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Evoked fear and effects of appeals on attitudes to performing breast self-examination: an information-processing perspective

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Abstract

The effect of fear arousal on attitude toward participating in early detection activities [i.e. breast self-examination (BSE)] was studied from an information-processing perspective. It was hypothesized that fear arousal motivates respondents to more argument-based processing of fear-relevant persuasive information. Respondents first read information about breast cancer in which fear was manipulated. After measuring fear arousal, respondents read a persuasive message about performing BSE. Analyses with reported fear, but not manipulated fear, found support for the hypothesis. Respondents who reported mild fear of breast cancer based their attitude toward BSE more on the arguments provided than respondents who reported low fear of breast cancer. This finding suggests that the use of fear arousal may be an efficient tool in health education practice. However, alternative interpretations are provided, in addition to the suggestion to be careful with using fear arousal in health education messages.

Introduction

One of the remaining questions in health education practice is whether an effective persuasive message should evoke fear of the negative consequences of unhealthy behavior. However, public health campaigns frequently employ potentially frightening messages that highlight threats to well being (e.g. HIV infection, lung cancer or car accidents) and recommend protective action (such as the use of condoms, to stop smoking or no drinking when you are driving). For instance, recent smoking prevention campaigns targeted at young people in The Netherlands and Australia vividly display the negative consequences of smoking, followed by a briefly formulated recommendation not to start smoking or to give up smoking (Stivoro, 1997; National Expert Advisory Committee on Tobacco, 1999). These campaigns have not been appropriately tested, but evaluations of comparable campaigns on HIV prevention in Australia (e.g. the 'Grim Reaper' campaign) and the UK (e.g. the 'Tombstones' campaign) have cast doubt on the effectiveness of evoking fear in health education practice (Rigby *et al.*, 1989; Ross *et al.*, 1990; Sherr, 1990). The present study was aimed to provide theoretical and practical implications for the role of fear arousal in health messages. It specifically examined the effects of evoked fear on argument-based processing of fear-relevant persuasive information. First we will briefly review the literature on fear arousal in health education, after which we will describe and discuss the rationale, methods and results of our study.

A fear appeal is a persuasive communication that arouses fear to promote self-protective action (Witte, 1992). Fear appeals have mainly been designed and studied from the perspective of Rogers' protection motivation theory (Rogers, 1975, 1983). This expectancy-value model postulates that the appraisal of a severe threat to which

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the recipient is susceptible will instigate protection motivation, but that the nature of this motivation will depend on coping appraisal. When the recommended precaution is evaluated as sufficient regarding its efficacy in averting the threat (response efficacy) and its feasibility (self-efficacy), it will be adopted. The result is a reduction in threat. When the recommendation is judged as not being helpful in coping with the threat, action will be focused on reducing experienced levels of fear (fear reduction or control, instead of threat reduction or danger control). The message may then be denied or avoided, while risk behavior generating the health threat will be maintained or even intensified [e.g. (Leventhal, 1970; Rogers, 1983; Rippetoe and Rogers, 1987; Mulilis and Lippa, 1990; Witte, (1993)].

Fear appeal theory therefore supposes that the kind of action undertaken in response to fear-arousing information varies with the interaction of the perceived threat of the health problem and the perceived efficacy of the recommended precaution. However, in a recent empirical review of protection motivation theory, Rogers and Prentice-Dunn concluded that in almost 50% of the studies the predicted interaction effect of threat and efficacy variables on precautionary motivation was not found [(Rogers and Prentice-Dunn, 1997), p. 119]. Thus, despite the long-standing interest in the effects of fear appeals within social psychology and health education research [for reviews, see (Higbee, 1969; Sutton, 1982; Eagly and Chaiken, 1993; Ruiter *et al.*, 2001)], empirical findings do not provide clear evidence of their effectiveness. In fact, recent meta-analyses of protection motivation theory indicate that threat appraisal measures are poor predictors of protective action compared to coping appraisal measures (Floyd *et al.*, 2000; Milne *et al.*, 2000). Severity and susceptibility perceptions seem to have a more distal effect on precautionary motivation than response efficacy and self-efficacy beliefs [e.g. (Rippetoe and Rogers, 1987; Abraham *et al.*, 1994); see also (Ruiter *et al.*, 2001)].

Certain mediating cognitive processes may be the reason for the inconsistencies regarding the interaction effect of threat and efficacy variables [*cf.* (Eagly and Chaiken, 1993)]. For instance, fearful respondents may become more critical and as a result easily reject recommended actions that are sustained with weak arguments [*cf.* (Baron *et al.*, 1994)]. Dual-process models of attitude formation and change, such as Petty and Cacioppo's elaboration likelihood model [ELM (Petty and Cacioppo, 1986)] and Chaiken's heuristic systematic model [HSM; see (Chaiken *et al.*, 1989)], may be helpful in studying the cognitive processes that mediate the effects of evoked fear on persuasion (i.e. attitude change). Both models suggest that attitude change after exposure to a persuasive message is not always the result of careful consideration of the quality of presented arguments as assumed by the cognitive response model (Greenwald, 1968). If the receiver is not motivated to carefully read the contents of the message or does not have the cognitive abilities for the task, attitude change may sooner be based on other characteristics of the message (i.e. peripheral cues), e.g. the layout of the message or the perceived credibility of the source of the message. Such peripheral or heuristic ('rule-of-thumb') processing of persuasive information results in relatively less stable attitudes, which predict behavior less well, compared with argument-based attitudes [for a recent overview of dual-process theories in attitudes, see (Chaiken and Trope, 1999)].

