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HEALTH RISK PERCEPTIONS AND CONSUMER PSYCHOLOGY

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This chapter outlines recent developments in the consumer psychology literature examining people's health-related risk perceptions. We first define risk, and discuss the importance of studying risk perceptions in the health domain. We integrate extant models proposed in social and health psychology and build a theoretical model for examining risk perceptions. We then describe the model in terms of the antecedents of health risk perceptions (*e.g.*, motivational, cognitive, affective, contextual, and individual differences), their consequences (*e.g.*, awareness and interest in the health hazard, trial and adoption of precautions or medical treatments, and subsequent behavior in terms of continued adoption or repetition, and word-of-mouth/recommendations of precautionary steps or treatments), and the factors that moderate the link between these two (*e.g.*, financial, performance, psycho-social, and physiological risk). A primary contribution of our approach is to suggest that eliciting risk perceptions serves a persuasive role besides a measurement role, leading to the provocative question as to whether marketers should knowingly leverage their knowledge of how consumers assess risk to encourage behaviors leading to a healthier lifestyle. Implications for public policy makers, consumer welfare advocates, and commercial marketing companies are also discussed.

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WHAT IS RISK?

Risk, according to the Miriam Webster Online dictionary[i], is defined as *the possibility of loss or injury*. In any task that involves action, people typically assess the probability of such loss or injury. If the probability falls with the "acceptable" range, people engage in the risky behavior (see chapters in Fischhoff et al. 1984). Otherwise, they refrain. This assessment of what qualifies as acceptable risk can vary depending on the context.

Risk has been studied from many different perspectives: economic, psychological and consumption. Economists and insurers define risk in terms of a company, country, or instrument defaulting (*i.e.*, not following through on a promised or expected return; see McFadden 1999). Finance defines risk in terms of the volatility of price around a mean (Shefrin 2005). Statisticians think of risk in terms of uncertainty, or a probabilistic assessment of the likelihood of an event occurring versus not occurring with this usage common in the behavioral decision theory literature as well (Tversky and Kahneman 1974). Because of the multi-dimensional nature of risk, methods for studying and observing its effects have varied within and across paradigms and disciplines.

In this chapter, we define risk as a *negatively-valenced likelihood assessment that an unfavorable event will occur*. Risk, as defined by us, differs from an uncertainty judgment in three dfferent ways. *First*, uncertainty judgments can be positively valenced (*e.g.*, winning a sweepstake) or negatively-valenced (*e.g.*, having an accident), whereas we define risk as always being in a negatively-valenced domain. *Second*, events that occur with a probability of 0.50 are more uncertain than those that occur with a probability closer to either 0 or 1, whereas, risk increases as a probability approaches 1. *Third*, less controllable events are more uncertain, while they may be no more or less risky.

In summary, we define health risk as the *perception* of the *subjective likelihood* of the occurrence of a *negative* event related to health for a *person or group of people* over a *specified time* period.

IMPORTANCE OF STUDYING HEALTH RISK PERCEPTIONS

Health risk perceptions are important to study because they are theoretically interesting, managerially relevant, and have consumer welfare and public policy implications. The domain of health provides a rich set of constructs that allow a consumer researcher to examine larger theoretical questions such as: What is the interplay of the cognitive and affective systems (in the construction of risk estimates)? What factors moderate the link between judgments (like risk perceptions) and (health related) behavior? How is memory-based information used along with context-based information to make (risk) judgments? Do individuals differ in the manner in which they process information and make judgments? This chapter focuses on the theoretical antecedents of risk perceptions, the behavioral consequences of accepting risk, and the factors that moderate the link between the two.

Beyond theoretical reasons, however, the antecedents and consequences of health risk perceptions are of increasing managerial importance given the rise in direct-to-consumer advertising which relies on consumers' ability to self- or proxy-diagnose.[ii] From a consumer welfare perspective, the almost epidemic rise in health conditions ranging from depression, anxiety, and bi-polar disorder, to obesity, autism, alcoholism, pre-menstrual disorder (PMDD), erectile dysfunction (ED), and attention deficit disorder (ADD), added to preexisting health conditions like cholesterol, blood pressure, heart disease, cancer, hepatitis, and AIDS suggests that a better understanding of a person's level of risk will allow them to make better informed life choices for themselves and others.[iii] Finally, an unhealthy workforce has public policy implications as preventing, identifying, and treating physical and mental disorders can reduce the number of lost working days and health care costs in the country.

The rest of this chapter is organized as follows: We integrate several extant approaches to studying health risk and propose a conceptual model of the antecedents and consequences of health risk perceptions. We place the extant research in the health domain in our proposed framework, with the antecedents, consequences, and factors moderating their link described in detail. We conclude with open questions for future research that emerge from this synthesis.

EXTANT APPROACHES AND A PROPOSED MODEL OF HEALTH RISK PERCEPTIONS

The psychology of health is a large and growing area (see Taylor 1990, 2003 for reviews). One of the earliest models proposed was the Health Belief Model (Becker 1974; Rosenstock 1974) which proposes that increasing risk perceptions should lead to precautionary behavior. The primary critique against this model is the increasing evidence that accepting risk is a necessary but not a sufficient condition to engage in health related behaviors in domains ranging from AIDS (Gerrard, Gibbons, and Bushman 1996) to depression (Raghubir and Menon 2005a).

One of the widest used models to examine health risk is the Theory of Reasoned Action (Ajzen and Fishbein 1975). This theory has the following key features: (a) Behavior is predicted to follow a behavioral intention, which in turn is based on an overall attitude. (b) The overall attitude is constructed using a weighted average of the belief that a particular attitude object has a given level of an attribute, weighted by the importance of that attribute; as well as subjective norms which are based on perceptions of the preferences of others, weighted by the importance of these others. (c) The model is predominantly a cognitive, rational one, where beliefs, and importance weights for aspects intrinsic to the attitude object, as well as extrinsic to it, together are integrated into an attitude. (d) The model is a compensatory one (*i.e.*, is additive) where lower levels of performance on one attribute can compensate for higher levels of performance on another attribute.

