THE FEAR MANAGEMENT MODEL: BUILDING AN INTEGRATIVE FEAR APPEAL THEORY THROUGH SYSTEM DYNAMICS

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ABSTRACT

This paper attempts to refine the Extended Parallel Process Model by adding the notion of hope to highlight the significant role of fear in fear appeals. Using System Dynamics modeling methods to reformulate the key constructs and integrate the ideas drawn from theories of multiple disciplines, the relationship between danger control and fear control processes are modified. Accordingly, the Fear Management Model is devised to fix the flaws and resolve the major unanswered questions in fear appeal literatures. Moreover, the implications for helping resistant audiences to pursue adaptive behaviors are discussed. Fourteen propositions are proposed for guiding hypothesis development in future research.

Keywords: Fear Appeal, Hope, Efficacy, Risk Taking, EPPM, Fear Management Model, Health Communication, System Dynamics.

INTRODUCTION

Since the Extended Parallel Process Model (EPPM) was first published in 1992, it has become one of the most influential theories in fear appeal literature (Maloney et al., 2011; Roberto, 2013). In order to stress the critical role of fear in fear appeals, Witte (1992) deliberately devised the title of her paper as "Putting the Fear Back into Fear Appeals." However, although fear was supposed to act as a central factor in the model, subsequent studies have provided insufficient evidence to support the existence of a direct relationship between fear and message acceptance (Witte, 1994a, 1998). As a result, on the 20th anniversary of the EPPM, even Witte (2013) herself could not but admit, "[T]he major flaw in the theory is the heavy focus on cognition" (p. 4).

To improve the validity and explanatory power of the EPPM, Witte (2013) suggested that the real arousal of fear and its impact on behavior change should be further explored. Moreover, "new and clever methodologies are needed" if the intertwining connections and dynamic interactions between the key constructs of the EPPM are to be adequately tested (Witte, 1998, p. 446). In particular, based on the concern of helping resistant audiences to pursue adaptive behaviors, future research should put greater emphasis on the fear control process (Witte, 2013).

To respond to the call of Witte to refine the EPPM, the notion of hope is added to modify the connection between the threat appraisal and the coping appraisal. In addition, by drawing ideas from other disciplines and using System Dynamics as the integration platform, the composition of perceived threat, perceived efficacy, and individual differences are reformulated, whereas the feedback loop between perceived threat, perceived efficacy, and fear are revised. Finally, by refining and elaborating the EPPM, the Fear Management Model is devised to provide new insights for guiding future research and practice in the field of fear management.

A BRIEF REVIEW OF THE EPPM

The EPPM was formulated by integrating and expanding previous theories of fear appeal (i.e., Janis's fear-as-acquired drive model, Leventhal's parallel process model, and Roger's protection motivation theory) to explain why fear appeals succeed or fail (Witte, 1998). As a predominant message design theory, the EPPM has provided an understandable and viable framework for studying the effectiveness of health communication campaigns (Maloney et al., 2011). Nevertheless, the constructs, structure, and validity of the EPPM have been frequently questioned and criticized as empirical studies have often revealed equivocal and inconsistent research findings (Carcioppolo et al., 2013; Ooms et al., 2015; Roskos-Ewoldsen et al., 2004; Ruiter et al., 2001; Witte & Allen, 2000). The review in this section aims to demonstrate a profile of the EPPM for later discussions.

Key Constructs of the EPPM

The EPPM includes six key constructs, which are the foundation for building its theoretical framework and propositions (Witte, 1992, 1998). These key constructs are briefly described in line with the logical order of the EPPM.

First, *threat* is the major factor that may directly lead to fear arousal. A threat is a communication stimulus that illustrates some undesirable consequences to evoke a fear response (Witte, 1992). However, a threat has to be perceived by an audience before it can generate any effect (Witte, 1994a). If perceived threat is low, no further processing of the fear-arousing message will occur. Moreover, perceived threat is essential in determining the intensity of an individual's response (i.e., the degree of the reaction to the message)(Witte, 1992, 1998). *Perceived threat* is composed of perceived severity (i.e., an individual's belief about the significance of the threat) and perceived susceptibility (i.e., an individual's belief about the probability of the threatened event or action occurring). Individuals are most likely to experience fear when both perceived severity and perceived susceptibility are high (Witte, 1992).

Fear, as the second construct depicted in the EPPM, is a negatively valenced emotion that may be elicited by a seriously perceived threat (Witte, 1992, 1998). According to the propositions of the EPPM, fear directly leads to fear control responses, but indirectly affects

danger control responses when perceived efficacy is high, with the mediation of perceived threat (Maloney et al., 2011; Witte, 1992, 1998). Consequently, the role of fear in the EPPM appears to be demoted and limited, even though it is often seen as a critical factor for increasing risk estimates, activating the behavioral inhibition system, and predicting persuasion (Dillard & Anderson, 2004; Lerner et al., 2003; So, 2013).

The third construct is *perceived efficacy*, which refers to the cognitions of individuals concerning the feasibility of a recommended response for coping with the threat. Perceived efficacy is postulated as irrelevant when perceived threat is low, but it is a crucial determinant regarding whether an individual will engage in danger control or fear control responses when perceived threat is high (Witte, 1992, 1998). Again, perceived efficacy is comprised of perceived response efficacy (i.e., an individual's belief about the effectiveness of a response for preventing the threat) and perceived self-efficacy (i.e., an individual's belief about his or her ability to avert the threat by undertaking the recommended response)(Witte, 1992). Theoretically, perceived efficacy is assumed to be high when both perceived response efficacy and perceived self-efficacy are at high levels (Maddux & Rogers, 1983; Witte, 1992). However, this assumption was not supported in empirical studies (Maddux & Rogers, 1983; Witte & Allen, 2000).

The fourth and fifth constructs are the two types of reactions of the audience. First, *danger control responses* refer to the belief, attitude, intention, and behavior changes of individuals according to the recommendations of a fear appeal message. When individuals engage in danger control responses, they are motivated to exhibit adaptive changes to protect themselves against a significant threat. Second, *fear control responses* are the coping responses of individuals that aim at alleviating fear rather than averting threat. Individuals undertaking fear control responses will suppress their fear and display maladaptive behaviors such as defensive avoidance, denial, aggression toward the communicator, and inattentiveness to the communication (Witte, 1998; Witte et al., 1996).

