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SCARY WARNINGS AND RATIONAL PRECAUTIONS: A REVIEW OF THE PSYCHOLOGY OF FEAR APPEALS

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Research into the effects of fear-arousal on precautionary motivation and action is reviewed. Current models do not adequately distinguish between emotional (i.e., fear arousal) and cognitive (i.e., threat perception) responses to fear appeals and, in general, are not well supported. Evidence suggesting that (i) coping appraisals are more powerful predictors of precautionary action than threat perception and that (ii) fear control processes may interfere with precautionary motivation, recommends cautious and limited use of fear appeals in health promotion. It seems likely that fear arousal is less important in motivating precautionary action than perceptions of action effectiveness and self-efficacy. Moreover, perceived personal relevance may be critical to the emotional and cognitive impact of threat information. Available findings are summarised in the form of a process model that highlights the potential complexity of fear arousal effects. Sequential measurement of fear arousal, other than by self-report, is recommended in studies seeking to clarify these effects.

KEY WORDS: Fear-arousal, persuasion, health behaviour, health promotion, review.

INTRODUCTION

Public health campaigns frequently combine messages highlighting threats to well-being with recommendations to take protective action. This practice is founded on implicit assumptions about the effects of fear arousal and perceived threat on decision making and action regulation. Considerable research efforts have been devoted to investigating these processes, but it is questionable whether health-related fear appeals are evidence-based in the sense that they reflect research findings.

Fear-inducing HIV-preventive campaigns in 1980s and 1990s used images of death such as tombstones (in the UK) or the grim reaper (in Australia), but evaluations have cast doubt on the effectiveness of such campaigns (e.g., Rigby *et al.*, 1989; Ross *et al.*, 1990; Sherr, 1990). Moreover, reviews of intervention effectiveness have not identified fear arousal as a feature that distinguishes between effective and ineffective interventions (Fisher and Fisher, 1992; Kirby *et al.*, 1994). Yet fear-arousing messages continue to be employed in health promotion. This is illustrated by recent smoking prevention campaigns designed in Australia, the Netherlands and Canada, including plans to illustrate warning messages on

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cigarette packets with pictures of diseased lungs (http://www.hc-sc.gc.ca/english/archives/releases/2000_07e.htm; Research and Evaluation Committee of the National Expert Advisory Committee on Tobacco, 1999; Stivoro, 1997).

Clarification of research findings in this area and their implications for practice as well as identification of unanswered questions would provide a foundation for developing evidence-based practice. This paper reviews theoretical models and empirical findings pertinent to the relationship between fear arousal, motivation, information processing, and self-protective action. We highlight the, sometimes blurred, distinction between fear arousal and threat perception and discuss evidence suggesting that fear arousal may prompt denial that undermines precautionary motivation. Defensive responses may result in inadequate processing of precautionary instructions or the systematic rejection of arguments prompting precautions. Consideration of automatic and deliberative processes prompted by fear-arousing messages is linked to recent findings elucidating deliberative and volitional processes in action initiation. Our analysis suggests that future research should employ measures of fear arousal that do not depend upon self-reports and we sketch a process model that highlights the potential complexity of psychological responses to fear appeals.

WHAT IS A FEAR APPEAL?

A fear appeal is a persuasive communication attempting to arouse fear in order to promote precautionary motivation and self-protective action (cf. Rogers, 1983; Rogers and Deckner, 1975). Fear arousal is an unpleasant emotional state triggered by the perception of threatening stimuli. It is assumed that such states involve physiological arousal and motivate cognitive, affective, and behavioural responses directed towards alleviation of threat and reduction or elimination of fear (cf. Dijkster *et al.*, 1997; Frijda, 1986). This definition distinguishes fear arousal from cognitive processes involved in attitude change, including cognitive dissonance (e.g., Cooper and Fazio, 1984; Harmon-Jones *et al.*, 1996), as well as from the concept of negative mood (Forgas, 1992). Thus while threat perception may be inherent to fear arousal (Frijda, 1986; Lazarus, 1991a; Lazarus, 1991b; Lazarus and Folkman, 1984; Zajonc, 1980; Zajonc, 1984) the former does not necessitate the latter (Leventhal, 1970; Rogers, 1983).

Fear appeals typically provide two types of information. First, an attempt is made to arouse fear by presenting a threat (e.g., "HIV infection") to which the recipient is susceptible (e.g., "having unprotected sex puts you at risk for acquiring AIDS") and which is severe (e.g., "AIDS is a deadly disease"). Secondly, a search for "safety conditions" is prompted by recommending protective action (e.g., "by using condoms you can prevent HIV infection"). Such action may be presented as effective in neutralising the threat (e.g., "condoms prevent HIV infection during sexual intercourse") and easy to execute (e.g., "condoms can be bought everywhere and are easy to use"). This ideal structure has changed little during more than 45 years of research into fear appeals (Eagly and Chaiken, 1993; Witte, 1992a).

