Fear appeal messages have long been used in persuasive messages to motivate people to perform adaptive behaviors. This research explored the influence of a fear appeal message concerning breast cancer on attitude accessibility. Messages advocating the efficacy of breast self-examinations increased the accessibility of attitudes toward the adaptive behavior. Further, the accessibility of participants’ attitudes toward the adaptive behavior predicted behavioral intentions to perform breast self-examinations. Attitudes toward the threat became less accessible after exposure to a high fear-arousing message, however. Analyses suggest that defensive reactions to the fear-inducing message mediate the influence of the message on the accessibility of the attitudes toward breast cancer. Implications of these findings for models of fear appeals are discussed.

Keywords: Fear Appeals; Attitude Accessibility; Attitude–Behaviour Relationship; Defense Processing

Fear appeals have long been used in persuasive messages to scare people in the hopes that the aroused fear will result in the performance of adaptive behaviors. For example, a fear appeal message might discuss the dangers of breast cancer in an attempt to get women to perform monthly breast self-examinations to increase the chance of early detection of breast cancer. The ultimate goal of this research on fear appeals has been to determine the influence of fear appeal messages on changing or preventing certain behaviors and maintaining those changes (Leventhal & Cameron, 1980).
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1994; Rogers & Prentice-Dunn, 1997). Generally, fear appeal messages have been found to be effective at bringing about behavioral change (Boster & Mongeau, 1984; Dillard, 1994; Floyd, Prentice-Dunn, & Rogers, 2000; Mongeau, 1998). The disadvantage of using fear appeal messages is that biased processing of the current message or future messages concerning the threat may result, perhaps making the desired behaviors even less likely (Hovland, Janis, & Kelley, 1953; Witte, 1992, 1994).

The goal of this research is to specify the mechanisms underlying the influence of fear appeal messages by focusing on the effect of fear appeal messages on attitudes and attitude accessibility. First, although the primary focus of most fear appeal research is the effect of fear appeal messages on behavioral intentions (Floyd et al., 2000), many fear appeal studies have focused on attitudes. For example, in their meta-analysis of the fear appeal literature, Boster and Mongeau (1984) identified 25 studies that measured attitudes toward an adaptive behavior. They found an overall correlation between fear appeals and attitudes toward the behavior, although the magnitude of the correlation was small (see also Witte & Allen, 2000).

This view is extended by proposing that fear appeal messages influence two attitudes—the attitude toward the threat (e.g., breast cancer) and the attitude toward the behavior (e.g., breast self-exams). It is important to consider the effect of fear appeal messages on these specific attitudes because they may be influenced by different components of the fear appeal message. Furthermore, the attitude toward the behavior and the attitude toward the threat may predict different consequences of the fear appeal message. Obviously, the attitude toward the adaptive behavior should influence whether the person performs the adaptive behavior. The attitude toward the threat, however, may influence whether the person defensively reacts to the current message and future messages concerning the threat. Thus, understanding how fear appeals influence these different attitudes should aid in the construction of fear appeal messages that are more successful at bringing about the adaptive behavior across an extended period of time (Roskos-Ewoldsen, Arpan-Ralstin, & St. Pierre, 2002a).

Second, this research explores the influence of fear appeal messages on the accessibility of these two attitudes. Attitude accessibility refers to the ease of activating an attitude from memory (Fazio, 1989; Roskos-Ewoldsen, 1997). Accessible attitudes are easier to access from memory and are more likely to be spontaneously activated upon the mere presentation of the attitude object than are less accessible attitudes. Accessible attitudes are highly functional and influence attention to future persuasive messages relevant to that attitude, biased processing of the message, and subsequent decisions and behavioral responses to the messages (for reviews see Fazio, 1989, 2000; Fazio & Roskos-Ewoldsen, 1994; Fazio, Roskos-Ewoldsen, & Powell, 1994; Roskos-Ewoldsen, 1997; Roskos-Ewoldsen et al., 2002a). If fear appeal messages increase the accessibility of people’s attitudes toward the adaptive behavior, this outcome would provide the mechanism by which fear appeal messages influence subsequent behavior.

Understanding the mechanisms by which fear appeals influence attitude accessibility and therefore the predictability of behavior would be an important step in developing more successful public health campaigns. Nevertheless, accessible
attitudes may also result in future defensive message processing if the accessibility of people’s attitudes toward the threat are influenced by the message. This experiment specifically explores the effect of defensive processing of the current message on the accessibility of the attitude toward the threat. If defensive processes result in a change in the accessibility of the attitude from memory, it could provide a mechanism for explaining how fear appeal messages result in subsequent defensive processing of threat related information.

**Current Models of Fear Appeals**

This discussion of fear appeals and attitude accessibility focuses on Witte’s (1992, 1994, 1995) extended parallel process model (EPPM) of fear appeals. Although a number of models have been developed to explain fear appeals, the EPPM is an example of a recent model of fear appeals. The EPPM maintains that when receiving a fear appeal, people engage in two appraisal processes: threat appraisal and perceived coping appraisal. Threat appraisal involves judging the severity of the danger and one’s susceptibility to the danger. Coping appraisal incorporates judgments of the efficacy of the proposed response and self-efficacy judgments. If the perceived threat results in an at-risk judgment and the efficacy judgment suggests the individual can respond to the threat, that person should be motivated to engage in danger control processes. Thus, in the classic fear appeal study in which threat and efficacy are manipulated, the EPPM predicts an interaction between threat and efficacy with danger control processes occurring when threat and efficacy are both high. Danger control processes should lead to acceptance and performance of the adaptive behavior to decrease the danger to the self.

