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Danger and Fear Control in Response to Fear Appeals: The Role of Need for Cognition

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This study examined the influence of need for cognition (Cacioppo & Petty, 1982) on adaptive and maladaptive responses to fear appeals. After measuring their need for cognition, participants read a high versus low threat message about breast cancer, followed by a persuasive message that recommended breast self-examination. Interaction effects between need for cognition and threat on measures of precautionary motivation supported our main hypothesis that fear appeals only result in adaptive coping (i.e., danger control) among respondents who are high in need for cognition. If possible, persuasive communicators may thus consider screening participants first on their need for cognition. On the other hand, predicted main effects of threat information on maladaptive coping (i.e., fear control) suggest that fear appeals should be used with caution, preceded by extensive pilot testing.

An important goal of persuasive communications, and health education messages in particular, is to encourage and motivate people to engage in health promoting and disease preventive behaviors. One way of achieving this goal is to confront target groups with fear appeals related to the health issue at hand (i.e., breast cancer among women in this study). *Fear appeals* are persuasive communications attempting to arouse fear to promote precautionary motivation and self-protective action (cf. Rogers, 1983). Typically, a fear appeal is organized in such a way that, first, threat information is presented that describes a severe threat and the person's susceptibility to it (e.g., "Breast cancer is a deadly disease and women may acquire it"), followed by coping information outlining the feasibility and effectiveness of a recommended action (e.g., "Breast self-examination is easy to perform and may help you in detecting breast cancer in an early and therefore better treatable stage").

More than 5 decades of systematic research into fear appeals have produced numerous studies testing the effects of threat and coping information on measures of attitudes, intentions, and behaviors, which are all considered to be indicative of precautionary motivation and action (for overviews of studies, see Eagly & Chaiken, 1993; Higbee, 1969; Rogers & Prentice-Dunn, 1997; Ruiter, Abraham, & Kok, 2001; Sutton, 1982; for meta-analyses, see Floyd, Prentice-Dunn, & Rogers, 2000; Milne, Sheeran, & Orbell, 2000; Witte & Allen, 2000). More specifically, empirical data on the topic of performing breast self-examination suggest that threatening information about breast cancer motivates both adaptive (e.g., intention to perform breast self-examination) and maladaptive (e.g., avoid thinking about breast cancer) action, whereas coping information is essential in determining whether adaptive or maladaptive action is undertaken in response to the threat (Prentice-Dunn, Floyd, & Flournoy, 2001; Rippetoe & Rogers, 1987; for a discussion about the

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relationship between threat and coping information, see Ruiter, Abraham, et al., 2001).

THE ROLE OF INDIVIDUAL DIFFERENCE VARIABLES

The majority of fear appeal studies examined the effects of situational variables on processes of intention formation and behavioral change. These situational variables, for example, include the threat and coping information components of a fear appeal, but also variables such as the provision of specific action instructions (e.g., Leventhal, Singer, & Jones, 1965). In addition to situational variables, individual difference variables could be a significant source of variance in reactions to fear appeals. However, only a limited number of studies have addressed the role of individual difference variables in explaining the effects of fear appeals. The only personal variable that received considerable attention has been trait anxiety, which is defined as one's general level of anxiety in reaction to personal threats (Spielberger, Gorsuch, & Lushene, 1970). A recent meta-analysis by Witte and Allen (2000) found no associations, however, between one's level of trait anxiety and cognitive and behavioral responses toward fear appeals. Because the focus on individual difference variables has been too limited to date, more research is required investigating other individual difference variables and their influences on fear appeals.

In this study, we focused on individual differences in *need for cognition*, which has been defined by Cacioppo and Petty (1982) as people's "tendency … to engage in and enjoy thinking" (p. 116). Although need for cognition has been shown to significantly influence persuasion processes (for a review, see Cacioppo, Petty, Feinstein, & Jarvis, 1996), no research to date – to our knowledge—has been published that examined its influence on responses to fear appeals. Therefore, the purpose of this study was to test whether need for cognition significantly moderates responses to fear appeals. Before describing and discussing the hypotheses, methods and results of our study, we will briefly review the effects of fear appeals on danger-oriented and fear-oriented coping responses and the role of need for cognition in these processes.

REACTIONS TO FEAR APPEALS: DANGER CONTROL VERSUS FEAR CONTROL

Several theoretical models have been formulated to explain the effects of fear appeals on precautionary motivation and self-protective action; among those are the drive reduction model (Hovland, Janis, & Kelley, 1953; Janis, 1967; McGuire, 1968; McGuire, 1969), the parallel response model (Leventhal, 1970), and the protection motivation theory (Rogers, 1975, 1983). In general, these models (for a review of these models, see Eagly & Chaiken, 1993) assume that threat information is only effective in inducing attitudinal and behavioral change if threat perceivers belief that they have the necessary coping abilities to avert the threat. That is, only if people believe that the recommended action can avert the threat (referred to as response efficacy; Rogers, 1975) and they feel confident to perform the recommended action (referred to as self-efficacy; Bandura, 1986; Rogers, 1983), are they willing to perform the recommended threat-averting action.