FEAR AS A LEARNING-ENHANCING DRIVE

The systematic analysis of the processes mediating the effects of fear appeals on persuasion began with the development of the *Drive Reduction Model* of persuasion by Carl Hovland and colleagues (Hovland *et al.*, 1953). This model and its extensions, as formulated by

Janis (1967) and McGuire (1968, 1969), highlighted motivational processes (or drives), such as attitudes, goals, needs and especially emotional arousal, that explain the effects of communication on action (Eagly and Chaiken, 1993). Fear was portrayed as a drive state motivating trial-and-error behaviour that may reduce the drive. Drawing upon learning theory principles, it was proposed that fear arousal enhances message acceptance when the message also prompts mental rehearsal of the recommended precaution that reduces fear. Consequently, high levels of fear arousal may fail to prompt change because rehearsal of recommended precautions may result in inadequate fear reduction. Hence the assumption of a curvilinear relationship between fear arousal and persuasion. Janis (1967) and McGuire (1968, 1969) predicted a \cap shaped relationship, with moderate levels of fear arousal (defined by personal and contextual factors) resulting in maximum persuasion. Their models postulated (albeit supposing different underlying processes) that low fear motivates precautionary action (i.e., acceptance of recommended behaviour), whereas high fear may instigate defensive processes that interfere with message acceptance (e.g., derogation of the message content, denying the threat). In the latter case risk behaviour will either remain unchanged or may be intensified (see Rogers, 1983, on boomerang effects).

Empirical support for drive reduction models is weak. The hypothesized curvilinear relationship has only rarely been observed (Boster and Mongeau, 1984; Eagly and Chaiken, 1993; Janis and Leventhal, 1968; Leventhal, 1970; Sutton, 1982). Janis and Leventhal (1968) concluded that most studies found a positive linear relationship in which greater message acceptance was more likely in high fear-arousing conditions (e.g., Berkowitz and Cottingham, 1960; Leventhal and Niles, 1965; Leventhal *et al.*, 1965). Janis and Feshbach (1953) reported greater change in attitudes and dental hygiene behaviours after presenting groups of high school students mild rather than strong fear appeals but this finding has not been replicated. Indeed an attempted replication by Leventhal and Singer (1966) found the reverse effect: greater attitude and behaviour change after a strong fear appeal than after moderate or weak fear appeals. It should be noted, however, that practical and ethical restrictions mean that laboratory experiments rarely generate intense fear (cf. Boster and Mongeau, 1984; Janis and Leventhal, 1968). It remains possible, therefore, that high fear arousal may prompt avoidance responses due to, for instance, feelings of hopelessness (see Greenberg *et al.*, 1997, for a recent review).

Empirical tests have also failed to confirm the postulated mediating role of fear reduction in fear arousal – persuasion relationships. Hendrick *et al.* (1975), Leventhal and Singer (1966) and Mewborn and Rogers (1979) found that lower fear, following fear appeals and the presentation of precautionary recommendations, was *not* predictive of precautionary motivation or action. Overall then, empirical findings have not confirmed predictions derived from drive reduction models and, in particular, there is little support for the fear reduction hypothesis (Beck and Lund, 1981; Eagly and Chaiken, 1993; Leventhal, 1970).

THE COGNITIVE BASIS OF PRECAUTIONARY MOTIVATION

Leventhal (1970, 1971) reviewed this literature and argued for greater research emphasis on the cognitive antecedents of self-protective action. His *Parallel Response Model* (PRM; Leventhal, 1970) suggests that fear appeals incorporate different stimuli that trigger distinct motivational and coping responses, particularly fear control and danger control. Fear control can be thought of as involving emotion-focussed coping (Lazarus and Folkman, 1984) that generates reassurance through denial of the threat or derogation of the message.

It is maladaptive because it does not avert the perceived threat (Leventhal, 1971; Witte, 1992a). Danger control, on the other hand, refers to cognitive processes orientated towards the presented threat, rather than the evoked fear. Danger control responses may prompt protective action. Leventhal (1970, 1971) argued that fear and danger control responses may operate independently but that one may dominate the other. For example, people with low self-esteem seem to be primarily concerned with fear control and to turn to danger control only when fear has been reduced. In contrast, people high in self-esteem may act directly on controlling presented threats through adaptive action (see Leventhal, 1971). In summary then, the PRM suggests that fear arousal need not precede the danger control processes that underpin precautionary motivation and that fear can also precipitate emotion-focussed processes that may undermine precautionary motivation.

Rogers elaborated Leventhal's work by developing *Protection Motivation Theory* (PMT; Rogers, 1975). Based on expectancy-value theory (Edwards, 1954), this social cognitive model and its revision (see Maddux and Rogers, 1983; Rogers, 1983) have become the predominant theoretical frameworks within which fear appeals have been studied. Similar models have been suggested by Beck and Frankel (1981) and Sutton (1982) but attracted fewer empirical tests. PMT suggests that fear appeals instigate two mediating cognitive processes that, together, constitute danger control responses. Threat appraisal (including assessments of threat seriousness and personal susceptibility) and coping appraisal (including assessments of the effectiveness of potential responses and one's ability to undertake these successfully) generate protection motivation defined as "an intervening variable that has the typical characteristics of a motive: it arouses, sustains, and directs activity" (Rogers, 1975, p. 98). In practice, protection motivation is operationalised as an *intention* measure (i.e., "the intent to adopt the communicator's recommendation"; Rogers, 1983, p. 158).

