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Abstract: In an effort to better understand the ways in which risk messages can indirectly affect risk-related behaviors, this review explores the links between such messages and information seeking and processing. The narrative first offers a brief look at the literature that shores up salient concepts, then moves to a model of Risk Information Seeking and Processing (RISP), constructed by Griffin, Dunwoody, and Neuwirth (1999), which seeks to organize those factors into a coherent framework. The RISP model, thus, serves as a crossroads for selected concepts synthesized from Eagly and Chaiken's (1993) Heuristic-Systematic Model (HSM) of information processing, Ajzen's (1988) Theory of Planned Behavior (TPB), and other bodies of research in communication and risk perception. Of particular interest is the extent to which the model can accommodate reactions to both personal risks and risks to persons and objects other than oneself. This last

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domain is particularly important to the development of policy in arenas such as public health and climate change. This review explores the theoretical underpinnings of the RISP model, then summarizes a decade of studies that have examined a subset of RISP variables most closely related to information seeking and processing: channel beliefs, perceived information gathering capacity, and two motivation variables, information sufficiency and informational subjective norms. Finally, the authors explore the research potential of both the model and of efforts to track the role of information in risk perceptions and behavior change.

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Introduction

Research on how to best communicate risk has become something of a cottage industry for federal agencies and for researchers worldwide. Communication scholars understand a great deal now about how experiential, cognitive and affective factors can influence risk perceptions and risk-related behaviors. But, consistent with much of the literature on information campaigns, risk messages have tended to play only modest roles in behavior change. In many studies, the link between mediated information exposure/use and behavioral intentions is trumped by other factors, such as personal experience with a risk or *a priori* beliefs about the risk. Those results, in turn, suggest that information is probably at its most powerful as an indirect—rather than direct—instigator of behavior change.

Additionally, while much risk communication scholarship that acknowledges this indirect path has focused on cognitive and/or affective reactions to risk as important way stations on the road to behavior change, few studies have tried to —"unpack" the processes by which messages can actually influence these variables. Even fewer

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have sought to turn the tables in order to examine the impacts of risk perceptions on the ways in which individuals seek and utilize risk information.

These issues led us to an interest in information seeking and processing within a risk context. If information use is indeed indirectly (albeit importantly) related to risk behavior change, then developing a more nuanced understanding of what drives more or less effortful use of information is an important goal. This exploration was facilitated by a large body of theory in both psychology and communication studies that focuses on these concepts, specifically Petty and Cacioppo's (1981) Elaboration Likelihood Model (ELM) and, more recently, Eagly and Chaiken's (1993) Heuristic-Systematic Model (HSM).

This review, then, examines information seeking and processing in the context of risks to health and the environment, with an eventual focus on the Model of Risk Information Seeking and Processing (RISP) as first proposed by Griffin, Dunwoody, and Neuwirth (1999). Inherent in the model is an assumption that the complicated nature of risk and the potentially serious consequences associated with some health and environmental hazards make it important to understand the conditions that drive individuals to be more or less systematic in their use of risk information. The model also makes the case that variance in seeking and processing will stem from a number of background factors, such as various dimensions of risk perception (e.g., perceived level of risk and its seriousness), affective response to a risk (e.g., worry, anger), and perceived social pressures to stay informed about a risk (Griffin et al., 1999). These variables have been associated, directly or indirectly, with motivations to achieve sufficient information to deal with a risk (e.g., Griffin, Neuwirth, Dunwoody, & Giese, 2004a; Griffin et al., 2008). The RISP model pays special notice to the ways individuals process risk information. Deeper, systematic processing of information is expected to result in longer-lasting attitudes (Eagly & Chaiken, 1993), an outcome that is particularly important to risk communication efforts designed to encourage individuals to adopt sustained beliefs, attitudes, and behaviors related to health, safety, and environment (Ajzen & Manstead, 2007; Griffin et al., 1999).

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The RISP model introduces few new concepts; instead, it concentrates on forging new linkages among established concepts. It was constructed through a procedure of first isolating factors important to risk behavior change generally, and to information seeking and processing specifically, and then linking those factors together in a coherent way (Griffin et al., 1999). In that sense, it builds on the wealth of previous risk perception/communication research while seeking to make a contribution via its ability to test a novel *assemblage* of concepts and to allow powerful concepts from other models to compete with one another for variance in the information seeking and processing dependent variables. The RISP model is essentially a work in progress, inviting various researchers to contribute to its evolution and development.

In this narrative, we will first explore the dimensions of risk communication scholarship and theoretical models in both communication and psychology that led us to the RISP model, then we will share evidence to date regarding the model's robustness for human health risks and for risks to things other than self—what Kahlor, Dunwoody, Griffin, and Neuwirth (2006) term "impersonal risk" (p. 163). Finally, we will discuss ways in which scholars can further advance our understanding of linkages among risk messages, information processing and seeking, and behavior change.

Relevant Research Traditions

Although a narrative such as this cannot provide a comprehensive look at the massive literatures that inform the theoretical domains highlighted below, this review seeks to orient the reader with brief reflections on three domains: risk perception and communication, information seeking and processing (with an emphasis on Eagly and Chaiken's Heuristic-Systematic Model), and Ajzen's Theory of Planned Behavior.

Risk perception and communication

Early work in this area fell prey to strong effects assumptions, but scholars quickly learned that—as in other message effects domains—risk information influences are mediated by a host of

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factors, among them personal experiences with risky behaviors, cultural assumptions about risk, and even ideology. A few evolutionary trends that have brought us to our current understanding of risk perceptions and the ways in which information informs those perceptions are:

●**Unidimensional to multidimensional.** Initially, scientists and risk managers assumed risk was a unidimensional construct: an estimate of the likelihood of coming to harm. Successful risk communication, then, meant conveying that estimate accurately to audiences and expecting behavior change consonant with the estimate. If audiences reacted in ways contrary to the estimate—if a low risk of harm still sent folks into protective behavior mode, for example—that signaled a bad fit between risk and behavior and the problem was attributed to the inability of audiences to understand the risk (Hance, Chess, & Sandman, 1989; National Research Council, 1989; Fischhoff, 1995). Psychologist Paul Slovic changed this landscape dramatically with work that suggested individuals' risk perceptions are multidimensional: Perceptions include likelihood of harm but also take into account other factors, such as familiarity with a risk, the extent to which a risk might affect future generations, and the number of people affected at any one time (Slovic, 1987; 1992; 2000).

●**Cognitive to affective.** The primacy of "knowing" or of "feeling" has waxed and waned in both risk perception and communication effects literatures. In health communication, for example, cognitive theories such as the Health Belief Model (Rosenstock, 1966) and social-cognitive models such as the social learning theory (Bandura, 1977) have long competed with fear appeal frameworks such as Protection Motivation Theory and Witte's Extended Parallel Process Model (Witte & Allen, 2000; Fishbein & Yzer, 2003). Affect took a back seat in the risk perception literature for many years, although Sandman highlighted the role of "outrage" in his work (Sandman, 1987) and Slovic's psychometric paradigm always featured an important factor that he termed "dread." But today, many risk perception scholars are incorporating affect into their models, principally worry and fear. Slovic himself has been a primary actor in

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this arena (for example, see a compilation of Slovic's work on affect in Slovic, 2010)

●**Psychological to sociological.** While most risk perception research examines risk and behavior at an individual level, predictors of those beliefs and behaviors have been both individual and aggregate in nature. The bulk of the risk perception literature focuses on individual-level cognitions and affective states, but scholars such as Douglas and Wildavsky (1983), Kasperson (1992) and, most recently, Kahan (Kahan, Braman, Slovic, Gastil, & Cohen, 2009; Kahan, 2010) seek to understand the ways in which societal norms and beliefs drive individual risk judgments.

●**Personal to impersonal.** Risk perception and communication studies often focus on health risks to the self. While not surprising, that emphasis has probably contributed to a dearth in the development of theoretical frameworks that predict the ways in which individuals establish and act on perceptions of risk to others or to non-human elements in their environments. Individuals do make distinctions between self and other when assessing risk (Weinstein, 1989; Klein & Weinstein, 1997), and scholars have begun to explore the influence of other factors, among them "moral" emotions such as guilt and deeply held values, on behavioral reactions to others who are at risk (see, for example, Kollmus & Agyeman, 2002; O'Keefe, 2000; Massi Lindsey et al., 2007). This "impersonal" risk dimension has become increasingly important as societies struggle with the need to protect threatened ecosystems, maintain public health, or try to mitigate the impacts associated with climate change. While research has come a long way in understanding what motivates behavior change at the level of risk to self, there is still a long way to go in unpacking the factors that lead individuals to act on behalf of others or in service to the protection of such things as endangered animals and plants.

Information seeking and processing

Much of the focus on information seeking and processing in communication scholarship stems from an interest in dual processing theories, which posit that individuals are driven by a variety of factors

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to engage differently (if dichotomously) with information depending on their needs. Sometimes, these models argue, people utilize information in an effortful, thoughtful way while at other times they move fitfully, even superficially, over the surface of information available to them. People are occasionally moved to seek information purposively but often find themselves in a more passive mode, reacting to information that comes over the transom in the course of a typical day.

Most of the dual processing models establish a normative hierarchy, regarding systematic, effortful processing as better than heuristic, superficial processing. Scholars such as Gigerenzer (1996; 2000) counter such normative assumptions, arguing that heuristic processing has the advantage of being "fast and frugal" and, often, leads to successful outcomes. But in the main, scholars who employ dual processing models privilege systematic processing, arguing that it results in better decision-making and more stable belief patterns.

One of the most successful dual processing theories is Eagly and Chaiken's Heuristic-Systematic Model. Structured within a broader framework to probe what constitutes the formation of attitude, Eagly and Chaiken (1993) argue that information processing, which offers cognitive resources to help form judgments, interacts with other affective and experiential factors to shape attitudes. Similar to other dual-processing theories, HSM defines heuristic processing as "a limited mode of information processing that requires less cognitive effort and fewer cognitive resources" (p. 327). Systematic processing, in comparison, is a "relatively analytic and comprehensive treatment of judgment-relevant information" (Chen & Chaiken, 1999, p. 74). These two concepts resemble the "peripheral route" and "central route" described in the Elaboration Likelihood Model (Petty & Cacioppo, 1986). However, as Chaiken and Stangor (1987) pointed out, HSM asserts that "persuasion is often mediated by simple decision rules that associate certain persuasion cues with message validity," whereas ELM specifies motives that produce attitude change without generating active issue-relevant thinking (p. 593).

Even though heuristic processing is viewed as the flawed route in many studies, it has the mental and economic advantage of

requiring a minimum of cognitive effort (Chaiken, 1980). Therefore, people tend to engage in heuristic processing unless motivated to adopt the more effortful strategy. However, Chaiken (1980) pointed out that a heuristic approach may be less reliable in judging message validity because an overreliance on simple decision rules may lead recipients to accept conclusions they might otherwise reject had they invested the time and cognitive resources to discover and scrutinize different arguments (p. 753).

Systematic processing, along with its potential to give individuals a better understanding of complex issues such as health and environmental risks, can produce more stable attitudes (Eagly & Chaiken, 1993). Thus, beyond information seeking, the conditions that lead to systematic processing should be of special interest to those who attempt to inform lay audiences about risks (e.g., journalists, public health, and public information professionals) and to those who try to persuade individuals to adopt enduring changes in their behavior, e.g., to eat healthier diets.

Although the two processing approaches sound orthogonal, heuristic and systematic processing can occur at the same time (Dijksterhuis, Bos, Nordgren, & Van Baaren, 2006). The bottom line, though, is that one would expect individuals who encounter information about a risk to engage in heuristic information seeking and processing unless one or more mediating factors push them into more systematic mode. Put another way, systematic processing of risk-related information should be rare.

The Theory of Planned Behavior (TPB)

Finding strong linkages between knowledge, attitudes and behavior has always been challenging in the social sciences, and TPB has emerged as one of the most successful avenues for achieving that. The Theory of Planned Behavior (Figure 1) proposes that a person's behavior is anticipated by his or her behavioral intention to perform a specific act. That intention, in turn, is based on three proximate predictors, any of which might be more important than the others from time to time: a favorable or unfavorable evaluation of the behavior (attitude toward the behavior*, AAct*), perceived social pressure to

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perform or not perform the behavior (subjective norm, *SN*), and perceived capacity to perform the behavior (perceived behavioral control, *PBC*) (Ajzen, 1991).