Conversely, if the person judges the threat as real, but does not feel that the proposed action can be effectively carried out, fear control processes will result. Again, in the classic fear appeal study in which threat and efficacy are manipulated, the EPPM predicts an interaction between threat and efficacy with fear control processes occurring when the threat is high but efficacy is low. Fear control processes lead to the use of defensive processes, such as avoiding future information on the topic or derogating the source of the information in order to minimize the resulting fear.

Published research has generally supported the EPPM (Witte, 1994, 1995; Witte, Stokols, Ituarte, & Schneider, 1993). Nevertheless, the results of two recent meta-analyses of the fear appeal literature are ambiguous as to whether a fear reaction is necessary for danger control processes to occur (Floyd et al., 2000; Witte & Allen, 2000). For example, Floyd et al. (2000) found that, regardless of the level of fear, response efficacy and perceived self-efficacy are the best predictors of whether one will engage in danger control processes and intend to engage in adaptive behavior (see also Witte & Allen, 2000). Likewise, Witte and Allen’s (2000) meta-analysis suggests that fear control processes may occur whenever the threat is high, regardless of the level of efficacy.

Despite these inconsistencies, incorporating attitude accessibility could strengthen the EPPM. First, as with earlier models of fear appeals, the EPPM does not specify the mechanism that results in people performing the adaptive behavior. As discussed
subsequently, incorporating attitude accessibility into the EPPM would provide a mechanism for how fear appeals may result in long-term behavior change. Although long-term behavior change is not studied in this experiment, several studies have found that accessible attitudes are predictive of long-term behavior (Fazio & Williams, 1986; Zanna, Fazio, & Ross, 1994). Fear appeal messages may successfully influence behavior because they enhance the accessibility of the receiver’s attitude toward the adaptive behavior. Second, although the EPPM predicts that under certain circumstances avoidance and defensive processing are the likely results of fear appeal messages, again, the model does not explain the mechanisms by which these defensive processes occur. Further, the EPPM does not adequately explain defensive reactions while a fear appeal message is being received. In the model the fear response to the message is temporary (e.g., the fear dissipates with time), but the EPPM does not explain future defensive processing after the fear reaction to the original message has faded. If fear control processes influence the accessibility of the attitude toward the threat, however, the change in accessibility could provide a mechanism for explaining future defensive processing, because accessible attitudes can influence what messages are attended to and how messages are processed (Fazio et al., 1994; Fazio & Williams, 1986; Houston & Fazio, 1989; Roskos-Ewoldsen & Fazio, 1992).

**Attitude Accessibility**

When a person has an accessible attitude, that attitude is quickly and relatively effortlessly retrieved from memory upon exposure to the corresponding attitude object. To understand attitude accessibility it is useful to think of human memory as a highly integrated network of concepts, attributes, and beliefs. For example, in network models of memory (see Anderson, 1990; Greene, 1984) each piece of acquired information is represented in memory as a node. Associative pathways connect nodes that are similar in some way. Within a network model, attitudes can be viewed as associations in memory between the attitude object and one’s evaluation of the object. Additionally, network models assume that the strength of the connection between nodes can vary such that certain nodes are connected by stronger pathways. The strength of the association between an object and the attitude toward that object determines the accessibility of the attitude toward that object, with stronger associations resulting in higher levels of attitude accessibility.\(^1\)

Attitudes that are quickly retrieved from memory are said to be highly accessible, whereas attitudes that are difficult to retrieve are low in accessibility. Typically, attitude accessibility is measured by the length of time it takes someone to evaluate an attitude object upon its presentation (Fazio, 1990a; Houston & Fazio, 1989; Roskos-Ewoldsen & Fazio, 1992). The faster people can indicate a like or dislike for the attitude object, the more accessible the attitude is from memory.

Accessible attitudes play a central role in the processing and likely impact of persuasive and social influence messages (Roskos-Ewoldsen, 1997; Roskos-Ewoldsen et al., 2002a). Specifically, accessible attitudes influence the orienting of attention to
environmental stimuli (Roskos-Ewoldsen & Fazio, 1992), the perception of information (Fazio, 2000; Fazio et al., 1994; Fazio & Towles-Schwen, 1999; Fazio & Williams, 1986; Houston & Fazio, 1989; Smith, Fazio, & Cejka, 1996), the extent to which persuasive messages are processed (Fabrigar, Priester, Petty, & Wegener, 1998; Roskos-Ewoldsen, Bichsel, & Hoffman, 2002b), and decision-making (Fazio, 1989). Perhaps the most important aspect of the research on attitude accessibility concerns the attitude–behavior relationship. A number of studies have found that highly accessible attitudes are more likely to predict behavior than are less accessible attitudes (for general reviews, see Fazio, 1986; Fazio & Roskos-Ewoldsen, 1994; Roskos-Ewoldsen, 1997). The reason is that an attitude can affect behavior only if the attitude has been activated from memory. Hence, attitudes that are more accessible from memory are more likely to be activated and influence behavior. As a consequence, changing the accessibility of an attitude can be just as, or more important, than changing the actual attitude (Dillard, 1993).

Despite the large number of studies documenting the functional nature of accessible attitudes, relatively little research has been conducted on ways to increase attitude accessibility (Roskos-Ewoldsen, 1997; Roskos-Ewoldsen et al., 2002a). Systematic or elaborative processing of a message’s content has been hypothesized to result in more accessible attitudes from memory (Chaiken, Liberman, & Eagly, 1989; Petty & Cacioppo, 1986; Sherman, 1987). Specifically, increasing cognitive work involved in central processing should result in increasingly integrated attitudes that are more accessible from memory. Indeed, recent research has found that elaborative message processing does increase attitude accessibility (Kardes, 1988; Yi, Phelps, & Roskos-Ewoldsen, 1998).