The model has been widely tested in the health domain (e.g., Fishbein and Middlestadt 1989; Albarracin et al. 2001; Fishbein, Middlestadt and Hitchcock 1994). A meta-analysis by Albarracin et al. (2001) of 96 data sets from 42 articles (n = 22,594) using this paradigm to examine condom use shows that condom use was related to intentions (r = .45), which, themselves, were based on attitudes (r = .58) and subjective norms (r = .39), with attitudes based on behavioral beliefs related to condom use (r = .56), and subjective norms related to normative beliefs (r = .46). However, just as the health belief model was critiqued on the grounds that risk perceptions do not always translate into behavior, the theory of reasoned action is critiqued on the grounds that intentions do not necessarily translate into behavior. There is, accordingly, a need to identify: (a) antecedents other than cognitive belief based ones; (b) factors that moderate the cognitive, motivational, and affective antecedents of risk perceptions; and (c) factors that moderate the judgment-intention-behavior link.

The Theory of Planned Behavior (Ajzen 1991) suggests that perceived control is an independent construct that affects both intentions as well as future behavior: the higher the perceived controllability of a symptom, the higher the intention to engage in precautionary or preventive behavior, and the greater the likelihood of engaging in the behavior. Perceived controllability has also been shown to affect people's perceptions of risk and intentions to seek assistance (Lin, Lin and Raghubir 2003a; Raghubir and Menon 2005a; Taylor, Lichtman and Wood 1984; Taylor et al. 1991), though its role for automatic or habitual behaviors has been contended (Eagly and Chaiken 1993). In fact, current research on these theories has suggested that "past behavior" may be another important construct that affects actual behavior, intentions, perceived control, attitudes, norms, as well as beliefs (Figure 3 in Albarracin et al. 2001).

A different approach to understanding health risk and the risk-behavior link is the Cognitive Adaptation theory (Taylor 1983). Given that psychological well-being may be necessary to achieve physiological well-being, those who do not fully accept their risk may have better mental health, and so may, counter-intuitively be better able to accept and cope with physiological risk (Taylor and Brown 1988, see also Taylor 2003; Taylor et al. 2003). The basic argument put forward is that accepting physiological risk may be potentially harmful to psychological risk. Therefore, being unrealistically optimistic in the domain of a health risk, such as cancer, may encourage people to seek diagnosis, which would assist prevention and early cure (Taylor 1983). For example, Taylor et al. (1992) found that HIV positive men who inaccurately, but optimistically, believed that they could halt the progression of AIDS, practiced better health habits than those who were pessimistic (see also Reed et al. 1994).

Taylor et al. (2000) reviewed a decade of research on the relationship between optimism and perceived control with mental and physical health. They find that unrealistically optimistic beliefs, that are associated with mental well-being, may also be health protective, as they act as resources which allow consumers to cope with negative life events. This theory explicitly

recognizes the role that emotions and affect play in assessing risk and deciding on behavioral actions. Newer additions to the theory allow for the positive effect of mental simulation where people can imagine possible positive scenarios and, therefore, regulate their behavior to work towards bringing them about (Taylor and Schneider 1989, Taylor et al. 1998; for a review see Taylor 1998), as well as mindset (Taylor and Gollwitzer 1995). Their body of work suggests that individual differences moderate the effect of motivational effects on risk perceptions. While coping is one example, albeit an important one, of the factor moderating the risk perception-diagnostic behavior link, we propose that it is only one of a genre that includes other aspects of risk.

Each of the above models makes interesting and unique predictions. However, their individual scope is limited in laying out the growing array of effects, factors, and processes being documented in the area of health risks. We propose a theoretical model that combines the lessons from the above models with other health research and more general consumer research to provide a broader road-map to studying the psychology of health risk perceptions. Our model categorizes the antecedents of health risk perceptions into five broad categories: motivational, cognitive, affective, contextual, and individual differences. Individually and interactively, these factors are integrated to form a judgment of health risk. We further propose that there are several primary behavioral consequences of forming such a judgment. These are categorized as awareness, interest, trial, adoption, repeat-behavior, and word-of-mouth, based on the consumer diffusion of product innovations (Rogers 1962; 1987). Finally, we propose that four related risk perceptions - financial, performance, psycho-social, and physiological risk - moderate the likelihood that a health risk perception will translate to a behavioral consequence. Our conceptual model is depicted in Figure 1.

-- Insert Figure 1 about here –

The key aspects of our model that differentiate it from others are: (a) A broader incorporation of cognitive, motivational, and affective factors; (b) Individual factors proposed both as antecedents of health risk perceptions and moderators of the motivational antecedents of risk; (c) Contextual factors proposed both as antecedents of health risk perceptions and moderators of the cognitive antecedents of risk; (d) The consideration of a variety of behavioral consequences; and (e) The conceptualization of four other perceived risks that moderate the risk perception-behavior link that incorporate prior proposed constructs (such as perceived control and coping), but also suggest new ones.

One of the primary contributions of our approach is to examine the contextual antecedents of risk perceptions, whose direct and moderating effect suggest that eliciting health risk perceptions may serve a persuasive role besides a measurement role. Given that the measurement of risk perceptions are prone to a variety of context effects, one way of thinking about this malleable quality of health risk is to categorize changes in risk perceptions as measurement *errors*. Thus, one could attempt to increase the reliability of the data collected. Another way to think about the malleability of health risk is as a measurement *effect*. For example, Morwitz and her colleagues have examined how the mere measurement of a construct changes the likelihood that an event will occur in the future (*e.g.*, Dholakia and Morwitz 2002; Fitzsimons and Morwitz 1996; Morwitz and Schmittlein 1992; Morwitz, Johnson and Schmittlein 1993). By thinking of it as a measurement effect, one can view the risk measuring instrument as a persuasive device that can be strategically used to make people's risk estimates more in line with reality, less biased, and more likely to be used to make a judgment regarding preventative or diagnostic behavior. Thus, one could leverage the context effects to change risk perceptions, and get consumers to take action. Intertwined in the examination of the different antecedents of risk perceptions, we also review the different ways in which risk has been measured and the pros and cons of these techniques.

ANTECEDENTS OF CONSUMER PERCEPTIONS OF RISK

The antecedents of health risk perceptions in the existing literature can be classified into five major types of psychological factors: motivational, cognitive, affective, contextual, and individual differences (see left hand side of Figure 1). Table 1 summarizes some of the key findings in the literature pertaining to these antecedents, together with their implications for theory and practice, and some open questions that may be addressed through future research. We elaborate on each of the antecedents in greater detail in the sections below.