[INSERT FIGURE 1 HERE]

In the TPB model, each of these three elements, in turn, is influenced by a set of specific beliefs measured in expectancy-value scale format. For example, AAct is influenced by a set of behavioral beliefs the individual might have about the likelihood that performing the behavior would lead to various outcomes that he or she might favor or disfavor to various extents. Each outcome belief is measured, on a bipolar scale (unlikely-likely), according to the person's perceived probability of its happening as a result of his or her performing the behavior (e.g., how likely/unlikely it is that a camping trip planned for next week would result in one's exposure to an infectious tick, would result in conversations with fellow campers, would cost a certain amount of money, would mean doing a lot of hiking, etc.). Then, the individual evaluates each potential outcome on a bipolar scale according to how bad or good it would be for him or her. Each outcome belief is multiplied by its evaluation rating and the product terms are summed to represent a cognitive structure of behavioral beliefs, which represents the tradeoffs the person perceives in judging the behavior and developing an attitude toward performing it. In the above example, the person effectively weighs the risk of exposure to an infectious tick and the perceived seriousness of that exposure against the benefits (or drawbacks) of the other outcomes associated with the trip. Indeed, recent theoretical development emphasizes individuals' beliefs about the positive and negative consequences of the behavior (Fishbein & Yzer, 2003). In comparison with other popular behavioral theories, these authors concluded that a *cost-and-benefit* analysis approach should become an integral part of how one conceptualizes and evaluates attitude.

One benefit that TPB offers for many studies of risk-related behaviors is that fundamental elements of risk perception—perceived susceptibility to a hazard and the potential seriousness of exposure to it (e.g., Rosenstock, 1966)—can be incorporated directly into the measures of behavioral beliefs, as in the camping trip example where

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the individual considers the likelihood of encountering an infectious tick as well as the potential seriousness (badness) of that outcome. For one individual, that risk may be the one factor that overwhelmingly affects his or her attitude toward going on the camping trip, while for another individual the risk is simply weighed along with all the other perceived costs and benefits of the trip. Thus, TPB invites researchers to consider other beliefs and values that individuals weigh when considering a risky behavior or when thinking about taking steps to avoid or overcome hazards to self, others, or the environment (e.g., weighing the costs and benefits of having a flu shot, quitting smoking, engaging in recycling, buying compact fluorescent lamp bulbs).

Another element of TPB essential to studies of risk-related behavior is perceived behavioral control. Perceived behavioral control deals with the perceived presence of factors that can facilitate or impede one's performance of the behavior. To assess perceived behavioral control, TPB-based research usually focuses on self-efficacy, which refers to one's perceived capacity or confidence to perform the recommended behavior. The TPB suggests that greater perceived control leads to stronger behavioral intention (Ajzen, 1988) and, when it is an accurate perception of actual control, strengthens the link between behavioral intention and actual behavior (Ajzen, in press).

TPB also brings to studies of risk behavior the concept of subjective norms. People who perceive a greater social pressure to perform the behavior are expected to develop stronger behavioral intentions (Ajzen, 1988). These perceived behavioral expectations usually come from one's family and friends, as well as other important referent groups in one's social network (normative beliefs). An individual might perceive that these relevant others think he or she should perform the behavior (injunctive subjective norms) or perceive that the relevant others themselves generally do so (descriptive subjective norms).

Over the past three decades, the Theory of Planned Behavior (TPB) has guided hundreds of empirical tests of its applicability in explaining why people engage in certain behaviors (for a review, see Ajzen & Fishbein, 2005), including a wide array of studies related to

health behaviors (Ajzen & Manstead, 2007). TPB has been criticized for not including emotion, an important factor in risk perception and behavior, among the drivers of behavior (e.g., Dutta-Bergman, 2005). Ajzen and Manstead (2007), however, indicate that emotion can be one of the background factors that affect behavioral, control, and normative beliefs in the Theory of Planned Behavior.

A rationale for integrating these three research traditions into one model

The research traditions and models discussed above have been spectacularly successful at illuminating segments of risk perception and decision-making processes. But as scholars have struggled to introduce communication variables into the mix, they have employed messages as something akin to "black boxes," components that may produce effects—albeit often indirect ones—but whose mechanisms are rarely well specified. We felt the theoretical domains discussed above offered a way to explore the mechanisms underlying risk information seeking and processing and, in the next section, detail how we extracted concepts from each in order to build a model that could usefully explore the ways in which individuals utilize information related to both personal and impersonal risks.

Model of Risk Information Seeking and Processing

To rise to the challenge of helping researchers understand how individuals seek and process information about risks, the Model of Risk Information Seeking and Processing (Griffin et al., 1999) incorporates elements from the larger risk perception literature and, more specifically, from Eagly and Chaiken's (1993) Heuristic-Systematic Model (HSM) and Ajzen's (1988) Theory of Planned Behavior (TPB). The risk perception literature offers a rich array of potential mediating factors, while the Heuristic-Systematic Model provides the framework with a basic theoretical foundation in which to examine individuals' motivations and information processing capacities associated with risk information they might seek or encounter. The Theory of Planned Behavior, in turn, makes available compatible insights into risk

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information seeking and processing specifically as communication *behaviors*.

From the risk perception and extant risk communication literature, Griffin et al. (1999) sequestered not only salient demographic characteristics of the audience but also a small set of cognitive and affective factors. On the cognitive side are perceived hazard characteristics, which employ a subset of Slovic's psychometric factors. On the affective side is a set of questions about both positively and negatively valenced reactions to the risk at hand.

The RISP model adopts HSM's proposition of a sufficiency principle, which suggests that "people will exert whatever effort is required to attain a 'sufficient' degree of confidence that they have satisfactorily accomplished their processing goals" (Eagly & Chaiken, 1993, p. 330). This judgmental confidence is closely tied to message validity and is termed, thus, an *accuracy motivation*. In the RISP model, information seeking and systematic processing are motivated by a person's desire for sufficiency and moderated by a person's capacity to do so (Griffin, Neuwirth, Dunwoody, & Giese, 2004a). According to Trumbo (2002), this framework is appropriate for communication studies because it effectively links the questions of where people get information about a particular topic to how they deal with this information.

Griffin et al. (1999) related the Theory of Planned Behavior to the RISP model in two different ways. First, they proposed that systematic processing of information about a risk-related behavior would strengthen and stabilize behavioral beliefs and attitudes toward that behavior; to the extent that AAct, among other factors, influences behavior, stable AAct should help stabilize behavior. However, this proposed effect is not directional in terms of promoting risk-reducing beliefs, attitudes, or behaviors. For example, a person might carefully consider some information advising her to exercise to lose weight and then decide, for the long term, that exercising is not for her.

Second, Griffin et al. (1999) incorporated two elements of the Theory of Planned Behavior, perceived behavioral control and subjective norms. Perceived behavioral control is compatible with the

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concept of capacity in the HSM model, given that risk information seeking and processing are the target behaviors. The upshot in the RISP model is a concept termed Perceived Information Gathering Capacity. Similarly, subjective norms begets Informational Subjective Norms in the RISP model; the latter track an individual's beliefs that relevant others think he or she should stay informed about a given risk (i.e., seek and process information about it), considered an injunctive subjective norm, or that relevant others are themselves seeking and processing such information, a descriptive subjective norm.

[INSERT FIGURE 2 HERE]

Figure 2 illustrates the Model of Risk Information Seeking and Processing. While the original model proposed relationships between information seeking/processing and subsequent risk-related behaviors as specified by the Ajzen's (1988) Theory of Planned Behavior (see Griffin et al., 1999), we limit our discussion in this review chapter to the variables shown in Figure 2, especially those on the right side of the figure: risk information seeking and processing and their proximate predictors (information insufficiency, perceived information gathering capacity, relevant channel beliefs, and informational subjective norms). These variables have received the most scholarly attention to date among the studies that have employed the RISP model.

Generally, the RISP model proposes that risk information seeking (or avoidance) and processing are affected by three main components, each of which may be more or less influential under different conditions: perceived information gathering capacity, relevant beliefs about the channels of communication that might carry risk-related information (channel beliefs), and information insufficiency, a subjectively perceived "gap" between one's current knowledge about the risk and the level of knowledge needed to deal adequately with the risk in one's life. In the RISP model, information insufficiency is considered a primary motivation for seeking and processing and can be affected by two other factors: informational subjective norms and affective responses to the risk, such as worry or anger. We propose that various risk perceptions, labeled in Figure 2 as Perceived Hazard Characteristics, could trigger such affective responses to the risk.

Demographic and other personal characteristics might influence other RISP model variables, among them risk perceptions and channel beliefs. The capacity to successfully seek and process new risk information can be affected by factors such as social status (especially education) and current knowledge. Although the RISP model does not show feedback loops, we assume that most variables in the model (e.g., current knowledge, capacity, channel beliefs, risk perception, affective responses to risks) represent ongoing, cyclical processes that can be continuously affected by an individual's previous information seeking and processing and other factors, such as their personal experiences with risks.

Generally, if one assumes that audiences are goal-directed in seeking and processing information, then any study of these information-oriented behaviors must also examine variables that lead individuals to opt for some information channels over others. Slater (1997) explores this "active audience" approach in a theoretical article that draws on the existing uses and gratifications literature (e.g., Rosengren, 1974; Katz, Blumler, & Gurevitch, 1974; also see Rubin, 2002) but then posits that different receiver goals should create different information processing strategies. Those strategies, then, would lead an individual to select particular channels to satisfy particular needs, and would also lead an individual to opt into different levels of processing intensity. By way of example, Slater notes that a surveillance goal would lead an individual to the kinds of information channels that emphasize timely, relevant information (e.g., television news), but that goal would also permit a less effortful processing mode.

Thus, the RISP model strives to capture the relationship between processing goals (motivations) and general beliefs about channels of risk information that one might use to reach these goals, and then complements those relationships with measures of the impact of an individual's capacity to seek and process risk information. Consistent with Eagly and Chaiken's (1993) Heuristic-Systematic Model, the Perceived Information Gathering Capacity concept in the RISP model reflects an individual's ability (albeit self-reported) to perform the information processing steps necessary for the outcome

he or she desires, but expands the concept to include the individual's ability to seek the information as well (Griffin et al., 1999). As illustrated in Figure 2, three factors (capacity, channel beliefs, and information insufficiency motivation) are expected to combine to affect individuals' seeking, avoidance, and processing of risk information.

The Key Components

With this as background, our exploration of the model begins with an explanation of the key variables, emphasizing those more closely related to communication and starting with the dependent variables: risk information processing and seeking. We will then visit studies that explore how well the key communication-related variables in the RISP model—information insufficiency, capacity, channel beliefs, and informational subjective norms—relate to risk information seeking and processing across time and different risks. A brief digest of these communication-related variables, their definitions and theoretical origins, can be found in Table 1.

[INSERT TABLE 1 HERE]

Information processing. Information processing is the keystone of the RISP model, and forms the primary theoretical gateway between communication-related variables and their potential impacts on the structure and stability of risk-related beliefs, attitudes, and behavior.

By default and necessity, according to the HSM model, most people employ the principle of least effort in processing messages, judging their validity and making inferences or decisions to comply through superficial cues such as the length of the message, the use of a trusted spokesperson, or the use of statistical data. This "heuristic processing" of information, Eagly and Chaiken (1993) state, is "a limited mode of information processing that requires less cognitive effort and fewer cognitive resources" (p. 327) than systematic processing. The latter, by comparison, is a much more comprehensive effort to analyze and understand information. In HSM terms, people tend to adopt the form of processing that they use for a given message based on (1) their *capacity* to process the information in each

manner, and (2) their *motivation* to go beyond the more superficial (heuristic) processing to engage in systematic processing. In the absence of sufficient capacity and motivation, individuals will usually default to heuristic processing.

According to the HSM formulation, a person's desire for sufficiency motivates systematic processing. For example, the personal relevance of the message topic to the individual can elevate the amount of confidence people want to have in the validity of the message and/or the judgmental confidence people tend to want (the "sufficiency threshold") in their own attitudes: Do those attitudes square with relevant facts? (*accuracy motivation*); are they defensible? (*defense motivation*); are they socially acceptable? (*impression motivation*) (Chaiken, Giner-Sorolla, & Chen, 1996; Eagly & Chaiken, 1993).

To help validate the concept and measurement of systematic processing within the RISP model, and to examine the proposed relationship of processing to the structure of subsequent beliefs (Griffin et al., 1999), Griffin, Neuwirth, Giese, and Dunwoody (2002) examined the relationship between the RISP model and Ajzen's TPB. Consistent with RISP predictions, they found that systematic processing of risk information was positively related to attitude strength, evaluation strength, and the number of strongly held behavioral beliefs across three environmental risks and among residents of two metropolitan areas, results that are consistent with RISP model predictions based on Eagly and Chaiken (1993). Similarly, other studies employing the RISP model have found that systematic processing is associated with attitudes toward clinical trial enrollment (Yang et al., 2010a) and with health-protective behaviors (Hovick, Freimuth, Johnson-Turbes, & Chervin, 2011).