**Fear Appeals and Attitude Accessibility**

Meta-analyses of the fear appeal literature demonstrate that fear appeal messages that result in perceptions of response and self efficacy influence people’s attitudes toward the adaptive behavior (Floyd et al., 2000; Mongeau, 1998; Witte & Allen, 2000). This study seeks to replicate this finding. Furthermore, the experiment will examine if the mechanism through which fear appeal messages influence the adaptive behavior is the accessibility of people’s attitudes toward the adaptive behavior.

The EPPM is not a process model of persuasion in that it does not directly focus on how people process the fear appeal message. Research suggests, however, that there are multiple mechanisms by which fear appeal messages increase attitude accessibility (Roskos-Ewoldsen, 1997; Roskos-Ewoldsen et al., 2002a). Specifically, danger control processes may increase the accessibility of attitudes toward the adaptive behavior. Previous research has demonstrated that successful fear appeal messages result in elaborative message processing (Roser & Thompson, 1995). There are two reasons to believe that efficacy appeals will heighten elaborative message processing. First, messages that engage danger control processes rely on the use of highly personalized language (e.g., “You can easily perform a breast self-exam”; Witte, 1992, 1993), and research has demonstrated that the use of personalized
language increases the motivation to process elaboratively persuasive messages (Burnkrant & Unnava, 1989). Second, appeals concerning self-efficacy are expected to engage greater levels of self-awareness because the focus of the message is on whether the self can perform the adaptive behavior. Numerous studies have found that increasing self-awareness increases people’s elaborative processing (Baumeister, 1998; Pittman, 1998; Wegner & Bargh, 1998). Because elaborative processing increases the accessibility of attitudes from memory, the EPPM predicts that when threat and efficacy are high, danger control processes should result in more accessible attitudes toward the adaptive behavior.

H1: Messages high in efficacy and threat will result in more positive attitudes toward the adaptive behavior.

H2: Messages high in efficacy and threat will increase the accessibility of attitudes toward the adaptive behavior.

The EPPM also predicts when fear appeal messages are expected to result in fear control processes. When the message creates a fear response because the threat is high but efficacy is low, fear control processes will dominate and people may subsequently show defensive processing, which may influence the accessibility of the attitude toward the threat. It is proposed that when the message results in a fear reaction, the consequent fear will lead to attempts to suppress thinking about the threatening event (Hovland et al., 1953). Defensive processes, which attempt to suppress unwanted thoughts, however, tend to backfire and result in more thinking about the threatening event (Wegner, Schneider, Carter, & White, 1987; Wenzlaff, Wegner, & Roper, 1988). Ruminating about the threat instead of elaborating on the message content is expected to influence the attitude toward the threat. Research has demonstrated that thinking about the object of an attitude (e.g., breast cancer) results in more extreme attitudes toward the object (Tesser, 1976; Tesser & Leone, 1977). Based on the research on thought-induced attitude change, the EPPM predicts that defensive-based rumination resulting from a message with a high threat but low efficacy should result in more negative attitudes toward the threat.

H3: Messages high in threat but low in efficacy will result in more negative attitudes toward the threat.

There are three reasons to suspect that when a message results in fear control processing the accessibility of the attitude toward the threat that causes the fear reaction should increase. First, the fear reaction should result in rumination, which is expected to result in more accessible attitudes because ruminating about the threat is likely to act like a repeated attitudinal judgment of the threat. Numerous studies have shown that making repeated attitudinal judgments of an object increases the strength of the attitude–object link and correspondingly increases the accessibility of the attitude from memory (Berger & Mitchell, 1989; Downing, Judd, & Brauer, 1992; Houston & Fazio, 1989; Roskos-Ewoldsen & Fazio, 1992). Second, fear control processes are expected to result in strong affective reactions to the threat. Research has demonstrated that affectively-based attitudes are more accessible from memory.
(Fazio, 1995; Roskos-Ewoldsen et al., 2002a). Third, as discussed above, fear appeals tend to use highly personalize language (Witte, 1992, 1993), which increases elaborative message processing (Burnkrant & Unnava, 1989) and attitude accessibility (Roskos-Ewoldsen, 1997).

H4: Messages high in threat but low in efficacy will result in more accessible attitudes toward the threat.

Because the hypothesized mechanism by which fear appeal messages influence the accessibility of attitudes toward the threat is through a rumination process that is triggered by fear control processes, one would also expect that there should be a relationship between the accessibility of participants’ attitudes toward the threat and defensive reactions to the message. Research has demonstrated that fear appeal messages can result in immediate defensive reactions to the message (Rippetoe, 1985; Witte, 1994). For example, Rippetoe (1985) found several defensive reactions to a high fear message about breast cancer, including a desire to avoid future information about breast cancer, an increase in fatalistic thoughts about the impossibility of avoiding breast cancer, an increased reliance on religious faith to cope with the immediate threat, and discounting the message. Although it is expected that there should be a relationship between defensive responses to the fear appeal message and the accessibility of participants’ attitudes toward breast cancer, there is no basis for predicting any specific relationship.

RQ1: Is there a relation between the accessibility of attitudes toward the threat of a fear appeal and defensive responses to the fear appeal message?