Fear appeals are not always effective persuasion means. Indeed, especially when people do not feel able to sufficiently control the presented threat, they may deny or derogate the information included in the fear appeal, as such revealing no attitudinal or behavioral changes (e.g., Leventhal, 1970). In an attempt to explain defensive reactions to fear appeals, in addition to adaptive reactions, Witte (1992a) proposed the extended parallel process model (EPPM), which combines the previously mentioned theoretical frameworks. This model emphasizes the central role of fear arousal and its influence on defensive responses, such as message avoidance and denial. More specifically, EPPM specifies two cognitive processes in response to threatening information: *danger control* and *fear control* (see also Leventhal, 1970, and Lazarus' similar distinction between problem-focused and emotion-focused coping responses to stressful events; e.g., Lazarus & Folkman, 1984). Danger control is defined as a cognitive process in which people evaluate the presented threat (including the assessment of threat seriousness and personal susceptibility) and suggested coping responses (including the assessment of response efficacy and self-efficacy). High threat perception combined with high efficacy beliefs may prompt acceptance of the recommended precaution as evidenced by positive changes in attitude, intention, and behavior (see also protection motivation theory, Rogers, 1983). Fear control, on the other hand, operates when threat is high but efficacy is low due to either situational (e.g., no specific instructions) or personal (e.g., lack of experience) variables. Feelings of helplessness due to low efficacy beliefs may then result in increased feelings of fear and attempts to reduce the unpleasant experience of fear through avoidance, denial, or derogation of the message (Witte, 1992a; see also Prentice-Dunn et al., 2001; Rippetoe & Rogers, 1987), whereas maintaining or even intensifying the risk behavior generating the threat (see also Rogers, 1983). Fear control is defined as an affect-driven cognitive response that is maladaptive because it is not aimed at effectively reducing the presented threat.

In general, empirical studies have found considerable support for the message components that comprise an effective fear appeal. Threat information and coping information are essential for effective communication to occur (Eagly & Chaiken, 1993; Floyd et al., 2000; Milne et al., 2000; Ruiter, Abraham, et al., 2001; Sutton, 1982). However, to go one step further in testing the effects of fear appeals, it would be helpful to assess how different manners of processing (i.e.,

heuristic versus systematic) influence the effects of threat and coping information. These processes may shed more light on the type of responses (danger or fear control) people may show as a function of fear appeals. One individual difference variable that is particularly useful in this perspective is need for cognition.

NEED FOR COGNITION

Need for cognition is a relatively stable individual difference variable that systematically influences the way people cognitively process presented information. In their review of the literature on need for cognition, Cacioppo, Petty, Feinstein, and Jarvis (1996) concluded that "Individuals who differ in terms of their need for cognition also differ in terms of their tendency to engage in effortful cognitive activity when given a task or making sense of the world, actively acquire information about a relevant stimulus or event, and enjoy (or are less stressed by) cognitively effortful problems, life circumstances, or tasks" (p. 243). People high in need for cognition thus seem to engage more in systematic message-oriented thinking than people low in need for cognition (e.g., Cacioppo, Petty, & Morris, 1983).

The role of need for cognition in how people deal with persuasive messages has particularly been examined within the context of the elaboration likelihood model (Petty & Cacioppo, 1986) and similar dual process models of attitude change, such as Chaiken's heuristic-systematic model (e.g., Chaiken, Giner-Sorolla, & Chen, 1996; Chaiken, Liberman, & Eagly, 1989). These models suggest that attitudes can be formed and changed via two distinct routes of information processing. For example, the elaboration likelihood model (Petty & Cacioppo, 1986) distinguishes between a *central* and a *peripheral* information-processing route. The former route evokes cognitive change based on an elaborate processing of presented arguments, whereas peripheral route processing can result in cognitive change due to other characteristics of the message (e.g., the expertise of the source) and simple decision rules or heuristics (e.g., "an expert should know what is best"). In general, central or systematic route attitude changes have been found to be more stable and predictive of behavior and more resistant to counterargumentation than peripheral or heuristic route attitude changes (for useful reviews, see Chaiken & Trope, 1999; Eagly & Chaiken, 1993).

Research on persuasive communication has illustrated that individual differences in need for cognition influence the route taken by recipients of a persuasive message. The review by Cacioppo et al. (1996) indeed showed that people high in need for cognition process persuasive messages more systematically than people low in need for cognition. For example, Cacioppo et al. (1983) demonstrated that those high in need for cognition engaged more in elaborate and systematic processing as evidenced by their capacity to discriminate between strong and weak arguments. Moreover, those low in need for cognition have been found to be more persuaded by specific peripheral features of the message (i.e., attractiveness of the source), suggesting their frequent use of heuristic processing (e.g., Axsom, Yates, & Chaiken, 1987).