Information seeking and avoidance. In an effort to extend the Heuristic-Systematic Model in a way that more closely relates to communication research, the RISP model includes information seeking and avoidance as another set of behaviors for which components of the model could account. The model proposes that a greater need for information sufficiency is likely to motivate active information seeking. On the other hand, people who believe that they already know

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enough—or even too much—about a given topic might avoid additional information. Besides motivation, information processing capacity also influences information seeking activities because of individuals' differential access to information channels and differences in their abilities to understand the messages those channels convey.

Communication researchers have consistently argued for a distinction between active, purposeful information seeking and incidental exposure to information (Johnson & Meischke, 1993; Kim & Grunig, 2011; Niederdeppe, Frosch, & Hornik, 2008), especially in an information-saturated media environment (Brashers, Goldsmith, & Hsieh, 2002; Romantan, Hornik, Price, Cappella, & Viswanath, 2008). Thus, in addition to examining superficial and effortful processing separately, the RISP model distinguishes between "routine" exposure to risk information, as might occur through a casual encounter with risk information via habitual use of certain media, and the more active seeking of risk information (termed "non-routine") in Figure 2.[1] Kim and Grunig (2011) draw a similar distinction between *information seeking* and the more passive *information attending* in their Situational Theory of Problem Solving. The RISP model also acknowledges that people might devote more or less effort to avoiding information that distresses them (Case, Andrews, Johnson, & Allard, 2005; Witte, 1994) or distracts them from their primary goals for communication (McLeod & Becker, 1974).

The RISP model distinguishes seeking from processing, and emphasizes the latter, primarily because of the effects that processing can have on the stability and structure of beliefs that individuals may hold about a risk. Thus, for validity purposes, it is important to separate processing from seeking. However, the various combinations of seeking (non-routine/routine) and processing (heuristic/systematic) are worth considering (Griffin et al., 1999). These would include: (1) routine/heuristic, probably the most common, in which people superficially attend to risk messages they encounter through routine scanning of habitual media (e.g., they come across a health risk story while checking a news web site they frequent); (2) routine/systematic, in which people do not alter their seeking patterns but do process more deeply and critically the risk information they come across through habitualized media use; (3) non-routine/heuristic, in which

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people expend extra effort to get information that they would then process heuristically (e.g., calling or seeing the doctor to acquire diagnoses and treatment recommendations that they plan to follow uncritically); and (4) non-routine/systematic, the most effortful, in which people expend extra effort to go beyond routine sources of information to get information that they plan to examine more deeply and to evaluate critically (e.g., getting second opinions from doctors and complementing that with visits to sources such as WebMD to get further background information).

The outcomes of these admixtures on such things as belief structures would be exploratory. However, following are the various factors that could affect individuals' seeking and processing of risk information, separately or in combination.

Information (in)sufficiency. Building on the HSM concepts of accuracy motivation, sufficiency, and judgmental confidence, the RISP model proposes that different people try to reach varying but subjectively satisfactory levels of confidence in the information that they hold about a given topic ("information sufficiency"), especially as the basis for developing their risk-related beliefs, attitudes, and behavioral intentions. Griffin et al. (1999) propose that the drive to overcome information insufficiency (e.g., to gain and hold enough information to deal with a risk in daily life) motivates individuals to process risk-related information more systematically and less heuristically. In two studies applying elements of HSM to risks, Trumbo (1999; 2002) found full or at least partial support for a relationship between information sufficiency motivation and more effortful processing of risk information. Griffin et al. (1999) also propose that the sufficiency drive can similarly motivate more active, non-routine seeking of information—that is, attempts to gather relevant risk information (e.g., calling the doctor) that go beyond habitual or routine channels a given individual might use for such information (e.g., watching the evening newscast)—and less avoidance.

Based on Eagly and Chaiken's (1993) accuracy motivation factor, the size of the subjective gap between information held (termed *current knowledge* in the RISP model) and that needed (*knowledge sufficiency threshold*)[2] will ultimately affect the

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information-seeking and processing styles employed by individuals to learn more about the risk. However, information seeking and processing are also seen as dependent upon one's ability to learn more about the risk (based on HSM's concept of capacity), on one's existing knowledge structures, and on the perceived usefulness and credibility of available information. Therefore, seeking (which includes avoidance) and processing are also affected by the variables termed "perceived information gathering capacity" and "relevant channel beliefs" in the RISP model.

Perceived information gathering capacity. Because the dependent variables of risk information seeking and processing are essentially communication *behaviors*, one's sense of self-efficacy (e.g., Bandura, 1986) or perceived behavioral control (e.g., Ajzen, 1988) in performing them are considered as important to measure here as in other domains of behavior or behavioral intention. Information-gathering capacity should reflect an individual's perceived ability to perform the information-seeking and processing steps necessary for the outcome he or she desires, especially when an outcome requires more cognitive effort and non-routine gathering of information. Although not specified in the original RISP model, current knowledge could enhance one's perceived capacity to seek and process new information about that topic, a proposition consistent with the Knowledge Gap model (ter Huurne, Griffin, & Gutteling, 2009; Tichenor, Donohue, & Olien, 1970).

In terms of seeking and accessing information, Chaffee (1986) pointed to two concepts that he argued were important predictors of channel use. One, channel accessibility, reflects the ease with which an individual can make use of the channel.[3] The second concept posed is relevance, the likelihood that a channel will actually contain the information sought.[4] In essence, Chaffee's approach posits a cost-benefit analysis in which an individual weighs the likelihood that a channel will deliver the content sought versus the difficulty he or she would have in accessing that channel. In the RISP model, an individual's sense of the cost of access (seeking) and processing is captured by the perceived information gathering capacity variable (i.e., greater capacity would make access easier, less "costly" and, therefore, more likely). Perceived benefits of seeking and processing

information from various channels would be assessed by the individual's beliefs about the channels he or she might use to get risk-related information.

Relevant channel beliefs. Beliefs about channels of risk information, including their trustworthiness and usefulness, could affect the information seeking and processing strategies people employ. In their study of how audiences relate to general and political news in the mass media, Kosicki and McLeod (1990) observed that people's beliefs about the media (e.g., that the media represent special interests, that they are accurate and responsible) are affected by social structural, political and cultural factors. Furthermore, their evidence indicates that these images of the media seem to affect the habitual information processing strategies that people develop. Thus, the RISP model suggests that relevant channel beliefs might affect, directly or indirectly, the ways in which people seek and process risk information.

Generally, factors that drive individuals toward purposeful, active seeking of risk-related information might also motivate them to engage in more effortful (i.e., systematic) processing of that information as well. Conversely, those who happen to encounter risk information through habitual, fairly routine monitoring of their various channels of communication may default to less effortful (i.e., heuristic) processing. However, various combinations of channel beliefs, motivations, and capacity could yield the different blends of seeking and processing activity noted previously (e.g., non-routine/heuristic). Thus, the RISP model suggests that these factors might interact to affect risk information seeking and processing.

For example, a patient worried about the potential side effects from a newly prescribed drug might be highly motivated to reduce her uncertainty by contacting her physician (the "channel," in this case). She may be quite capable of seeking the information but, without a medical diploma, she may not have the capacity to understand and critically assess the technical information her physician could relay to her. Thus, despite her motivation, she might default to heuristically processing what the trusted expert doctor tells her about the drug and just take the doctor's advice. However, given sufficient motivation and

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a sense that she can indeed find the information that she needs, she might seek out other sources of information, trusted channels that she expects will explain the side-effects in everyday language, in an attempt to triangulate the doctor's advice. Or she might even take steps to improve her own capacity to understand and, thus, think critically about the biochemical workings of the vexing pharmaceutical.

Informational subjective norms. Social environments could influence people's judgment about the amount of information that they feel they need to achieve their information processing goals (ter Huurne et al., 2009). For example, family and friends' expectations that people will stay informed about risks related to health and environment could trigger a greater need for relevant information. Based on Ajzen's (1988) concepts of normative beliefs and subjective norms, the RISP model labels this perception of others' expectation about one's information level as informational subjective norms. Stated more formally, the RISP model suggests that individuals' own beliefs about what others—especially people who are important to them—think they should know about a risk topic, or individuals' perceptions about what relevant others already know about the risk, could motivate them to seek greater information sufficiency and, thus, indirectly drive seeking and processing.

Perceived hazard characteristics. In place of concepts such as personal relevance, salience, or involvement, the RISP model proposes perceived hazard characteristics and affective responses to the risk as effective background predictors of information use and processing. The former are often associated with more effortful processing of information (e.g., Eagly & Chaiken, 1993), but they may be too broad for studies of risk communication and may not provide as much interpretive—and, thus, theoretical and practical—value (Griffin et al., 1999).

Cognitive evaluations of the nature of a hazard could have a direct impact on people's judgment of information sufficiency about the risk. Elevated risk perception could increase one's need for additional information if the risk issue is unknown. Alternatively, even with some familiarity, people might still want to gather additional

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information to deal with concerns they have about these health risks and environmental hazards.

Consonant with classic works such as the Health Belief Model (Rosenstock, 1966), which assess risk perception based on perceived susceptibility and severity, the RISP model recognizes risk as a multi-dimensional concept that could involve other mechanisms. For example, the perceived loci of control and responsibility (e.g., myself? others? everybody? nobody?) for managing a risk could influence the way a person responds cognitively and affectively to a hazard to self, others, or the ecosystem. Thus, a person's perception of hazard characteristics can include one's sense of efficacy, i.e., personal control over harm from the hazard (Weinstein, 1993; Rogers, 1985); one's trust in risk management agencies and institutions (Slovic, 1992) to manage harm to individuals or the ecosystem; and one's causal attributions for the occurrence of the hazard (Griffin et al., 2008; McGuire, 1974). Perceived hazard characteristics can also include, among other factors, perceived threat to one's personal values (Earle & Cvetkovich, 1994) and the personal or impersonal nature of the risk.

Affective responses. Affective responses resulting from risk perception could also contribute to a sense of information insufficiency related to risk. Negative emotions such as worry, anger, or fear are often associated with risk and hazard, and fear appeals have a fairly lengthy, if mixed, relationship to individuals' responses to health risks (Witte, 1992). Affective responses could increase one's need for information by activating tendencies embedded in these emotions, such as anger's role in urging an individual to reassert control over a situation (Frijda, 1986). Or, based on the dynamics of Witte's (1992) Extended Parallel Process Model, an individual's fear of a salient hazard could combine with various components of perceived hazard characteristics in the RISP model (i.e., one's sense of susceptibility to a risk and its severity, and one's sense of efficacy in dealing with it) to affect information seeking or avoidance as well as one's behavior toward the hazard itself.

Positive emotions, such as hope, can arise in risky situations characterized by high uncertainty (Lazarus & Smith, 1988) or, a

heightened need to maintain positive affect in order to regulate negative affect might also influence judgmental confidence based on risk-related information sufficiency.

Individual characteristics. The RISP model in Figure 2 also includes a role for demographic variables (e.g., education) and other individual characteristics (e.g., past experience with a hazard, relevant values) in the deep background of risk information seeking and processing. Studies related to environmental risks, for example, might include measures of fundamental environmental beliefs and values (e.g., Dunlap, Van Liere, Mertig, & Jones, 2000; Stern, Dietz, & Kaloff, 1993).

How Robust is RISP?

The main goal of this section is to explore the robustness of that part of the model most closely associated with communication: the relationships of information insufficiency, channel beliefs, perceived information gathering capacity, and informational subjective norms to information seeking and processing. We will do so in two ways. The first approach is based on a report of a comparative analysis across five risks, employing data from two comprehensive, federally funded sample surveys that were guided by the RISP model (Griffin et al., 2004b). Since these two data sets formed the basis for a variety of published works referred to at the end of the following subsection, we will use the Griffin et al. (2004b) synthesis as the most efficient and straightforward way to present these results rather than to report the outcomes of each of these studies separately. The second approach is to examine in more detail the findings of literature that has utilized at least some of the RISP model across a number of risks. To be as comprehensive as possible, we conducted a systematic, online search of the relevant literature databases with the assistance of a reference librarian at one of the author's universities. A brief, graphic overview of the results of these studies can be found in Table 2. Our take-home message: Although the behavior of some model components waxes and wanes with type of risk, type of measurement, and other factors, the model itself seems to be surviving these tests reasonably well.