Perhaps the most exciting aspect of research on attitude accessibility is the part this research played in the renewed examination of the attitude–behavior relationship. A major impetus for the study of attitudes was the axiomatic assumption that attitudes predicted behavior (see most notably Allport, 1935; Doob, 1947). The apparent inability to find a strong relationship between attitudes and behavior, however, almost led to the demise of attitude research in the early 1970s (Larson & Sanders, 1975). The resurgence of attitude–behavior research in the 1970s and 1980s turned from questioning whether attitudes predict behavior to examining when and how attitudes predict behavior through such models as the theory of reasoned action and the process model of the attitude–behavior relationship (Fazio & Roskos-Ewoldsen, 1994; Zanna & Fazio, 1982). Subsequently, studies have found that highly accessible attitudes are more likely to predict behavior than are less accessible attitudes (for general reviews, see Fazio, 1986; Fazio & Roskos-Ewoldsen, 1994; Roskos-Ewoldsen, 1997). The reason is that an attitude can affect behavior only if the attitude has been activated from memory. Hence, attitudes that are more accessible from memory are more likely to be activated and influence the behavioral process.

H5: As the accessibility of attitudes toward the adaptive behavior increase, behavioral intentions to perform the behavior will also increase.
To test these hypotheses and research questions, female research participants were presented messages concerning the dangers of breast cancer and the efficacy of breast self-exams in early detection and treatment of breast cancer. Participants were presented with either a high or low fear version of the message. The efficacy of breast self-exams was also manipulated.

**Method**

**Participants**

One hundred ten female undergraduates participated in this experiment. All participants received partial credit toward the fulfillment of a class requirement. Research participants were randomly assigned to one of four conditions.

**Design**

The design of the experiment was a 2 (high vs. low threat) × 2 (high vs. low efficacy) factorial design. Both factors were between subjects. The messages dealt with the threat of breast cancer and breast self-exams as an adaptive behavior for the early detection of breast cancer. The messages were modified from Rippetoe and Rogers (1987). The high threat condition stressed the risks of breast cancer to all women regardless of their age. The low threat condition focused on the risks of breast cancer to older women. The high efficacy version of the message argued that breast self-exams are an effective method for the early detection of breast cancer. The low efficacy condition asserted that breast self-exams were difficult to carry out and less effective at detecting breast cancer. All four versions of the message were equated for length. The messages were tape-recorded and lasted approximately 8 min.

**Dependent Variables**

**Manipulation checks**

The manipulation check for threat involved asking participants to rate how they felt while listening to the radio interview on a −3 (strongly disagree) to 3 (strongly agree) scale. The four critical items were frightened, uncomfortable, tense, and nervous. There were also seven filler items (lighthearted, confident, anxious, angry, nauseous, skeptical, and carefree).

The effectiveness of the manipulation of efficacy was assessed using four scales to measure perceived response efficacy (“If I examine my breast regularly myself, my chances of detecting cancer are extremely high”; “Regular self-examination of the breasts is the best, most effective method of detecting breast cancer early”; “By detecting breast cancer myself through breast self-examination I greatly improve my
chances of survival”; and “Adopting a monthly practice of breast self-examination will not drastically improve my chances of surviving breast cancer”—reverse coded). In addition, four scales measured self-efficacy (“A good self-examination of the breasts is easy to perform”; “A qualified doctor of nurse is more capable of detecting a breast lump than I am”—reverse coded; “Even if I do examine my breasts, often I don’t know if I am doing it correctly”—reverse coded; and “I believe I can effectively examine my breasts for abnormalities”). All items used a –3 (strongly disagree) to 3 (agree) scale.

**Attitude accessibility**

Attitude accessibility was operationalized as the time (in milliseconds) it took respondents to press a response key indicating whether they liked or disliked the item presented on a computer screen. Participants were seated in front of a computer screen and instructed that words would appear on the screen one at a time. Their task was to press either the like or dislike key. Participants completed five blocks of 20 trials. The first three blocks were designed to familiarize participants with the reaction time task and the phrase “press the like [dislike] key” appeared on the screen. Prior to the fourth block, participants were warned that the practice trials were completed. The fourth block consisted of 20 names of objects, behaviors, and social issues. This block was included to familiarize further participants with the task. The critical items (“breast cancer” and “breast self-exams”) appeared in the fifth block. The order of items in the fourth and fifth blocks was randomly determined by the computer for each participant.

**Attitude**

Attitudes toward breast cancer and breast self-exams were each measured using 19 semantic differential scales (−3 to +3): positive/negative, sad/delighted, annoyed/happy, valuable/worthless, imperfect/perfect, tense/calm, like/dislike, acceptance/disgusted, bad/good, beneficial/harmful, love/hateful, safe/unsafe, wholesome/unhealthy, relaxed/angry, useless/useful, wise/foolish, sorrow/joy, excited/bored, and undesirable/desirable.

**Defensive processing**

Four types of defensive reactions to fear appeal messages concerning breast cancer were measured: message credibility, religious faith, fatalism, and avoidance (Rippe toe, 1985). *Message credibility* was measured using four questions (“I didn’t really believe what I read in the essays”; “The information in the essays seemed accurate and believable”; “The essays I just read were easy to understand”; “The information
Religious faith was measured using three questions (“I turn to my spiritual beliefs when faced with the threat of developing breast cancer”; “When it comes to the possibility of developing breast cancer, I think it best to pray and put the problem in God’s hands”; “Strength in my faith in God is an effective way to cope with the possibility of breast cancer”). Fatalism was measured using two questions (“Given what I know about breast cancer, I sometimes feel it’s almost useless to try to stay healthy”; “When I think about the prospect of cancer, I sometimes feel like saying, ‘What’s the use is staying healthy?’”). Finally, avoidance was measured using four questions (“I try not to think about the possibility of developing breast cancer”; “I sometimes wish I could avoid situations that confront me with facts about breast cancer and breast self-examination”; “When I think about the threats of something like breast cancer, I find it best to get my mind on something more pleasant”; “When I think about the prospect of breast cancer, I sometimes feel like either eating or drinking too much”).