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Motivational Factors

A variety of factors and biases in the domain of health risks may be attributed to motivational factors. Motivational factors are inherently intertwined with perceptions of health risk. Three primary phenomena highlight the motivational factors affecting health risk perceptions: self-positivity (or unrealistic optimism), social desirability, and self-control.

Self-Positivity Bias. To accommodate a need for mental well-being and self-enhancement, people might be unrealistically optimistic in their own risk perceptions (Taylor and Brown 1988). This motivationally driven bias, referred to the self-positivity bias (Ragubir and Menon 1998), is widely documented in the health literature and can affect risk perceptions in several ways (for a review see Taylor 2003; Taylor et al. 2000). Stemming from a desire to self-enhance, the self-positivity bias is people's tendency to believe that bad things are less likely to happen to them than to the average person – an "It cannot happen to me" syndrome (Taylor and Brown 1988; Weinstein 1980). The self-positivity effect was first tested in the domain of health risk perceptions by Perloff and Fetzer (1986), and has since become a topic of mainstream interest in consumer psychology (Chandran and Menon 2004; Keller et al. 2003; Lin et al. 2003b; Luce and Kahn 1999; Menon et al. 2002; Raghubir and Menon 1998, 2001). It has been shown for a number of different diseases, including HIV and AIDS (*e.g.,* Raghubir and Menon 1998; Schneider, Taylor, Kemeny and Hammen 1991; Bauman and Siegel 1987; Joseph et al. 1987), mononucleosis and heart problems (*e.g.,* Chandran and Menon 2004; Lee 1989; Dolinski, Gromski and Zawisza 1987; Weinstein and Lachendro 1982), flu (Larwood, 1978), hepatitis (Menon et al. 2002), cancer (Lin et al. 2003a, 2003b; Perloff and Fetzer, 1986), and mental illness, including depression and suicide *(e.g.*, Drake 1987; Kuiper, and MacDonald 1982; Perloff and Fetzer 1986). Shepperd, Helweg-Larsen, and Ortega (2003) found that self positivity manifests regardless of time, as well as whether or not one has experienced related event.

Self-positivity leads people to perceive themselves as being less risk-prone than known or similar others in the same risk group (*e.g.*, their best friend). Self-positivity effects may be due to an overall desire to feel happy (Raghubir and Menon 1998), and maintain or enhance self-esteem (Lin et al. 2003b; Weinstein 1980). Lin et al. (2003b) showed that self-positivity effects are greater for events perceived to be controllable (see also Burger and Palmer 1992; see Harris 1996 for a review on the effects on controllability on self-positivity effects), and therefore, counter-intuitively, information highlighting an individual's lack of control in contracting a disease can increase the likelihood that they go for screening. They argued that if people can attribute a lower risk of a negative event to their own actions, which is more likely to be true for controllable (vs. less controllable) events, the belief that they are less at risk than others should improve their self-esteem.

If consumers assume that they are less at risk than others they may tune out preventative advertising directed to them (Diclemente and Peterson 1994; Fisher and Fisher 1992). Raghubir and Menon (1998) showed that people believe they are less at risk of contracting AIDS than are others. Self-positivity could also promote complacency (Skinner 1995) rather than effective goal-relevant behavior (Weinstein 1989). On the one hand, self-positivity motivated by self-enhancement may have negative effects on health outcomes through a lack of attention or defensiveness towards another wise relevant risk. Self-enhancement motives operating through the same self-positivity effect could create an illusion of positivity that might provide a stress-buffering resource to deal with information that conveys a relevant risk (Taylor et al. 2003). Taylor and Brown (1988) argue that self-positivity may carry benefits such as goal attainment and positive mental health. On the other hand, self-positivity could also have a positive effect on health behaviors if people thought a treatment would more likely work for them than for others; that is, the efficacy of a treatment was higher for themselves than others. Self-positivity could provide a buffer for people to deal with the negative impact of considering risk and help them process information. While extant research recognizes both the positive and the negative consequences of self-enhancement motives, often manifesting in self-positivity, there is little research on how and when self-enhancement motives will affect risk perceptions such that people are more willing to accept risk, and affect behaviors in a healthy way. Future research is needed to understand clearly the conditions when self-positivity could play a positive rather than a negative role in motivating healthy cognition and behavior.

One of the implications of the self-positivity bias pertains to its measurement. Given that the bias is a relative one, it implies that changing the absolute level of risk may not be either necessary or sufficient to de-bias risk estimates. The use of a relative difference in the perceived likelihood of an event occurring has the advantage of measuring the extent of "bias" (difference from an objective reality), as well as a few pleasing psychonomic properties: (a) The perception of the risk of another person serves as a within-subjects control. Relative measures are less dependent on individual heterogeneity in reading and responding to scale measures, leading to lower variance in the actual estimates of risk. (b) The variance in actual self-estimates bring in statistical noise that is reduced when a relative measure is used (because people are likely to use the scale in a similar way for both themselves and another person). (c) The use of absolute estimates could lead to erroneous conclusions (*e.g.*, that people believe they are more at risk of getting AIDS than they actually are even though they believe that they are less at risk than another person, and therefore, they should be educated into believing that they are less at risk).

Overall, the self-positivity bias is weaker between one's self and a close friend or a parent or siblings than it is for a less specific target such as the average undergraduate or average person (Chandran and Menon 2004; Helweg-Larsen and Shepperd 2001; Menon et. al. 2002; Perloff and Fetzer 1986; Raghubir and Menon 1998). Perloff and Fetzer (1986) argued that while predicting the risk level of a vague target (*i.e.*, the average person), respondents may have chosen a person who fit their stereotype of someone to whom the event would occur, leading to the bias being stronger when an unknown target is used as a comparison other.

The self-positivity bias is also a function of the manner of elicitation of the risk estimate. Otten and van der Pligt (1996) showed that the self-positivity bias was greater when respondents were asked a directly comparative estimate (*e.g.*, "How much are you at risk compared to an average person?") rather than when these were inferred from two separate responses indirectly. They found that direct relative estimates were the least prone to order effects as well, as respondents appeared to base them on actual behavioral data using themselves as a standard.