The revised theory incorporates two additional constructs: rewards associated with maladaptive responses (e.g., smoking and relaxation), and costs associated with adaptive responses (e.g., non-smoking and gaining weight). By adding these two belief components Rogers (1983) redefined PMT as an attitude-based model (i.e., attitude = outcome expectations \times evaluations; Fishbein and Ajzen, 1975), rather than a derivative of the health belief model (see Becker, 1974; Janz and Becker, 1984; Strecher and Rosenstock, 1997). The revised PMT is founded on stress coping models, as indicated by the concepts of threat appraisal and coping appraisal, but its specification of the cognitive constituents of appraisal processes strongly resembles the theory of planned behaviour (Ajzen, 1988) and social cognitive theory (Bandura, 1986), including outcome expectations (specified as beliefs about seriousness, susceptibility, rewards, costs, and response efficacy) and self-efficacy expectations as the main determinants of intention to take self-protective action (cf. Milne *et al.*, 2000).

The internal structure of PMT has been extensively tested (for reviews, see Boster and Mongeau, 1984; Eagly and Chaiken, 1993; Floyd *et al.*, 2000; Milne *et al.*, 2000). In general, experimental and non-experimental studies have found considerable support for the postulated relationships between threat appraisal (i.e., severity, susceptibility) and coping appraisal (response efficacy, self-efficacy) measures and precautionary intentions, across a wide variety of behavioural domains. However, while the independent associations with intention are relatively strong and consistent for response efficacy and especially for self-efficacy, they are weaker and less consistent for perceived susceptibility and especially perceived severity (Bandura, 1997; Eagly and Chaiken, 1993; Floyd *et al.*, 2000; Milne *et al.*, 2000; Schwarzer, 1992; Sutton, 1982).

Fewer tests of PMT's capacity to predict behaviour are available. A recent meta-analysis (Milne *et al.*, 2000) indicates threat appraisal (i.e., severity and susceptibility) and response efficacy measures have small associations with concurrent behaviour, and do not predict future behaviour. By contrast, self-efficacy, response costs and intention were found to be strong predictors of concurrent and future behaviour. Thus, consistent with the larger domain of attitude-behaviour research, efficacy components are stronger determinants of protective action than threat perceptions (see also Floyd *et al.*, 2000; Godin and Kok, 1996). In other words, it is perceptions of the precautions themselves that appear to be the strongest determinants of protective action.

Research also suggests that threat perception, in the absence of high self-efficacy and response efficacy, may prompt maladaptive fear control coping rather than danger control in the form of preparation for action (Abraham *et al.*, 1994; Rippetoe and Rogers, 1987; Witte *et al.*, 1998). For example, Rippetoe and Rogers (1987), found that perceptions of threat concerning breast cancer prompted both adaptive (e.g., intentions to perform breast self-examination) and maladaptive (e.g., avoid thinking about breast cancer) action. However, the critical factor in determining whether threat perceivers had a preference for adaptive or maladaptive responses were perceptions of response efficacy and self-efficacy. Under conditions of high threat, when both efficacy perceptions were high, adaptive responses were preferred over maladaptive ones. Conversely, when both efficacy perceptions were low maladaptive responses were preferred.

The potentially negative effects of threat perception on protective motivation are recognised by PMT. The theory proposes that becoming conscious of the severity of a threat that one is susceptible to will instigate protection motivation but that the nature of this motivation will depend on coping appraisal (i.e., response efficacy and self-efficacy). When recommended protective action is judged to be ineffective in averting the threat or impossible to undertake then no intention to act will result. Consequently, risk behaviour generating the threat will be maintained or even intensified (Rogers, 1983). However, empirical findings are mixed in relation to this proposed interaction effect (Eagly and Chaiken, 1993; Rogers and Prentice-Dunn, 1997). Some studies report support (e.g., Kleinot and Rogers, 1982; Maddux and Rogers, 1983; Rogers and Mewborn, 1976; Self and Rogers, 1990) while others do not (e.g., Griffith and Rogers, 1976; Mulilis and Lippa, 1990; Rippetoe and Rogers, 1987; Rogers and Thistlethwaite, 1970; Shelton and Rogers, 1981; Wolf *et al.*, 1986; Wurtele and Maddux, 1987). In their review of 15 years of empirical research into PMT, Rogers and Prentice-Dunn (1997) stated: "Threat and coping appraisal variables have been found to interact in about *one half of the studies* in which both classes of variables have been tested" (p. 119, *italics added*). Thus, while threat appraisal measures have been found to be poor predictors of protective action compared to coping appraisal measures, it is unclear that this can be explained in terms of the proposed interaction between these processes.

PMT served to elaborate what might be meant by danger control processes but focused on threat perception rather than fear arousal. The theory explicitly acknowledges that fear arousal can be the source and the product of threat perception (Rogers, 1983; Rogers and Prentice-Dunn, 1997) but does not specify a process model implying sequential measurement of fear over time. This cognitive focus has led some authors to replace the term fear appeals with threat appeals (e.g., Beck and Frankel, 1981) thereby effectively removing questions concerning fear arousal from research into fear appeals. This cognitive focus has also indicated that efficacy perceptions are more powerful predictors of preventive action than threat perception, suggesting that other models such as the theory of planned behaviour

may provide equally valid models of the relevant cognitive prerequisites (Godin and Kok, 1996).