The last construct is *individual differences*. Since different people may perceive the same fear appeal message differently, their responses may also vary (Witte, 1992). The EPPM proposes that individual differences indirectly affect fear appeal outcomes through perceived threat and perceived efficacy (Witte, 1998). In the literature, individual differences have been operationalized as sensation seeking (Witte & Morrison, 1995), trait anxiety (Witte & Morrison, 2000), cultural orientation (Murray-Johnson et al., 2011), Big-Five dimensions of personality (Terblanche-Smit & Terblanche, 2011), dispositional coping style (So, 2013; Witte, 1991), health status (McKay et al., 2004), health consciousness (Hong, 2011), prior knowledge or experiences (Barnett et al., 2014; Averbeck et al., 2011; Cauberghe et al., 2009; Fry & Prentice-Dunn, 2005; Goei et al., 2010), need for cognition (Ruiter et al., 2004), and stages of change (Cho & Salmon, 2006). The broad proposition regarding individual differences provides the advantage of inspiring future research by

allowing greater freedom to extend the model and test variables (Maloney et al., 2011). However, the trade-off of such a broadly defined construct is the inconsistent findings that beget arguments and perplexities (Witte & Allen, 2000; Witte & Roberto, 2009).

The Theoretical Framework

According to the EPPM, individuals may conduct threat and coping appraisals successively. First, individuals appraise the extent of threat in fear appeal messages to form their perceived threat through combining perceived severity and susceptibility. If the perceived threat is trivial, individuals do not respond at all. Once the perceived threat rises to a certain threshold that evokes fear, individuals begin the second appraisal to evaluate response efficacy and self-efficacy (Witte, 1998). Then, the two appraisals jointly result in one of the following two responses.

Danger control responses occur when both perceived threat and perceived efficacy are high. As long as perceived efficacy is greater than perceived threat, individuals are presumed to undertake the recommended actions. Conversely, individuals with high perceived threat and low perceived efficacy will engage in fear control responses, which aim at derogating the message, seeing the message as mere manipulation, or avoiding thinking about the threat and the recommended action (Witte & Roberto, 2009).

At the inception of the EPPM, fear was designated as playing a central role in activating the coping appraisal. Accordingly, fear was assumed to result in maladaptive responses and indirectly affect adaptive responses (Witte, 1992). Further, the feedback between perceived threat and fear implies that the two constructs may reinforce each other through reciprocal interactions (Dillard, 1994; Witte, 1992). In a later study, the feedback loop was expanded by hypothesizing that the elicited fear would become greater when perceived efficacy was low. However, this hypothesis was not supported since "[f]ear arousal and the perceived threat-fear relation did not vary across efficacy group" (Witte, 1994a, p. 124). Because no evidence corroborates the existence of this feedback, later studies simply leave it unmentioned (e.g.,Witte et al., 1996; Witte & Roberto, 2009). Once again, the role of fear shrinks and its remaining function is no more than motivating people to make additional appraisals and ensuring ongoing processing of the message (Dillard, 1994; Lewis et al., 2013; Maloney et al., 2011).

The Strengths and Weaknesses of the EPPM

By integrating previous fear appeal theories, the EPPM incorporated both fear and danger control processes to explain when and why fear appeals work or fail (Witte, 1998). Thus, it could reconcile contradictory predictions and findings in prior research with an elegant and easily understood structure (Popova, 2012). This advantage has made the EPPM an appealing framework for guiding research and campaign design in the field of health communication (Maloney et al., 2011).

Similar to many other models, the EPPM inevitably has structural shortcomings. First, despite the fact that the label "Parallel Process" is manifested in the name of the EPPM, it postulates a sequential processing of information in threat and coping appraisals (Ruiter et al., 2001). Second, although two thresholds are delineated to trigger coping appraisals and fear control responses respectively, they have never been measured in the literature (Popova, 2012). *Threshold* appears to be an idle phrase that has little role in empirical research. Third, individual differences are assumed to affect perceived threat and perceived efficacy. Nonetheless, since individual differences may imply any number of personal traits or properties, "more work is needed to find out which individual differences influence reactions to fear appeals" (Witte, 1998, p. 446).

In addition to structural shortcomings, the formulas that define the relationships between related variables are also subject to controversy. Initially, the EPPM followed protection motivation theory to assume a multiplicative relationship between threat and efficacy, but did not explicitly define the rule for combining the two dimensions of either construct (Witte, 1992, 1994a). While protection motivation theory originally postulated protection motivation as a multiplicative function of appraised severity, expectancy of exposure, and belief in coping response efficacy, ensuing studies rejected the multiplicative combinatory rule but supported the interaction between expectancy of exposure and the efficacy of coping responses (Rogers et al., 1978; Rogers & Mewborn, 1976). For this reason, protection motivation theory was revised to suggest a sub-additive combinatory rule that included the probability of occurrence, coping response efficacy, and self-efficacy (Maddux & Rogers, 1983).

Likewise, Witte (1998, p. 435) in her seminal piece suggests that "threat and efficacy interact multiplicatively to influence outcomes" whereas the two dimensions of each construct are combined additively. A meta-analysis of ninety-eight fear appeal studies reveals that the additive model tends to better fit the data (Witte & Allen, 2000). Notwithstanding the fact that the multiplicative model was rarely supported in empirical research, Basil et al. (2013) did find a "magic cell" interaction (i.e., persuasion outcomes are most favorable when all the four components are at high levels) to support the multiplicative assumption. Moreover, Weinstein's (2000) research exhibited a multiplicative relationship between expected probability and perceived severity by using a within-subject design. Viewed in this light, calculating the two constructs as a product of their underlying dimensions should not be dismissed.