Behavior intentions
Behavioral intentions regarding breast self-exams were measured using 12, 7-point scales ranging from −3 (strongly disagree) to 3 (strongly agree). The items measured participants’ intentions to learn more about breast self-exams (“In the immediate future, I plan to find someone who will teach me to do an accurate breast self-examination”), intentions to perform breast self-exams (“In the next two weeks, I intend to adopt monthly breast self-examinations as a regular habit”; “I do not intend to adopt monthly breast self-examinations as a regular habit”), and motivation to learn more about breast self-exams (“I am motivated to learn more about the connection between self-examination of the breasts and surviving breast cancer”).

Procedure
Participants were run one or two at a time. Participants initially completed an informed consent form, and then were instructed that the study concerned their evaluation of a new interview program that had been proposed for the student radio station. Participants were told that they would listen to an 8–10 minute talk from a faculty member concerning that faculty member’s research. Then they listened to the message over a set of headphones.

After listening to the fear appeal, participants completed the measure of attitude accessibility. Then they completed a series of paper-and-pencil measures including manipulation checks, attitudes toward breast cancer and breast self-exams, behavioral intentions, and measures of defensive reactions to the message. Finally, participants were debriefed and supplied with materials on breast cancer and breast self-exams from the American Cancer Society.
Results

Manipulation Check

The check of the threat manipulation involved participants’ ratings of how they felt while listening to the radio interview (e.g., how frightened, uncomfortable, tense, and nervous). The four critical items were averaged (α = .85). The feeling data were analyzed using a 2 (threat) × 2 (efficacy) between-subjects ANOVA. The main effect of threat was statistically significant, F(1, 106) = 27.99, p < .05, r = .45. Participants felt substantially more fear in the high threat condition (M = 0.83, SD = 1.29) than in the low threat condition (M = −0.55, SD = 1.41). Neither the main effect of efficacy, F(1, 106) = 0.004, n.s., r = .006, or the two-way interaction was statistically significant, F(1, 106) = 1.91, n.s., r = .13. The manipulation resulted in a low to moderate level of fear, which is consistent with previous meta-analyses of the fear appeal literature that suggest it is difficult to construct messages to evoke high levels of fear (Boster & Mongeau, 1984). It should be noted that this result is not consistent with the EPPM because a strong fear reaction should occur only when the threat is high and efficacy is low according to the EPPM (e.g., when danger control processing occurs).

The four scales used to measure response efficacy and the four scales used to measure self-efficacy were averaged to form a composite measure of perceived efficacy (α = .88). As with the manipulation of threat, the manipulation of efficacy was successful, F(1, 106) = 145.65, p < .05, r = .75. The high efficacy message (M = 1.10, SD = 0.83) resulted in substantially higher levels of perceived efficacy than did the low efficacy message (M = −1.18, SD = 1.17).

Attitudes

The 19 semantic differentials used to measure participants’ attitude toward breast self-examinations were averaged to form a composite attitude measure (α = .96). The attitudes toward breast self-exam data were analyzed using a 2 (threat) × 2 (efficacy) between-subjects ANOVA (see Table 1). Contrary to hypothesis 1 the interaction between threat and efficacy that is predicted by the EPPM was not statistically significant, F(1, 106) = .16, n.s., r = .06, but the main effect of efficacy was statistically significant, F(1, 106) = 27.97, p < .05, r = .45. Participants expressed more positive attitudes toward breast self-exams in the high efficacy condition (M = 1.96, SD = 1.00) than in the low efficacy condition (M = 0.64, SD = 1.61). Unexpectedly, there was also a main effect of threat on participants’ attitudes toward breast self-exams, F(1, 106) = 5.63, p < .05, r = .22. Participants in the low threat condition expressed more positive attitudes toward breast self-exams (M = 1.60, SD = 1.44) than did participants in the high threat condition (M = 1.00, SD = 1.48).

The 19 semantic differentials used to measure participants’ attitude toward breast cancer were also averaged to form a composite measure of participants’ attitude toward breast cancer (α = .92). The attitudes toward breast cancer data were analyzed using a 2 (threat) × 2 (efficacy) between-subjects ANOVA (see Table 1).
Table 1 Means (and Standard Deviations) for the Dependent Variables Across the Four Experimental Conditions

<table>
<thead>
<tr>
<th></th>
<th>Low fear</th>
<th>High fear</th>
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<tr>
<td></td>
<td>Low efficacy</td>
<td>High efficacy</td>
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<tr>
<td>Low fear</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attitude toward breast self-exams (-3 to 3 scale)</td>
<td>0.97 (1.68)</td>
<td>2.20 (0.82)</td>
</tr>
<tr>
<td>Attitude toward breast cancer (-3 to 3 scale)</td>
<td>-2.42 (0.77)</td>
<td>-1.99 (1.43)</td>
</tr>
<tr>
<td>Behavioral intentions (-3 to 3 scale)</td>
<td>0.10 (1.20)</td>
<td>0.90 (0.95)</td>
</tr>
<tr>
<td>Accessibility of attitude toward breast self-exams*</td>
<td>1654 ms (0.23)</td>
<td>1525 ms (0.32)</td>
</tr>
<tr>
<td>Accessibility of attitude toward breast cancer*</td>
<td>1109 ms (0.28)</td>
<td>997 ms (0.34)</td>
</tr>
</tbody>
</table>

*The mean reaction times are transformed back to milliseconds from the original reciprocal transformation of the reaction time data. The standard deviations are from the analysis of the transformed reaction time.