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[INSERT TABLE 2 HERE]

Comparative analysis

One of the surveys that Griffin et al. (2004b) utilized in their analysis, the "Great Lakes study," focused on the ways that adult residents of two Great Lakes cities – Milwaukee, WI, on Lake Michigan and Cleveland, OH, on Lake Erie – sought and processed information about risks related to the Great Lakes.[5] Two of the hazards could harm personal health: eating Great Lakes fish and drinking tap water drawn from the Great Lakes. The third hazard involved threats to the ecological integrity (health) of the Great Lakes themselves. The data in the other survey, the "Watershed study," concerned the ways that heads of households in two urban river watersheds in the Milwaukee, WI, area dealt with risk information about flood hazards (one watershed) and hazards to the ecological integrity of the streams (both watersheds).[6] The data were from the first wave of each of these multi-wave panel surveys (1996-1997 for the Great Lakes study, n=1,123, and 1999-2000 for the Watershed survey, n=759). Testing the model by using environmental as well as health risks opened the door to exploring the model's applicability to "impersonal risks," i.e., risks not to the self but, for example, to others or to the ecosystem.

A series of multiple regression analyses showed that information insufficiency was positively associated with risk information seeking and with systematic processing and was negatively related to risk information avoidance and to heuristic processing. These results were consistent with the RISP model. However, the relationships of perceived information gathering capacity and of channel beliefs with risk information seeking and processing were mixed, much of it a function of measurement issues.

In the watershed study, an improved measure of the capacity variable performed generally as expected; i.e., it was positively associated with risk information seeking and, to lesser extents, positively with systematic processing and negatively with heuristic processing and with avoidance. (In the earlier Great Lakes study, a different measure of capacity had produced null or, in one situation,

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enigmatically contrary results.) The improved measure (see Griffin et al., 2008) has been used successfully in subsequent studies.

In terms of channel beliefs, a person's belief that risk communication channels provided him or her with essential cues to the validity of the information was positively related to systematic processing of the information, consistent with the model. However, this same belief was related only weakly (but positively) to risk information seeking and was generally unrelated to heuristic processing and risk information avoidance. The belief that risk information channels were biased and distorted bore essentially no relationship to risk information seeking and processing. In the wake of these results, the researchers suggested that channel beliefs in the RISP model be reconceptualized: Instead of reflecting broad beliefs about channels of risk information, measures should reflect the individual's expectations about the outcomes (e.g., benefits or drawbacks for the self) of using specific channels for risk information. This approach would be more in line with the conceptualization and measurement commonly used for "behavioral beliefs" in Ajzen's (1988) Theory of Planned Behavior.

Alas, the Griffin et al. (2004b) analysis did not include informational subjective norms (ISN). However, to provide a comparable basis of results for this review, we conducted subsequent multiple regression analyses with the same data and variables. Results show consistent positive relationships between those norms and risk information seeking (overall beta = .34, $p<.01$) and processing (overall beta = .28, $p<.01$). Similarly, informational subjective norms demonstrated consistently negative relationships with risk information avoidance (overall beta = -.18, $p<.001$) and heuristic processing (overall beta = -.20, $p<.001$). These results indicate that informational subjective norms might serve as a more direct motivator of risk information seeking and processing, alongside information insufficiency or perhaps as an alternative under some conditions, a possible change to the RISP model.

Expanded descriptions of the tests of the RISP model, using the above data and examining the variable relationships above, can be found in Kahlor et al. (2006), in regard to impersonal risks to the

Great Lakes ecosystem, and in Griffin et al. (2008) as related to risks from river flooding. Other analyses of the dynamics of the model using these data can be found in Griffin et al. (2002, 2004a) and in Kahlor et al. (2003).

RISP in the hands of other scholars

In addition to work by the model developers, discussed in some detail above, various studies by other scholars have explored the robustness of the RISP model in terms of relationships among the communication-related variables spotlighted in this report. In some cases, those scholars enlisted the assistance of one of the original model developers, while in other cases the work was independent.

One analysis with strong ties to the original data was conducted by Kahlor et al (2003). The team employed an "information catalyst"—an alleged magazine article about the ecological health of the Great Lakes—that was mailed to a set of respondents with instructions to read the piece. The individuals were then contacted and asked to respond to questions relevant to the RISP model. The PIs were trying, in this effort, to operationalize heuristic and systematic information processing with reference to an actual piece of information.

Consistent with the predictions of the model, respondents' information processing capacity was negatively related to heuristic processing: The less able someone believed she was to handle the information the more likely she was to have engaged in superficial processing of the article. And the model's predictions about information insufficiency were also borne out: The larger one's perceived information gap the more likely one processed the article systematically. Those who engaged in this effortful processing also reported that they paid more attention to the scientific information in the article, a result consistent with the concept of systematic processing. However, this time informational subjective norms played no significant role in motivating information processing. Channel beliefs were also unrelated to processing. As might be expected, one strong predictor of systematic processing of the article was respondent interest in the topic. While not surprising, this kind of relationship may

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be a byproduct of efforts to measure information processing strategies in the field with real-world messages.

In another study, Kahlor (2007) supplemented the RISP model with a number of additional variables from the Theory of Planned Behavior (Ajzen & Fishbein, 2005) in order to explore respondent reactions to the ecological risks of global warming. Results supported the role of information insufficiency and, especially, informational subjective norms in encouraging individuals to seek more information about the issue.

In an effort to better understand the ways in which Americans evaluate the possible risks of participating in clinical trials, Yang et al (2010b, 2010c) employed RISP concepts. Information insufficiency fared badly in this study; the size of the perceived information gap about this risk was not a motivator of information seeking and processing after the analysis controlled for the extant knowledge of the respondents. However, informational subjective norms and affective responses emerged as primary predictors of information seeking, including multi-channel information seeking (2010c), and of systematic and heuristic processing (2010b).

A two-country test of the model that focused on industrial risks found support for most of the predicted relationships. Ter Huurne et al (2009) employed a number of the model's variables in surveys in both the United States and The Netherlands. With a focus on information seeking but not processing, the PIs found that respondents were more motivated to seek information about industrial chemicals if they felt there was a lot they needed to learn (information insufficiency) about these risks and if they felt they could find the information they needed (perceived information gathering capacity). In one interesting cultural difference, those US respondents who indicated they felt pressure from others to learn about the risks (informational subjective norms) were more motivated to seek information while the same relationship did not hold for the Dutch.

Fischer and Frewer (2009) utilized a few variables from the RISP model among a wider set of variables in their experiments on the effects of information about the risks and benefits of foods that were

familiar and those that were unfamiliar to their subjects. They found that, for unfamiliar foods, subjects who believed they had received sufficient information to make a decision about risks and benefits from an unfamiliar food (information sufficiency) were less inclined to seek further information, a result consistent with the RISP model.

A study by Johnson (2005) borrowed concepts from the work of three groups of scholars, including the RISP team, to create a Model of Cognitive Processing of Risk Information. His design focuses on a single potential risk—an industrial factory and the possible hazards it might present to nearby residents—and adds measures of involvement, relevance and ability to RISP concepts. While both information insufficiency and perceived information gathering capacity were positively associated with information seeking, Johnson's involvement variable also contributed to variance in both information seeking and information avoidance. In contrast, few of the variables in Johnson's model were related to information processing, either systematic or heuristic. Informational subjective norms and channel beliefs were not included in the analysis.

Most recently, Horvic et al (2011) employed most of the RISP model in a study of risk information processing among poor whites and African-Americans living in the southern United States. Each of the respondents picked one of 10 possible health risks she/he worried about the most. Across risks, results generally supported the relationships among perceived hazard characteristics, worry, information insufficiency and systematic processing proposed by the RISP model. A self-report measure of health protective behavior was also associated positively with systematic processing. The study did not, however, measure informational subjective norms or channel beliefs.

Across these studies, the size of individuals' perceived knowledge gap about the risks, their perceived capacity to gather the information they need, and their judgment that others expect them to learn more about the risks repeatedly contributed to information seeking and processing. The strength of these contributions varied by study and by risk, leading us to caution the reader that differences in measurement strategies and in the risks themselves will influence

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comparability. But the emergence of these factors across both operational differences in study design and in type of risk does suggest that these RISP variables seem indeed to be important precursors to information seeking and processing.

Implications for the Study of Information Seeking and Processing

In a Risk Context

The series of studies discussed above suggest that there is merit in a focus on information seeking and processing across different types of risk. Interest in developing valid ways to operationalize seeking and processing in a survey format has grown (Eveland, 2001; 2005; Schemer, Matthes, & Wirth, 2008; Trumbo, 2002), broadening the methodological landscape for those interested in these dependent variables. And models such as RISP suggest that some factors will be more valuable than others in studies seeking to better understand what encourages the types of seeking and processing that underlie stable beliefs about risks. We take a brief look at those factors below.

Motivations for Risk Information Seeking and Processing

Information insufficiency. To date the RISP model has concentrated on employing, behind the scenes of its information insufficiency concept, the HSM *accuracy* motivation to represent individuals' drives for seeking and processing risk-related information. In tests of the model, the cognitive drive for information sufficiency has performed reasonably well, even when its component variables (current knowledge and sufficiency threshold) have been operationalized differently (e.g., ter Huurne et al., 2009; ter Huurne & Gutteling, 2009) from those used by the original researchers.

Accuracy motivation is based on a person's "desire to hold attitudes and beliefs that are objectively valid" (Chaiken et al., 1996; p. 556), a concept highly appropriate as a centerpiece for studies of communication about health and environmental risks. Information

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about these risks, after all, is typically couched in exhortations to change one's beliefs, attitudes, or behaviors in response to real-world conditions, but conditions that are nonetheless often hidden (i.e., small particulates as a form of air pollution) or that might occur only in the future (i.e., radiation escaping from failed long-term storage facilities many decades hence). Risk information can be especially challenging for even educated laypersons to examine and process critically because it often includes technical terminology and is expressed in terms of probabilities.

However, other deep-seated motivations (e.g., McGuire, 1974) for seeking/avoiding and processing risk information may also be valuable to explore. These could readily include the pair of complementary motivations from the HSM model (Chaiken et al., 1996) noted previously: *defense* motivation, which originates from a person's desire to form, hold, or defend beliefs or attitudinal positions important to the individual, and *impression* motivation, which is based on a person's desire to have or form socially acceptable beliefs or attitudes that help him or her meet social goals.[7] Of course, individuals may have various admixtures of HSM motivations at any given time. However, defense motivation and, particularly, impression motivation are the most likely to result in biased information processing (Chen & Chaiken, 1999) and seeking. In addition, social roles, such as preparing to tell someone else about a topic or, instead, preparing to learn more from another person or source, might differentially affect the ways in which information is sought, avoided, processed and structured in long-tem memory (Guerin & Innes, 1989; Zajonc, 1960).

Personality traits such as one‘s need for cognition (Cacioppo & Petty, 1982) also appear to motivate information seeking and systematic processing through information insufficiency (Eagly & Chaiken, 1993, p. 332). That is, these motivational determinants of elaboration could increase people‘s desired levels of judgmental confidence. As a result, the elevated sufficiency threshold could generate greater amount of information seeking and systematic processing. Future studies should include need for cognition as part of the individual characteristics block on the left side of the RISP model.

Informational subjective norms. Within the RISP model, subjectively perceived social pressures on seeking and processing risk information are channeled primarily through informational subjective norms, a variable derived from Ajzen's (1988) TPB. Informational subjective norms was originally conceptualized as a background factor that affects risk information seeking and processing only indirectly, via information insufficiency (Griffin, Dunwoody, & Neuwirth, 1999). However, as this review has noted, subsequent research has indicated that informational subjective norms may also be a consistent and fairly strong direct motivational factor in its own right, sometimes working through the cognitive drive for information sufficiency to affect information seeking and processing but sometimes working independently of it (Figure 3).

In fact, subjective norms like the ones used here may well be among the most important motivators of effortful information seeking and processing for impersonal risks. In the absence of concern about one's personal welfare, individuals may still be encouraged to develop beliefs and behaviors because they are sensitive to what others think they should do. That is, while you may feel that global warming will not influence you personally, you may become convinced that others think it is important and, as a result, believe you should be informed. Those perceptions, in turn, may jump start more systematic information seeking and processing. Scholars such as Cialdini (2003) have demonstrated the power of subjective norms to generate environmentally sensitive behaviors; the question for us is whether those behaviors may also include effortful information use.