One of the open questions of research in this area is to examine whether, when, and why self estimates or other estimates are more tensile and prone to being affected by contextual cues. Most prior research suggests that it is self estimates that change. For example, Raghubir and Menon (1998) showed that self-perceptions of the risk of AIDS were more tensile and affected by the number of AIDS-related behaviors that people recalled. Menon et al. (2002) showed that self-perceptions of hepatitis C were tensile and were affected by the type of behaviors listed in an ad. Lin et al. (2003b) showed that self-estimates were more likely to change as a function of the order in which estimates were elicited as compared to others' estimates.

Social Desirability Bias. The social desirability bias is motivated by social goals and the concern among consumers about the impression they make (Fenigstein, Scheier and Buss 1975). Ajzen and Fishbien (1980) also recognized the role played by social goals (through normative beliefs: what one should do, and through subjective norms: whether it is socially or interpersonally desirable to perform a behavior) in determining behavioral intentions and behavioral change. They argue that if an individual, who would like others to think of him/herself in a positive way, believes these relevant others would see a certain behavior as positive (i.e., subjective norms surrounding the behavior are positive), the individual will have higher behavioral intentions and is more likely to perform the behavior. If a subjective norm surrounding a behavior is negative (e.g., my friends think smoking is bad), then an individual is less likely to perform that behavior. Argo, Dahl and Manchanda (2005), for example, demonstrated that people's shopping habits undergo a change when there is a sales person around (see also Dahl, Manchanda and Argo 2001). Thus, social desirability effects are likely to manifest more when there is an outsider present that may have an opportunity to observe and hear how consumers might react to health messages. For topics such as sex, drugs, alcohol, religion and voting, where social desirability has been most examined (see Schwarz and Sudman 1994), there tends to be a strong consensus of what is socially desirable or acceptable. To the extent that a consumer wishes to portray that they are not promiscuous, they are less likely admit to engaging in behaviors that are central to how some diseases are contracted.

While behavioral reports for socially desirable behaviors, such as practicing safe sex, are typically biased upwards, those for socially undesirable behaviors such as marijuana and cocaine consumption,

are typically under-reported (Fendrich and Vaughn 1994). Overall, the more sensitive the question, the greater the likelihood that respondents will tailor their responses towards what they believe is socially acceptable (Maccoby and Maccoby 1954). The bias is robust across measures, behaviors, and disciplines (Fisher 1993; Levy 1981; Peltier and Walsh 1990; Robinette 1991; Simon and Simon 1975; Zerbe and Palhaus 1987). One of the primary problems associated with the social desirability bias is that it can lead to misleading results, not only in terms of the mean likelihood of an event occurring (Peterson and Kerin 1981), but also the strength of the relationship between interventions, attitudes and behavior (Zerbe and Paulhus 1987).

Understanding the precise social motive that may drive the bias (e.g., privacy versus image management concerns) can help identify relevant ways to reduce the bias. Given that this bias may be a measurement artifact, the suggested ways of decreasing the bias are discussed below.

Indirect questioning is when a respondent is asked to answer, in a structured or unstructured format, a question on behalf of another person, rather than for themselves (Fisher 1993). Indirect questioning is hypothesized to be successful as the respondent projects their own unconscious biases into ambiguous situations which end up revealing their own attitudes, without the embarrassment of revealing their own private attitudes. Fisher (1993) found that using structured projective techniques reduced social desirability biases for behaviors that were subject to social influence rooted in both privacy as well self-presentation.

The *Shopping List technique* was originally used by Haire (1950) to measure attitudes to instant coffee. In this technique, respondents are given a shopping list with a target item (or a control item), and asked to describe the personality of the person shopping. This indirect method allows the researcher to examine the implications of a product on the shopping list from the point of view of the inferences people draw about the person buying it. In a recent application of this technique to the domain of safe sex, Dahl et al. (forthcoming) found that one of the reasons people were reticent about carrying condoms was that they believed it signaled overconfidence and promiscuity, rather than responsibility. This, added to the fact that there is embarrassment associated with the purchase of condoms (Dahl, Gorn and Weinberg, 1998, 1999) is a major obstacle to the practice of safe sex.

Mode of administration may also affect risk assessments. Aquilino (1994) showed that that self-administered questionnaires were more successful in getting people to admit that they consumed illicit drugs compared to personal face-to-face-interviews, that worked better than telephone interviews due to the ability of the interviewer to assuage confidentiality concerns, and build rapport (see Aquilino and LoSciuto 1990 for a discussion of success of this technique by race).

Randomized response technique also satiates privacy concerns (Warner 1965). In this technique, based on a random event (e.g., coin flip), respondents are asked to "yes" or "no" to one of two questions one of which is the sensitive question and the other an innocuous question with a known population probability. The aggregate probability of the group responding to the sensitive question can then be calculated given the known probabilities of the random event and the innocuous question.[iv]

Camouflaging sensitivity may also help reducing biases in the measurement of risk. Hiding the sensitive question among a group of more innocuous questions is another recommended technique (Bradburn et al. 1978; Sudman and Bradburn 1974). When a behavior is one on a list of many behaviors, it is less threatening and increases the chances that a respondent will answer it truthfully.

Counterbiasing techniques involve introducing the target socially undesirable behavior as a "normal" one by suggesting how common it is in the population, and therefore, reducing the embarrassment associated with admitting to it (Barton 1958; Bradburn et al. 1978; Sudman and Bradburn 1974). Applying the technique to reports of safe sex, Raghubir and Menon (1996) found that providing counter-biasing information as a base-rate (a population average) rather than in term of individuating information (an average member of the population) was more effective, presumably because it carried more information, being based on a large sample size.

Self Control. Most messages that highlight health risks convey information that is emotionally aversive but beneficial to long-term well-being. That is, an effective health message should enable a person to recognize risks and act on it to get tested or change behaviors in

the long run, but in the short run recognizing risk might lead to unpleasant trade-offs. Sometimes short term goals (e.g., participating in a sex encounter even in the absence of protection) are in conflict with long term goals (e.g., staying healthy), presenting a self-control problem (Loewenstein 1996). Thus, in the short run, consumers are motivated to lower the immediate intangible costs (e.g., time, effort, emotion) of recognizing risk perceptions (Agrawal, Menon, and Aaker, forthcoming; Raghunathan and Trope 2002; Keller et al 2003). On the other hand, consumers could be motivated to seek the long-term benefits of recognizing risk such as preventing a disease or detecting it in early stages or seeking early treatment. Thus, depending on whether a consumer is focused on long-term or immediate motives, they may be more open to health risk consideration. These long term or short term motives may not only influence risk perceptions and behavioral intentions, but may also influence the likelihood of practicing a healthy lifestyle. For instance, the short-term motive of self-enhancement may lead to a lower risk perception of contracting AIDS (Raghubir and Menon 1998), but even if risk were recognized, the short-term motive of gratification might lead one to still have unsafe sex. Interventions that highlight long-term benefits of processing health risks could help people recognize risk and practice healthy behaviors (Raghunathan and Trope 2002).