Taken together, need for cognition influences the way people cognitively deal with persuasive communications with high need for cognition leading to more message-oriented processing, and also more effective solving of problems that require effortful thinking (e.g., course performance), than low need for cognition (Cacioppo et al., 1996). Furthermore, and particularly important to this study, Cacioppo et al. concluded that people who differ in need for cognition do not differ in their emotional reactions toward social stimuli. However, this latter conclusion seems to be mainly based on research that found no or only modest (negative) relationships between need for cognition and affect-related individual difference variables such as affect orientation, affect intensity, and state and trait anxiety (see Cacioppo et al., 1996, Table 2). In this study, a more direct test of the relationship between need for cognition and emotional reactions is provided by looking at the role of need for cognition in reactions to threatening information.

FEAR APPEALS AND NEED FOR COGNITION: HYPOTHESES

A large number of studies has illustrated that the effects of fear appeals on precautionary motivation are inconsistent (Eagly & Chaiken, 1993; Floyd et al., 2000; Higbee, 1969; Milne et al., 2000; Ruiter, Abraham, et al., 2001; Sutton, 1982). One possible variable that may explain this inconsistency is people's need for cognition. Indeed, Cacioppo et al.'s (1996) conclusion that people high in need for cognition spend more cognitive effort on persuasive information, are more effective problem solvers, but do not react more emotionally to social stimuli, seems to suggest that need for cognition may moderate the effects of fear appeals on (problem-driven) danger control processes, but not those on (affect-driven) fear control processes. That is, assuming that people high in need for cognition more critically read the coping information in the fear appeal and subsequently evaluate the recommended action as effective and feasible, chances are higher that they will perform the recommended action (i.e., danger control) as compared to people low in need for cognition. The latter's attitude toward the recommended action might be equally positive, but it will be less predictive of intention and behavior due to less systematic processing (cf. Petty & Cacioppo, 1986). Fear control, on the other hand, is largely the result of emotional reactions to threat information. Cacioppo et al.'s conclusion that people who differ in need for cognition do not differ in their emotional reactions to stimuli suggested that individual differ-

ences in need for cognition will not moderate the effects of fear appeals on fear control responses.

Following from the previous reasoning, two hypotheses were delineated. First, we assume that threat information will result in more adaptive coping (i.e., danger control) among people high in need for cognition than among people low in need for cognition. Thus, an interaction effect between need for cognition and threat information on danger control responses (i.e., attitude, intention, behavior) is predicted. To be more specific, the effect of threat information on danger control responses is expected to be significant among people high in need for cognition, but not among those low in need for cognition (Hypothesis 1).

Second, we assume that fear control responses in reaction to a fear appeal will not be moderated by individual differences in need for cognition. Thus, we predict a main effect of threat information on fear control responses (i.e., defensive avoidance, message derogation, perceived manipulation), which is not qualified by an interaction with participants' need for cognition (Hypothesis 2).

METHOD

Participants and Design

Randomly, 77 first-year undergraduate women from the Department of Psychology at Universiteit Maastricht were distributed across the conditions of a one-factorial (Threat: low versus high) between-subject design. Participants could sign up for a series of behavioral science studies, whereby they would receive a monetary reward in return (€4, approximately $4 U.S., in this study). Participants left their names and telephone numbers on the sign-up forms and were later invited to the laboratory.

Procedure and Materials

On arrival in the laboratory, participants were welcomed by a female experimenter. Participants were seated in separate cubicles that were equipped with a computer and were told that they would participate in two unrelated studies. The experiment was completely computer-controlled. In the first part of this study, need for cognition was assessed by means of the Dutch translation of the 18-item need for cognition scale (Cacioppo, Petty, & Kao, 1984; for a list of the Dutch items, see Pieters, Verplanken, & Modde, 1987). Participants were told that the items were translated from English into Dutch and were the object of a validation study by a graduate student. The scale used in this study revealed a good internal reliability (Cronbach's $\alpha = .80$) and was characterized by one dominant factor accounting for 25.2% of the variance (with the second and the third factor accounting for 9.2% and 7.8% of the variance, respectively). These results are similar to the findings of other studies (see Cacioppo et al., 1996), and in particular to the findings in Dutch samples reported by Verplanken and colleagues (Pieters et al., 1987; Verplanken, 1989, 1991, 1993; Verplanken, Hazenberg, & Palenewen, 1992).