The discriminating value formula for identifying whether an audience is in fear or in danger control is also dubious. According to the EPPM, individuals make coping appraisals by subtracting perceived threat from perceived efficacy to yield a discriminating value. Since adding or subtracting values with different units of measurement (e.g., meter vs. kilogram) is apparently invalid in mathematics, the EPPM wisely devised a mathematical

formula by first standardizing the scores of perceived threat and perceived efficacy before performing subtractions (Witte, 1994b). Admitting that standard scores are a dimensionless quantity, performing addition or subtraction between two standard scores that imply qualitatively different things still makes no sense.

In sum, both the structure of the EPPM and the mathematics for computing relevant values in the two appraisals are inherently controversial. As a result, the following four questions remain to be answered. First, do individuals process threat and efficacy messages sequentially or simultaneously? Second, how can fear appeal messages, perceived threat, perceived efficacy, and the emotion of fear be linked more reasonably? Third, how do individual differences exert influences in the fear appeal process (Witte, 1998)? Last, but not least, how can we bring people out of fear control responses and help them engage in adaptive behaviors (Witte, 2013)? The next section intends to provide answers to the above questions by building a new fear management model on the basis of the EPPM.

THE FEAR MANAGEMENT MODEL

Many scholars have devoted efforts to refine the EPPM since its invention. For example, McKay et al. (2004) pointed out that health status was positively associated with perceived threat and fear. De Pelsmacker et al. (2011) indicated that issue familiarity and the amount of information in persuasive messages jointly affected perceived threat, fear, and perceived efficacy. Cho and Salmon (2006) and Wong and Cappella (2009) suggested stages of change as an effective device for segmenting the audience. On the other hand, So (2013) developed an extended EPPM and proposed a feedback loop to indicate that individuals who appraise perceived efficacy to be lower than perceived threat may engage in information seeking and make more coping appraisals before undertaking fear control responses.

Two valuable insights can be drawn from the above research. First, besides stable individual difference variables such as gender, race, and personality traits, certain properties of individual differences such as health status, knowledge, and preparedness are malleable and subject to change over time. If aggregate variables are used to encompass all of the effects of both types of individual difference variables, the relationships between individual differences and reactions to fear appeals may be easily clarified by testing their effects inter-individually and intra-individually across situations and time (Trimpop, 1994). Second, individuals with a coping style of monitoring may seek more information and make multiple coping appraisals as they find current efficacy unsatisfying (So, 2013). In this sense, some features of fear control responses may be intermediate reactions, implying that individuals are on the alert for more threat or efficacy cues to be present.

Although the insights of the above extensions are enlightening, none of them have provided sufficient answers to the four unresolved questions noted in the previous section.

For this reason, the Fear Management Model is proposed to illuminate the complex nature of psychological responses to fear appeals through System Dynamics (Ruiter et al., 2001).

System Dynamics is widely known as a robust approach for unraveling complex systems (Schwaninger & Ríos, 2008). A complex system is characterized by nonlinearity, feedback loops, and time delays (Aaltonen, 2007; Miller & Page, 2007; Sterman, 2001). System Dynamics tackles the intertwining relationships in complex systems with two techniques. First, Systems Thinking uses causal loop diagrams to illustrate causality and feedback between related elements. Second, formal model building techniques based on rigorous mathematical rules are powerful in detecting structural flaws and unit inconsistencies in equations (Maani & Cavana, 2000; Richardson & Pugh, 1981). As a result, policy leverage points can be identified by distinguishing exogenous from endogenous variables and examining the feedback loops in the model.

An Overview of the Fear Management Model

In the past two decades, neuroscience has made tremendous progress in exploring the interdependent relationship of cognition and emotion (Dalgleish, 2004; LeDoux, 1989). Based on fear conditioning experiments, Romanski and LeDoux (1992) identified two routes involving the amygdala, which is seen as having a key role in processing signals of threats. The first route is a direct thalamo-amygdala pathway that bypasses the thalamo-cortical sensory pathway and allows stimulus processing without involving the cortex to interface emotion with cognition and control emotional responses. This pathway is the low road, which is shorter and faster but with a limited capacity for stimulus discrimination. The second route is the thalamo-cortico-amygdala pathway, also known as the high road, which has several cortico-cortical links between the thalamus and the amygdala. This longer route allows more complex and accurate analysis of incoming messages but at the cost of slower reactions (Dalgleish, 2004; LeDoux, 1995, 1996; Öhman, 2008; Storbeck & Clore, 2007). A corollary of this finding is that the two pathways process information concurrently. Therefore, the answer to the first question regarding whether individuals process the threat and efficacy messages sequentially or simultaneously is obvious. That is, because the thalamo-amygdala pathway transmits messages faster than the thalamo-cortico-amygdala pathway, individuals seem to process threat messages before efficacy messages, while in effect they process the messages through two parallel pathways simultaneously instead of sequentially (LeDoux, 1996). Under the guidance of the parallel presumption, the Fear Management Model is developed as shown in Figure 1.

In general, the Fear Management Model has retained the basic structure of the EPPM. However, five improvements are proposed. First, the Fear Management Model suggests that individuals perform the threat appraisal in parallel with the coping appraisal through the pathways delineated in neuroscience. Second, the delay sign between perceived efficacy and gap implies an information delay in the coping appraisal process since the high road

takes more time to analyze the incoming stimulus and deliver a conditioned emotional response (Dalgleish, 2004). Third, hope and desired efficacy are added to the model as two new constructs. Hope motivates individuals to change their desired efficacy, while desired efficacy helps to make the comparison between the two appraisals more reasonable. Fourth, individual differences are redefined as consisting of risk-taking capacity and risk-taking willingness. Theoretically, risk-taking capacity is presumed to moderate the relationship between message threat and perceived threat, while risk-taking willingness is postulated as a mediator intervening between fear and desired efficacy (Baron & Kenny, 1986). Finally, the plus sign beside the arrow head refers to a positive causality and the minus sign represents a negative causality between the two variables connected by the arrow. Accordingly, two feedback loops are identified to illustrate the significant role of fear in fear appeal processes. The details and related propositions regarding the Fear Management Model are explicated in line with the order of the other three questions listed in the previous section.