However, informational subjective norms require fuller development in terms of concept, operationalization, antecedents and outcomes. For example, through most of its history, the concept has been defined and operationalized in terms of injunctive perceived norms (i.e., one's beliefs regarding what relevant others think he or she should do in terms of possessing or seeking knowledge of a risk). However, it is also valuable to develop concepts and measures related to descriptive informational subjective norms (based one's perceptions about the seeking and holding of risk knowledge by relevant others), as has been initiated recently by Kahlor (2007) and Kahlor and Rosenthal (2009), at least in regard to subjective norms for risk

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information seeking. In applying their measure to a study of knowledge about global warming, Kahlor and Rosenthal (2009) found a slight negative relationship between informational subjective norms related to information seeking and two of their four open-ended measures of knowledge and its structure.[8] Although there may be various explanations for these results, they might reflect biased or selective seeking or processing[9] of global warming information in response to perceived social forces, at least among some individuals.

In terms of antecedents to informational subjective norms, Ajzen (1988) indicates that subjective norms are the byproduct of an individual's beliefs about the norms held by specific referent others (e.g., friends, spouse, co-workers) pertinent to the behavior, and the motivation one has to comply with these referents. One could apply the same formulation to informational subjective norms when the risk involves specific others relevant to the individual (e.g., a meal preparer for a household might feel social pressures specifically from his family to stay informed about fatty foods, or a parent might feel that other parents in her neighborhood have already sought important information that she doesn't have about a pesticide the city plans to apply locally).

People who are more inclined toward self-monitoring (e.g., Gangestad & Snyder, 2000; Snyder & Gangestad, 1986) might be more sensitive to informational subjective norms, as might those who perceive themselves in various social roles that involve being informed or providing others with information, e.g., in the role of an opinion leader, as proposed by Clarke (2009). Under some circumstances, informational subjective norms might be associated with impression or even defense motivation for information processing (Chaiken et al., 1996). If so, then the kinds of risk information the individual seeks and processes may be highly selective.

Affect. Although predominantly cognitive, the RISP model does include a set of affective variables ("affective response") as an anticipated driver of a person's perceived information gap. That decision stemmed from an acknowledgement of a large and growing literature that explores the power of emotion generally in catalyzing behavior and the influence of affect more specifically in behaviors

related to risks. Items related to negative emotions, especially worry and anger, were indeed related to respondents' information gaps and to information seeking and processing across a range of RISP-related studies (see Table 3)

[INSERT TABLE 3 HERE]

In particular, seven studies found consistent, positive relationship between negative emotions and risk information insufficiency (Griffin et al., 2008, Griffin et al., 2004a; Hovick et al., 2011; Kahlor, 2007; ter Huurne et al., 2009; Powell et al., 2007; Yang et al., 2010c). Two studies looked at the role of positive affect as a potential predictor of risk information insufficiency but found no significant relationship (Yang et al., 2010b; 2010c). Thus, the valence of the affect might influence whether people sense a need to know more about a given risk.

Four studies found a direct, positive relationship between affect and information seeking. Two used negative emotions only (Griffin et al., 2008; ter Huurne et al., 2009), one used positive emotions only (Yang et al., 2010b), and another included both negative and positive emotions (Yang et al., 2010c).[10] In addition, all four included information insufficiency in the analysis, which meant that affect might not necessarily work through information insufficiency to influence seeking. Some aspect of affect might be a more direct predictor of seeking.

Fewer studies have explored direct relationships between negative emotions and information processing. Two studies showed a positive relationship between negative emotions and systematic processing (Griffin et al., 2008; Hovick et al., 2011), but another showed no significant relationship (Kahlor et al., 2003). Yang et al. (2010b) found that a positive emotion, hope, had a positive relationship with systematic processing and a negative relationship with heuristic processing. In the three studies that found significant relationships between affect and information processing, information insufficiency was also included in the analysis. As with seeking, therefore, affect might influence processing in a manner that does not require a need for cognitive closure (information sufficiency).

In sum, existing empirical evidence using the RISP model suggests that affect does not necessarily work through information insufficiency to influence risk information seeking and processing. Future research should continue to explore whether and why the origin and valence of the affect might govern its performance as a motivator in the RISP model.

As we refine the model, we will seek to incorporate affect more substantively and in a more complex fashion. Studies of the ways in which emotion interacts with thinking to drive attitudes and behaviors are flourishing and demonstrate that cognitive and affective systems are not orthogonal to one another; rather, they are often employed in concert, making their relative use in risk judgments important to understand.

The question for our RISP model is not whether to employ affect as a predictor but, rather, what role we would expect that concept to play in risk judgments relative to cognitive elements. Most risks in our world are low level ones; they do not generate high levels of fear and, on the contrary, may be the product of behaviors that are enjoyable. People who catch and eat fish from the Great Lakes, for example, are exposing themselves and their families to contamination that can cause developmental delays in fetuses or cancer in adults. But those risks are relatively low while the enjoyment derived from fishing is often quite high. Affect may be a powerful actor in risk judgments when it comes to catching and eating contaminated fish, but one would need to be able to track not only the interaction between affect and cognition but also possible interactions among affective responses.

[INSERT FIGURE 3 HERE]

This suggests that the role of affect will be highly situational. So while we include affect in our revised RISP model (Figure 3), we give it a wide operating berth; it may influence information seeking and processing directly for some risks, be mediated by information sufficiency for others, and it may interact with cognition, with perceptions of information gathering efficacy, with channel beliefs, or with other components of the model.

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Capacity and Channel Beliefs

Two essential, but sometimes challenging, components of the RISP model have been *perceived information gathering capacity* and *channel beliefs*. The two are seen as working in tandem as individuals conduct cost-benefit analyses in service to deciding if more effortful information gathering/seeking is worth the trouble.

In many ways, capacity reflects the cost to the individual—in terms of time and effort—of seeking and processing risk information. The individual might, in effect, weigh these subjectively assessed costs against channel beliefs, i.e., the perceived benefits (e.g., usefulness) and drawbacks of seeking and processing the information in different ways from different channels. At any given level of motivation, people with higher capacity have more channel and information options open to them; those who have less capacity (e.g., because of constraints on time, channel access, effort, existing knowledge, or cognitive ability) would be more limited in their choices, especially when it comes to non-routine seeking of risk information and to processing it systematically. In a result consistent with the above scenario, our analyses show that the more knowledge people believe they currently have about a risk, the more capacity they believe they have to seek and process new information about it.

The first attempts to operationalize capacity in the RISP model, as employed in the Great Lakes study and illustrated earlier, were based on one aspect of Ajzen's (1988) Perceived Behavioral Control variable from the Theory of Planned Behavior (TPB), in particular, the expected ease or difficulty the individual would have in performing an action, in this case, getting information about the risk. Kahlor (2007) and Kahlor and Rosenthal (2009) expanded the perceived behavioral control application to include measures of the extent to which the individual has volitional control over seeking the risk information. Unfortunately, these measures did not work out well in any of these applications of the RISP model. Instead, the six-item measure used in the Watershed study (Griffin et al., 2008), as noted earlier, operationalized some elements of processing as well as seeking

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capacity and provided more interpretable results. However, it needs further development in concept and measurement[11] (e.g., reliability).

Individuals' beliefs about the channels of risk information have related only weakly and inconsistently to risk information seeking and processing in studies employing the RISP model.[12] Much of this may be due to channel beliefs being operationalized in terms of individuals' reflections on news media rather generally as sources of risk information. At minimum, the ascendance of the Internet and of social media would make this approach incomplete. In addition, interpersonal channels are essential to include, especially given the apparent role of informational subjective norms as motivation for seeking and processing risk information. The challenge is to operationalize channel beliefs in ways relevant to seeking and to processing, to capture the notion of subjectively perceived benefits vs. costs or drawbacks, and to do so with an appropriate level of source specificity or generality.

By applying a source-specific operationalization of channel beliefs, Yang et al. (2010b) found that trust in doctors was associated positively with systematic processing of information about enrolling in clinical trials (beta= .22, $p<.05$). However, trust was unrelated to information seeking. In her study of individuals' intentions to seek information about global warming, Kahlor (2007) adopted another of Ajzen's (1988) TPB variables, AAct, and termed it attitude toward the behavior (seeking). Her measure was not source-specific. It was designed to capture at least part of the concept of benefits vs. drawbacks behind channel beliefs as related to risk information seeking, although not necessarily to replace the channel beliefs variable. Consistent with Ajzen's formulation, her measure (alpha= .79) was comprised of four semantic differential scales assessing whether the individual considers the seeking of global warming information to be worthless/valuable, harmful/beneficial, bad/good, more unhelpful/more helpful. Her measure correlated positively with information seeking intention (beta= .22, $p <.001$), the expected direction. The study did not address risk information processing, however.

Perhaps the more promising approach to operationalizing channel beliefs is to employ what Ajzen (1988) considers to be the

antecedent to AAct, that is, a set of behavioral beliefs. Applied in this manner, each behavioral belief could be measured in an expectancy-value format that represents the individual's estimated likelihood that an action (e.g., seeking or processing information about a risk from a specific channel or channels) would lead to a particular outcome (e.g., encountering countervailing advice, statistics, technical terminology, reassurance), weighted by the valence (good/bad) the individual puts on that outcome. The advantage of behavioral beliefs is that they tend be more finely grained in their explanation of behavior than the more general AAct variable. They also offer an array of interesting and revealing analytical options (e.g., one individual might default to considering just one behavioral belief, while another's behavior might be affected by many). A similar formulation has been used in the Uses and Gratifications literature (e.g., Palmgreen & Rayburn, 1982; Rubin, 2002), and has also been suggested by Kahlor and Rosenthal (2009).

Measuring Information Processing

As noted earlier in this section, there is increased interest in devising better ways to measure information seeking and processing, particularly in a survey context. Employing measures used in RISP and other studies, Schemer et al. (2008) conducted an extensive review of the track record of various measures of heuristic and systematic processing of media information. They then developed and tested the validity and reliability of their resulting scales in three separate surveys among German-speaking Swiss residents. More recently, Smerecnik, Mesters, Candel, De Vries, and De Vries (2011) further developed and tested self-report measures of heuristic and systematic processing specifically within a risk context. Overall, the results reinforce the two-dimensional, heuristic-systematic nature of information processing, the value of information processing concepts and measures in communication research, and point the way to much needed further research developing and validating measures of these phenomena.

Reprise

In general, the RISP model suggests that there are ways to identify and configure factors that could affect the ways in which

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individuals seek and process information about a risk.[13] The set of concepts employed seems to capture both cognitive and affective dimensions of risk experience and judgment, and the model itself offers ways to array those factors in service to identifying individuals' perceptions of their information needs, which in turn are associated with types of information processing and seeking. The model also suggests that subjective norms constitute a means of introducing perceptions of societal pressure on individuals, which in turn may be important catalysts for learning more about risks to others and to the world around us.

Our examination of the track record of the RISP model also suggests a "to-do" list for future research:

- Although much more exploration is still needed into the cognitive, affective, and behavioral "so what?" of risk information processing activity, aspects of the RISP model not detailed in this report (e.g., Griffin et al., 1999; 2002) offer some guidance. In particular, risk information processing and some other variables in the RISP model might affect elements of Ajzen's (1988) Theory of Planned Behavior when the latter is applied to individuals' behavioral responses to a risk. For example, processing activity could influence the structure, strength, and stability of behavioral beliefs which, in TPB, are one of the essential elements that can eventually drive behavior (Griffin et al., 1999).
- Research is also needed into the interactions among the RISP model predictors of risk information seeking and processing, although improved measurement, especially of seeking, processing, affect, and channel beliefs, should precede these efforts.
- Channel beliefs could be recast in a manner consistent with Ajzen's (1988) concept of behavioral beliefs, for example, as a person's expectations about the outcomes of gathering risk-related information from a given channel or channels of information.
- Future research should delve into the various potential roles of affect in the RISP model. Not covered in this chapter have been the results of analyses of the RISP model that investigate the

relationships among affective responses to a risk, perceived hazard characteristics, and individual characteristics. These offer fertile ground for research using the RISP model, including a potential application of the Extended Parallel Process Model (Witte, 1994).

- Other investigations should examine two variables that might be included among individual characteristics in the RISP model: need for cognition (Cacioppo & Petty, 1982) and self-monitoring (Snyder & Gangestad, 1986). The former could influence information insufficiency and systematic processing fairly directly, and the latter could sensitize individuals to informational subjective norms (e.g., they might weigh these perceived norms more heavily).
- Other motives for risk information seeking and processing, such as impression and defense motivations (Chaiken et al., 1996), would be valuable to explore. Although the context is political communication, Neuwirth, Frederick, and Mayo (2010) have developed useful measures of accuracy and defense motives.