After they finished the need for cognition scale, participants were introduced to the second part of the study. They were told that they would be presented a message about breast cancer, and were asked to read this message carefully. At this moment, the manipulation of threat was introduced. The threatening messages were similar to the ones used by Ruiter and colleagues (Ruiter, Kok, Verplanken, & Brug, 2001; Ruiter, Verplanken, Kok, & Werrij, 2003). Recipients in the high threat condition read information that stressed the severity of breast cancer and recipients' susceptibility to it. They were told that they could already develop breast cancer in their younger years. This was mainly done by introducing the topic of breast cancer by means of a photograph of a peer group member on the computer screen who ostensibly stated that she discovered breast cancer herself after participating in the same study last year. The severity of breast cancer was emphasized by describing breast cancer as a very serious disease with significant physical and emotional consequences that often ends in death. This written information was illustrated with photographic material showing pictures of women that had undergone amputation of one of the breasts. In the low threat condition the picture of the same girl was used, but she stated that this study was part of a research project she was carrying out. The participant's susceptibility to breast cancer was described as low, for example, by stating that "Breast cancer is a form of cancer that is most common among women older than 50 years of age", and by describing the Dutch medical examination program for breast cancer, which invites biannually all women between 50 and 70 years of age to undergo a mammography. The severity of breast cancer was ignored by providing boring, biological information about the development of breast cancer along with pictures of cell divisions. Both messages were equal in length and contained the same number of photographs.

Next, fear arousal was measured by means of four items on a 9-point scale (i.e., "As you read the message about breast cancer, did you feel … worried, afraid, uncomfortable, frightened", ranging from 1 [*not at all*] to 9 [*very much*]; cf. Mewborn & Rogers, 1979; Ruiter, Kok, et al., 2001; Ruiter, Verplanken, et al., 2003). These four items were combined to form an average fear arousal scale (Cronbach's $\alpha = .92$). Then, a message about performing breast self-examination was presented to the participants stressing its effectiveness of detecting breast cancer in a better treatable stage and its feasibility (e.g., "By performing breast self-examination you may easily detect breast cancer in a early stage and thus increase your chances of full recovery from the consequences of breast cancer."). Finally, the dependent variables danger control (attitude and intention) and fear control (defensive avoidance, message derogation, perceived manipulation) were measured, followed by measures of efficacy beliefs and

behavior (see later). Except for the dichotomous measure of behavior (yes–no), all measures used 9-point scales.

The experiment lasted about 30 min. After leaving the cubicles participants were extensively debriefed by the female experimenter. She was especially alert to any signs of current fears participants possibly expressed. All participants were told that their chance of getting breast cancer in their younger years was very low because it is most common among women older than 45 years of age. Thereafter, they received information about breast cancer and breast self-examination performance issued by the Dutch Cancer Society and were urged to read it carefully. Participants were then paid and asked not to talk about the objectives and topic of the study with fellow students.

Dependent Measures

Danger control. Measures of attitude, intention and behavior toward performing breast self-examination were used to operationalize danger control (cf. Witte, Berkowitz, Cameron, & McKeon, 1998). The *attitude* toward monthly breast self-examination was measured through summarizing the scores on five semantic-differentials: 1 (*unimportant*) to 9 (*important*); 1 (*bad*) to 9 (*good*); 1 (negative) to 9 (*positive*); 1 (*foolish*) to 9 (*wise*); 1 (*insensible*) to 9 (*sensible*) ($\alpha = .87$). The *intention* to perform monthly breast self-examination was measured with three items—that is, "Do you plan to perform a breast self-examination this month?", 1 (*surely not*) to 9 (*surely yes*); "How likely is it that you will examine your breasts in the next month?", 1 (*extremely unlikely*) to 9 (*extremely likely*); "I intend to examine my breasts in the next month", 1 (*strongly disagree)* to 9 (*strongly agree*). These three items were combined to form an average intention score ($\alpha = .91$). Before leaving the experimental cubicle, *behavior* was measured on a scale from 0 (*no*) to 1 (*yes*) by giving participants the opportunity to register for a course on performing breast self-examination. They could write down their name, address, and telephone number and send this information to a (nonexisting) e-mail address.

Fear control. Fear control responses were operationalized via measures of defensive avoidance, message derogation, and perceived manipulation (cf. Witte et al., 1998). One item measured the extent to which participants avoided the issue of breast cancer—that is, "When I read the message about breast cancer my first reaction was that I did not want to think about breast cancer", 1 (*totally disagree*) to 9 (*totally agree*). To measure the extent to which participants criticized the threat message, two items—that is, "The information about breast cancer was … overblown, exaggerated," 1 (*not at all*) to 9 *(very much*) were combined in one index of *message derogation* ($r = .49$, $p < .001$). Finally, two items—that is, "The information about breast cancer tried to … manipulate my feelings, strain the truth," 1 (*totally disagree*) to 9 (*totally agree*) were combined to measure the extent to which participants thought the threat message deliberately manipulated their feelings (*perceived manipulation*; $r = .33$; $p < .01$).