A RETURN TO FEAR CONTROL PROCESSES

Witte (1992a) argues that fear control processes need to be understood because they may interfere with the establishment of cognitive antecedents of precautionary intentions (cf. Dillard, 1994). Witte notes that Leventhal's (1970) PRM did not specify how fear control and danger control process are related (cf. Beck and Frankel, 1981) and that Rogers' (1983) PMT focuses exclusively on danger control processes. To resolve these shortcomings she has proposed her own *Extended Parallel Process Model* (EPPM; Witte, 1992a) and presented evidence supporting hypotheses generated by EPPM (Witte, 1992b; Witte, 1994; Witte and Allen, 2000; Witte *et al.*, 1998). EPPM proposes that threat perception initially instigates danger control processes. Threat perceivers evaluate recommended action on its effectiveness and feasibility and their psychological response depends on the outcome of this coping appraisal. If the recommended action is thought to be ineffective or impossible then continuing threat perception will result in emotional and, in particular, fear arousal. At this point fear control processes are promoted resulting in denial and avoidance coping. Thus EPPM has the advantage of incorporating both fear and danger control processes. Nevertheless, certain questions remain unanswered. For example, the model does not clarify how these processes operate in parallel. Indeed it tends to imply sequential processing. We return to such questions below.

FEAR AROUSAL AS AN INFORMATION-PROCESSING MODERATOR

PMT, like other social cognitive models (Conner and Norman, 1996), assumes rational and deliberative information processing. People perceiving a threat to their health are portrayed as attending carefully to information about recommended action and basing coping appraisals of efficacy and feasibility on the arguments provided. Yet research into dual process models of attitude change (e.g., Chaiken *et al.*, 1996; Chaiken *et al.*, 1989; Petty and Cacioppo, 1986) suggests that attitudes can be formed and changed through less rational processes, especially when the motivation or cognitive capacities to process information are low. The Elaboration Likelihood Model (ELM; Petty and Cacioppo, 1986), for example, distinguishes between central and peripheral information processing. The former evokes cognitive change based on consideration of presented arguments but peripheral route processing can result in cognitive change due to other characteristics of the message, such as the expertise of the source. In general, central route attitude changes have been found to be more stable and predictive of behaviour and more resistant to counter-argumentation (for useful reviews, see Chaiken and Trope, 1999; Eagly and Chaiken, 1993).

The processing of threat-relevant information after the presentation of threatening information has been investigated by several studies (e.g., Baron *et al.*, 1994; Gleicher and Petty, 1992; Meijnders, 1998; Pointer and Rogers, 1993; Ruiter, 2000; Ruiter *et al.*, in press). In general, these studies have hypothesised that threat perception and fear arousal will heighten the relevance of threat-relevant information and, therefore, result in systematic processing of threat-relevant persuasive information. There is some evidence to

support this hypothesis. Baron and colleagues (1994) reported that under conditions of high threat attitudes towards dental hygiene were more positive after reading a strongly argued persuasive message than after reading the weak persuasive message. This effect of argument strength on attitude was not found in the low threat conditions, supporting the hypothesis that fear, or at least perceived threat, promotes systematic processing of threat-relevant persuasive information. The overall picture is not conclusive, however, because unpublished studies have reported inconsistent support for this hypothesis (Meijnders, 1998; Pointer and Rogers, 1993; Ruiter, 2000; Ruiter *et al.*, in press).

One reason for inconsistency may be a lack of clarification concerning the relationship between threat, usually manipulated by presenting high/high or low/low severity and susceptibility information, and fear arousal. Since threat manipulations prompt fear arousal, it is difficult to ascertain whether threat perceptions or the emotion of fear are responsible for the observed effects on message processing. Our own studies suggest, however, that fear arousal may have stronger effects on systematic processing of threat-relevant persuasive messages than perceptions of severity, susceptibility, or threat. For example, Ruiter *et al.* (in press) followed a threat manipulation concerning breast self-examination (BSE) with a 10 item self-report measurement of fear arousal ("How...anxious, worried, frightened, etc...were you while reading the information about breast cancer"; cf. Mewborn and Rogers, 1979). Female participants then read persuasive information about performing monthly BSE. Analyses revealed no support for more systematic processing of the BSE message under conditions of high threat compared to low threat but when reported fear arousal was included, results indicated that argument strength influenced attitude towards BSE to a greater extent amongst those who expressed greatest fear. These findings suggest that it may be fear arousal, rather than threat perception that prompts systematic processing. This conclusion could, however, be premature because, since threat manipulations were used to generate fear arousal but fear arousal and not threat perception appears to influence processing, it is possible that a third variable affected fear of breast cancer. Individual differences such as chronic anxiety relating to breast cancer (e.g., induced by experience of breast cancer in the respondent's family) and general responsiveness to threatening information (e.g., trait anxiety) could account for these results (cf. Jepson and Chaiken, 1990).

A second reason for inconsistency may be that, instead of appraising information about the effectiveness and feasibility of the recommended action, as assumed by PMT, fearful participants may search for reassurance. For example, Gleicher and Petty (1992) reported that moderately fearful participants only processed information concerning a recommended response if they expected this information to reassure them. Undergraduates were presented with moderate or low fear-inducing information about either illness (irrelevant fear) or crime (relevant fear) on campus. They were then given information about a new campus crime prevention programme that should be funded by an increase in tuition fees, supported by either strong arguments or weak arguments. Under conditions of moderate fear, irrespective of the object of fear (illness or crime), if an expert stated in advance that the presented solution would be effective in averting the threat (crime at the campus), respondents supported the prevention programme without critically evaluating the strength of presented arguments. However, if the expert was not clear about the efficacy of the solution but hinted that it might be effective, participants in the moderate fear conditions evaluated the recommended action on the basis of the presented arguments. Participants were more positive about the prevention programme after reading the strong arguments than after reading the weak arguments. Gleicher and Petty thus concluded that expectations

of reassurance determine whether fearful people are motivated to process persuasive messages.