Factors such as perceived personal relevance and distraction have been studied quite extensively as possible determinants of an individual's motivation and ability to systematically process persuasive information (Eagly and Chaiken, 1993; Petty and Wegener, 1998). Studies into the effects of fear arousal on argument-based message processing have only recently been reported (Gleicher and Petty, 1992; Pointer and Rogers, 1993; Baron *et al.*, 1994; Meijnders, 1998). In general, these studies suggest that an increase in fear arousal is accompanied by more argument-based processing. This is especially true if recipients are not reassured in advance about the effectiveness of the recommended action to avoid a threat. In such a case, processing may undermine this reassurance

(Gleicher and Petty, 1992). The direction of these findings is in contrast with results reported by Jepson and Chaiken (Jepson and Chaiken, 1990). They concluded that fear of cancer impedes systematic processing of issue-specific persuasive messages. However, they studied the role of chronic issue-specific fear and argued that, in contrast to evoked fear, chronic fear may have resulted in well-learned defensive responses to fear-relevant material such as defensive avoidance.

The present study builds on research that examined the effects of evoked fear on argument-based processing of fear-relevant persuasive messages [e.g. (Baron *et al.*, 1994)]. Our study extends this line of research by studying the effects of fear of breast cancer on attitudes toward performing breast self-examination (BSE). Breast cancer is a highly prevalent type of cancer among women, which can be treated successfully if detected in an early stage. Performing BSE regularly is therefore an important self-protective behavior. In an experimental design, fear was evoked by providing participants with either low- or high-risk information about breast cancer. After the measurement of fear arousal, a persuasive message about performing BSE was presented. The main dependent variable was the attitude toward performing BSE. Consistent with the notion that fear arousal is a motivational construct that urges people to seek safety conditions [*cf.* Frijda, 1986; Ditto *et al.*, 1988; Dijker *et al.*, 1997)] and the little research that studied the persuasive effects of message-induced fear from an information-processing perspective (Gleicher and Petty, 1992; Pointer and Rogers, 1993; Baron *et al.*, 1994; Meijnders, 1998), we hypothesized that fear of breast cancer will increase argument-based processing of subsequent fear-relevant persuasive information.

Evidence for this hypothesis was sought by using two analytical procedures. First, argument-based processing implies that the strength of the provided arguments is supposed to influence attitudes (Petty and Cacioppo, 1986; Chaiken *et al.*, 1989). Therefore, we expected the effects of argument strength on attitude toward BSE to be stronger in the mild-fear conditions than in the low-fear conditions. Second, most fear appeal studies measured fear only after presenting the persuasive information and administering the dependent measures [e.g. (Gleicher and Petty, 1992; Baron *et al.*, 1994)]. This excludes the possibility to study the effects of evoked fear, as it leaves it unclear whether the fear reported was the actual level of fear while reading the threat information or some residual level that remained after reading the persuasive information [*cf.* (Sutton, 1982)]. We therefore measured fear arousal directly after participants read the threat information about breast cancer and before they read the persuasive information about BSE. This also made it possible to test the effects of reported fear on argument-based processing. We expected the effects of argument strength on attitude toward BSE to be stronger among participants who reported mild fear arousal than among participants who reported low fear arousal.

Method

Participants and experimental design

The participants were 88 female first-year undergraduates at Maastricht University. Their mean age was 20 years. The participants were contacted by means of registration forms that asked for first-year students to participate in several behavioral science studies. After leaving their name and telephone number, they were invited by telephone to come to the laboratory. They were not given any information in advance about the topic and objectives of the study other than that they had to read some educational materials and answer some questions. They were randomly assigned to the conditions of a 2 (Fear: low versus mild)×2 (Argument Strength: weak versus strong) between-participants design.

Procedure

Participants were invited to the laboratory in groups of at most four persons and were placed in separate cubicles. They started with completing a questionnaire provided to them on paper, which measured their pre-experimental attitude toward BSE. They

were then told that they would evaluate the effectiveness of several educational messages about breast cancer developed by the Department of Health Education and Promotion of Maastricht University. The experiment was completely computer controlled. Participants first read a message about the threat of breast cancer, which contained the manipulation of fear. The threat message was followed by a self-report measure of fear arousal. Next, participants read a persuasive message about performing a monthly BSE, supported by either eight weak or eight strong arguments, which constituted the manipulation of argument strength (see Appendix). Finally, a questionnaire was administered with the post-experimental attitude toward BSE as dependent measure.

Manipulations

Fear

A common way to induce different levels of fear arousal is that in the mild-fear condition the threat is presented as very severe and as personally relevant, because the person is told to be susceptibility to it. Conversely, in the low-fear condition the threat is presented as not severe and not personally relevant [e.g. (Gleicher and Petty, 1992; Baron *et al.*, 1994; Meijnders, 1998)]. Thus in many studies, severity and susceptibility are confounded, and their independent effects on precautionary motivation cannot be studied [*cf.* (Eagly and Chaiken, 1993)].

For several reasons we decided to manipulate fear of breast cancer by varying information about the severity of breast cancer, while keeping constant information that stressed the perceiver's susceptibility to breast cancer. Firstly, 71 female first-year undergraduates of the University of Leiden participated in a pre-test of the fear manipulation in which severity and susceptibility information were varied. A 2 (Severity: low versus high)$\times$2 (Susceptibility: low versus high) between participants design showed that severity significantly interacted with Susceptibility on a four-point scale of fear arousal, $F(1,67) = 4.10$, $P < 0.05$. More specific analyses revealed that the largest difference between the means was the result of a main effect of Severity among conditions of high susceptibility ($M_{\text{high severity, high susceptibility}} = 2.87$ versus $M_{\text{low severity, high susceptibility}} = 1.87$). In other words, severity seems only important in fear arousal among women who believed to be susceptible to the threat of breast cancer. Secondly, it may ease the interpretation of the effects of threat information if only one fear component (i.e. severity) is varied. Thirdly, perceptions of severity are assumed to be more strongly related to the emotion of fear than perceptions of susceptibility [see (Rogers, 1983)].

