2.54$, $SD = 1.49$) than the low threat message ($M = 3.46$, $SD = 1.72$), $F(1, 201) = 14.10$, $p < .001$, $d = 0.57$, and women perceived the messages as less humorous ($M = 2.74$, $SD = 1.53$) than men ($M = 3.55$, $SD = 1.83$), $F(1, 201) = 7.69$, $p = .006$, $d = 0.48$.

The ANOVA did not show a Threat \times Gender interaction, nor a three-way interaction, but did show a marginally significant Humour \times Threat interaction, $F(1, 201) = 3.84$, $p = .051$, $\eta^2 = .015$ and a significant Humour \times Gender interaction, $F(1, 205) = 4.26$, $p = .040$, $\eta^2 = .016$. Simple main effect tests indicated that the humorous high threat message was perceived as less humorous ($M = 2.66$, $SD = 1.52$) than the humorous low threat message ($M = 4.10$, $SD = 1.65$), $F(1, 201) = 17.65$, $p < .001$, $d = 0.91$, whereas the non-humorous high threat and low threat messages did not differ in perceived humour ($M_{\text{high threat}} = 2.44$, $SD = 1.47$ vs. $M_{\text{low threat}} = 2.81$, $SD = 1.55$), $F(1, 201) = 1.50$, $p = .22$. Simple main effect tests also indicated that men considered the humorous message as more funny ($M = 4.13$, $SD = 1.74$) than women ($M = 2.95$, $SD = 1.59$), $F(1, 201) = 12.37$, $p = .001$, $d = 0.71$, whereas men and women did not differ in their perception of humour of the non-humorous message ($M_{\text{men}} = 2.77$, $SD = 1.67$ vs. $M_{\text{women}} = 2.56$, $SD = 1.46$), $F < 1$. Finally, men considered the humorous message as more funny than the non-humorous message, $F(1, 201) = 12.21$, $p = .001$, $d = 0.80$, whereas for women this difference did not reach significance, $F(1, 201) = 2.52$, $p = .114$.

4. Argument quality was manipulated as an additional factor in this study. However, including this variable in all reported analyses did not significantly affect our results. This variable is therefore not further discussed and not included in any of the analyses (i.e. low and high argument quality conditions were collapsed).
5. The cartoon, as well as the neutral picture in the humour absent condition were selected based on a pretest ($N = 24$; 10 women, 14 men; $M_{\text{age}} = 22.17$, $SD_{\text{age}} = 7.68$). In this pilot study, a set of pictures was rated on humour, using the semantic differential scales that were used as manipulation check in the present study, such as 'I think this picture is: not humorous-humorous'. Although the overall appreciation for the pictures did not significantly differ between the cartoon and the neutral picture that were used in the present study (measured on a ten-point scale; $M_{\text{cartoon}} = 5.50$, $SD_{\text{cartoon}} = 2.43$; $M_{\text{neutral picture}} = 4.20$, $SD_{\text{neutral picture}} = 1.48$, $F(1, 18) = 1.39$, $p = .254$, $d = 0.65$), the humour picture that was chosen for the present study was evaluated as highest on humour (seven-point scale; $M = 4.73$, $SD = 1.08$), whereas the neutral picture scored lowest on humour ($M = 1.77$, $SD = .71$) in the pretest, $F(1, 20) = 14.18$, $p = .001$, $d = 3.24$.
6. In addition, a three-way ANOVA with perceived threat as a function of threat condition (low threat vs. high threat), humour condition (humour absent vs. humour present) and gender (men vs. women), showed that women perceived the messages as more threatening than men ($M_{\text{women}} = 3.96$, $SD = 1.40$ vs. $M_{\text{men}} = 3.50$, $SD = 1.32$), $F(1, 234) = 7.89$, $p = .005$, $d = 0.34$. No interaction effects were significant (all $F_s < 2.50$, all $p > .12$).
7. A three-way ANOVA with perceived humour as a function of threat condition (low threat vs. high threat), humour condition (humour absent vs. humour present) and gender (men vs. women), did not show any additional effects (all $F_s < .37$, all $p > .54$).

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