Efficacy Beliefs

Perceived efficacy of breast self-examination was measured by averaging the scores on three measures of response efficacy—that is, "If I would get breast cancer, the performance of breast self-examination will increase my chances to detect it in an early and treatable stage"; "Examining my breasts every month is an effective way to discover breast cancer at an early stage"; "Detecting breast cancer early strongly improves the chances of being cured," 1 (*totally disagree*) to 9 (*totally agree*) and two measures of self-efficacy—that is, "Suppose you are planning to do a monthly breast self-examination, do you feel confident that you will correctly perform the self-exam?"; "If I wanted to, it would be easy for me to examine my breasts in the next month", 1 (*surely not*) to 9 (*surely yes*). The combined scale (e.g., Witte et al., 1998) had a good internal reliability ($\alpha = .79$).

RESULTS

Analytical Strategy

Hierarchical regression analyses tested the main effects of Threat (coded as 0 = *low*, 1 = *high*) and Need for Cognition in Step 1, and the interaction term in Step 2, on measures of fear arousal, efficacy beliefs, and indices of fear control and danger control. To ensure that multicollinearity did not affect the results, individual scores on Need for Cognition were centered (i.e., by subtracting the mean from each score) and the interaction term was based on these centered scores. In case of a significant contribution of the interaction term to the prediction of the dependent variable, the main effect of Threat was analyzed for high and low levels of need for cognition by means of simple slope analyses (for a more elaborate description of analyzing interactions in multiple regression, see Aiken & West, 1991). Means, standard deviations, and intercorrelations for the study variables are presented in Table 1. All analyses used a significance level of $p < .05$.

Fear Arousal

Table 2 shows that only Threat had a significant contribution to the prediction of fear arousal. Need for Cognition and the interaction term were not significantly related to the amount of reported fear. Respondents in the high threat conditions reported more fear arousal ($M = 5.41$, $SD = 1.74$) than respondents in the low threat conditions ($M = 3.77$, $SD = 1.76$), thus proving the effectiveness of the threat manipulation.

TABLE 1
Means, Standard Deviations, and Intercorrelations of Need for Cognition, Fear Arousal, Efficacy Beliefs, Defensive Avoidance, Message Derogation, Perceived Manipulation, Attitude, Intention, and Behavior

		M	*SD*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
1	Need for cognition	3.30	0.47	1.00								
2	Fear arousal	4.56	1.92	.03	1.00							
3	Efficacy beliefs	6.17	1.30	.04	–.04	1.00						
4	Defensive avoidance	3.34	2.20	.05	.39***	.00	1.00					
5	Message derogation	3.72	1.60	–.05	.17	.05	.12	1.00				
6	Perceived manipulation	3.47	1.60	–.04	.32**	.20	.29*	.50**	1.00			
7	Attitude	6.64	1.05	.22	.23*	.36***	–.02	–.14	.00	1.00		
8	Intention	5.75	1.85	.09	.37***	.31**	–.11	–.11	.08	.74**	1.00	
9	Behavior[a]	0.40	0.49	.10	.36**	.04	.22	–.05	.11	.37***	.32**	1.00

Note. $N = 77$.
[a]Spearman's rho correlation coefficients for intercorrelations with behavior are reported (all other are Pearson correlation coefficients)
*$p < .05$. **$p < .01$. ***$p < .001$.

TABLE 2
Summary of Hierarchical Regression Analyses for Fear Arousal and Efficacy Beliefs Measures

	Fear Arousal				*Efficacy Beliefs*			
	Step 1		*Step 2*[a]		*Step 1*		*Step 2*[b]	
Predictor or Statistic	*B*	*SE B*	*B*	*SE B*	*B*	*SE B*	*B*	*SE B*
Threat	1.64*	0.40	1.63*	0.40	0.01	0.30	0.01	0.30
Need for cognition	–0.02	0.43	–0.43	0.57	0.12	0.32	–0.08	0.43
Threat × Need for Cognition	—	—	0.94	0.87	—	—	0.47	0.65
Regression constant	—	—	3.75	0.28	—	—	6.16	0.21
R^2	0.18		0.20		0.00		0.01	

Note. $N = 77$.
[a]$MS_{error} = 3.10$. [b]$MS_{error} = 1.73$.
*$p < .001$.

Efficacy Beliefs

The information about breast self-examination was successful in stressing the effectiveness and feasibility of performing the self-exam. Overall, participants had positive beliefs about the effectiveness and feasibility of breast self-examination as the average score on the measure of perceived efficacy ($M_{overall} = 6.17$, $SD = 1.30$) was significantly higher than the scale's midpoint (5.0), $t(76) = 7.93$, $p < .001$. Table 2 further shows that efficacy beliefs were not systematically influenced by Need for Cognition, Threat or their interaction.