Perhaps the most significant outcome of this overview, however, is the appearance of the comparatively strong role of informational subjective norms. It would be valuable to explore the descriptive as well as the injunctive perceived norms of this type. Overall, examining the various motivations for risk information seeking and processing that have powerful underpinnings in social interactions would contribute to new dimensions of research in risk communication. For the most part, research in that field has concentrated on finding cognitive, affective, and behavioral effects on individuals who have been exposed to risk messages. Given the politicization of various risk-related issues (e.g., health care and global climate change), and the explosive growth of social media, the impact of social variables such as informational subjective norms on risk information seeking and processing is especially important and inviting to explore.

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References

Ajzen, I. (1988). *Attitudes, personality, and behavior.* Milton Keynes, UK: Open University Press.

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*, 179-211.

Ajzen, I. (in press). Perceived behavioral control, self-efficacy, locus of control, and the Theory of Planned Behavior. *Journal of Applied Social Psychology.*

Ajzen, I., & Fishbein, M. (2005). The influence of attitudes on behavior. In D. Albarracin, B.T. Johnson, & M.P. Zanna (Eds.), *The handbook of attitudes* (pp. 173-221). Mahwah NJ: Erlbaum.

Ajzen, I., & Manstead, A. S. R. (2007). Changing health-related behaviors: An approach based on the theory of planned behavior. In K. van den Bos, M. Hewstone, J. de Wit, H. Schut & M. Stroebe (Eds.), *The scope of social psychology: Theory and applications* (pp. 43-63). New York: Psychology Press.

Atkinson, R. C., & Shiffrin, R. M. (1968). Human memory: A proposed system and its control processes. In K. W. Spence & J. T. Spence (Eds.), *The psychology of learning and motivation* (Vol. 2, pp. 89-195). New York, NY: Academic Press.

Bandura, A. (1977). *Social learning theory.* Englewood Cliffs, NJ: Prentice Hall.

Bandura, A. (1986). *Social foundations of thought and action.* Englewood Cliffs, NJ: Prentice Hall.

Bostrom, A., & Lashof, D. (2007). Weather or climate change? In S.C. Moser & L. Dilling (Eds.), *Creating a climate for change: Communicating climate change and facilitating social change* (pp. 31- 43). Cambridge, UK: Cambridge University Press.

Brashers, D. E. (2001). Communication and uncertainty management. *Journal of Communication, 51*(3), 477-497.

Brashers, D. E., Goldsmith, D. J., & Hsieh, E. (2002). Information seeking and avoiding in health contexts. *Human Communication Research, 28*, 258-271.

Cacioppo, J.T., & Petty, R.E. (1982). The need for cognition. *Journal of Personality and Social Psychology*, 42, 116-131.

Case, D. O., Andrews, J. E., Johnson, J. D., & Allard, S. L. (2005). Avoiding versus seeking: The relationship of information seeking to avoidance, blunting, coping, dissonance, and related concepts*. Journal of the Medical Library Association, 93*, 353-362.

Chaffee, S. H. (1986). Mass media and interpersonal channels: Competitive, convergent, or complementary? In G. Gumpert & R. Cathcart (Eds.), *Inter Media* (3rd. ed) (pp. 62-80). New York: Oxford University Press.

Chaiken, S., Giner-Sorolla, R., & Chen, S. (1996). Beyond accuracy: Defense and impression motives in heuristic and systematic information processing. In P.M. Gollwitzer & J.A. Bargh (Eds.), *The psychology of action: Linking cognition and motivation to behavior* (pp.553- 578). New York: Guilford Press.

Chaiken, S., Liberman, A., & Eagly, A. H. (1989). Heuristic and systematic information processing within and beyond the persuasion context. In J. S. Uleman & J. A. Bargh (Eds.), *Unintended thought* (pp. 212-252). New York: Guilford Press.

Chaiken, S., & Stangor, C. (1987). Attitude and attitude change. *Annual Review of Psychology, 38*, 575-630.

Chen, S., & Chaiken, S. (1999). The heuristic-systematic model in its broader context. In S. Chaiken & Y. Trope (Eds.), *Dual-process theories in social psychology* (pp. 73-96). New York, NY: Guilford Press.

Cialdini, R. B. (2003) Crafting normative messages to protect the environment. *Current Directions in Psychological Science*, *12*, 105-109.

Clarke, C. (2009). Seeking and processing information about zoonotic disease risk: A proposed framework*. Human Dimensions of Wildlife, 14,* 314-325.

Dijksterhuis, A., Bos, M. W., Nordgren, L. F., & Van Baaren, R. B. (2006). On making the right choice: The deliberation-without-attention effect. *Science, 311*, 1005-1007.

Douglas, M. & Wildavsky, A. (1983) *Risk and culture*. Berkeley, CA: University of California Press.

Dunlap, R. E., Van Liere, K. D., Mertig, A. G., & Jones, R. E. (2000). Measuring endorsement of the New Ecological Paradigm: A revised NEP scale. *Journal of Social Issues, 56*, 425-442.

Dutta-Bergman, M. J. (2005). Theory and practice in health communication campaigns: A critical interrogation. *Health Communication, 18*, 103-122.

Eagly, A. H., & Chaiken, S. (1993). *The psychology of attitudes.* Fort Worth, TX: Harcourt Brace and Jovanovich.

Earle, T. C., & Cvetkovich, G. (1994). Risk communication: The social construction of meaning and trust. In B. Brehmer & N. Sahlin (Eds.), *Future risks and risk management* (pp. 141-181). Dordrecht, Netherlands: Kluwer Academic.

Epstein, S. & Pacini, R. (1999). Some basic issues regarding dual-process theories from the perspective of cognitive-experiential self theory. In Chaiken, S. & Trope, Y. Eds. *Dual-Process Theories in Social Psychology*. pp. 462-482, New York: Guilford Press.

Eveland, W. P. Jr. (2001) The cognitive mediation model of learning from the news: Evidence from nonelection, off-year election and presidential election contexts. *Communication Research*, *28,* 571-601.

Eveland, W. P. Jr. (2005). Information processing strategies in mass communication research. In S. Dunwoody, L. B. Becker, G. Kosicki, & D. McLeod (Eds.), *The evolution of key mass communication concepts: Honoring Jack McLeod* (pp. 217-248). Cresskill, NJ: Hampton Press.

Fischer, A. R. H., & Frewer, L. J. (2009). Consumer familiarity with foods and the perception of risks and benefits. *Food Quality and Preference, 20*, 576-585.

Fischhoff, B. (1995) Risk perception and communication unplugged: Twenty years of progress. *Risk Analysis, 15,* 137-145.

Fischoff, B. (2009). Risk perception and communication. In R. Detels, R. Beaglehole, M.A. Lansang, and M. Guilliford (Eds.), *Oxford Textbook of Public Health, Fifth Edition* (pp. 940-952). Oxford: Oxford University Press.

Fishbein, M. & Yzer, M.C. (2003) Using theory to design effective health behavior interventions. *Communication Theory, 13,* 164-183.

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

Gangestad, S. W., & Snyder, M. (2000). Self-monitoring: Appraisal and reappraisal. *Psychological Bulletin, 126*, 530-555.

Gantz, W., Fitzmaurice, M., & Fink, E. (1991). Assessing the active component in information seeking. *Journalism Quarterly, 68*, 630-637.

Gigerenzer, G. (1996) Reasoning the fast and frugal way: Models of bounded rationality. *Psychological Review*, *103,* 650-669.

Gigerenzer, G. (2000). *Adaptive Thinking: Rationality in the Real World. New York: Oxford University Press.*

Griffin, R. J., Dunwoody, S., & Neuwirth, K. (1999). Proposed model of the relationship of risk information seeking and processing to the development of preventive behaviors. *Environmental Research, 80,* S230-S245.

Griffin, R. J., Neuwirth, K., Dunwoody, S., & Giese, J. (2004a). Information sufficiency and risk communication. *Media Psychology*, *6*, 23-61.

Griffin, R.J., Neuwirth, K., Giese, J., & Dunwoody, S. (2002). Linking the heuristic-systematic model and depth of processing. *Communication Research, 29*, 705-732.

Griffin, R. J., Powell, M., Dunwoody, S., Neuwirth, K., Clark, D., & Novotny, V. (2004b, August). Testing the robustness of a risk information processing model. Paper presented at the Association for Education in Journalism and Mass Communication annual convention, Toronto, ONT, Canada.

Griffin, R. J., Yang, Z., Boerner, F., Bourassa, S., Darrah, T., Knurek, S., Ortiz, S., & Dunwoody, S. (2005, August). Applying an information

seeking and processing model to a study of communication about energy. Paper presented at the Association for Education in Journalism and Mass Communication annual convention, San Antonio, TX.

Griffin, R. J., Yang, Z., ter Huurne, E., Boerner, F., Ortiz, S., & Dunwoody, S. (2008). After the flood: Anger, attribution, and the seeking of information. *Science Communication, 29*, 285-315.

Guerin, B., & Innes, J. M. (1989). Cognitive tuning sets: Anticipating the consequences of communication. *Current Psychology: Research & Reviews, 8*, 234-249.

Hance, B. J., Chess, C., & Sandman, P. M. (1989) Setting a context for explaining risk. *Risk Analysis, 9,* 113-117.

Hovick, S.R., Freimuth, V.S., Johnson-Turbes, A., & Chervin, D.D. (2011). Multiple health risk perception and information processing among African Americans and Whites living in poverty. *Risk Analysis.* Advance online publication. doi: 10.1111/j.1539-6924.2011.01621.x .

Hovland, C. I., Janis, I. L., & Kelley, H. H. (1953). *Communication and persuasion: Psychological studies of opinion change*. New Haven, CT: Yale University Press.

Johnson, J. D., & Meischke, H. (1993). A comprehensive model of cancer related information seeking applied to magazines. *Human Communication Research, 19*, 343-367.

Johnson, B. B. (2005). Testing and expanding a model of cognitive processing of risk information. *Risk Analysis, 25*, 631-650.

Kahan, D. (2010) Fixing the communications failure. *Nature, 463,* 296-297.

Kahan, D. M., Braman, D., Slovic, P., Gastil, J., & Cohen, G. (2009) Cultural cognition of the risks and benefits of nanotechnology. *Nature Nanotechnology, 4,* 87-90.

Kahlor, L. A. (2007). An augmented risk information seeking model: The case of global warming. *Media Psychology, 10*, 414-435.

Kahlor, L. A., Dunwoody, S., Griffin, R. J., & Neuwirth, K. (2006). Seeking and processing information about impersonal risk. *Science Communication, 28*, 163-194.

Kahlor, L. A., Dunwoody, S., Griffin, R. J., Neuwirth, K., & Giese, J. (2003). Studying heuristic-systematic processing of risk communication. *Risk Analysis, 23,* 355-368.

Kahlor, L. A., & Rosenthal, S. (2009). If we seek, do we learn? Predicting knowledge of global warming. *Science Communication, 30,* 380-414.

Kasperson, R. E. (1992) The social amplification of risk: Progress in developing an integrative framework. In S. Krimsky & D. Golding (Eds.), *Social theories of risk* (pp. 153-178). Westport, CT: Praeger.

Katz, E., Blumler, J. C. & Gurevitch, M. (1974). Utilization of mass communication by the individual. In J.G. Blumler & E. Katz (Eds.), *The uses of mass communication* (pp. 19-32). Newbury Park, CA: Sage.

Kim, J.-N., & Grunig, J.E. (2011). Problem solving and communicative action: A situational theory of problem solving. *Journal of Communication 61*, 120-149.

Klein, W. M. and Weinstein, N. D. (1997). Social comparison and unrealistic optimism about personal risk. Health, coping and well-being: Perspectives from social comparison theory. In B.P. Buunk & F.X. Gibbons (Eds.) *Health Coping, and Well-Being: Perspectives from Social Comparison Theory* (pp. 25-61). Mahwah, NJ: Lawrence Erlbaum Associates.

Knobloch-Westerwick, S. (2008). Information Seeking. In W. Donsbach (Ed.), *International Encyclopedia of Communication* (Vol. 5, pp. 2264 - 2265). Malden, MA: Wiley-Blackwell.

Kollmuss, A. & Agyeman, J. (2002) Mind the gap: Why do people act environmentally and what are the barriers to pro-environmental behavior? *Environmental Education Research, 8,* 239-260.

Kosicki, G. M., & McLeod, J. M. (1990). Learning from political news: Effects of media images and information processing strategies. In S. Kraus (Ed.), *Mass communication and political information processing* (pp. 69-93). Hillsdale, NJ: Erlbaum.