In summary, self-positivity, social desirability and self control are three motivational factors that affect the perceptions and report of a person's own health risk. Our model proposes that the extent to which they exist is a function of individual and contextual differences (both of which are discussed later in this section). We now discuss affective factors impacting health risk judgments.

Affective Factors

Affective factors play a role in terms of people's ability to deal with negative events or information. People might anticipate and experience the negative affective consequence of considering health risks. In the context of processing health message information in the domains of skin cancer and sexually transmitted diseases, Block and Keller (1995) demonstrated that information that highlights negative consequences of contracting a disease is more persuasive when there are cues in the message that induce in-depth processing. On the other hand, when the information is being processed only in a shallow manner, the valence of the information presented did not affect persuasion. For example, highlighting negative consequences may lead to feelings of fear, which may decrease the persuasiveness of an appeal (Keller and Block 1996; Roger and Mewborn 1976). Furthermore, while positive affect fosters the processing of negative information, negative affect hinders this processing because people are in a mood repair mode and negative information does not contribute to this goal (Keller et al 2003; Raghunathan and Trope 2002; Salovey et al. 1991).Thus, if consumers are asked their perceptions of risk of health hazards when in a positive affective state, they may be more open with dealing with the reality, and may estimate risk perceptions that reflect less of the self-positivity bias. On the other hand, if consumers are in a negative affective state, they are less likely to be willing to process negative information, and the self-positivity bias may be enhanced. Taking this one step further, Agrawal et al. (forthcoming) examine the role of discrete emotions in enhancing health message persuasiveness. They theorize that discrete emotions play a dual role in influencing the effectiveness of health-related messages: as a provider of resources and of information. While the valence of the emotion provides resources as demonstrated by Raghunathan and Trope (2002), other appraisal dimensions of the emotions (e.g., self/other-relatedness, uncertainty) provide information that people use to decipher information provided in a health message.

Given the strong inter-connections between the health domain and emotions, this is an important antecedent of health risk perception, albeit under-researched, and therefore, and a future avenue for rich theoretical research.

Cognitive Factors

Feldman and Lynch's (1988) accessibility-diagnosticity framework help us understand how the different pieces of information that are salient to a consumer at a given time might influence the kind of risk related cues that come to mind. They predict that "(a given piece of information)…will be used as an input to a subsequent response if the former is accessible and if it is perceived to be more diagnostic than other accessible inputs" (p. 431). *Accessibility* is defined as the ease of retrieving an input from memory. *Diagnosticity* is defined in terms of how complete the input is to make a judgment. The greater the accessibility and diagnosticity of an input for a judgment relative to

alternate inputs, the greater the likelihood that it will be used (Simmons, Bickart and Lynch 1993). The interplay of accessibility and diagnosticity in the domain of risk judgments is now discussed.

Accessibility of Information in Memory. Accessibility is a direct function of the frequency and recency of activation of information in memory (Higgins 1989). The higher the information accessibility, the more easily should information come to mind, and to the extent this information is diagnostic of making a risk judgment, the lower should be the self-positivity bias. Raghubir and Menon (1998) showed that increasing the accessibility of causal information reduced the self-positivity bias, and potentially increasing the accessibility of preventive behaviors enhances the self-positivity bias. This was because the accessibility of information was more diagnostic of, and accordingly, affected perceptions of own risk more than it affected perceptions of others' risk. There are four different aspects of accessibility of information in memory: valence (negativity or positivity), extremity, recency and frequency. These are elaborated on below.

Negative information comes to mind more easily than positive information (Higgins 1989) and so may be more likely to enter into a risk judgment. This implies that framing could affect the efficacy of health messages (Block and Keller 1995; Keller et al 2003; Maheswaran and Meyers-Levy 1990; Meyerowitz and Chaiken 1987). Furthermore, if the retrieval of negative information puts the person in a negative mood, they are less likely to process a health message that touts the negatives associated with a disease and the potential of the person having the disease (Agrawal et al. forthcoming; Keller et al 2003).

Extreme information is likely to make other equally accessible information less diagnostic. For example, Raghubir and Menon (2005a) showed that while risk estimates are affected by the presence or absence of suicide in a self-diagnosis inventory for depression, intentions to seek assistance are only marginally so. They also showed that including an extreme behavior in a behavioral checklist, decreases the diagnosticity of the other behavioral symptoms included in the battery, in the absence of information about the diagnosticity of the behaviors. However, the same behavior, "thoughts of suicide or death" also led to other behavioral symptoms being perceived to be more controllable. They conclude that this symptom may act as a double-edged sword, its presence at the same time depressing estimates of risk but increasing perception of control over those symptoms. If this is the case, then including the behavior in the self-diagnosis inventory brings substantial benefits, especially if one can control or limit the informative value (or perceived diagnosticity) of the behavior for the remaining symptoms of depression. Thus, the information value of response alternatives can be leveraged to limit the perceived diagnosticity of any extreme behavioral symptom in a risk inventory.

Recently engaged-in behaviors are likely to be more accessible than behaviors engaged in further back in time (Higgins 1989). Therefore, if recent behaviors are recalled as they are diagnostic of the health hazard in question, risk perceptions are likely to be inflated. On the other hand, if the behaviors that lead to the disease are recalled but are less accessible because they occurred further back in time, they may be (wrongly) judged to be less diagnostic of the disease, and discounted when arriving at risk perceptions, even though a single encounter of unprotected sex with a person with AIDS might result in a person becoming HIV positive (see Raghubir and Menon, 2005b, for when the recency of information recalled undercuts the diagnosticity of recalling more numerous pieces of information on judgments related to the content of this information).