Danger Control

Attitude. The main effect terms of Need for Cognition and Threat were not related to the attitude toward performing breast self-examination (see Table 3). However, in line with predictions, the interaction between both variables was significant. Simple slope analysis (see Aiken & West, 1991) revealed support for Hypothesis 1 as threat was positively related to attitude when need for cognition was high, $B = 0.64$, $t(76) = 1.98$, $p = .05$, whereas Threat was negatively related to attitude when need for cognition was low, $B = –0.68$, $t(76) = –2.10$, $p < .05$ (see Figure 1).

Intention. Need for Cognition and Threat had no significant contribution to the prediction of the intention to perform breast self-examination. In line with Hypothesis 1, however, the interaction between Need for Cognition and Threat was significant (see Table 3). Simple slope analysis confirmed that Threat was positively related to intention when need for cognition was high, $B = 1.74$, $t(76) = 3.09$, $p < .01$, whereas it had no significant contribution to the prediction of intention when need for cognition was low, $B = –0.97$, $t(76) = –1.69$, $p = .10$ (see Figure 2).

Behavior. To test for the combined effects of Need for Cognition and Threat on behavior, a logistic regression analysis was conducted that regressed the behavioral measure (i.e., registering for a breast self-examination course) on Need for Cognition, Threat, and their interaction. The predicted contribution of the interaction term was marginally significant, *Wald* (1) = 3.24, $p = .07$ (see also Table 3). Simple slope analysis revealed nevertheless support for Hy-

TABLE 3
Summary of Hierarchical Regression Analysis for Indexes of Danger Control

	Attitude				*Intention*				*Behavior*			
	Step 1		*Step 2*[a]		*Step 1*		*Step 2*[b]		*Step 1*		*Step 2*	
Predictor or statistic	*B*	*SE B*	*B*	*SE B*	*B*	*SE B*	*B*	*SE B*	*B*	*SE B*	*B*	*SE B*
Threat	–0.01	0.24	–0.02	0.23	0.41	0.43	0.39	0.40	0.66	0.47	0.66	0.49
Need for cognition	0.50	0.26	–0.11	0.32	0.32	0.46	–0.92	0.57	0.21	0.51	–0.65	0.70
Threat × Need for Cognition	—	—	1.41*	0.49	—	—	2.89**	0.86	—	—	1.95	1.08
Regression constant			6.63	0.16			5.51	0.28			–0.77	0.35
R^2	.05		.15		.02		.15		.03		.07	

Note. $N = 77$. [a]$MS_{error} = 0.99$. [b]$MS_{error} = 3.04$.
*$p < .01$. **$p < .001$.

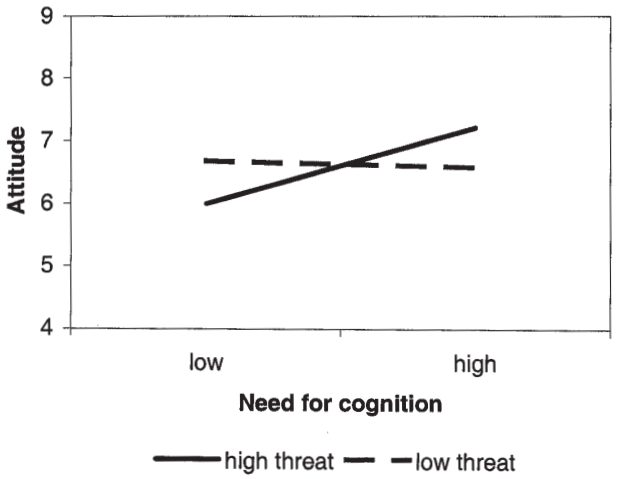


FIGURE 1 Regression slopes arising from the relation between threat condition and attitude for participants who are relatively high (one *SD* [*SD* = 0.47] greater than the mean, see Aiken & West, 1991) versus low (one *SD* less than the mean, see Aiken & West, 1991) in need for cognition.

pothesis 1: Threat was positively related to behavior when need for cognition was high, $B = 1.57$, *Wald* (1) = 4.94, $p < .05$, whereas it had no significant contribution to the prediction of behavior when need for cognition was low, $B = -0.26$, *Wald* (1) = 0.14, $p = .71$ (see Figure 3).

Fear Control

The findings on indices of fear control supported Hypothesis 2 (see Table 4). Threat was positively related to defensive avoidance (marginally significant, $p = .06$), message derogation, and perceived manipulation, whereas no significant support was found for Need for Cognition and the interaction term.