Lazarus, R. S., & Smith, C. A. (1988). Knowledge and appraisal in the cognition-emotion relationship*. Cognition and Emotion, 2*, 281-300.

Massi Lindsey, L. L., Yun, K. A., & Hill, J. B. (2007) Anticipated guilt as motivation to help unknown others: An examination of empathy as a moderator. *Communication Research*, *34,* 468-480.

McLeod, J. M., & Becker, L. B. (1974). Testing the validity of gratification measures through political effects analysis. In J.G. Blumler & E. Katz (Eds.), *The uses of mass communication*. (pp. 137-166). Newbury Park, CA: Sage.

McGuire, W. J. (1968). Personality and attitude change: An information-processing theory. In A. G. Greenwald, T. C. Brock & T. M. Ostrom (Eds.), *Psychological foundations of attitudes* (pp. 171-196). San Diego, CA: Academic Press.

McGuire, W. J. (1974). Psychological motives and communication gratification. In J.G. Blumler & E. Katz (Eds.), *The uses of mass communication*. (pp. 167-196). Newbury Park, CA: Sage.

National Research Council. (1989) *Improving risk communication*. Washington, DC: National Academy Press.

Neuman, R., Marcus, G.E., Crigler, A.N., & MacKuen, M. (2007). *The Affect Effect*. Chicago: University of Chicago Press.

Neuwirth, K., Frederick, E., & Mayo, C. (2010, November). *The role of heuristic-systematic accuracy and defensive information processing during a Congressional election*. Paper presented at the Midwest

Association for Public Opinion Research annual conference, Chicago, IL.

Niederdeppe, J., Frosch, D. L., & Hornik, R. C. (2008). Cancer news coverage and information seeking. *Journal of Health Communication 13,* 181-199.

O'Keefe, D. J. (2000). Guilt and social influence. In M.E. Roloff (Ed.), *Communication Yearbook 23* (pp. 67-101). Thousand Oaks, CA: Sage.

Palmgreen, P., & Rayburn, J. D., II. (1982). Gratifications sought and media exposure: An expectancy value model. *Communication Research, 9*, 561-580.

Peters, E., Romer, D., Slovic, P, Jamieson, K.H., Wharfield, L., Mertz, C.K. & Carpenter, S. M. (2007). The impact and acceptability of Canadian-style cigarette warning labels among US smokers and nonsmokers. *Nicotine & Tobacco Research*, 9, 473-481.

Petty, R. E., & Cacioppo, J. T. (1981). *Attitudes and persuasion: Classic and contemporary approaches.* Dubuque, IA: W. C. Brown.

Petty, R. E., & Cacioppo, J. T. (1986). *Communication and persuasion: Central and peripheral routes to attitude change*. New York: Springer-Verlag.

Rogers, R.W. (1985). Attitude change and information integration in fear appeals. *Psychological Reports, 56*, 179-182.

Romantan, A., Hornik, R., Price, V., Cappella, J. N., & Viswanath, K. (2008). A comparative analysis of the performance of alternative measures of exposure. *Communication Methods and Measures, 2*, 80-99.

Rosengren, K. E. (1974). Uses and gratifications: A paradigm outlined. In J.G. Blumler & E. Katz (Eds.), *The uses of mass communication*. (pp. 269-286). Newbury Park, CA: Sage.

Rosenstock, I. M. (1966). Why people use health services. *Milbank Memorial Fund Quarterly*, *44*, 94-124.

Rubin, A. M. (2002). The uses-and-gratifications perspective of media effects. In J. Bryant & D. Zillmann (Eds.), *Media effects* (2nd ed.) (pp. 525-548). Mahwah, NJ.: Erlbaum.

Sandman, P. M. (November, 1987) Risk communication: Facing public outrage. *EPA Journal, 9,* 21-22.

Schemer, C., Matthes, J., & Wirth, W. (2008). Toward improving the validity and reliability of media information processing measures in surveys. *Communication Methods and Measures,* 2, 193-225.

Slater, M. D. (1997). Persuasion processes across receiver goals and message genres. *Communication Theory, 7*, 125-148.

Slovic, P. (2010) *The feeling of risk*. London: Earthscan Publications Ltd.

Slovic, P. (1987) Perception of risk. *Science, 236,* 280-285.

Slovic, P. (1992). Perceptions of risk: Reflections of the Psychometric Paradigm. In S. Krimsky & D. Golding (Eds.)*, Social theories of risk* (pp. 117-152). Westport, CT: Praeger.

Slovic, P. (2000) *The perception of risk*. London: Earthscan Publications Ltd.

Smerecnik, C.M.R., Mesters, I., Candel, M.J.J.M., De Vries, H., & De Vries, N.K. (2011). Risk perception and information processing: The development and validation of a questionnaire to assess self-reported information processing. *Risk Analysis.* Advance online publication. doi: 10.1111/j.1539-6924.2011.01651.x.

Snyder, M., & Gangestad, S. (1986). On the nature of self-monitoring: Matters of assessment, matters of validity*. Journal of Personality and Social Psychology, 51*, 125-139.

Stern, P. C., Dietz, T., & Kalof, L. (1993). Gender orientations, values, and environmental concern. *Environment & Behavior, 25,* 322-348.

Ter Huurne, E., Griffin, R. J., & Gutteling, J. (2009). Risk information seeking among U.S. and Dutch Residents: An application of the Model of Risk Information Seeking and Processing. *Science Communication, 31,* 215-237.

Ter Huurne, E., & Gutteling, J. (2009). How to trust? The importance of self-efficacy and social trust in public responses to industrial risks. *Journal of Risk Research, 12*, 809-824.

Tichenor, P. J., Donohue, G. A., & Olien, C. N. (1970). Mass media flow and differential growth in knowledge. *Public Opinion Quarterly, 34*, 159-170.

Trumbo, C. W. (1999). Heuristic-systematic information processing and risk judgment. *Risk Analysis, 19*, 391-400.

Trumbo, C. W. (2002). Information processing and risk-perception: An adaptation of the heuristic-systematic model. *Journal of Communication, 52, 367-382.*

Weinstein, N. D. (1993) Optimistic biases about personal risks. *Science*, *246*, 1232-1233.

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

Witte, K. (1994). Fear control and danger control: A test of the Extended Parallel Process Model (EPPM). *Communication Monographs, 61*, 113-134.

Witte, K., & Allen, M. (2000). A meta-analysis of fear appeals: Implications for effective public health campaigns. *Health Education & Behavior, 27*, 591-615.

Yang, Z. J., McComas, K., Gay, G., Leonard, J. P., Dannenberg, A. J., & Dillon, H. (2010a). From information processing to behavioral intentions: Exploring cancer patients' motivations for clinical trial enrollment*. Patient Education and Counseling, 79*, 231-238.

Yang, Z. J., McComas, K., Gay, G., Leonard, J. P., Dannenberg, A. J., & Dillon, H. (2010b). Motivation for health information seeking and processing about clinical trial enrollment. *Health Communication, 25*, 423-436.

Yang, Z. J., McComas, K. A., Gay, G., Leonard, J. P., Dannenberg, A. J., & Dillon, H. (2010c). Information seeking related to clinical trial enrollment. *Communication Research*. Advance online publication. doi: 0.1177/0093650210380411.

Zajonc, R. B. (1960). The process of cognitive tuning in communication. *Journal of Abnormal and Social Psychology, 61*, 159-167.

Notes

[1] Kahlor and Rosenthal (2009), using some variables from the RISP model, found that active seeking of information was associated with more accurate knowledge of global warming.

[2] Although information insufficiency is a subjective judgment on the part of the individual, at least one analysis found that it related to actual knowledge in a way consistent with the concept. In a comparison of respondents' perceived information insufficiency with a test of their knowledge about global warming, Kahlor and Rosenthal (2009) found that "the larger one's perceived knowledge deficit...the lower one's actual knowledge" (p. 401).

[3] Accessibility will be affected by a variety of costs, from actual dollars (a book that costs $150 may be too expensive to purchase) to expertise (inability to operate a computer may make the WWW unavailable) to cultural costs (we view physicians as channels of last resort for our health questions, despite their obvious expertise on the matter, because they are difficult and costly to schedule).

[4] Channels differ dramatically in the kinds and levels of information they offer. While a newspaper story may satisfy a surveillance need, it may be too superficial to provide the level of detail sought by an individual trying to understand an issue fully. Conversely, someone interested in a rapid surveillance function may eschew a book-length treatise on the topic at hand.

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[7] Chaiken, Lieberman, and Eagly (1989) propose that both defense motivation and impression motivation could lead to either heuristic or systematic processing, depending on the social contexts in which they function. For instance, when defense-motivated individuals receive information from an authority figure that is in line with their own position, they may employ heuristics such as the belief that expertise and specialized knowledge are always trustworthy. However, when the same defense-motivated individuals receive a similar message from a less-valued source, they may engage in further deliberation to reinforce their own belief. Similarly, even though following a simple decision rule such as *go with the consensus* sounds heuristic in nature, the desire to identify the consensus and reach conformity might generate greater information seeking and more effortful processing.

[8] It might be valuable to relate the RISP model, especially variables related to motivations for heuristic and systematic processing, to outcomes on individuals' mental models of risks (e.g., Bostrom & Lashof, 2007; Fischoff, 2009).

[9] Although ISN is normally associated with systematic over heuristic processing, it is possible for individuals to seek information actively but process it heuristically. Unfortunately, their study did not include measures of risk information processing, which would be more closely associated with cognitive structure.

[10] Kahlor (2007) showed a positive zero-order relationship between worry and seeking.

[11] Kahlor and Rosenthal (2009) used the item "I usually understand what I read or hear when I encounter information about global warming" as a measure of what they term *understanding*. This measure correlated positively with knowledge complexity in their study and might be useful among the newer measures of perceived information gathering capacity.

[12] Griffin et al. (2002), however, found that channel beliefs related consistently to the apparent outcomes of processing, including the strength of cognitive structure regarding risk-related behaviors.

[13] There is also some initial evidence that the communication-related variables in the RISP model might be applicable to individuals' seeking and processing of information about other issues, such

as energy (Griffin et al., 2005), that are steeped in technical information and the potential for behavioral change.

Table 1
Theoretical origins and definitions of information seeking and processing variables in the RISP model, and their proximate predictors

Concept	Definition	Origin
Information Processing	Treatment of information as a chain of responses: attention to the message (presentation, attention); comprehension of its content (comprehension); and acceptance or rejection of its conclusions (yielding, retention, and behavior) (Eagly & Chaiken, 1993, 259-260). The RISP model focuses broadly on cognitive processes related to the selection, encoding, and storage of risk-related information in human memory, and retrieval of relevant knowledge (beliefs) from memory; individuals' motivations, beliefs and capacity related to seeking and processing; and outcomes, especially in terms of the stability of risk-related beliefs, attitudes, and behaviors. *Systematic processing:* Relatively analytic and comprehensive treatment of judgment-relevant risk information. *Heuristic processing:* Limited mode of information treatment that requires less cognitive effort and fewer cognitive resources.	Heuristic-Systematic Model (HSM), e.g., Eagly & Chaiken (1993); McGuire (1968), Hovland, Janis, & Kelley (1953); Atkinson & Shiffrin (1968)
Information Seeking / Avoidance	Deliberate, intentional pursuit of further knowledge, as well as the more casual skimming of message and accidental observations and encounters. *Information seeking:* More or less effortful attempts to gather information through a variety of mass and interpersonal channels to achieve personal goals, including those representing various cognitive and affective motivations. Seeking might be routine (e.g., fairly passive exposure to risk-related information based on media use habits) or non-routine (e.g., more active efforts to gather risk-related information that go beyond habitual sources). *Information avoidance:* More or less effortful attempts to evade information due to uncertainty management strategies, including avoiding information to reduce negative affect and maintain positive affect.	Brashers (2001); Gantz, Fitzmaurice, & Fink (1991); Johnson & Meischke (1993); Knobloch-Westerwick (2008) Witte (1994)
Information (In)Sufficiency	Information sufficiency is a subjectively satisfactory level of judgmental confidence in one's knowledge to cope with a given risk. Information *in*sufficiency, therefore, refers to an individual's subjective sense that one's current knowledge is not sufficient for that purpose. Information in this context refers to knowledge (beliefs) held by an individual, or potentially available to the individual (e.g., that he or she can seek or avoid), subjectively related to coping with a given risk.	HSM
Informational Subjective Norms	Perceived socio-environmental influence on one's subjective evaluation of information held to cope with a given risk and motivation to engage in subsequent information seeking and processing activities. *Descriptive norms:* Beliefs, from perceptions of others, about the extent to which gathering and learning risk information is done by relevant others. *Injunctive norms:* Perceived social normative influence from relevant others on information held about a given risk.	Theory of Planned Behavior (TPB), e.g., Ajzen (1988)
Relevant Channel Beliefs	*Original definition:* Beliefs about channels of information, including their trustworthiness and usefulness. *Newer, recommended approach:* One's beliefs and evaluations about the outcomes of one's seeking and processing risk information from various channels.	Kosicki & McLeod (1990); TPB; Palmgreen & Rayburn (1982)
Perceived Information Gathering Capacity	Perceived ability to perform the information seeking and processing steps necessary for the outcome one desires.	TPB, HSM

Table 2:
Overview of results from past analyses of proximate predictors of risk information seeking and processing in the RISP Model

Key Predictors		Information Insufficiency	Information Seeking	Systematic Processing	Heuristic Processing
Information insufficiency		--	a+ b+ d+ e0 f+ gx h+	a+ b+ c+ e0 i+	a- b- c0 e0
Informational Subjective Norms		a+ b+ d+ f+ j+	a+ b+ d+ e+ fx j+	a+ b+ c0 e+	a- b- c0 e-
Channel Beliefs:	*Media distort*	a0 b0	a0 b0	a0 b0 c0	ax b+ c0
	Validity cues	a0 b0	a+ b0	a+ b+ c0	a0 b0 c0
Perceived Information Gathering Capacity		a0 b0	ax b+ d0 f+ h+	ax b+ c0	ax b- c-

Notes:

The studies (a-j below) that have investigated a given variable relationship are listed in each cell with the following code to indicate the results:

+ Statistically significant positive relationship found.
- Statistically significant negative relationship found.
0 No statistically significant relationship found.
x Mixed results, see text.