Another factor that affects information accessibility, and hence risk perceptions based on this information, is the *frequency* with which people engage in behaviors or are exposed to information about these behaviors. Furthermore, the regularity of the frequent behavior is also key in how this information is represented in memory and whether this information is going to more or less accessible and in what form. For example, Menon (1993, 1997) demonstrated that people tend to have a rate-of-occurrence easily accessible in memory that is used in subsequent frequency, and potential risk estimation, tasks. On the other hand, for irregular behaviors which occur at less periodic time intervals, people have to resort to specific episodes, and less frequent behaviors then are more highly accessible than frequent ones. Depending on the domain of risk estimation, then, the regularity and the frequency of the behaviors will impact final risk perceptions (see also Albarracin et al. 2001 for evidence regarding the importance of past experience as an antecedent of risk judgments and the risk-intention-behavior link).

Diagnosticity of information cues to make judgments. Consumers could use the diagnosticity of cues either retrieved from

memory or provided in the context to infer risk perceptions (Feldman and Lynch 1988). The mere accessibility of the information provided could also in and of itself be used as a diagnostic cue (Menon and Raghubir 2003), implying that if risky behaviors are easily retrieved from memory, risk perceptions would be higher than if they were difficult to recall. Further, the presence of a single extreme factor could overshadow the diagnosticity of less extreme factors that should be normatively used to estimate risk (Raghubir and Menon 2005a, for this demonstration in the domain of depression with the presence of the symptom: "thoughts of suicide/ death"). To summarize, the accessibility and diagnosticity of information in memory can affect people's perceptions of health risk. However, judgments may be memory-based, context-based, or a combination of these. Thus, contextual factors moderate the extent to which cognitive, memory based factors are used to estimate risk (see Menon, Raghubir, and Schwarz1995a, 1997, Sudman, Bradburn, and Schwarz 1995 for the interplay between these two sets of factors). These contextual cues are discussed next.

Contextual Factors

One of the better studied contextual sources of information to make responses is the questionnaire itself (Bickart 1993), including the manner in which questions are framed, the order in which they are asked, the response alternatives used to elicit their responses and other incidental information in the questionnaire that ends up serving an informative function rather than the pure recording function for which it was intended. The cognitive aspects of survey methodology literature shows that the manner of construction of a questionnaire affects the reports elicited, and can, in turn, affect later responses (see Sudman et al. 1995 for a review). These contextual factors as they pertain to health judgments are discussed below.

Response Alternatives: The range of response alternatives used may be informative if respondents believe that the set constructed by the researcher reflects a population's frequency distribution, leading to their inferring how often an average person behaves, and then categorizing themselves with respect to this average person (e.g., Menon et al. 1995b, 1997; Schwarz et al. 1985). The use of response alternatives increases when reports are made for another person for whom memory-based information is even less accessible than for oneself (Schwarz and Bienias 1990), and as the task complexity increases (Bless et al. 1992). Given the number and types of scales used to elicit behavioral and other symptoms for conditions ranging from depression to diabetes, the manner of construction of these scales could affect risk judgments. Other contextual factors that have been examined include the enhanced accessibility of responses to earlier questions (Menon et al. 1995a), the effects of question framing (Raghubir and Johar 1999), and the presence of middle and explicit "don't know" options (see Schuman and Presser 1996 for a review of question form, wording and context effects). All these factors will also affect risk perceptions. Future research needs to be conducted to examine the effects of response scales on behavior identification and the likelihood of using the behavior to construct a risk judgment.

Proxy Information: Proxy-diagnosis is when you ask a person whether they believe someone they know is at risk of a disease. A common practice, it has many of the advantages of indirect questioning, as motivational antecedents are less important in assessing others' risk versus own risk. When judgments relate to another person whom one knows, such as a significant other, people are more likely to project their own attitudes and behaviors to the other person (Davis, Hoch and Ragsdale 1986). People tend to assume that those similar to themselves, share their attitudes and behaviors. For example, Menon et al. (1995b) showed that respondents based their reports of their spouse's behavioral frequencies on their own behavioral frequencies (see also Bickart et al. 1994). Menon et al. (1995b) found that proxy-reports are frequently based on self-reports, as self-reports are an easily accessible source of information to use to make judgments about others.

Assessing whether proxy-reports are subject to the same contextual cues that self-reports are is an area for future research. Prior research has found mixed results. Raghubir and Menon (1998) found that self-reports changes more than other-reports when AIDS related behaviors were made contextually accessible, while Menon et al. (2002) found that when an advertiser listed two ways that Hepatitis C could be contracted, people assume that there were fewer ways for the average person to contract the disease than when eight ways were listed.

Availability of Alternative Sources of Information: Given that an over-arching goal of health-marketers is to bring risk perceptions in line with reality (and objective data), a legitimate question is whether providing simply base-rates of an event can achieve this goal. If people are prone to self-positivity because they do not have sufficient information about others or fail to consider other people's circumstances (Regan, Snyder and Kassin, 1995), then providing them base-rates should reduce the self-positivity bias. For example, Weinstein and Lachendro (1982) were able to reduce the self-positivity bias by providing detailed, personalized information about the risk status of five other students or asking participants to imagine that they were the typical same-sex student. However, it is plausible that base-rates may not eliminate the self-positivity bias as consumers are notorious for ignoring base-rate information (Tversky and Kahneman, 1974).

Framing: A topic of recent interest is how the manner in which risk information is provided could itself bias people's perceptions of risk. For example, respondents have been shown to ignore the format in which numerical information is provided and make judgments based on the absolute magnitudes of the number provided (Halpern, Blackman and Salzman 1989). This led to people perceiving "100% greater" to mean "twice" as large, and "200% greater" to also mean "twice" as large! Halpern et al. (1989) also showed that "4.15 times greater" was perceived to be equivalent to "415% times greater" rather than the normatively correct "315% times greater." Interestingly, presenting information as a percentage or as number of times (i.e., actual frequency), also affected risk perceptions: though people perceived "4.15 times" to be the same as "415%" they judged 415% to be a greater risk of death than 4.15 times. Applying these findings to framing counter-biasing information to reduce under-reports of undesirable behaviors, Raghubir and Menon (1996) found that presenting information as "1 out of 5" (people performed the undesirable behavior) was less effective than presenting the same information as "20%."