Unexpectedly, the evaluation of the recommended action was also dependent on the strength of the arguments under conditions of low fear, but irrespective of the expert statement. Gleicher and Petty argued that this interest in the merits of the recommended solution was not driven by a motivation to find reassurance, because the induced fear was low, but by the high issue relevance of the message (cf. Petty and Cacioppo, 1986) as all participants studied on the campus. The findings of Gleicher and Petty thus suggest that fearful participants have a strong need for reassurance, which, if not satisfied in advance, may motivate them into systematic processing of persuasive communications. If reassured in advance, fearful participants may be defensively motivated to process persuasive communications that are relevant to their fear.

Two studies by Chaiken and colleagues have suggested that chronic fear and high perceptions of personal relevance are important determinants of defensive reactions to health information. Jepson and Chaiken (1990) found that participants who had high chronic fear of cancer detected fewer errors in a persuasive communication to promote regular cancer checkups, that also contained threatening information about cancer among young adults (e.g., "danger of cancer to the young is increasing"; Jepson and Chaiken, 1990, p. 68), than participants with low chronic fear. They concluded that people with high chronic fear have developed well-learned defensive avoidance strategies to deal with persuasive information, and so were more inattentive than those with low chronic fear.

Liberman and Chaiken (1992) reported that highly relevant information tends to result in defensive systematic processing of the threatening message. They presented coffee-drinking and non coffee-drinking participants with threatening information linking coffee-drinking to the development of fibrocystic disease (a precursor to breast cancer). The findings showed that women coffee-drinkers, for whom the message was highly relevant, were less persuaded of the link between caffeine and fibrocystic disease than female non-coffee drinkers. More importantly, coffee drinkers seemed to have systematically processed the threatening parts of the message, in a defensive, biased manner. Compared with non-coffee drinkers, they were less critical of information questioning the link between caffeine and fibrocystic disease and more critical of information supporting the link. Thus individual characteristics such as chronic fear and personal relevance may induce defensive processing, resulting in either defensive avoidance of action recommendations (Jepson and Chaiken, 1990) or critical systematic processing of threatening information (Liberman and Chaiken, 1992).

In a recent paper, Sherman *et al.* (2000) hypothesised that this defensive motivation stems from the anticipation that threatening information will damage self-image (cf. Greenberg *et al.* 1997). Two experimental studies suggested that defensive processing may help maintain a positive self-image. Among respondents for whom the presented threat was highly relevant, those who maintained a positive self-image through self-affirmation techniques, reacted more positively to recommended actions than those whose central values were not affirmed. To what extent affirmed respondents systematically processed the persuasive message remained unclear and should be subjected to further study.

Two other methodological issues arise from research into the effects of threat perception and fear arousal on the processing of persuasive information. First, the relationship between personal relevance and perceived susceptibility. These constructs have been used interchangeably by fear appeal researchers (e.g., Baron *et al.*, 1994) but it is possible for people to acknowledge a threat as relevant (e.g., "lung cancer is a risk because I smoke")

without accepting their own susceptibility (e.g., "I will not contract lung cancer because neither my mother or grandfather have it and both have smoked all their lives"). Theoretical and operational separation of these constructs would be desirable. Secondly, the operational definition of systematic processing as the impact of strong (*vs.* weak) arguments on attitude change may be problematic when applied to health promotion. Strong arguments must be relevant, valid and supportive of the recommended protective action but strong arguments may also be those that have not been previously considered (Vinokur and Burnstein, 1978). This is often problematic in health promotion research because key arguments are already in the public domain. For example, the argument, "If you perform regular self-examination you are likely to detect any cancer early and it is likely to be more easily treated" provides the strongest reason for performing BSE but it is not new to most women. A new argument should perhaps read "You probably know . . . but did you know that . . .".

In summary, the effects of fear arousal and threat perception on the likelihood of systematic processing of persuasive information are still not fully understood. Experimental procedures have not distinguished adequately between the effects of threat perception and fear arousal on information processing. Fear may promote the cognitive antecedents of precautionary intentions by activating systematic, rather than peripheral processing, but individual characteristics may also be involved in determining the extent and direction of systematic processing. Perceived personal relevance and chronic fear seem to be important personal variables that result easily in defensive reactions to health information, but other variables such as direct or indirect previous experience may also be important. These defensive reactions seem to be directed both to the threatening and reassuring parts of the fear appeal, and may involve different extents of systematic processing varying from defensive avoidance to critical systematic processing. Recent research suggests that these reactions may be affected by concerns about self-image (Sherman *et al.*, 2000).

RE-CONCEPTUALISING FEAR AROUSAL AND ITS RELATIONSHIP TO THREAT PERCEPTION, FEAR CONTROL AND PRECAUTIONARY MOTIVATION

It is clear that research into fear appeals has yet to answer some important questions. In particular, is there something more to fear arousal than threat perception and, if so, how does this affect the processing of information on risk and precautionary action? We believe that a more sophisticated model is implicit in the literature and we have outlined this below. In doing so we highlight a number of hypotheses arising out of the existing literature.