The RISP model does not propose that information insufficiency is correlated with channel beliefs or perceived information gathering capacity. They should be independent.

Study codes:

a. Griffin et al. (2004b)
b. Griffin et al. (2008)
c. Kahlor et al. (2003)
d. Kahlor (2007)
e. Yang et al. (2010b)
f. ter Huurne et al. (2009)
g. Fischer & Frewer (2009)
h. Johnson (2005)
i. Horvick et al. (2011)
j. Yang et al. (2010c)

Table 3
Relationship of affective response with information insufficiency, seeking, and processing variables in the RISP model

Affect	Information Insufficiency	Information Seeking	Systematic Processing	Heuristic Processing
Anger (Griffin et al., 2008)	+	+	+	N.S.
Worry (Griffin et al., 2004a)	+	N/A	N/A	N/A
Worry (Hovick et al., 2011)	+	N/A	+	N/A
Worry (Kahlor et al. (2003)	N/A	N/A	N.S.	N.S.
Worry (Kahlor, 2007)	+	(+)[1]	N/A	N/A
Negative (Anger, Worry) (Powell et al., 2007)	+	N/A	N/A	N/A
Negative (Anger, Worry, etc.) (ter Huurne et al., 2009)	+	+	N/A	N/A
Negative (Afraid, Worried, Anxious)	+	+	N/A	N/A
Positive (Hope) (Yang et al., 2010c)	N.S.	+	N/A	N/A
Positive (Hope) (Yang et al., 2010b)	N.S.	+	+	-

Notes:
1. Kahlor (2007) reported a zero-order positive correlation in a table.

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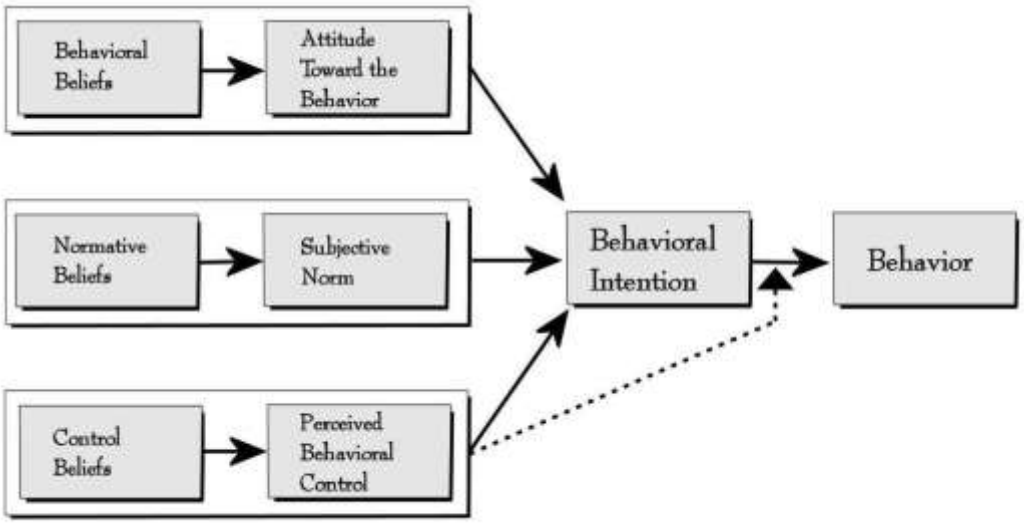

Figure 2: Ajzen's (1988, 1991) Theory of Planned Behavior

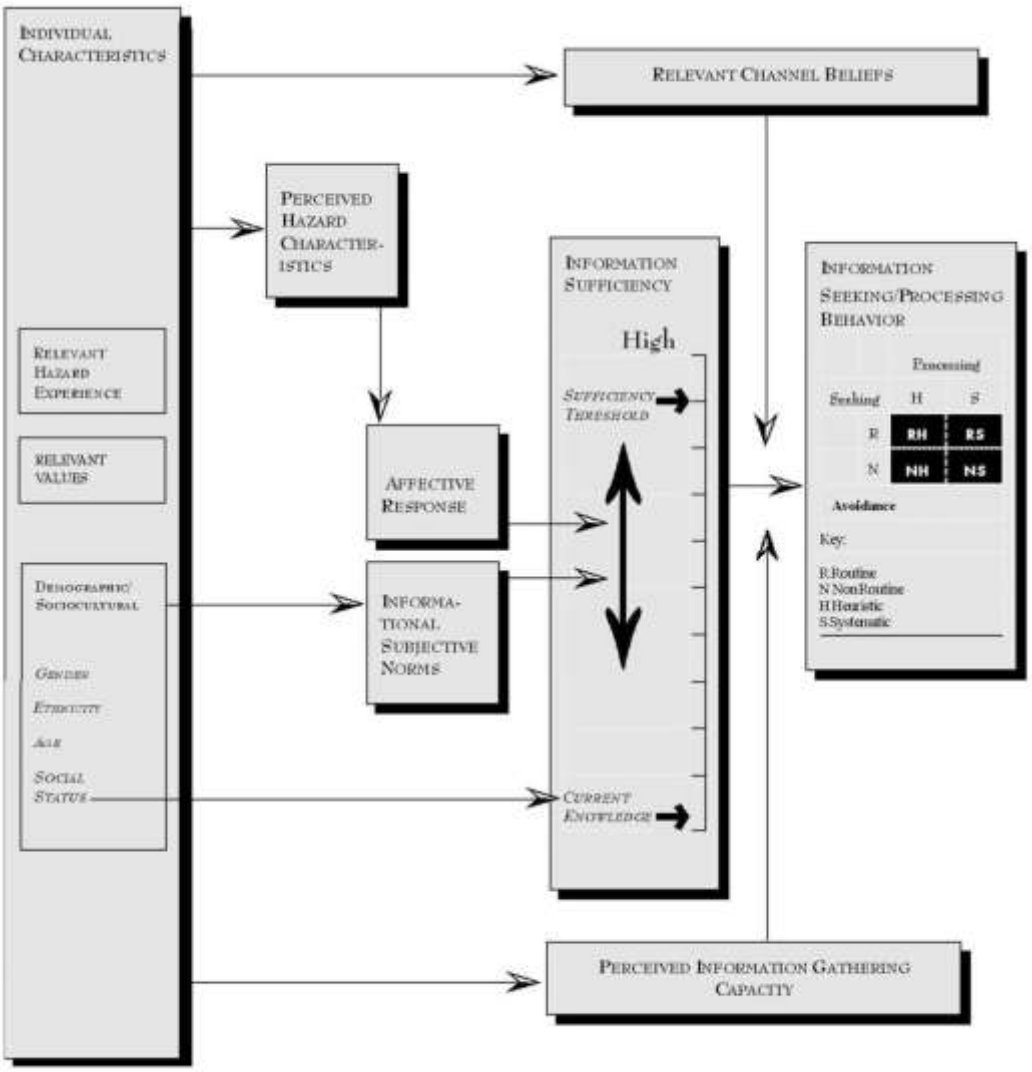

Figure 2: Model of Risk Information Seeking and Processing (Based on Griffin, Dunwoody, and Neuwirth, 1999)

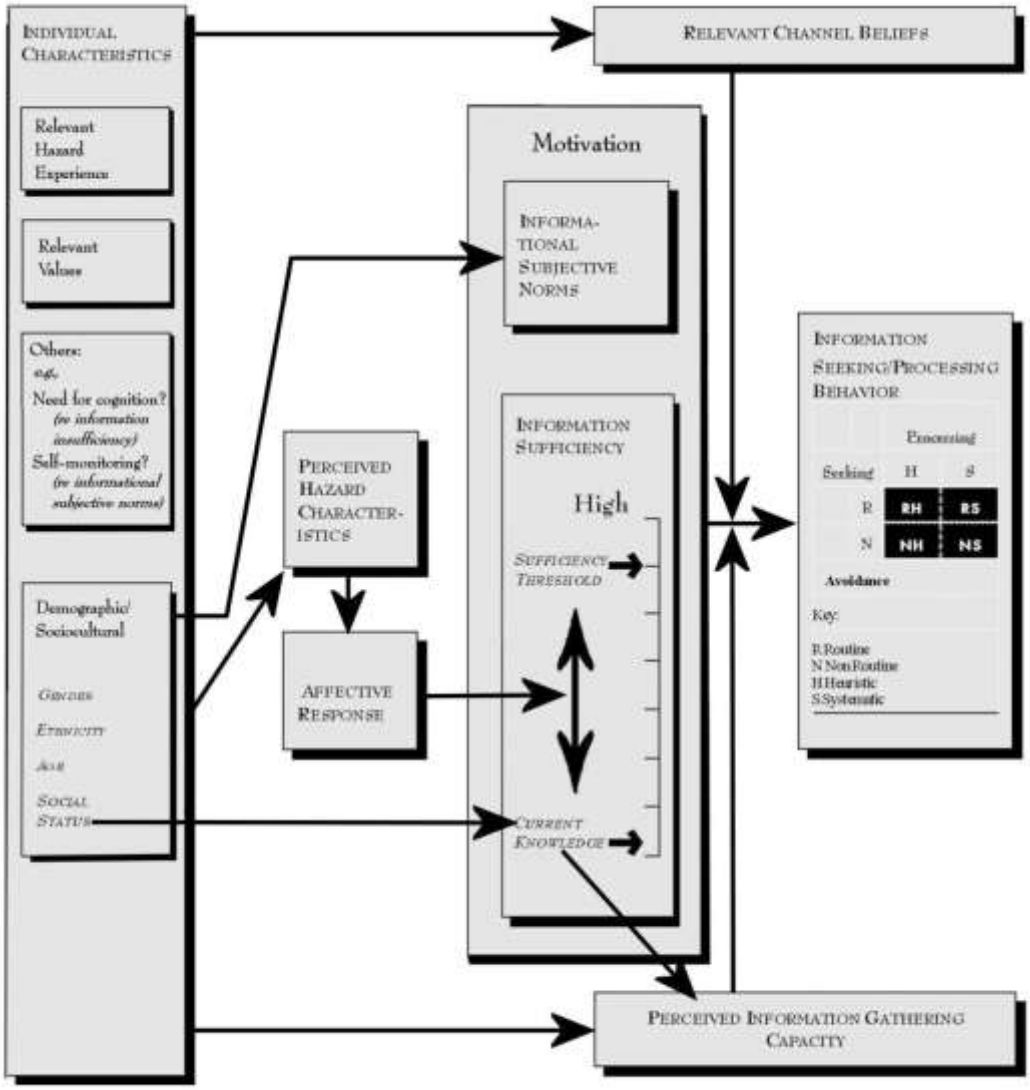

Figure 3. Amended RISP model (Based on Griffin, Dunwoody, and Neuwirth, 1999)