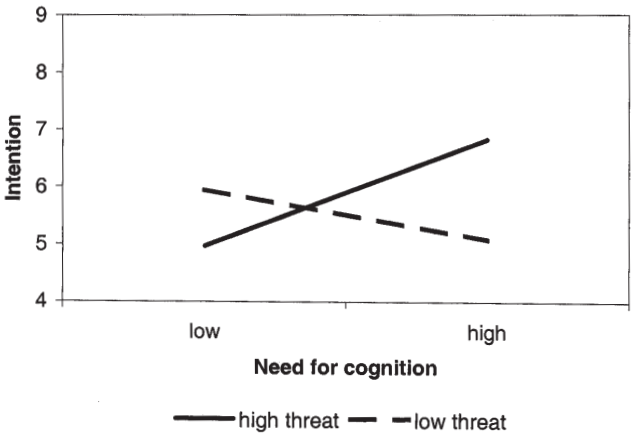


FIGURE 2 Regression slopes arising from the relation between threat condition and intention for participants who are relatively high (one *SD* [*SD* = 0.47] greater than the mean, see Aiken & West, 1991) versus low (one *SD* less than the mean, see Aiken & West, 1991) in need for cognition.

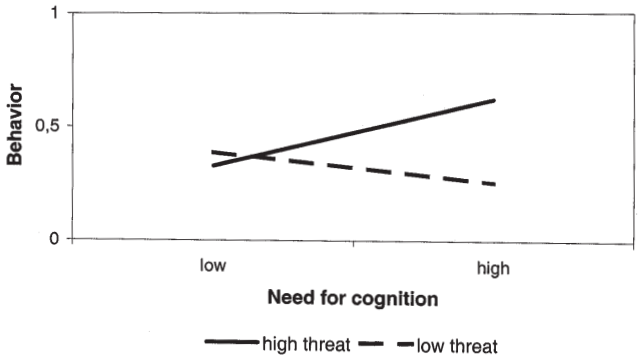


FIGURE 3 Regression slopes arising from the relation between threat condition and behavior for participants who are relatively high (one *SD* [*SD* = 0.47] greater than the mean, see Aiken & West, 1991) versus low (one *SD* less than the mean, see Aiken & West, 1991) in need for cognition.

DISCUSSION

The purpose of this study was to examine the influence of individual differences in need for cognition on adaptive (i.e., danger control) and maladaptive (i.e., fear control) reactions to fear appeals. Following Cacioppo et al.'s (1996) conclusion that people high in need for cognition have a strong tendency to cognitively tackle presented problems, but do not react more emotionally to these problems, we predicted, first, that people high in need for cognition would be more willing to accept recommended actions that could avert a personally relevant and serious threat than people low in need for cognition. Convincing support for this hypothesis on measures of attitude, intention, and more important, behavior was found. That is, presenting a serious and personally relevant threat of breast cancer motivated participants to adopt the recommended response of performing breast self-examination, but only among those high in need for cognition. Among people low in need for cognition, presenting threatening information did not result in greater acceptance of the recommended response. Negative regression coefficients on attitude and intention even suggest that these people were less willing to perform breast self-examination after reading high threat information about breast cancer than after reading low threat information.

Second, based on recent studies of fear appeals (e.g., Ruiter, Verplanken, et al., 2003; Witte, 1992b; Witte et al., 1998), we hypothesized that people have a general tendency to react defensively to threatening messages (i.e., fear control), irrespective of their levels of need for cognition. This hypothesis also received strong support. Main effects of the threat manipulation were found on all three indices of fear control, supporting the prediction that presenting high threat

TABLE 4
Summary of Hierarchical Regression Analysis for Indexes of Fear Control

	Defensive avoidance				*Message derogation*				*Perceived manipulation*			
	Step 1		*Step 2*[a]		*Step 1*		*Step 2*[b]		*Step 1*		*Step 2*[c]	
Predictor or Statistic	*B*	*SE B*	*B*	*SE B*	*B*	*SE B*	*B*	*SE B*	*B*	*SE B*	*B*	*SE B*
Threat	0.95	0.50	0.96	0.50	1.16*	0.35	1.16*	0.35	1.53*	0.33	1.53*	0.33
Need for cognition	0.15	0.53	0.47	0.71	–0.28	0.37	0.03	0.49	–0.27	0.35	–0.03	0.47
Threat × Need for Cognition	—	—	–0.73	1.08	—	—	–0.71	0.75	—	—	–0.55	0.71
Regression constant			2.89	0.35			3.18	0.24			2.75	0.23
R^2	.05		.06		.13		.15		.23		.24	

Note. $N = 77$. [a]$MS_{error} = 4.78$. [b]$MS_{error} = 2.28$. [c]$MS_{error} = 2.05$
*$p < .001$.

information results into more defensive avoidance, message derogation and perceived manipulation than presenting low threat information. More important, none of these effects were moderated by individual differences in need for cognition.