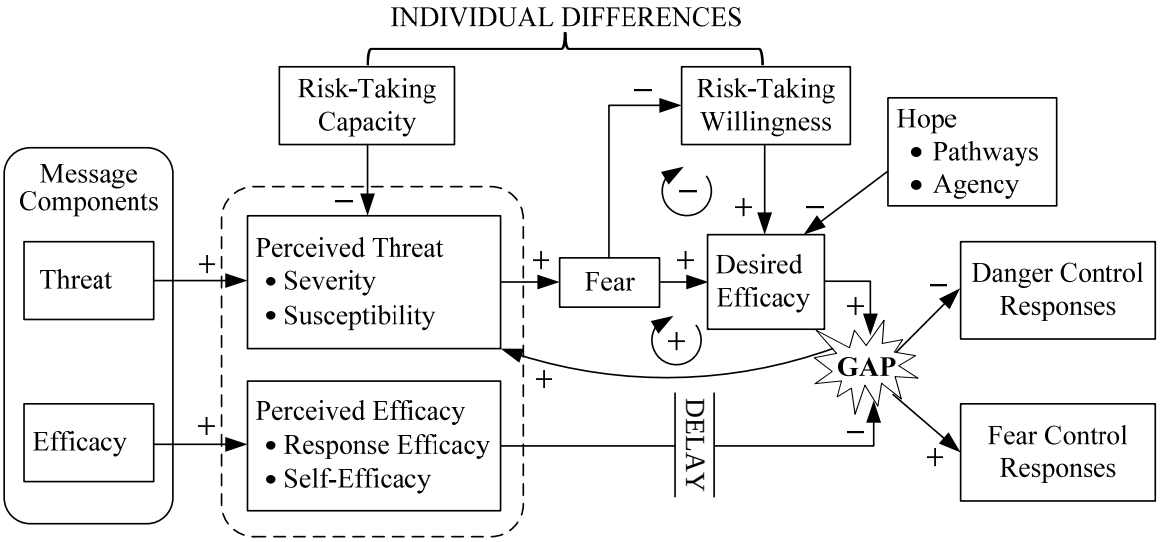

Figure 1. The Fear Management Model

Adding Hope and Desired Efficacy to the Model

Hope and *desired efficacy* are the two new constructs installed to help resolve the other three unanswered questions. In the Fear Management Model, hope is defined as a positive motivational state derived from the interaction of one's perceived capability to envision feasible responses and goal-directed energy for reaching desired goals (Snyder, 2000; Snyder et al., 2002). According to this definition, hope is composed of two interrelated components (i.e., pathways and agency), both of which are indispensable for hope to be present (Snyder et al., 1991; Taylor et al., 2000). *Pathways thinking* refers to an individual's perceived capability in producing plausible solutions to meet desired goals. *Agentic*

thinking, on the other hand, denotes an individual's perceived capacity to apply the generated solutions (Snyder et al., 2002). High-hope individuals armed with pathways and agency thoughts not only can figure out solutions to deter the threat by themselves, but can also be self-motivated to persistently carry out the solutions with greater efficacy (Snyder, 2000).

Desired efficacy acts as the counterpart of perceived efficacy. According to the principles for modeling human behavior in System Dynamics, system problems often arise from the gap between desired and actual states. Thus, to distinguish the two states is essential for detecting the fundamentals of the system (Sterman, 2000). Moreover, the gap between desired efficacy and actual efficacy often affects the behavior of individuals (McCluskey et al., 2004). In the Fear Management Model, desired efficacy is defined as the effectiveness that individuals demand for recommended responses to avert the threat. Like perceived efficacy, desired efficacy also comprises two dimensions. *Desired response efficacy* refers to an individual's demand regarding the feasibility of the recommended response to prevent a threat, while *desired self-efficacy* denotes an individual's wishful probability of being able to implement the recommended response. Desired efficacy is proposed as the product of desired response efficacy and desired self-efficacy (i.e., desired response efficacy × desired self-efficacy = desired efficacy).

As exhibited in Figure 1, hope is proposed to be negatively related to desired efficacy. That is, high-hope individuals who consider themselves as being able to generate feasible solutions and undertake those solutions to deter the threat are assumed to be more optimistic and rely less on the recommended responses, and thereby have a lower level of desired efficacy (Lopez et al., 2004). On the other hand, since fear is a functional emotion for eliciting defense to a hazardous threat (Marks & Nesse, 1994), greater fear often triggers higher desired efficacy with the expectation that effective responses can be gained from efficacy messages (Dillard, 1994).

Proposition 1: Individuals with a higher level of hope will have a lower level of desired efficacy, all else being equal.

Proposition 2: As the level of fear increases, desired efficacy will increase correspondingly.

Strengthening the Reasoning of Fear Appeal Processes

How to reasonably link fear appeal messages, perceived threat, perceived efficacy, and fear is the second question to resolve. A prerequisite of proposing answers to this question is elucidating the nature of the threat and efficacy thresholds based on threshold theories. Then, the constructs related to these two thresholds should be modified correspondingly. Finally, the links between relevant constructs can be thoroughly elaborated.

According to discontinuous threshold models, two major forms of threshold can be delineated. On the one hand, a threshold without hysteresis involves only a single control

parameter that creates a sudden change in one direction. On the other hand, a threshold with hysteresis has two or more control parameters that may lead a system to go back and forth between different states (Suding & Hobbs, 2009; Thompson, 1982; Zeeman, 1977). In the EPPM, the threat threshold corresponds to the former since perceived threat is the only parameter to determine the level of fear for triggering coping appraisals. By contrast, the efficacy threshold corresponds to the latter because two parameters (i.e., perceived threat and perceived efficacy) jointly determine whether an individual will undertake danger or fear control responses (Witte, 1992, 1998). According to the nature of the two thresholds, the formulas for calculating perceived threat and perceived efficacy are revised.

Considering that the threat threshold should have only one control parameter, the values of severity and susceptibility have to be integrated into a single value to represent the level of perceived threat. Therefore, perceived threat is proposed as the product of severity and susceptibility (i.e., severity × susceptibility = perceived threat), whereas the definitions of the two underlying dimensions remain unchanged. Based on the research findings of Witte (1994a) and the extended EPPM proposed by So (2013), fear is assumed to be positively associated with perceived threat. Moreover, unless perceived threat is strong enough, fear will not be aroused to a significant enough level to render fear appeals successful (Lennon & Rentfro, 2010).