To stress recipients' susceptibility to breast cancer, both the low- and the mild-fear message emphasized that breast cancer is a relevant topic even for women younger than 30 years of age. Information about the severity of breast cancer was varied. In the mild-fear condition it was explained that most of the women with breast cancer die from their disease, whereas in the low-fear condition the text read that women with breast cancer have a good chance to fully recover from their disease. Furthermore, the mild-fear condition described a 'radical mastectomy' (breast removal) as a common treatment for breast cancer and was accompanied by two photos showing the serious physical consequences of this treatment. The low-fear condition described a less radical treatment called 'lumpectomy' which removes the tumor without affecting the breast itself, accompanied by two photos that showed no visible physical consequences except for a small scar.

Argument strength

The manipulation of argument strength was developed and pre-tested along the guidelines proposed by Petty and Cacioppo [(Petty and Cacioppo, 1986), pp. 31–33]. Either eight strong arguments or eight weak arguments persuaded respondents to perform monthly BSE. Both persuasive messages were equal in length (694 words). An example of a weak argument that was used was: 'Performing BSE is a nice way to be intimate with yourself'. An example of a strong argument was: 'By performing BSE you are able to detect breast cancer in an earlier and therefore more treatable stage'.

Measures

Pre-experimental attitude

In the first questionnaire, three semantic-differentials assessed respondents' attitude toward BSE on seven-point scales (unimportant–important, undesirable–desirable, ineffective–effective; Cronbach's $\alpha = 0.71$). This measure was used as a covariate to control for existing differences in attitude toward BSE between participants upon entering the experiment. Our interest in these questions was concealed by including similar questions concerning other health topics (i.e. AIDS and condom use, skin cancer and self-examination, and heart disease and low-fat diet).

Fear arousal

The level of evoked fear of breast cancer was measured between the fear-arousal message and the persuasive message through 10 mood adjectives (relaxed, nervous, tense, jittery, restful, anxious, calm, uncomfortable, worried, frightened) on a four-point scale (1 = not at all, 2 = a little, 3 = rather much and 4 = very much). The adjectives were presented in random order. The adjectives and answering scale were derived from earlier social psychological research into the effects of fear appeals [e.g. (Leventhal *et al.*, 1965; Rippetoe and Rogers, 1987; Mewborn and Rogers, 1979)], the 'tense arousal scale' of the UWIST mood adjective checklist (Matthews *et al.*, 1990), and the Dutch version of the Spielberger's (Spielberger *et al.*, 1970) state and trait anxiety index (Van der Ploeg et al., 1979). After proper re-coding, the scores on 10 items were averaged into one index of fear arousal (Cronbach's $\alpha = 0.92$).

Post-experimental attitude

The attitude toward performing a monthly BSE was assessed directly after reading the persuasive message by four seven-point semantic differentials (unimportant–important, undesirable–desirable, bad–good, negative–positive). Scores on these items were averaged to create a single attitude index (Cronbach's $\alpha = 0.85$).

Ancillary measures

To check whether the fear messages indeed were able to vary perceptions of severity under conditions of high susceptibility, we measured both constructs. Perceived severity of breast cancer was originally measured by three items, but weak inter-correlations between these items (Cronbach's $\alpha = 0.55$) made us decide to use the single item that most directly measured perceived severity ('To what extent do you consider breast cancer a serious health problem; 1 = not at all–7 = very serious'). Three items measured perceived susceptibility to breast cancer (Cronbach's $\alpha = 0.78$, e.g. 'To what extent do you think that breast cancer is a health problem that can happen to yourself; 1 = not at all–7 = very much').

The argument strength manipulation was checked after the post-experimental attitude measure by asking respondents 'To what extent do you think that the message about BSE used strong arguments for advocating the performance of breast self-examination' (1 = no strong arguments–7 = a lot of strong arguments).

Finally, two items asked participants whether they knew somebody among their friends or family who (had) suffered from breast cancer (yes–no) or another kind of cancer (yes–no).

Debriefing

Before leaving the cubicles, participants read a message on the computer screen that stated the actual objectives of the study. It further told them that the presented information was correct but differently worded between groups to induce different levels of perceived threat. On leaving the laboratory participants were individually and extensively debriefed. They were invited to talk about how they experienced the study. The experimenter was particularly alert on any signs of current fears as expressed by the participants. No such signs were perceived. On the contrary, many participants responded that they thought the study was interesting and that they learned something new, while others informed the experimenter that the topic was familiar to them because they knew somebody in their social environment who (had)

suffered from breast cancer. No signs of fear were expressed and none of the participants reported that they regretted their participation.

Furthermore, participants received a booklet about breast cancer and an instruction card on how to perform BSE. Both are used by the Dutch Cancer Society as standard materials in their educational program about breast cancer. Participants were urged to read the booklet and instruction card to correct any misinterpretations of the information provided in the experimental study. They further received a monetary reward of Dfl10 (about US$5) for participating and were asked to be silent about the objectives of the study.

Results

Manipulation checks

Fear of breast cancer was successfully evoked and manipulated. An independent samples *t*-test on actual fear showed that respondents in the mild-fear condition reported more fear ($M = 2.51$, SD = 0.58) than respondents in the low-fear condition ($M = 1.98$, SD = 0.55) after reading information about breast cancer, $T(86) = 4.43$, $P < 0.001$. Furthermore, two 2 (Fear)×2 (Argument Strength) ANOVAs on perceived severity and perceived susceptibility, respectively, replicated the pre-test findings that fear arousal can be successfully manipulated by varying severity information under conditions of high perceived susceptibility. The main effect of Fear was significant on perceived severity, $F(1,84) = 9.87$, $P < 0.001$, and not on perceived susceptibility, $F(1,84) = 2.19$, $P = 0.14$. Respondents in the mild-fear conditions perceived breast cancer as more severe ($M = 5.86$, SD = 0.93) than respondents in the low-fear conditions ($M = 5.11$, SD = 1.26). Both groups felt equally susceptible to breast cancer ($M = 4.55$, SD = 1.00 versus $M = 4.21$, SD = 1.16, respectively). No other statistically significant effects were found ($P > 0.28$).