To summarize so far, these findings provided strong support for our hypotheses and suggest that need for cognition may be an important, but also restricting variable in motivating people to adopt behavior that can prevent certain health threats. Only people who are high in need for cognition may profit from confrontations with fear appeals. Threatening information seems to motivate them to engage more into healthy action, although they may also react defensively to threat information (see our results on fear control). In contrast, people who are low in need for cognition do not seem to be motivated by fear-evoking persuasive campaigns. Their reactions to fear appeals may be easily dominated by defensive responses.

Thus, our findings contrast Witte and Allen's (2000) conclusion that individual differences do not appear to have an important role in responses to fear appeals. However, this conclusion was mainly made with respect to the role of trait anxiety, for which indeed no consistent relationship with persuasion outcomes has been found yet. Taken together, our study is one of the few studies that tested the role of need for cognition in reactions to fear appeals. Future research is required to examine the impact of other individual difference variables affecting responses to fear appeals.

If need for cognition indeed influences the acceptance of recommended action in reactions to threatening information, as our data suggest, then it is important to examine what processes mediate the effects of need for cognition on the relationship between fear appeals and precautionary action. Many studies on the role of need for cognition in the processing of persuasive messages suggest that people high in need for cognition spend more cognitive effort in processing the information presented to them, relative to people low in need for cognition. In addition, provided that the argumentation is strong and the recommended action is presented as effective and feasible (measures of efficacy beliefs indicated that we were successful in this), systematic processing of the presented persuasive information should increase adoption of the recommended action among people for whom the threat is relevant (e.g., Petty & Cacioppo, 1986; Rogers, 1983). However, we hasten to say that the extent to which people high in need for cognition indeed systematically processed breast self-examination information, after being confronted with threatening information about breast cancer, and, as such not using their perception of threat as a peripheral cue, could not be directly derived from our data. We suggest that future research should include more specific measures that are capable of tracking the cognitive processes mediating the effects of need for cognition in responses to fear appeals.

In addition to lacking insight into the mediating cognitive processes, a further limitation of this study is that its findings may not generalize beyond the specific behavioral domain of breast cancer detection and the subpopulation of highly educated young women. Future research should examine whether or not the reported findings also hold across other domains of self-protective action, and among other subpopulations including men, lower educational levels, and other age groups. Furthermore, this research did not include the performance of breast self-examination as a dependent variable to measure behavior. Including breast self-examination performance in the analyses requires a follow-up measure outside the laboratory. However, when including such a variable, sufficient measures should be taken to control for possible negative effects of the threat manipulation when participants have left the controlled setting of the laboratory. Of course, this should happen without neutralizing the threat manipulation, which may prove to be a difficult task. Behaviors that can be observed in the laboratory may remain the best feasible way to measure behavior in response to threatening information.

This study suggests that fear appeals are more effective among people high in need for cognition than among people low in need for cognition. Although people's need for cognition is difficult to change, our findings do reveal important practical implications when considering the use of fear appeals. For instance, the use of the computer (e.g., computer-tailored advice, see Brug & de Vries, 1999) may make it possible to measure participants' need for cognition in advance and adjust persuasive messages to the reported level of need for cognition. For example, people high in need for cognition may receive cognitive challenging information, whereas people low in need for cognition should be persuaded via more peripheral routes. Alternatively, information may be provided in such a way that people high in need for cognition have the opportunity to access additional materials. However, our findings may also be translated from a personality context to a conceptually identical situational context. That is, higher levels of need for cognition have been associated with more systematic processing, and our findings suggest that fear appeals work better for people who are high in need for cognition. Thus, content-related processing of the persuasive message should be promoted among people low in need for cognition, not by designing "funny black humor" or sarcastic messages with a deeper meaning, or by presenting health education messages between commercials for beer and detergents, but by presenting information that is easy to understand and to the point in indicating the recommended action and its effectiveness and feasibility in reducing the threat.

Finally, the extent to which fear appeals are useful at all in persuasive communications remains an important and interesting question in itself. Indeed, we found main effects of threat information on measures of fear control independent of people's need for cognition. Thus, fear-arousing information can easily be followed by emotional reactions instigating

denial or avoidance of the presented information, which may interfere with the adoption of the recommended action (Rippetoe & Rogers, 1987; Witte & Allen, 2000). This finding raises doubt about the renewed interest in fear arousal that we particularly witness in health education practice in The Netherlands. Examples with respect to this renewed interest are commercials that show traffic accidents with bloody and deadly consequences, and the enlarged and now clearly visible printing of health warnings on cigarette packages (e.g., "smoking may result in a slow and painful death"). Obviously, program developers presume that fear arousal directly motivates people to safer behavior. Our findings with regard to defensive responses, however, suggest that fear arousal should be used with greater caution and preceded by extensive pilot testing. Furthermore, these messages should be sustained with strong appeals to the effectiveness and feasibility of recommended action to decrease fear control and increase danger control.

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