Contrary to the prediction of hypothesis 3, the interaction between threat and efficacy was not statistically significant, $F(1, 105) = 2.55$, n.s., $r = .15$. Likewise, the main effect for efficacy, $F(1, 105) = .12$, n.s., $r = .03$, and the main effect of threat, $F(1, 105) = .25$, n.s., $r = .04$, were not statistically significant. The lack of substantial effects of the messages on attitudes toward breast cancer may be due to a floor effect as the overall attitude toward breast cancer was -2.24 (SD = 1.06) with -3 as the anchor. Indeed, the correlation between the means and variance for the four conditions was positive ($r = .96$), which is consistent with a floor effect.

**Attitude Accessibility**

Reaction time data tend to be highly skewed. Although the reaction times measuring the accessibility of participants’ attitudes toward breast self-exams were not highly skewed (1.19), the reaction times measuring the accessibility of participants’ attitudes toward breast cancer were highly skewed (3.29). There are several methods for transforming skewed data, and a reciprocal transformation was employed in this case (Fazio, 1990a). Because reciprocal transformations result in very small numbers, making follow-up analysis difficult because of rounding errors, the following transformation was used: $1/RT * 1000$. In reporting mean reaction times, reaction times are transformed back into milliseconds. Hypothesis 2 stated that as threat and efficacy increase, the accessibility from memory of participants’ attitudes toward breast self-examinations is expected to increase. The reaction time data were analyzed using a 2 (threat) $\times$ 2 (efficacy) between-subjects ANOVA (see Table 1). Contrary to the hypothesis, the interaction between threat and efficacy was not statistically significant, $F(1, 106) = 1.11$, n.s.,
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The high efficacy messages, however, increased the accessibility of the participants’ attitudes toward breast self-exams, $F(1, 106) = 6.72, p < .05, r = .24$. Participants hearing the high efficacy messages ($M = 1380$ ms) had more accessible attitudes toward breast self-exams than did participants hearing the low efficacy messages ($M = 1704$ ms). The main effect of threat was also not statistically significant, $F(1, 106) = 3.10, n.s., r = .17$.

Hypothesis 4 dealt with whether a message high in threat but low in efficacy would influence the accessibility of participants’ attitudes toward breast cancer. The reaction time data were analyzed using a $2 \times 2$ between-subjects ANOVA (see Table 1). Contrary to the hypothesis, the interaction between threat and efficacy was not statistically significant, $F(1, 106) = 1.10, n.s., r = .10$. Threat affected the accessibility of participants’ attitudes toward breast cancer, $F(1, 106) = 4.18, p < .05, r = .19$. Typically, changes in attitude accessibility result in faster reaction times. In this instance, however, participants who heard the high threat message expressed their attitudes more slowly ($M = 1419$ ms, $SD = 790$) than did participants hearing the low threat message ($M = 1166$ ms, $SD = 415$). The main effect of efficacy was not statistically significant, $F(1, 106) = 0.52, n.s., r = .07$.

Defensive Reactions

The four items used to measure message credibility were averaged to form a composite measure ($\alpha = .82; M = 1.80, SD = 1.16$). The three items used to measure religious faith were averaged to form a composite measure ($\alpha = .85; M = 1.16, SD = 1.51$). The two items used to measure fatalism were averaged to form a composite measure ($\alpha = .77; M = 2.12, SD = 1.23$). Finally, the four items used to measure avoidance were also averaged to form a composite measure ($\alpha = .60; M = -0.80, SD = 1.23$).

The research question concerned the relationship between various defensive reactions to fear appeal messages and the accessibility of participants’ attitudes toward breast cancer and breast self-examinations. As an initial attempt to answer this question, the four different types of defensive reactions (message credibility, avoidance, religious faith, and fatalism) were correlated with the accessibility of participants’ attitudes toward breast cancer and breast self-examinations. Only fatalism was correlated substantially with either the accessibility of participants’ attitudes toward breast cancer ($r = -0.25; 95\% \text{ CI} = -0.07 \text{ to } -0.42$) or the accessibility of participants’ attitude toward breast self-examinations ($r = -0.30; 95\% \text{ CI} = -0.12 \text{ to } -0.46$).

Behavioral Intentions

Hypothesis 5 concerned the influence of the accessibility of participants’ attitudes toward breast self-examinations on intentions to perform breast self-examinations.
The 12 scales used to measure behavioral intentions were averaged to form a composite measure of behavioral intentions ($\alpha = .92$). Initially, the behavioral intentions data were analyzed using a $2 \times 2$ between-subjects ANOVA (see Table 1). Contrary to the predictions of the EPPM, the interaction between threat and efficacy was not statistically significant, $F(1, 106) = .07$, n.s., $r = .06$. Consistent with Witte and Allen’s (2000) meta-analysis, however, there was a statistically significant main effect of efficacy on behavioral intentions, $F(1, 106) = 16.56$, $p < .05$, $r = .36$. Participants in the high efficacy condition expressed greater behavioral intentions to perform breast self-examinations in the future ($M = 1.14$, $SD = 1.05$) than did participants in the low efficacy condition ($M = 0.19$, $SD = 1.40$). There was no statistically significant effect of fear, $F(1, 106) = 2.13$, n.s., $r = .14$.

In addition, of interest was whether the accessibility of the attitudes toward breast self-examinations predicted the behavioral intentions to perform breast self-exams. OLS regression was used to test this relationship. The criterion variables were the four defensive reactions (message credibility, religious faith, fatalism, and avoidance), the extremity of participants’ attitude toward breast self-examinations, and the accessibility of participants’ attitudes toward breast self-exams. The four defensive reactions were included in the analysis because Rippetoe (1985) found they predicted behavioral intentions. Attitude extremity was included in the analysis because it has traditionally been used to predict behavioral intentions. The results of the regression analysis were statistically significant, $R = .37$, $F(6, 102) = 2.69$, $p < .05$. The significant predictors in the model were the accessibility of participants’ attitudes toward breast self-exams ($\beta = .936$, $t = 2.03$, $p < .05$) and religious faith ($\beta = .176$, $t = 2.17$, $p < .05$).