Proposition 3: As perceived threat increases to a level that exceeds the threat threshold, the greater the perceived threat becomes, the higher the fear aroused.

The efficacy threshold involves two control parameters to decide the outcome of fear appeals. In this respect, the EPPM proposed the discriminating value formula to provide an easy way for distinguishing people undertaking danger control responses from those undertaking fear control responses (Witte et al., 1996). As mentioned before, the equation for calculating the discriminating value is dimensionally invalid. To eliminate the problem of invalidity, the formula for calculating perceived efficacy is revised based on the following reason.

As noted earlier, there was little evidence to support the existence of interactions between perceived response efficacy and perceived self-efficacy. Nevertheless, Witte et al. (1996) did find the efficacy factor as a second-order unidimensional construct composed of response efficacy and self-efficacy. Moreover, Choi et al.'s (2013) research based on a large sample (n = 2,129) suggests the two components of perceived efficacy as separate dimensions where response efficacy functions as a moderator to modify the relationship between self-efficacy and substance use. In addition to the sample size, their success in differentiating response efficacy and self-efficacy may also be attributed to the scenario statement that helps to make the focus of self-efficacy measures more specific and less ambiguous. Therefore, the assumption about the interaction between response efficacy and

self-efficacy should not be dismissed simply because of a lack of evidence in the literature.

For the above reason, self-efficacy is redefined as the perception of individuals regarding the likelihood of whether or not they will be able to successfully undertake the recommended response, whereas the definition of response efficacy remains the belief of individuals about the effectiveness of the recommended response for preventing the threat. Correspondingly, the value of perceived efficacy is revised as equal to the product of response efficacy and self-efficacy (i.e., response efficacy × self-efficacy = perceived efficacy). On the other hand, the notion of a gap drawn from System Dynamics modeling is used to connect desired efficacy and perceived efficacy. An efficacy gap exists when desired efficacy exceeds perceived efficacy. By contrast, an efficacy gap vanishes once perceived efficacy exceeds desired efficacy. As a result, individuals will engage in fear control responses when such a gap appears. Otherwise, they will undertake danger control responses.

Proposition 4: If desired efficacy is higher than perceived efficacy, the greater the resulting gap, the more likely individuals will engage in fear control responses.

Proposition 5: If desired efficacy is lower than perceived efficacy that renders no gap, individuals will undertake danger control responses.

Individual Differences as Risk-Taking Capacity and Willingness

The terms *perceived threat* and *perceived risk* are sometimes used interchangeably in fear appeal research, inasmuch as individuals who respond to threats always need to make risk judgments about their losses in case the threats come true (Rimal & Real, 2003; So, 2013). For this reason, the effects of individual differences on risk-taking behaviors found in the literature of risk analysis should also apply to fear appeal research.

A critical issue in the field of risk analysis is to find out what makes risks acceptable (Short, 1984). In this connection, Vlek and Stallen (1980) regard controllability and voluntariness as the two critical factors associated with risk judgment and risk acceptance respectively. Controllability refers to the extent to which individuals can exercise control over the consequence of a risky event (Holtgrave & Weber, 1993; MacGregor & Slovic, 1989). For instance, all death-defying edgework activities (e.g., skydiving, hang gliding, car racing) inevitably involve the use of specific individual capacities to maintain control over a situation that most people deem as hardly controllable. Most edgeworkers engage in high-risk events because they believe they can control their own fate (Lyng, 1990). Since controllability is often positively associated with individuals' health status, knowledge, or skills that allow them to better cope with uncertainty, the Fear Management Model therefore replaces controllability with risk-taking capacity, which refers to the capability of people to avoid or bear risk-associated losses, and functions as an aggregate variable to integrate the effects of those personal capacity-related individual difference variables.

Voluntariness implies the freedom of individuals to choose for or against the risks of an action (Holtgrave & Weber, 1993; Vlek & Stallen, 1980). In general, individuals voluntarily take risks when they perceive the value of outcomes as worthwhile (Kahneman & Tversky, 1984; Starr, 1969). Furthermore, individuals with arousal needs have a greater willingness to engage in risky activities for gaining stimulating experiences (Lyng, 1990; Zuckerman, 2007). For the reason that voluntariness involves people's willingness to engage in risk taking, the Fear Management Model defines risk-taking willingness as the voluntariness of individuals to remain inactive toward their perceived threat. Risk-taking willingness is designated as aggregating the effects of personality traits, stages of change, and other situational factors.

How does risk-taking willingness affect desired efficacy? The sufficiency threshold proposed in the heuristic-systematic model may provide some clues. A sufficiency threshold refers to an individual's desired confidence about making judgment in a given setting. According to the sufficiency principle of information processing, individuals cease information processing when their actual confidence is greater than or equal to their desired confidence. Moreover, individuals with a higher sufficiency threshold are more prone to engage in systematic processing. Otherwise, they will engage in heuristic processing (Eagly & Chaiken, 1993). Based on this theory, Todorov et al. (2002) suggest that people's information processing efforts can be motivated either by increasing their desired confidence, by reducing their actual confidence, or by doing both simultaneously.

Empirical research regarding risk taking and information processing has provided more valuable results. For instance, Trumbo (1999) pointed out that heuristic processing was associated with judgment of lower risk, while systematic processing was related to judgment of greater risk. Lion and Meertens (2001) found that risk takers would look up less information than risk avoiders. To relate these findings to the sufficiency principle of information processing, we may speculate that individuals with higher levels of risk-taking willingness are more likely to be risk takers with a lower level of sufficiency threshold. Thus, they tend to rely on available information and expert recommendations when engaging in heuristic processing. Moreover, they may have higher levels of desired efficacy that make them more critical and skeptical toward the recommended responses.