The manipulation of argument strength was also successful. We only found a significant main effect of Argument Strength in a 2 (Fear)×2 (Argument Strength) ANOVA on perceived argument strength, $F(1,84) = 20.05$, $P < 0.001$. Respondents judged the strong message as having stronger arguments ($M = 5.52$, SD = 1.02) than the weak message ($M = 4.39$, SD = 1.33). Neither the effect of Fear nor the interaction between Fear and Argument Strength was significant ($P > 0.21$).

Pre-experimental attitude

We carried out a randomization check on pre-experimental attitude. This revealed that pre-experimental attitude was the same for all conditions of the design ($P > 0.49$). Nevertheless, to increase the statistical power of our tests, we included pre-experimental attitude as covariate in the analyses reported below. The pre-experimental attitude was significantly related to post-experimental attitude in all analyses ($P < 0.001$) and thus permitted a more powerful test of the effect under consideration.

Manipulated fear and attitude toward BSE

Manipulated fear (Fear) was used as a factor in the design to test the hypothesis that fear of breast cancer leads to more argument-based processing of BSE information. We expected the effect of argument strength on attitude toward BSE to be stronger in the mild-fear conditions than in the low-fear conditions. A 2 (Fear)×2 (Argument Strength) analysis of variance with pre-experimental attitude as covariate (ANCOVA) revealed a main effect of Argument Strength that approached significance, $F(1,83) = 3.59$, $P = 0.06$. Respondents reported a more positive attitude toward BSE after reading the strong message ($M = 6.15$, SD = 0.78) than after reading the weak message ($M = 5.91$, SD = 0.70). The main effect of Fear was not statistically significant, $F(1,83) = 1.73$, $P = 0.19$, and more importantly, neither was the predicted interaction between Fear and Argument Strength, $F < 1.00$. Therefore, this analysis provided no support for the hypothesis. The main effect of Argument Strength suggests argument-based message processing irrespective of the level of evoked fear.

Reported fear and attitude toward BSE

Next, we tested our hypothesis with measured fear, instead of manipulated fear. We first carried out a median-split procedure on the self-reported level of fear (*Med* = 2.30). The resulting factor named Reported Fear was included in a 2 (Reported Fear: low versus mild)×2 (Argument Strength: weak versus strong) between-participants design. Four respondents who scored exactly on the median were excluded from the analyses ($N = 84$). The median-split procedure was successful as respondents were equally distributed over the four cells of the design, χ^2 (1, $N = 84$) = 0.20, $P = 0.66$. Including Reported Fear as a factor was justified and did not hamper causal interpretations of the findings. The measure of fear directly followed the fear manipulation and preceded the reading of the persuasive message, which constituted the argument strength manipulation.

A 2 (Reported Fear)×2 (Argument Strength) ANCOVA with pre-experimental attitude as covariate revealed a significant effect of Argument Strength, $F(1,79) = 3.92$, $P = 0.05$. The attitude toward BSE was more positive after reading the strong persuasive message ($M = 6.16$, SD = 0.76) than after reading the weak persuasive message ($M = 5.90$, SD = 0.70). More importantly, this effect of Argument Strength was qualified by an interaction with Reported Fear that approached significance, $F(1,79) = 3.18$, $P < 0.08$. To test our hypothesis that fear arousal increases motivation to elaborate on fear-relevant information, separate analyses were conducted for participants who reported low- and mild-fear arousal. As predicted, participants who reported mild fear based their attitude on the strength of the arguments presented, while participants who reported low fear did not (see Figure 1). More specifically, a significant effect of Argument Strength among participants who reported mild levels of fear of breast cancer indicated that they were more positive toward BSE after reading the strong persuasive message ($M = 6.32$, SD = 0.71) than after reading the weak persuasive message ($M = 5.76$, SD = 0.79), $F(1,40) = 8.18$, $P < 0.01$. In contrast, participants who reported low levels of fear did not seem to differ in their attitude toward BSE, whether they read the strong persuasive message ($M = 6.02$, SD = 0.79) or the weak persuasive message ($M = 5.99$, SD = 0.62), $F < 1.00$.

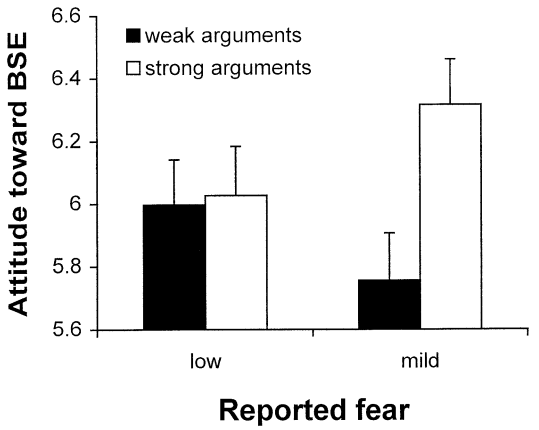


Fig. 1. Attitude toward BSE as function of reported fear and argument strength. Bars show means with higher scores indicating more positive attitude toward BSE performance. Error bars show mean + 1.0 SEM.

Discussion

In the present study, we examined the effect of fear arousal on argument-based processing of fear-relevant persuasive information. We built on earlier work that provided support for the positive effects of evoked fear on information processing in the domains of dental hygiene behavior (Baron *et al.*, 1994), campus safety (Gleicher and Petty, 1992), environmental protection (Meijnders, 1998) and alcohol consumption (Pointer and Rogers, 1993). We extended these earlier studies by focusing on the effect of fear of breast cancer on argument-based processing of information about BSE performance and by using self-reported fear as an independent variable in our analyses. The latter provides a more direct test of the effect of evoked fear on argument processing. We expected that the effect of argument strength on attitude toward BSE would be stronger in the mild-fear conditions than in the low-fear conditions. However, this was not supported by analyses with manipulated fear.