In a recent paper, Chandran and Menon (2004) demonstrated the differential effects of framing a health hazard as occurring every day versus every year (called "temporal framing"), two reference periods that objectively refer to the present, but are subjectively perceived as different. Drawing on Construal Level Theory (Trope and Liberman 2000), they showed that temporal framing mimics the effects of temporal distance such that an "every day" framing makes risks seem more proximal and concrete than a "every year" framing, resulting in higher perceptions of self-risk, more concerned attitudes, higher intentions to behave in a precautionary manner, greater anxiety about the hazard, and enhanced effectiveness of risk communication. For example, they reporedt that perceptions of self-risk, measured on a 101-point probability scale went from 4.86 in the "every year" condition to 22.00 in the "every day" condition. Furthermore, an "every day" attenuated the self-positivity bias was mitigated, but the "every year" framing enhanced it. Finally, these results were reversed when the health message was frame as "averting" a health hazard as opposed to "succumbing" to one, such that the "every day" frame increased the probability of avoiding the disease in the "avert" condition compared to the "every year" frame. Framing effects can be constructed at the geographical level, the psychological level, other demographic level, or at a mere aggregate statistical level. That is, suggesting that a million Americans have a problem would be less effective than suggesting that 100,000 Californians have the same problem (given California accounts for approximately 10% of the US population), which would be less effective than suggesting that 25,000 residents of the Bay area have the problem (given that a quarter of Californians, approximately 6 million people, reside in the Bay area), which would be less effective than suggesting that over 400 people in the city of Berkeley suffer from that problem (given that Berkeley has a population of approximately 100,000). Examining these predictions as well as other forms and effects of framing are be interesting areas of future research.

Individual Differences

There are many individual difference variables that may also account for systematic differences in risk perceptions between groups of individuals.

Depressive Tendency. One of the few groups of people who have been shown to <u>not</u> have the self-positivity bias are depressives. Their risk estimates are more realistic than the average population, a term referred to as "depressive realism" (cf. Alloy and Abramson 1979; Keller, Lipkus, and Rimer, 2002; see Ackermann and DeRubeis 1991 for a review). Depressives are less prone to self-positivity as they view their life and future in negative terms (Beck, 1967, 1976), have low self-esteem (Gerrard et al., 2000), with their risk

estimates reflecting pessimism (versus an absolute risk level) and self-negativity (versus another person; Keller, Lipkus and Rimer, 2002). Lin et al (2003a) showed that optimists are less likely to update self-estimates of controllable events when provided with base-rates, while pessimists incorporate base-rates into their judgments for all events.

Depressives appear to view their life and future in negative terms (Beck 1967, 1976), relying more on chronically accessible negative self-constructs (e.g., Gotlib and McCann 1984; for a review of the automaticity of cognitive processes in depression see Moretti and Shaw 1989). Information processing in depressives has been shown to be context-dependent with a controlled decision to engage in (negative) self-referential thoughts preceding the automatic activation of self-related constructs (Bargh and Tota 1988), which reflects a tendency to interpret a behavior as consistent with a chronically accessible construct (Higgins and King 1981).

Gender. Women have been found to be more prone to depression, though this may simply reflect their higher likelihood of seeking assistance and diagnosis. In fact, the psychosocial implications of being depressed may be worse for men due to the greater stigma attached to depression for this category (Russell 2000). Gender differences have also been documented in the self-positivity bias (Lin and Raghubir 2005). Several biases and factors affecting risk may have gender specific effects.

Personality. At the individual personality level, there is evidence that controllability attenuates the self-positivity bias (Darvill and Johnson, 1991), with optimists less likely to update their beliefs about themselves even when provided base-rate information (Lin et al. 2003b).

Culture. Cross-cultural variations in self-positivity have also been noted in the literature. Heine and Lehman (1995) showed that the belief that positive events are more likely to happen to ones self (relative to one's peer) was significantly reduced for Japanese individuals relative to Canadian individuals. Similarly, Chang (1996) found that across multiple measures, Chinese individuals were more pessimistic than were their American peers. There are also cross-cultural differences between UK and US populations in the size of the self-positivity bias in the context of cancer that reflect differences in the perception of control of cancer (Fontaine and Smith, 1995). However, Sedikides, Gaertner, and Toguchi (2003) have recently suggested that self-positivity may be a universal phenomenon, but the domain in which it is seen may differ for those from individualistic versus collectivistic cultures. Overall, those from a country with a "collectivist" versus "individualistic" orientation (cf. Hofstede 1990), have been shown to have a smaller magnitude of the bias, though it remains significant. In addition, to self psotivity, eaterns cultures may be more susceptible to social desirability biases than western culture (Lalwani, Shavitt, and Johnson 2006).

Priors. In addition to the above effects, individuals may also vary in their beliefs or lay theories about health concerns, which may themselves play a role in the construction of risk perceptions (Kelly et al. 2005; Leventhal et al. 2005). For instance, if individuals believed that a family history of cancer is a good predictor of cancer risk, then those who have a family history of cancer are likely to report higher risk estimated than those who do not. Note here that not all health related beliefs are true and could be systematically mislead risk perceptions.

To summarize, we have delineated five separate antecedents of risk perceptions: motivational, cognitive, affective, contextual, and individual differences. While Figure 1 presents these graphically in a conceptual model, Table 1 summarizes the key findings and potential areas for future research.

CONSEQUENCES OF RISK PERCEPTIONS

Risk perceptions can play two major roles: On the one hand, they can be highly correlated with behavior, such that when one believes that one is at risk, and then engages in more preventative, precautionary, and healthy behavior. This is the role of risk perceptions as a mediator to behavior. Relatedly, there are several factors that guide when risk mediates behaviors and when this link between risk and behavior breaks down. On the other hand, there could be other factors that interact with risk perceptions, and determine what kind of behaviors might be affected by the risk perceptions. This is the role of risk perceptions as a moderator. Our model emphasizes the need to understand the persuasive consequences of risk elicitation. Hence, it is important to understand when risk would mediate health behaviors and what kind of behaviors would be influenced. Both of these roles of risk perceptions are described below and are depicted graphically on the right side of Figure 1.