Theoretically, perceived threat and the aroused fear should be negatively related to risk-taking behavior. However, this supposition may not always hold. For example, for risky sexual behaviors and smoking, the consequences of which are unlikely to appear soon after the events, high sensation seekers are more willing to accept risks, even though their perceived risk is no different from that of low sensation seekers (Horvath & Zuckerman, 1993). Similarly, although edgeworkers are usually very nervous and fearful during the anticipatory phases of activities involving a threat of death or injury, they are still willing to face the challenge by virtue of pursuing self-actualization (Lyng, 1990). These findings

may imply that risk-taking willingness as an individual difference variable is accountable for determining whether or not individuals will engage in risky activities once their fear is aroused by their perceived threat.

Proposition 6: Individuals with greater risk-taking capacity have a lower level of perceived threat, all else being equal.

Proposition 7: Individuals with greater risk-taking willingness have a higher level of desired efficacy, all else being equal.

Proposition 8: When individuals have identical levels of perceived threat and fear arousal, risk-taking willingness becomes the determinant for segmenting risk takers and risk avoiders.

The Nonlinear Nature of Desired Efficacy

One of the most interesting assumptions in the fear appeal literature may be the inverted U-shaped relationship between fear arousal and persuasion. That is, moderate levels of fear arousal tend to result in maximum persuasion, while low and high fear levels tend to produce little attitude change (Janis, 1967). However, succeeding studies have provided little evidence to support this assumption (Hunt & Shehryar, 2011; Ruiter et al., 2001). On the contrary, research findings suggest that there is a positive linear relationship between fear arousal and persuasion. Therefore, as the fear appeal amplifies, so will attitude, intention, and behavior changes (Dillard, 1994; Higbee, 1969; Witte & Allen, 2000).

Why does the curvilinear assumption lack support from empirical evidence? Both Janis (1967) and Leventhal (1970) believed that there might be neglected or modifier variables interacting with those factors under investigation. Leventhal (1971) further argued that perhaps increases in fear arousal only resulted in persuasion at the low end of the scale where the strength of threat messages were below moderate levels. By contrast, increases in fear arousal may lead to decreases in persuasion at the high end of the scale where the strength of threat messages goes from mild to very strong.

Although the inverted U-shaped relationship between fear arousal and persuasion was rejected (Rotfeld, 2000; Witte & Allen, 2000), the speculations of Janis and Leventhal have shed light on the possibility of using the optimal level of arousal theory to explore an answer for how individual differences exert influences in the fear appeal process (Zuckerman, 2007). As Hebb (1955) has suggested, once the level of arousal reaches the point of waking, an organism's level of response first rises with increased stimulation and greater arousal, then decreases when the arousal exceeds its optimal level. However, he also emphasized that "the drive is an energizer, but not a guide; an engine but not a steering gear" (p. 249). Therefore, what the optimal-level theory describes is actually the relationship between an arousal and its corresponding responses instead of the organism's final behavior. In this

sense, the conventional inverted U-shaped relationship between fear arousal and persuasion may be an erroneous prediction based on false reasoning.

The theory of sensation seeking brought in the behavioral approach system (BAS), the behavioral inhibition system (BIS), and the fight-flight-freeze system (FFFS) to illuminate the approach and avoidance responses of individuals in risky situations (Zuckerman, 1979, 2007). According to the Neuropsychology of Anxiety, which is now known as Reinforcement Sensitivity Theory, the BAS is a positive feedback system related to personality traits such as optimism, reward-orientation, and impulsiveness, which tend to reinforce high-risk behaviors. The FFFS is a negative feedback system associated with personality traits such as fear-proneness and avoidance, which will elicit defensive attack, escape, or freezing to restore the desired safety state. Finally, the BIS is a negative feedback system that inhibits prepotent conflicting behaviors and encourages risk assessments until goal conflicts are resolved (Corr, 2008; McNaughton & Corr, 2004).

In Reinforcement Sensitivity Theory, fear and anxiety are seen as two distinct categories, albeit they are not independent in practice. Fear involves fight/flight/freezing and functions to remove an organism away from immediate threat, whereas anxiety involves inhibition of ongoing behaviors in approach-avoidance conflict situations and inspires the organism to search for more information and make further risk assessment by moving toward potential danger (Corr, 2008; Gray & McNaughton, 2000; McNaughton & Corr, 2004).

Despite the opposite natures of fear and anxiety, the sensation seeking theory conceives of fear as equivalent to anxiety (Zuckerman, 1979). In fear appeal research, other than So (2013) who suggests separating anxiety from fear in her four-part model, anxiety is commonly seen as a property of fear or a personality trait. For simplicity, the Fear Management Model does not distinguish anxiety from fear. Instead, it is proposed that high levels of fear occur when individuals experience more immediate and intensive threats, while anxiety is seen as fear of low to moderate levels (Blanchard & Blanchard, 2008; McNaughton & Corr, 2004).

Due to the fact that fear arousal produces a negative effect on risk-taking willingness, which is in turn positively associated with desired efficacy, the inverted U-shaped relationship actually describes the curvilinear causality between fear arousal and desired efficacy. As exhibited in Figure 2, the graph on the left-hand side depicts that increases in fear will lead to an exponential decay of risk-taking willingness. The graph on the right-hand side illustrates the inverted U-shaped relationship between fear and desired efficacy. At first, desired efficacy tends to grow when fear arousal increases. However, once intensity and immediacy reach extremely high levels, pushing the level of fear to the high end of the scale, the abrupt decline of risk-taking willingness will cause desired efficacy to drop drastically. As a result, individuals with a very low level of desired efficacy are willing to accept any solution to cope with the inescapable threat, hoping that they may

succeed by chance.