Instead, the findings suggested that participants carefully read the persuasive information provided, irrespective of the threat information that they read.

The measurement of evoked fear between the manipulations of fear and argument strength allowed us to study the effect of reported (i.e. not manipulated) fear on argument-based processing of fear-relevant persuasive information. Consistent with our hypothesis, we found that the effect of argument strength on the attitude toward BSE was stronger among participants who reported mild fear after reading information about breast cancer than among participants who reported low fear.

Thus, in contrast to the earlier studies that used manipulated fear, the support we found for the hypothesis was based on analyses with reported fear. This requires some further discussion. Although in our case the measurement of reported fear preceded the argument strength manipulation and thus did not seem to hamper causal interpretations of the effect of evoked fear, the inclusion of self-report measures in between-subjects designs may weaken the strength of these designs. Grouping people on the basis of a median-split procedure does not exclude the possibility that we distinguished, for instance, people who are more easily frightened from those that are less easily frightened (e.g. neurotic) or people who are chronically afraid of breast cancer from those that are not (e.g. previous experience with breast cancer) or people who are reactive to experimental demands from those that are not trying to be helpful to the experimenters. In other words, a third variable or any other variable we are not aware of may have been responsible for the effect of evoked fear on argument-based message processing.

Nevertheless, we have reasons to assume that these kind of alternative interpretations of the effect of reported fear are less applicable to the present study. First, the self-report scale we used for measuring fear has been well validated in past fear appeal research [e.g. (Mewborn and Rogers, 1979)] and is generally accepted as a measure of fear arousal in social psychology (Rogers, 1983; Witte, 1992) and other domains such as clinical psychology (Rachman, 1998). Second, we found no relation between reported fear and previous experience with breast cancer patients, either in family or other social relationships ($P > 0.21$). Finally, none of the participants indicated during the debriefing procedure that he or she found out about the study objectives. Nevertheless, future studies would more easily reject these alternative explanations of our findings with reported fear if they would make use of psychophysiological indices to measure fear arousal, in addition to the cognitive responses to self-report measures of fear that we used. Psychophysiological indices, such as the startle reflex and galvanic skin response, have been successfully employed as valid measures of fear arousal [e.g. (Lang, 1995)]. The additional advantage of these measures above self-report measures is that they do not interfere with the process that is being studied.

If we indeed measured evoked fear of breast cancer, then an important question to ask is why our hypothesis about the effect of evoked fear on argument-based processing was only supported for reported fear and not for manipulated fear. Two answers can be proposed for this question, based on the way we manipulated fear. First, the effect of manipulated fear may have been hindered by deliberately creating low and mild fear messages that induced equal perceptions of personal relevance in both groups. Dual process models of attitude change suggest that perceived personal relevance of the message is an important determinant of processing motivation [for reviews, see (Johnson and Eagly, 1989; Petty and Cacioppo, 1986)]. Assuming that perceptions of personal relevance and susceptibility are closely related to each other [e.g. (Baron *et al.*, 1994), but see also (Ruiter *et al.*, 2001)], it may thus be that the susceptibility to breast cancer we imposed on respondents in both fear conditions resulted in equal high processing motivation between both groups, as suggested by the reported main effect of argument strength, and thus resulted in no support for the hypothesis with manipulated fear.

Secondly, the lack of empirical support for manipulated fear suggests that perceptions of severity, which were successfully varied, do not influ-

ence argument-based message processing; at least not when people already feel susceptible to the threat. This lack of support for variations of severity on argument-based processing may explain why of the four components that comprise a fear appeal [i.e. severity, susceptibility, response efficacy and self-efficacy (Rogers, 1983)], perceptions of severity generally have been found to have the weakest relation with measures of precautionary motivation (Eagly and Chaiken, 1993; Floyd *et al.*, 2000; Milne *et al.*, 2000; Ruiter, manuscript under revision). Perceptions of severity may simply not raise sufficient attention for threat-related persuasive information, and thus do not reliably affect measures of precautionary motivation and self-protective action.

In conclusion, the present study supports the hypothesis that evoked fear motivates people into more argument-based processing. This conclusion supports earlier research that studied the effects of fear appeals from an information-processing perspective. Future research should now focus on disentangling the effects of fear arousal, perceived severity and perceived susceptibility on processing motivation. The effects of evoked fear may best be studied by using psychophysiological measures (e.g. startle reflex), whereas perceptions of susceptibility and severity need to be manipulated independently. To what extent the latter is possible, is an empirical question that awaits critical tests [*cf.* (Eagly and Chaiken, 1993)].

The findings presented here are not without limitations. Dual-process models in attitude theory suggest that argument-based attitudes are better predictors of behavior than attitudes based on peripheral cues or heuristic reasoning [e.g. (Petty *et al.*, 1995)]. In the present study the effect of fear-instigated and argument-based attitude change on precautionary action could not be tested. It should be doubted, however, whether we would find this effect if we measured actual BSE performance. Attitude-behavior research consistently shows that efficacy perceptions and goal intentions are more important predictors of precautionary action than threat perceptions and fear arousal [*cf.* (Godin and Kok, 1996)]. Furthermore, work by Gollwitzer and colleagues on implementation intentions has shown that statements by recipients of where and when they will perform the recommended action, which lack extensive reasoned processing, are simple but powerful tools in establishing behavioral change [(Gollwitzer and Moskowitz, 1996; Gollwitzer and Schaal, 1998); e.g. (Orbell *et al.*, 1997), for empirical evidence].