**Discussion**

The results of this experiment are consistent with many studies indicating that exposure to low to moderately fear-invoking messages can be effective in promoting healthier behaviors (Boster & Mongeau, 1984). Specifically, this experiment found that a message stressing the efficacy of the adaptive behavior resulted in more positive attitudes toward the adaptive behavior regardless of the level of threat contained in the message. Additionally, the high efficacy messages resulted in more accessible attitudes toward the adaptive behavior. This finding provides a mechanism for explaining how messages that stress the efficacy of an adaptive behavior can influence future behavior. Furthermore, consistent with the transactive model of attitude accessibility (Roskos-Ewoldsen, 1997), the accessibility of the attitude toward the adaptive behavior predicted participants’ behavioral intentions to perform that adaptive behavior. Finally, regardless of whether the message stressed the efficacy of the adaptive behavior, the high threat message appeared to decrease the accessibility of participants’ attitude toward the threat.
Implications for Fear Appeal Models

The results of this experiment complete part of the puzzle concerning the effects of fear appeal messages by providing a mechanism for the effect of high efficacy messages on future behavior. By examining the accessibility of the attitude toward the behavior, this experiment furnishes a mechanism through which fear appeal messages can affect change. Specifically, people are more likely to orient their attention to an object if they have an accessible attitude toward that object (Roskos-Ewoldsen & Fazio, 1992), and they are more likely to act in accord with an accessible attitude (Fazio, 1986; Fazio & Roskos-Ewoldsen, 1994; Roskos-Ewoldsen, 1997). Fear appeals that emphasize the efficacy of the action function by increasing the accessibility of the attitude toward the behavior, strengthening intentions to perform the adaptive behavior.

A further advantage of this work is the separate consideration of the attitude toward the threat and the attitude toward the behavior. The accessibility of these different attitudes was affected in predictable ways by the manipulations of efficacy and fear. That is, the efficacy manipulation increased the accessibility of the attitude toward the behavior, whereas the fear manipulation decreased the accessibility of the attitude toward the threat. Examining both types of attitudes gives a more complete picture of the reactions recipients have when confronted with health-related fear appeals. This outcome can be particularly important in devising health communications so that they are personally relevant, yet not so fear inducing that they push the recipients into a defensive processing style.

The results of the experiment are not, however, consistent with the extended parallel process model of fear appeals (Witte, 1992, 1994). Recall that the EPPM predicts that messages that are threatening but provide no effective way to deal with the threat result in danger control processes. In this situation, message recipients should react with a fearful response and use defense mechanisms to diffuse the fear that results from the threat, but if the same threatening message provides an effective way to deal with the threat through some type of adaptive behavior, then fear control processes should result. Fear control processes should lead to the intention to perform the adaptive behavior. Consequently, the EPPM predicts a statistical interaction between threat and efficacy. If threat is high and efficacy is low, then danger control processes will occur, but if threat and efficacy are both high, then fear control processes will occur.

Contrary to these predictions, this experiment suggests that fear control and danger control processes can operate independently of each other and can occur simultaneously. The high threat message resulted in fear reactions regardless of whether efficacy was high or low. Further, the high threat message influenced the accessibility of participants’ attitudes toward the threat regardless of efficacy. Both of these results suggest that participants were engaged in fear control processes whenever the message was threatening. Likewise, the high efficacy message resulted in more positive and accessible attitudes toward the adaptive behavior when the message was high or low in threat. Again, this result suggests that participants were
engaged in danger control processes regardless of whether fear was high or low. Although the findings in this experiment are contrary to the EPPM, they are consistent with the findings of Witte and Allen’s (2000) meta-analysis testing the EPPM. Their meta-analysis found evidence that danger control and fear control processes could operate independently of each other. Consequently, the same message may evoke both processes simultaneously. This experiment suggests, however, that fear control processes do not necessarily undermine the effectiveness of a threatening message. Even when people defensively process a message, they may still form the intention to perform an adaptive behavior to counter the threat.

Finally, the finding that the high fear appeal caused more negative attitudes toward the adaptive behavior (breast self-exam) is not consistent with the EPPM model (Witte, 1992, 1994). Specifically, the high fear appeal was expected to engage participants in fear control processes, which, according to the model, is irrelevant to their attitude toward the adaptive behavior. The direction of the effect may, however, be further evidence of defensive processing. That is, recipients in the high fear condition may have discounted the information related to the breast self-exams. Such discounting would result in a less favorable attitude toward the behavior. It is critical to note that the high efficacy message did increase the accessibility of the attitude toward the adaptive behavior in both the high and low threat conditions. Further investigation into the specific thoughts generated in response to the messages could better address this issue.

Implications for Understanding Attitude Accessibility

The research on attitude accessibility and the attitude-behavior relationship has focused on actual behavior. In the MODE model, Fazio (1990b) argued that accessible attitudes predict spontaneous behaviors. Furthermore, the MODE model maintains that behavioral intentions are the result of more deliberative processes such as those outlined by the theory of planned behavior (Ajzen, 1988). Thus, according to the MODE model, accessible attitudes may not predict behavioral intentions. Alternatively, Roskos-Ewoldsen’s (1997) transactive model of attitude accessibility maintains that accessible attitudes can act as a piece of information that something important is present in the environment (Roskos-Ewoldsen et al., 2002). Consequently, accessible attitudes can motivate deliberative processes that result in the formation of behavioral intentions.