We propose first that risk information generates the experience of fear before or in parallel to conscious perception of threat as is suggested by PRM and EPPM. This emotional response may generate fear control processes and affect precautionary motivation independently of threat perception. This proposal corresponds to theories of emotion that portray emotional experiences as the products of automatic, preconscious processing of perceptual cues in which physiological arousal and action readiness are combined (Frijda, 1986; Lazarus, 1991a; Lazarus, 1991b; Wegner and Bargh, 1998; Zajonc, 1980; Zajonc, 1984). Frijda (1986), for example, argues that emotions such as fear, arise as the result of rapid, preconscious information processing in which the stimuli are categorised (what is it?), compared (is it important to me?) diagnosed (what can I do?), and evaluated (what is the urgency, difficulty and severity of the situation?), followed by action orientation that lays the foundation for subsequent planned action (e.g., establishing a flight tendency). Dependent on the nature of the resulting action tendency, physiological changes are instigated (e.g.,

fear arousal). Fear is, therefore, viewed as an automatic and primary response that may contribute to but is not the product of more conscious, deliberative danger control processes that regulate action.

In discussing the relationship between fear arousal and attitude change, Rogers (1983) concluded that, "fear arousal does not facilitate attitude change unless this arousal directly affects the cognitive appraisal of the severity of that threat" (p. 165) but, in their review, Eagly and Chaiken (1993) noted that this path has not been well supported by empirical findings. They argued that there is more support for a path in which efficacy perceptions influence the level of fear which then influence fear control processes (such as defensive avoidance) (Eagly and Chaiken, 1993, p. 444). There is, however, an incompatibility between the emotional experience of fear arousal as described above and the measures of self-reported fear employed in the studies reviewed by Eagly and Chaiken (1993). It is possible, therefore, that *reported fear* is a reflection of threat and coping appraisals rather than an index of fear arousal. This would account for observations of high reported fear when perceived threat is high and adaptive coping possibilities are expected to be low (see Rippetoe and Rogers, 1987; Witte, 1992a).

In order to test the proposal that fear arousal precedes threat perception and Rogers' suggestion that threat perception may mediate the effect of fear on danger control processes, independent measures of fear arousal are required. Psychophysiological measures such as the galvanic skin response (measuring automatic nervous system arousal) or the startle reflex (measuring fear arousal) could be used on-line to determine levels of fear arousal. Similarly, procedures within neuropsychology to measure the brain activity (e.g., electroencephalography analysis 'EEG', functional magnetic resonance imaging 'f-MRI') could be employed to identify the onset of threat appraisal processes (Berntson and Cacioppo, 2000; Cacioppo *et al.*, 2000).

Witte (1992a, p. 116), draws upon research into affective processes to argue that fear control responses are more automatic and less conscious than danger control responses (Bargh and Chartrand, 1999; Lazarus, 1984; Lazarus, 1991a; Lazarus, 1991b; Murphy and Zajonc, 1993; Wegner and Bargh, 1998; Zajonc, 1980; Zajonc, 1984). For example, Wegner and Bargh (1998) suggest that negative emotions may automatically activate defence mechanisms to control the emotion. Such fear control processes may result in conscious responses such as avoiding situations that would evoke the emotion, but they may also prompt automatic, unconscious responses such as suppression of the emotional response. Thus fear may be a primary response that leads to automatic fear control processes that could interfere with the formation of precautionary motivation because attention may be distracted from subsequent reassuring messages (Witte, 1992a; see Witte and Allen, 2000, for empirical evidence). This could be tested by measuring attention independently of self-reported cognitive measures. On-line eye-movement registration (in case of exposure to video fragments), reading time and unanticipated post-hoc recall tasks could be employed. Such research would also have the advantage of observing study participants as active information seekers who have the opportunity to re-direct their attention from presented information, thereby better reflecting the reality of real-life responses to fear-arousing messages such as those presented on television (Jacoby *et al.*, 1987; Lion and Meertens, in press).

Witte (1992a) argued that fear control and danger control responses are determined by efficacy beliefs. Yet, Witte *et al.* (1998, p. 574) found only partial support for the hypothesis that "Individuals exposed to the fear appeal campaign message with low-efficacy perceptions should have a greater degree of defensive avoidance, perceived manipulation, and issue derogation than those with high-efficacy perceptions." However, Witte (1994,

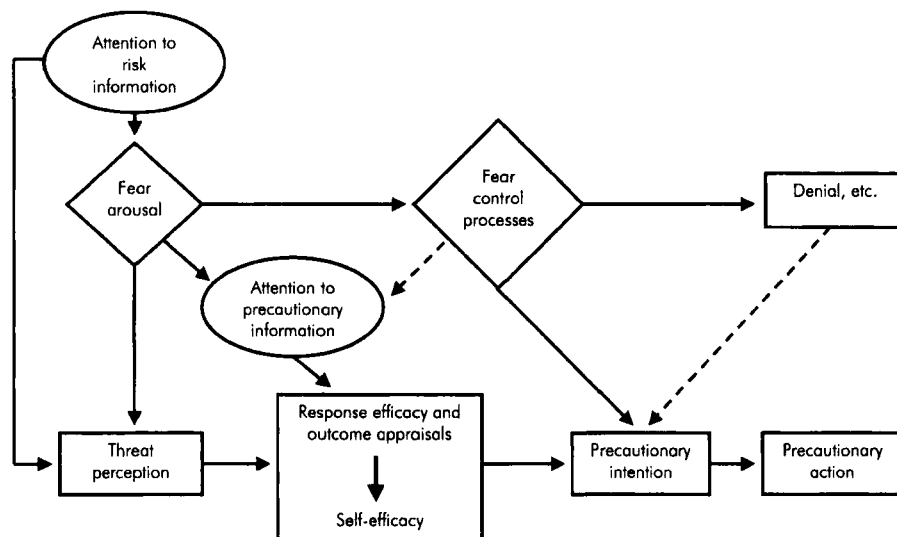
pp. 117–118) reported support for the hypotheses that, “There is a direct relationship between fear and message rejection outcomes, such as defensive avoidance and reactance” and that “Perceived efficacy... is unrelated to message rejection outcomes such as defensive avoidance or reactance.” This pattern of results could indicate that fear control processes are less influenced by efficacy perceptions because they are automatic in nature but that the more deliberative action planning involved in danger control is more dependent on efficacy perceptions.