Furthermore, fear-arousing campaigns are typically used to motivate young people to safer behavior. This partly justifies our choice for selecting first-year undergraduates as research participants. On the other hand, the high educational level of this group makes them not representative of the total population of young women in The Netherlands. Therefore, to generalize our findings, the current study needs to be replicated among other subpopulations of young women including those with lower educational levels and other age groups.

Finally, our findings may only generalize to the one health behavior of performing BSE or, at best, a category of health behaviors that is defined by Rothman and Salovey (Rothman and Salovey, 1997) as detection behaviors (e.g. getting regularly medical examinations) and is contrasted with (primary) prevention behaviors (e.g. using condoms to prevent HIV infection; exercising regularly). Recent studies by Rothman and Salovey and their colleagues into the effects of action framing on health protective actions indeed suggest that negatively framed messages that present the negative consequences of not performing the health action (e.g. fear appeals) are more effective when promoting detection behaviors, whereas positively framed messages that present the positive consequences of doing the health action are more effective when promoting prevention behaviors (Rothman and Salovey, 1997; Detweiler *et al.*, 1999; Rothman et al., 1999). To what extent different framing of the persuasive message within fear appeals influences the effects of evoked fear on precautionary motivation is an empirical question that has not been tested yet.

For the practice of health education and promotion, our findings suggest that evoked fear may

only result in possible effects on precautionary motivation and action if campaign developers are able to sustain the recommended action with strong arguments. A main feature of strong arguments is that they are perceived as new, in addition to being relevant and in the right direction [(Vinokur and Burnstein, 1978); see also (Petty and Wegener, 1998)]. However, presenting strong arguments may not be easy, especially when most arguments are in the public domain and therefore are already known to the target audience, as is for example the case with breast cancer and performing BSE. Furthermore, practical use of fear appeals is mainly to be found in mass media campaigns. Typically, these campaigns emphasize the negative consequences of the unsafe behavior (i.e. severity), followed by a brief formulation of the recommended action. These campaigns thus 'forget' to stress essential psychological constructs in an effective fear appeal, that is the respondent's susceptibility to the threat, and the effectiveness and feasibility of the recommended action. As we reviewed in the Introduction, fear-arousing information may only result in health protective motivation if the threat is perceived as personally relevant and information is available that sustains the effectiveness and feasibility of the recommended action with strong arguments.

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References

Abraham, C. S., Sheeran, P., Abrams, D. and Spears, R. (1994) Exploring teenagers' adaptive and maladaptive thinking in relation to the threat of HIV infection. *Psychology and Health*, **9**, 253–272.

Baron, R., Logan, H., Lilly, J., Inman, M. and Brennan, M. (1994) Negative emotion and message processing. *Journal of Experimental Social Psychology*, **30**, 181–201.

Chaiken, S. and Trope, Y. (eds) (1999) *Dual-process Theories in Social Psychology*. Guilford Press. New York.

Chaiken, S., Liberman, A. and Eagly, A. H. (1989) Heuristic and systematic processing within and beyond the persuasion context. In Uleman, J. S. and Bargh, J. A. (eds), *Unintended Thought*. Guilford Press, New York, pp. 212–252.

Detweiler, J. B., Bedell, B. T., Salovey, P., Pronin, E. and Rothman, A. J. (1999) Message framing and sunscreen use: gain-framed messages motivate beach-goers. *Health Psychology*, **18**, 189–196.

Dijker, A. J., Koomen, W. and Kok, G. (1997) Interpersonal determinants of fear of people with AIDS: the moderating role of predictable behavior. *Basic and Applied Social Psychology*, **19**, 61–79.

Ditto, P. H., Jemmott, J. B. and Darley, J. M. (1988) Appraising the threat of illness: a mental representational approach. *Health Psychology*, **7**, 183–200.

Eagly, A. H. and Chaiken, S. (1993) *The Psychology of Attitudes*. Harcourt Brace Jovanovich, Fort Worth, TX.

Floyd, D. L., Prentice-Dunn, S. and Rogers, R. W. (2000) A meta-analysis of research on protection motivation theory. *Journal of Applied Social Psychology*, **30**, 407–429.

Frijda, N. (1986) *The Emotions*. Cambridge University Press, Cambridge.

Gleicher, F. and Petty, R. E. (1992) Expectations of reassurance influence the nature of fear-stimulated attitude change. *Journal of Experimental Social Psychology*, **28**, 86–100.

Godin, G. and Kok, G. (1996) The theory of planned behavior: a review of its applications to health-related behaviors. *American Journal of Health Promotion*, **11**, 87–98.

Gollwitzer, P. M. and Moskowitz, G. B. (1996) Goal effects on action and cognition. In Higgins, E. T. and Kruglanski, A. (eds), *Social Psychology: Handbook of Basic Principles*. Guilford Press, New York, pp. 361–399.

Gollwitzer, P. M. and Schaal, B. (1998) Metacognition in action: the importance of implementation intentions. *Personality and Social Psychology Review*, **2**, 124–136.

Greenwald, A. G. (1968) Cognitive learning, cognitive response to persuasion, and attitude change. In Greenwald, A. G., Brock, T. C. and Ostrom, T. M. (eds), *Psychological Foundations of Attitudes*. Academic Press, San Diego, CA, pp. 147–170.

Higbee, K. L. (1969) Fifteen years of fear arousal: Research on threat appeals: 1953–1968. *Psychological Bulletin*, **72**, 426–444.

Jepson, C. and Chaiken, S. (1990) Chronic issue-specific fear inhibits systematic processing of persuasive communications. *Journal of Social Behavior and Personality*, **5**, 61–84.

Johnson, B. T. and Eagly, A. H. (1989) Effects of involvement on persuasion: a meta-analysis. *Psychological Bulletin*, **106**, 375–384.

Lang, P. J. (1995) The emotion probe: studies of motivation and attention. *American Psychologist*, **50**, 372–385.

Leventhal, H. (1970) Findings and theory in the study of fear communications. *Advances in Experimental Social Psychology*, **5**, 119–187.