The results of this experiment are consistent with the transactive model of attitude accessibility. The high efficacy messages resulted in more accessible attitudes toward performing breast self-exams. Further, the regression analysis found that as attitude accessibility increased so did participants intention to perform breast self-exams. The accessibility of participants’ attitudes improved the prediction of intentions to perform breast self-exams independent of the effect of attitudes.

Based on the current research on accessibility, there are at least two possible
explanations for why participants’ attitudes toward breast cancer became less accessible in the high fear condition. First, the decrease in accessibility could reflect a strong emotional reaction to the threat (Glaser & Banaji, 1999), which results in a startle reaction when the participant is presented with the threat. The startle reaction could slow participants’ reaction times. Note that in this interpretation the attitude has actually become more accessible from memory, but the methodology that was used to measure reaction times resulted in a slower time to respond to the probe. A second possibility is that participants are trying to suppress any thoughts related to the threat including their attitude toward the threat. In this instance, the attitude may become less accessible because it is automatically inhibited through some mechanism within the cognitive system. This thought suppression could occur through the use of controlled processing to suppress the unwanted thoughts. Thought suppression may not be the only mechanism influencing the accessibility of participants’ attitudes toward the threat. For example, a startle response and thought suppression may both be occurring when the threat is present. It is possible that this outcome is an important demonstration of the role of defensive processes in suppressing threatening thoughts. As demonstrated by Wegner et al. (1987), thought suppression can have paradoxical effects over time. Specifically, Wegner et al. propose that thought suppression requires a monitoring process that checks to be sure the suppressed information is not present in the contents of consciousness. The paradox results because the process of checking for activation of the suppressed information actually activates this information. Thus, the paradox is that trying to suppress specific thoughts actually makes them more accessible. Over time one would expect that the negative attitude toward breast cancer might actually become more accessible as a result of defensive, fatalistic thoughts. Further research in this area is necessary to determine if this paradoxical effect does occur with health-related fear appeals, and to examine the effects of thought suppression on processing of subsequent messages.

Finally, the finding that high threat messages apparently decreased the accessibility of attitudes from memory provides a potential mechanism for explaining findings in which fear appeal messages have been unsuccessful in changing behavioral intention (Hovland et al., 1953; Witte, 1992). The decrease in the accessibility of the attitude toward the threat may lead to subsequent avoidance or disparagement of information relevant to the threat. An interesting ramification of the finding that attitudes can become defensively less accessible is that the attention-orienting function of accessible attitudes will not operate. Consequently, an attitude that may have earlier influenced the orienting of attention toward health related information (e.g., information about breast cancer) will be less likely to do so because the attitude is less accessible. Thus the risk of exposure to fear-provoking information is reduced. On the other hand, there is a corresponding reduction in the likelihood that recipients will adopt the advocated behavior if they avoid processing health-related messages about the threatening issue.

An intriguing finding of this experiment is that the accessibility of participants’ attitudes toward breast cancer appears to have become less accessible (e.g., partici-
pants were slower to respond to the probe “Breast Cancer”) when the message was threatening. Research on attitude accessibility has focused exclusively on making attitudes more accessible from memory (e.g., participants are faster to respond to a probe). In part, the focus on increasing attitude accessibility follows from a long-standing view that highly accessible attitudes are more functional (Fazio, 1989; Roskos-Ewoldsen, 1997). More recently, Fazio (2000) has noted that accessible attitudes may not always be beneficial. For example, accessible attitudes bias the processing of incoming information, which means that they may result in people being closed-minded and inflexible regarding issues toward which they have more accessible attitudes. As a consequence, they may be unlikely to update their attitudes as new information becomes available. Thus, there may be conditions under which it would be desirable to decrease the accessibility of an attitude (Roskos-Ewoldsen, 1997; Sherman, 1987). This experiment provides the first demonstration that accessible attitudes can be made less accessible. Future work to investigate the specific ways in which attitude accessibility can be reduced is warranted.

In conclusion, this research has demonstrated that fear appeals affect the accessibility of attitudes toward the adaptive behavior and toward the threat in distinct ways. Considering the accessibility of these attitudes provides a mechanism for understanding how fear appeals affect behavioral intentions. Clearly, more research is needed on fear appeals, attitude accessibility, and defense mechanisms that result from fear appeal messages.

Notes

[1] Cognitive models other than network models can explain attitude accessibility. For example, connectionist models can account for the findings of research on attitude accessibility (Franks, Roskos-Ewoldsen, Bilbrey, & Roskos-Ewoldsen, 1999).

[2] Two studies have recently found that fear appeals did not increase elaborative message processing (Dillard, Plotnick, Godbold, Freimuth, & Edgar, 1996; Hale, Lemieux, & Mongeau, 1995). Nevertheless, these studies are not inconsistent with the hypothesis. Hale et al. (1995) only manipulated the noxiousness of the threat. Efficacy and susceptibility were not manipulated. Other studies that found that fear appeal messages increased elaborative processing manipulated susceptibility to the threat which is manipulated in this experiment. No studies that have explored the influence of efficacy appeals on elaborative message processing. Dillard et al. (1996) found that elaborative processing of fear appeals did not influence judgments of the persuasability of the message. Consequently, it is difficult to ascertain whether the fear appeal messages used in that study (AIDS public service announcements) influenced attitude change or behavioral intentions.

[3] Copies of the messages can be obtained from the first author.

[4] Nine participants expressed negative attitudes toward breast self-exams on both the paper-and-pencil measure of attitudes and in the response time task. The data were reanalyzed without these participants and the pattern of results did not change.

[5] One participant expressed a positive attitude toward breast cancer on both the paper-and-pencil measure of attitudes and in the response time task. The data were reanalyzed without this participant and the pattern of results did not change.
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