PMT and EPPM propose an interactive model in which the effects of threat recognition on intention formation are *moderated* by efficacy perceptions (Rogers, 1983; Witte, 1992a). An alternative view derived from the social cognitive literature is that the effects of threat perception on intention are largely *mediated* by coping appraisals. Perceptions of severity and susceptibility have, in some cases, been found to have direct effects on intention formation when controlling for theory of planned behaviour and PMT variables. However, in general, threat perception appears to have a more distal effect on motivation than response efficacy and self-efficacy (e.g., Abraham *et al.*, 1994; Plotnikoff and Higginbotham, 1995; Plotnikoff and Higginbotham, 1998). Consequently, a number of authors have suggested that threat recognition prompts action contemplation, whereas perceptions of efficacy and feasibility determine the kind of action that will be undertaken and are, therefore, more proximal determinants of action (Rippetoe and Rogers, 1987; Schwarzer, 1992; Witte *et al.*, 1998). Thus while threat perception may contribute to precautionary motivation by prompting consideration of outcome expectancies, perceptions of response efficacy, response costs and self-efficacy may determine intention formation and subsequent action. Bandura (1986, 1997) has argued that actions thought to be effective in reducing a threat may not be performed because people do not feel able to execute them but that ineffective actions do not need further consideration regarding their feasibility. This suggests that response efficacy expectancies have priority over self-efficacy appraisals/expectancies. Finally, it is worth noting that if the danger control process is unresolved due to unsatisfactory coping appraisals this is likely to generate feedback that enhances perceived threat and fear arousal and, thereby, amplifies fear control processes.

The relationships described above (apart from the potential feedback effects of unsatisfactory coping appraisals) are represented in Figure 1. This model implies complex and potentially contradictory relationships between fear arousal and the promotion of precautionary motivation. Fear may bolster threat perception which, in turn, has a weak but positive effect on the development of precautionary motivation. Fear may also prompt precautionary motivation through enhanced systematic processing. At the same time fear may prompt automatic fear control processes that distract attention from the processing of precautionary information. Fear control processes may result in an anticipatory motivation that bolsters intention formation but they may also lead to denial and other forms of avoidant coping that undermine the establishment of precautionary motivation. The impact of fear arousal on precautionary motivation may, moreover, be moderated by the intensity of the emotion and individual characteristics including anxiety levels and specific self-efficacy.

THE PRESENTATION OF PRECAUTIONARY INFORMATION

The model sketched above implies that precautionary information should ideally highlight the effectiveness of recommended action, address concerns over costs and bolster self-efficacy. Research based on the theory of planned behaviour suggests that normative perceptions



Legend. Circles represent initial responses to the fear appeal. The diamonds represent automatic emotional responses and are contrasted with conscious cognitive responses that are represented by rectangles. Facilitating effects are represented by continuous lines, the dashed lines represent inhibitory effects.

Figure 1 Re-conceptualising the effects of fear appeals on fear control and precautionary motivation.

may also be important (Ajzen, 1991; Trafimow and Fishbein, 1995), at least for some people and some actions (Trafimow and Finlay, 1996). Taking account of these findings it is possible to tailor health promotion messages so that they address the cognitions highlighted by social cognitive models. There is, however, a considerable body of research on persuasion that provides additional guidelines on the preparation of arguments and messages. Important features include argument strength, source expertise and action instructions (for a health-related overview, see Maibach and Parrott, 1995). Further improvements may be possible by carefully tailoring the contents (Brug and de Vries, 1999), valence of wording (Rothman and Salovey, 1997), and use of volitional prompts (Gollwitzer and Schaal, 1998).

More recent research drawing upon the work of Kahneman and Tversky (1979, 1984) and Meyerowitz and Chaiken (1987) has indicated that formulating what is objectively the same information in terms of either gains or losses (i.e., message framing) systematically influences decision making. Several studies have investigated the extent to which people are sensitive to message framing in the context of health decisions (Detweiler *et al.*, 1999; Rothman *et al.*, 1999; Rothman *et al.*, 1993). The persuasive effects of presenting the negative consequences of not performing the healthy behaviour (loss frame) have been compared to the effects of presenting the positive consequences of performing the healthy behaviour (gain frame) on measures of attitudes and behaviour (e.g., Meyerowitz and Chaiken, 1987).