Leventhal, H., Singer, R. P. and Jones, S. (1965) Effects of fear and specificity of recommendation upon attitudes and behavior. *Journal of Personality and Social Psychology*, **2**, 20–29.

Matthews, G., Jones, D. M. and Chamberlain, A. G. (1990) Refining the measurement of mood: the UWIST Mood Adjective Checklist. *British Journal of Psychology*, **81**, 17–42.

Meijnders, A. L. (1998) Climate change and changing attitudes: effect of negative emotion on information processing. *Doctoral dissertation*, Eindhoven University of Technology, Eindhoven.

Mewborn, C. R. and Rogers, R. W. (1979) Effects of threatening and reassuring components of fear appeals on physiological and verbal measures of emotion and attitudes. *Journal of Experimental Social Psychology*, **15**, 242–253.

Milne, S., Sheeran, P. and Orbell, S. (2000) Prediction and intervention in health-related behavior: a meta-analytic review of protection motivation theory. *Journal of Applied Social Psychology*, **30**, 106–143.

Mulilis, J. P. and Lippa, R. (1990) Negative threat appeals: a test of protection motivation theory. *Journal of Applied Social Psychology*, **20**, 619–638.

National Expert Advisory Committee on Tobacco (1999) *Australia's National Tobacco Campaign: Evaluation Report Volume 1: Every Cigarette is Doing you Damage*. Commonwealth Department for Health and Aged Care, Canberra.

Orbell, S., Hodgkins, S. and Sheeran, P. (1997) Implementation intentions and the theory of planned behavior. *Personality and Social Psychology Bulletin*, **23**, 945–954.

Petty, R. E. and Cacioppo, J. T. (1986) *Communication and Persuasion: Central and Peripheral Routes to Attitude Change*. Springer-Verlag, New York.

Petty, R. E. and Wegener, D. T. (1998) Attitude change: multiple roles for persuasion variables. In Gilbert, D. T., Fiske, S. T. and Lindzey, G. (eds), *The Handbook of Social Psychology*, 4th edn. McGraw-Hill, New York, pp. 323–390.

Petty, R. E., Haugtvedt, C. P. and Smith, S. M. (1995) Elaboration as a determinant of argument strength: creating attitudes that are persistent, resistant and predictive of behavior. In Petty, R. E. and Krosnick, J. A. (eds), *Attitude Strength: Antecedents and Consequences*. Lawrence Erlbaum, Mahwah, NJ, pp. 93–130.

Pointer, J. L. and Rogers, R. W. (1993) Cognitive processing and persuasive effects of threat, argument quality, and source expertise. Poster session presented at the *Meeting of the American Psychological Society*, Chicago, IL

Rachman, S. J. (1998) *Anxiety.* Psychology Press, Hove.

Rigby, K., Brown, M., Anagnostou, P., Ross, M. W. and Rosser, B. R. S. (1989) Shock tactics to counter AIDS: the Australian experience. *Psychology and Health*, **3**, 145–159.

Rippetoe, P. A. and Rogers, R. W. (1987) Effects of components of protection motivation theory on adaptive and maladaptive coping with a health threat. *Journal of Personality and Social Psychology*, **52**, 596–604.

Rogers, R. W. (1975) A protection motivation theory of fear appeals and attitude change. *The Journal of Psychology*, **91**, 93–114.

Rogers, R. W. (1983) Cognitive and physiological processes in fear appeals and attitude change: a revised theory of protection motivation. In Cacioppo, J. T. and Petty, R. E. (eds), *Social Psychophysiology: A Sourcebook*. Guilford Press, New York, pp. 153–176.

Rogers, R. W. and Prentice-Dunn, S. (1997) Protection motivation theory. In Gochman, D. S. (ed.), *Handbook of Health Behavior Research I: Personal and Social Determinants*. Plenum Press, New York, vol. 1, pp. 113–132.

Ross, M. W., Rigby, K., Rosser, B. R., Anagnostou, P. and Brown, M. (1990) The effect of a national campaign on attitudes toward AIDS. *AIDS Care*, **2**, 339–346.

Rothman, A. J. and Salovey, P. (1997) Shaping perceptions to motivate healthy behavior: the role of message framing. *Psychological Bulletin*, **121**, 3–19.

Rothman, A. J., Martino, S. C., Bedell, B. T., Detweiler, J. B. and Salovey, P. (1999) The systematic influence of gain- and loss-framed messages on interest in and use of different types of health behavior. *Personality and Social Psychology Bulletin*, **25**, 1355–1369.

Sherr, L. (1990) Fear arousal and AIDS: do shock tactics work? *Aids*, **4**, 361–364.

Spielberger, C. D., Gorsuch, R. L. and Lushene, R. E. (1970) *STAI Manual for the State-Trait Anxiety Inventory.* Consulting Psychologists Press, Palo Alto, CA.

Stivoro (1997) *'...Maar ik rook niet!' ['...But, I don't smoke!']*. Stivoro, Den Haag.

Sutton, S. R. (1982) Fear-arousing communications: a critical examination of theory and research. In Eiser, J. R. (ed.), *Social Psychology and Behavioral Medicine*. Wiley, Chichester, pp. 303–337.

Van der Ploeg, H. M., Defares, P. B. and Spielberger, C. D. (1979) *Zelf-Beoordelings-Vragenlijst. STAI-versie DY-1 en versie DY-2 [Self-Judgement-Questionnaire. STAI version DY-1 and version DY-2].* Swets en Zeitlinger, Lisse.

Vinokur, A. and Burnstein, E. (1978) Novel argumentation and attitude change: the case of polarization following group discussion. *European Journal of Social Psychology*, **8**, 335–348.

Witte, K. (1992) Putting the fear back into fear appeals: the extended parallel process model. *Communication Monographs*, **59**, 329–349.