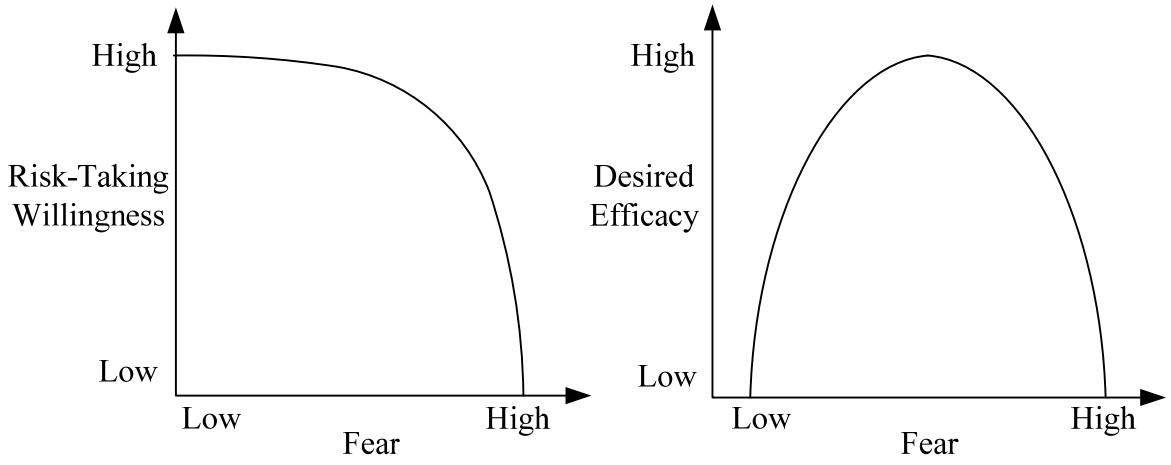

Figure 2. The Curvilinear Causality between Fear Arousal and Desired Efficacy

Proposition 9: At the low end of the scale when the fear level goes from low to moderate, the impact of fear on risk-taking willingness increases mildly and exerts little effect on desired efficacy.

Proposition 10: When fear reaches an extremely high level, the impact of fear on risk-taking willingness grows drastically, overturning the effect of fear on desired efficacy and causing desired efficacy to drop abruptly.

Proposition 11: As the level of fear increases, desired efficacy will first increase, and then decrease, resulting in an inverted U-shaped function.

Switching from Fear Control to Danger Control Responses

According to the EPPM, fear appeals are supposed to result in either message acceptance and adaptive changes, or message rejection and maladaptive changes (Witte, 1992, 1998). Among the audience, Witte (2013) suggests that the ten percent unpersuadable yet least studied people should be given more attention to help them switch from maladaptive to adaptive behaviors. The two feedback loops and the three exogenous variables (i.e., message threat, message efficacy, and hope) in the Fear Management Model are the key for providing resolutions to this issue.

As shown in Figure 1, the first feedback loop that runs from perceived threat through fear and desired efficacy, to the efficacy gap, and finally back to perceived threat is essentially an elaborated version of the feedback loop in the EPPM. The plus sign in its center denotes positive or reinforcing feedback. Once an efficacy gap emerges and activates

this loop, it amplifies deviations around the loop unless external forces interrupt to reverse its growing trend. The second feedback loop is a negative or balancing loop, which runs from perceived efficacy through fear, risk-taking willingness, and desired efficacy, to the efficacy gap, and back to perceived threat. The minus sign in the middle of this loop implies that it restrains deviations and motivates goal-seeking behaviors (Maani & Cavana, 2000; Richardson & Pugh, 1981; Sterman, 2000).

The implications of the two feedback loops are threefold. First, when the reinforcing loop is dominant, individuals will be unlikely to pursue adaptive behaviors, unless their perceived threat becomes strong enough to trigger extremely high levels of fear that activate the balancing loop to decrease risk-taking willingness and desired efficacy. Second, enhancing hope is another option that can break the vicious cycle by lowering desired efficacy to remove the efficacy gap. The third alternative is to strengthen message efficacy that causes perceived efficacy to exceed desired efficacy and moves the audience toward adaptive changes.

In addition to the feedback loops, the nuance in fear appeal responses is discussed based on Reinforcement Sensitivity Theory. On the one hand, fear operates via the FFFS to elicit the three defensive avoidance behaviors. Flight occurs when the threat is avoidable, whereas defensive attack and freezing appear when threats become unavoidable. On the other hand, anxiety operates via the BIS to result in two defensive approach behaviors. Defensive quiescence happens if the perceived threat level is high, whereas risk assessment takes place if the perceived threat level is medium (McNaughton & Corr, 2004, 2008). These five defensive behaviors are discussed below.

First of all, individuals may display defensive attack behaviors if they perceive a severe threat as excessively threatening and unavoidable. By contrast, individuals may engage in flight if they perceive the threat as frightening yet avoidable. Although both defensive attack and flight are manifest behaviors, they may or may not coincide with adaptive changes because of their undirected nature (Gray & McNaughton, 2000). On the other hand, individuals undertake risk assessment as they perceive the threat to be relatively mild. That is, they evaluate the efficacy of the recommended responses against their desired efficacy. However, the outcomes of risk assessment are often disappointing in that those audiences who would benefit the most are likely to be the highly resistant ones (Taylor & Sherman, 2004).

Finally, both freezing and defensive quiescence are immobility reactions to fear stimuli (Marks, 1987). Freezing is a behavior of attentive immobility that functions as an immediate response to a sudden threat before more information is available (Blanchard & Blanchard, 2008; Marks, 1987). Humans responding to social threat cues are found to display freezing-like behaviors such as muscle stiffness and bradycardia similar to the spontaneous body responses in fear of falling situations (Azevedo et al., 2005; Roelofs et al.,

2010). Defensive quiescence refers to the behavior of tonic immobility characterized by prolonged stillness and decreased responsivity (Marks, 1987). Defensive quiescence is also known as "playing possum" when an escape exit is absent in extremely fearful conditions (Bracha, 2004; Maren, 2008). Research findings indicate that some rape or torture victims tend to display such behaviors during the assault (Adenauer et al., 2010; Blanchard & Blanchard, 2008). Although freezing and defensive quiescence are different forms of immobility reaction, both of them are an interregnum of staying inactive but keeping vigilant until the cues priming an appropriate response appear (Blanchard & Blanchard, 2008).