Levin *et al.* (1998) defined this form of message framing as action framing and in a review of this literature, Rothman and Salovey (1997) suggested that the type of behaviour that is promoted determines which action frame will be most effective. Findings suggest that behaviours focussed on early detection of health problems are best promoted by loss frames (e.g., "Failing to use a disclosing rinse before brushing limits your ability to detect

areas of plaque accumulation"; Rothman *et al.*, 1999, p. 1361), whereas prevention behaviours are best promoted by gain frames (e.g., "People who use a mouth rinse daily are taking advantage of a safe and effective way to reduce plaque accumulation"; Rothman *et al.*, 1999, p. 1361). Rothman and Salovey (1997) explain these findings in terms of the greater perceived risk associated with detection behaviours. Although the long-term importance of, for example, performing BSE is generally acknowledged the short-term negative consequences may be especially important to intention formation and implementation (Weinstein, 1988). Prevention behaviours, in contrast, typically result in relatively certain, desirable outcomes so that not performing the behaviour becomes the risky option. Kahneman and Tversky (1979, 1984) have shown that people prefer risky options when confronted with losses but prefer certainty when considering gains. Consequently, the more risky detection actions will be most attractive when potential losses are highlighted whereas the less risky preventive behaviours will be promoted best by emphasising potential gains.

Leventhal and colleagues studied the relation between fear arousal and the provision of specific instructions on how to take precautionary action (Leventhal *et al.*, 1966; Leventhal *et al.*, 1965; Leventhal *et al.*, 1967). In one well known study (Leventhal *et al.*, 1965) participants read a potentially high or low fear-arousing message about the negative consequences of tetanus and were advised to have a vaccination injection at the local hospital. Half the respondents received a map highlighting the location of the hospital and were instructed to think about their daily schedule in order to arrange classes so that they would have time to visit the hospital. Results showed that those in the high fear condition had more positive attitudes and intentions towards tetanus injections than those in the low fear conditions; whereas the provision of action instructions had no influence on attitudes and intentions. Action instructions did, however, influence action: 30% of the students receiving action instructions had an injection while only 3% did so in the absence of action instructions. Thus fear arousal had a positive effect on the antecedents of precautionary motivation (i.e., attitudes) and on precautionary intention formation. This effect did not, however, translate into a greater likelihood of action. Motivation was nonetheless crucial to action. None of those in the control condition (with no fear message) went for an injection, irrespective of whether or not they received specific instructions. Thus fear and threat perception created motivational basis for action while specific instructions facilitated the translation of good intentions into action.

These findings foreshadow those of more recent work suggesting that postdecisional or volitional processes explain why some intenders act while others do not. A number of theorists have distinguished between two stages of action control; (i) a decisional or motivational stage which culminates in intention formation; and (ii) a postdecisional or volitional stage which involves self-regulatory activities directed towards the enactment of intentions (Gollwitzer, 1993; Gollwitzer and Moskowitz, 1996; Kuhl, 1992; Schwarzer, 1992). This work suggests that social cognitive models of motivation do not adequately represent key aspects of action control. Gollwitzer (1993), for example, has demonstrated that forming "implementation intentions", that is, specifying when and where an intention is to be enacted can distinguish between intenders who do and do not act. He argues that such detailed plans create cues to action in relevant environments, which prompt intenders to act automatically when encountered (see also Abraham *et al.*, 1999; Orbell *et al.*, 1997). This research emphasises the importance of combining fear appeals with specific instructions and prompts to action planning. It also raises interesting questions about the relationship between the emotion of fear and postdecisional processes. For example, does fear arousal inhibit or enhance action planning?

CONCLUSIONS AND IMPLICATIONS

This review indicates that the contribution of fear appeals to the adoption of self-protective behaviour is in doubt. Fear arousal may render information concerning response efficacy and self-efficacy more salient, for example, through enhancing systematic processing (e.g., Baron *et al.*, 1994), but it is the impact of these messages on attitude and intention formation that determine the effect of a fear appeal on precautionary action (e.g., Rippetoe and Rogers, 1987; Witte *et al.*, 1998). Measures of threat perception have weaker relationships with intention and behaviour (e.g., Milne *et al.*, 2000). This implies that it is the precautionary information or reassurance included in the message, not the capacity to arouse fear, that is likely to have greatest impact on behaviour, especially since fear may inhibit the establishment of precautionary motivation through the instigation of fear control processes (cf. Leventhal, 1970; Witte, 1992a; Witte and Allen, 2000).

We have suggested a re-conceptualisation of the psychological responses to fear appeals and recommended that future research invest in sequential measures of fear arousal other than self-report measures. We would also echo Eagly and Chaiken's (1993) call for more research into the effects of fear arousal on attention to precautionary information and the impact this has on the development of precautionary motivation. In addition we have highlighted the importance of tailoring precautionary information so that it addresses key cognitive antecedents of action (particularly response efficacy and self-efficacy), uses appropriate action framing and includes specific action instructions.

Although some key questions remain unanswered in this field, these findings have clear implications for the use of fear appeals. It seems likely that fear arousal may have inhibiting as well as facilitating effects on assimilation of protection motivation and can lead to avoidant coping. Consequently, cautions use of fear arousal techniques seems advisable. A greater focus on precautionary information and the promotion of action at the expense of prompting fear arousal is likely to be more consistently effective than attempts to frighten people about health risks with images of death and injury. Campaigns should continue to highlight the personal relevance of health threats but the severity of outcomes following health-risk behaviour may be much less important to establish than the feasibility of preventive action.

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