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Appendix

Weak persuasive message

What can you do yourself: breast self-examination
Many women examine their breasts for any changes every month. This booklet tells you why should also perform breast self-examination. But it first tells you how and when breast self-examination should be carried out.

When and how?
Performing breast self-examination means that a woman checks her breasts for changes once a month. The best time to do so is several days after menstruation. The breasts are then less swollen and therefore easier to examine. Many women have swollen breasts just before they have their periods, which often feel painful. As a result of a change in hormone production, lumps can sometimes be felt. After menstruation, these lumps will disappear or become smaller.

When your examine your breasts, be aware that they are never similar to each other. When you examine one breast and you think that you found something irregular but you are not sure, check the same part of your other breast. If you feel the same irregularity in both breasts, then this is probably due to the build of your breasts. If you have doubts about this, you should visit your GP. Do not keep yourself in a state of uncertainty.

Why breast self-examination?
Monthly breast self-examination is recommended by the European Cancer Code. This code was formulated by the Europe against Cancer organization and is part of a large program against cancer. The objective of this program is to reduce the risk of cancer and the expected death from cancer in the [then] 12 EC countries.

More and more women perform monthly breast self-examinations, mainly because they are now more concerned with their lives. In addition, they have a sense of responsibility for their environment ('You do no want to burden others with a disease that you could have prevented'), which for many women is a reason to perform breast self-examination. To make breast self-examination a habit, it is wise to start early, e.g. during your years of study. After all, during your study period, organizing and planning daily activities becomes more and more important. That is why the period of study is an ideal time to incorporate breast self-examination in your daily schedule. Moreover, breast self-examination is a nice way to be intimate with yourself and to get to know your body. In that way, you combine pleasure with business. A last important reason is that by performing monthly breast self-examination you save the community a lot of money. The medical costs of the treatment of breast cancer are much higher when the disease is detected in an advanced stage, because more and more expensive specialist care is needed.

Fear of detection
Many women do not perform breast self-examination because they fear that they will detect breast cancer. Such fears are understandable, but be aware that only by performing breast self-examination you will know whether you have breast cancer or not.

Some women decide to have their breasts examined by a physician. But if the physician instead of you yourself detects an abnormality, you immediately end up in the medical circuit. You will then have no opportunity to take your time and think about what is happening.

Conclusion
This booklet gives several reasons for performing monthly breast self-examination. The reasons are summarized below.

First, you take responsibility for your social environment and the society in general when you decide to perform monthly breast self-examination. After all, you cannot burden other people with a problem that you could have prevented yourself.

Second, your years of study are a perfect time to make the performance of monthly breast self-examination a habit in your life. During these years, you learn the best way to plan your daily activities.

Finally, by performing monthly breast self-examination you contribute to the objectives set by the 'Europe against Cancer' organization. That is, to reduce the number of cancer deaths in the coming years.

Strong persuasive message

What you can do yourself: breast self-examination
Like you just read, you too could get breast cancer. If you develop breast cancer, it is of utmost importance that you detect it at an early stage. In this way you will considerably increase your chances of full recovery.

Worldwide scientific research has shown that the chance of full recovery is around 90% when breast cancer is detected at an early stage, i.e. before the formation of secondary tumors (metastasis). It is therefore very important for every woman to perform breast self-examination every month.

Breast self-examination: how often, when and how?
Performing breast self-examination means that you check your breasts for changes once a month. The best time to do so is a few days after menstruation. The breasts are then less swollen and thus easier to examine.

Breast self-examination is easy to perform, quick to learn and only takes 10 min every time. Furthermore, it costs no money and you do not need special equipment.

You will find a detailed description of how to carry out breast self-examination in the instructions that will be handed out to you at the end of the study. When your examine your breasts, be aware that they are never the same. When you examine one breast and you think that you found something irregular but you are not sure, then check the same part of your other breast. When you feel the same irregularity in both breasts, this is probably due to the build of your breasts. Do not panic if you feel something that was not there last month. This certainly does not have to mean that you have cancer. Just do not keep yourself in a state of uncertainty and visit your GP.

Why breast self-examination?

Scientific research has shown that regular breast self-examination is the most effective and efficient way to detect breast cancer at an early stage. It is true that there has also been a national screening program for breast cancer using X-ray techniques (mammography) for a few years now, but this only targets women of 50 years of age and older. Performing breast self-examination does not replace mammography. The two methods complement each other.

Today, more women than ever before perform breast self-examination to check whether their breasts have changed. Especially the high survival rates when breast cancer is detected at an early stage and the fact that women can contribute to this themselves are important reasons for women to perform regular breast self-examination.

To make breast self-examination effective, it is important that you start at young age, preferably from 18 years onwards. If you spend some time every month to examine your breasts, it will become a habit and you will easily learn how your breasts normally feel. This increases your chances to detect any changes in your breasts. Moreover, you will be able to tell your GP what kind of changes you have felt. This is important to make a proper diagnosis.

Overcome your fear

Fear of detecting breast cancer is no cause of death from breast cancer. But fear may be more important than most people think. There are women, and maybe this is also true for you, who do not dare to perform breast self-examination because they are afraid to detect something. Others who detect a change, do not dare to visit their GP because they might be diagnosed as having cancer.

Such fears are understandable but you have to realize that performing breast self-examination may save your life in case you develop breast cancer in the future. After all, by performing monthly breast self-examination you increase your chances of detecting breast cancer at an early and therefore better treatable stage. This increases your chances of full recovery. Furthermore, feelings of fear will decrease after you have performed breast self-examination for a few months and it has become a habit.

Conclusion

Every woman is susceptible to breast cancer. That is why it is important for every woman, and hence also for you, to perform monthly breast self-examination. Scientific research has repeatedly shown that you can detect breast cancer at an early and therefore better treatable stage if you perform monthly breast self-examination. This significantly increases your chances of full recovery if diagnosed with breast cancer.