Strategies for helping unpersuadable people engage in adaptive behaviors can be developed by synthesizing the above discussions. First, an intense and immediate perceived threat that elicits very high levels of fear will activate defensive attack and flight. Since these two defensive avoidance behaviors are mostly automatic and emergency responses, high fear individuals should be guided with clearly specified goals and response recommendations to bring about adaptive changes (Hebb, 1955; Lopez et al., 2004; Zuckerman, 2007). Second, a medium and anticipated perceived threat that arouses moderate levels of fear will induce risk assessment behaviors. In these circumstances, the response of individuals can be managed by providing relevant information to increase their perceived efficacy, by enhancing hopeful thinking to decrease their desired efficacy, or by doing both (Lopez et al., 2004; Roskos-Ewoldsen et al., 2004; Todorov et al., 2002). Third, although freezing and defensive quiescence involve a period of inactivity, they do not imply hopelessness or complete inattentiveness (Jarvik & Russell, 1979). Instead, organisms in the state of freezing or defensive quiescence remain alert to changing conditions and wait for an opportune moment that allows them to avert the threat (Bracha, 2004; Marks, 1987). In these circumstances, accentuating hope is essential for motivating them to lower their desired efficacy based on a positive and rational attitude (Chang, 1998; Lopez et al., 2004). The lowered desired efficacy will in turn result in lower levels of fear that make risk assessment happen (Bandura et al., 1982; McNaughton & Corr, 2008).

Proposition 12: For individuals displaying defensive attack or flight behaviors, providing clear directions toward adaptive changes will facilitate danger control responses.

Proposition 13: For individuals displaying risk assessment behaviors, providing more efficacy messages and/or enhancing hopeful thinking will facilitate danger control responses.

Proposition 14: As individuals appear inactive, inattentive, or resistant to communication, boosting their perceived threat and fear, or accentuating their hope will encourage information seeking and risk assessment behaviors.

DISCUSSION

The mechanism of fear appeals is a popular research topic in the fields of communication, marketing, and social marketing. In all sorts of fear appeal theories, the EPPM has gained quite a little support from scholars and practitioners (Roberto, 2013). However, a number of flaws and unanswered questions regarding the EPPM have also been posed to delve into in future studies (Witte, 1998, 2013). The goal of this essay is to develop the Fear Management Model so as to revive the role of fear and simultaneously resolve related controversial issues.

Contributions and Implications

The ambiguous role of fear in fear appeal theories and the structural inconsistency of the EPPM have resulted in empirical inconsistencies and epistemological invalidity. Hence, this essay attempts to add to the literature by making the following contributions. First, referring to the hint of Witte and Roberto (2009), hope is introduced into the Fear Management Model to motivate positive thoughts and coping abilities for balancing the detrimental impacts of excessive fear (Lopez et al., 2004). Second, desired efficacy is used to connect threat and coping appraisals that make fear appeal messages, perceived threat, perceived efficacy, and fear to be more reasonably linked. Moreover, by highlighting the effects of fear on desired efficacy and risk-taking willingness, fear is brought back to the scene and once again plays a significant role in fear appeals. Third, by analogizing threat appraisals and coping appraisals as information processing in the thalamo-amygdala pathway and thalamo-cortico-amygdala pathway respectively, the parallel nature of the two appraisals is illuminated. Fourth, perceived threat and perceived efficacy are proposed as the products of their underlying dimensions, thereby allowing the threat and the efficacy threshold and the factors affecting them to be examined. Finally, individual differences are redefined as risk-taking capacity and risk-taking willingness, which are proposed to aggregate the effects of the other individual difference variables. Based on the explicit yet flexible definition, not only can the influences of individual differences on fear arousal and persuasion be clarified, but between-study comparisons and research replications also become possible.

The implications of the Fear Management Model for fear appeal communicators are twofold. First, too little fear will result in no response; too much fear will lead to undirected responses. Only appropriate fear arousal plus corresponding efficacy will bring about message acceptance and adaptive behaviors. Therefore, designing effective campaigns needs to take into account the risk-taking capacity and risk-taking willingness of the audience to evoke adequate fear without bringing about a gap between desired efficacy and perceived efficacy. Second, different strategies are required for motivating different individuals to engage in adaptive changes. For unresponsive people, providing stronger threat messages to raise their perceived threat to a level beyond their threat threshold is essential for eliciting

sufficient fear and activating subsequent reactions. For people displaying defensive attack or flight behaviors, providing them with unambiguous guidance toward danger control responses is critical. Lastly, for resistant audiences, the communicator may promote persuasion by raising their fear or enhancing their hope to reduce their desired efficacy, or by improving their perceived efficacy to exceed their desired efficacy, or by doing both simultaneously.

Limitations

The Fear Management Model inevitably has limitations that should be applied with caution. First, despite the fact that fear and anxiety are discrete emotions with different behavioral associations (McNaughton & Corr, 2008; So, 2013), they are not differentiated since the audience of fear appeals are normal instead of clinical populations (Öhman, 2008). However, it will be difficult, if not impossible, to identify an individual's defensive direction, which is the key for distinguishing approach from avoidance motivations (Corr, 2008). Second, fear can be considered as a pattern of responses including subjective experience, action tendency, expressive behavior, and physiological changes (Dillard, 1994). A measure of fear arousal that depends entirely on self-reporting and only implies subjective experience may not be able to reflect the actual fear of individuals, especially when the fear level is extremely high (Ruiter et al., 2001). Therefore, before verifying some of the above propositions, such as 10 and 11, a comprehensive fear scale will be required for better measurement of fear arousal and for making comparisons across studies.

CONCLUSION

Fear is a basic emotion that may mobilize quick and adaptive reactions in response to threatening situations (Hofmann et al., 2012). Since both emotion and cognition are interdependent in the process of making judgments, the role of fear in fear appeals should not be overlooked (Dillard, 1994; Storbeck & Clore, 2007). By adding hope and desired efficacy to the EPPM and integrating multiple theoretical perspectives, the Fear Management Model and its fourteen associated propositions are developed to revive the role of fear in fear appeals (Hanitzsch, 2013; Mayer & Sparrowe, 2013). In particular, the two feedback loops have spotlighted fear as the central factor in fear appeal processes. The Fear Management Model is expected to provide new insights in guiding future research on fear appeals. In the meantime, practitioners in the fields of health communication and social marketing may benefit from the theoretical framework in terms of identifying leverage points for designing effective fear appeal programs.

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