Risk as a Mediator to Behavioral Consequences

The extant literature has focused on reducing self-positivity in risk estimates with the idea of encouraging preventive behaviors (Chandran and Menon 2004; Menon et al., 2002; Raghubir and Menon 1998; Perloff and Fetzer 1986; Weinstein 1980). The focus has thus been to enhance self-risk perceptions, with the hope that doing so will reduce the distance between perceptions of risk between self and other (e.g., average person), and thus enhance people's vigilance of the health hazard. Another potential future research idea then is to systematically examine situations in which the risk perceptions associated with the average person may increase or decrease and affect the self-positivity bias. This may also affect the commitment to more preventive behaviors on the part of the target audience.

Factors Affecting When Risk Mediates Behavior. Whereas for most health hazards, increasing risk perceptions to bring them in line with reality may be adequate at encouraging action, this may not always be the case. There are several instances and reasons for when risk might not mediate behavior. Perceiving a very high risk may for instance turn away or "shut down" processing of health information (Keller and Block 1996). For example, persuading potential depressives that they could be at risk may be relatively easy (due to "depressive realism" Keller et al., 2002), but inadequate to persuade them to seek medical advice. They must also believe depression is controllable if they are to seek treatment. Interventions that can simultaneously bring self-perceptions of risk in line with behavioral symptoms, and increase beliefs in the controllability of those symptoms (Ajzen 1991; Ajzen and Fishbien 1980), should have a positive persuasive effect on seeking assistance and practicing health behaviors.

Recent work by Agrawal and Menon (2005) suggests that sometimes incidental emotions can moderate the risk-perception-behavior relationship as well. For example, the emotion being experienced at the time of processing a health message can have undercurrents of uncertainty, and could be positive (e.g., hope) or negative (e.g., anxiety). Therefore, if people are hopeful about a situation (e.g., they will not test positive for HIV), this hope may lead to people wanting to savor the feeling, and hence not implementing behavioral changes (e.g., get tested) for fear that the result may turn out to be negative. On the other hand, if people are anxious about the outcome, this anxiety may lead people to find closure to the negative uncertain emotion, and lead to behavioral change (e.g., they may want to get tested).

One reason why people might avoid processing of beneficial health information or performing healthy behaviors when they feel at risk might be that the thought of being at high risk is psychologically taxing. In this case, coping research might suggest ways of alleviating the psychological burden, and hence strengthening the risk and behavior link. Different coping mechanisms might be amenable to different types of information or behaviors. For instance, if people are more likely to cope by withdrawing, it is best not to actively try and persuade them. On the other hand, some people might cope by talking about their concerns and expressing their emotions, in which case it would be great to give them the opportunity of doing so. Some other situations or people might cope by looking for information and hence it would be best to provide comprehensive information (Duhachek 2006; Kahn and Luce 2003).

In addition to risk affecting behavior such that perceiving a high risk may lead to protective action, there are at least two other relationships between risk and behavior (Brewer et al. 2004). For instance, one might reappraise risk after performing a risky or healthy behavior. Or that risk perceptions themselves might be an accurate reflection of risky behavior. That is, people who more likely perform risky behaviors are likely to think they are at higher risk. Various factors may affect which relationship between risk and behaviors holds at a given point in time or given context. Future research is needed to address these relationships.

Risk as a Moderator of Behavioral Consequences

The link between risk and behavior can also be analyzed from the perspective of the different forms that the risk might take for the consumer. We defined risk as *negatively-valenced likelihood assessment that an unfavorable event will occur* in an abstract way. From a consumer standpoint, this risk could manifest in many different domains or forms. For instance, the risk could be related to *performance* of a test or treatment or health product, or it could be *financial*, *physiological*, or *psycho-social*. The form the risk takes for the consumer can govern how it influences decisions or behaviors, and what interventions may be effective in eliciting healthy behavioral patterns. These forms of risk may

be associated with the health problem itself or with preventive/corrective behaviors. The extent to which judgments of risk translate into corrective behavioral consequences depends on both, the risks associated with the health problem, as well as the risk related to the corrective behavior(s). Most existing models of health psychology discussed earlier endorse the importance of studying the risk-behavior link. However, their conceptualization of risk is mostly unidimensional. Our model recognizes that risk may manifest in several forms and these different forms of risk may lead to distinct behavioral outcomes. Related to the notion of distinct behavioral outcomes, the existing models of health psychology do not discriminate between various types of behavioral outcomes that may result from risk evaluation. In our model, we rely on previous marketing research (Rogers 1962; 1987) to identify a variety of different consumer decisions or behaviors that may occur due to risk evaluation. In the following section, we discuss the effects of different types of risks and how they affect a variety of consumer decisions.

Using Risk to Influence Behavior: Strategies from a Decision-Making Perspective

Consumer adoption of new products has been modeled in the literature on consumer diffusion of product innovations (e.g., Rogers 1962; 1987; 1995). For example, this literature suggests that consumers go through multiple stages of decision-making before they adopt a new product. In this section, we adapt the diffusion of innovation paradigm to examine changes in a person's behavior when faced with a health hazard.

The steps that a person may go through when facing a health hazard may be: *awareness, interest, trial, adoption*, *repetition*, and *endorsement* for medical diagnosis, treatment, and following healthy behaviors. Awareness may mean identifying symptoms or causes of a health problem (e.g., knowing that smoking may cause lung cancer). Interest or desire might lead a consumer to follow-up on a symptom or behavior, or seek diagnosis or to acquire more information to take preventive action (e.g., young adults seeking information about sexually transmitted diseases, or wanting to find out about the correct testing procedures for HIV). Trial relates to getting a consumer to go to their doctor for a diagnosis. Adoption may mean starting a course of treatment if one has a disease (*e.g.*, starting on anti-cholesterol drugs), or starting a course of preventive action to prevent getting or exacerbating a disease (*e.g.*, starting a regimen of heart-healthy food and daily exercise to bring the cholesterol ratios to acceptable levels). Repetition might translate to continuing a course of medication rather than stopping it and being regular in habits that are preventative in nature (*e.g.*, practicing safe sex, eliminating irregular social smoking or drug use, going to the gym etc.). Endorsement emphasizes word-of-mouth that suggests to others to take preventative action, or seek diagnosis and treatment.

Next, we discuss how different forms of risk could affect the consumer decision-making in different situations and how interventions can be designed to strategically influence the risk behavior link in specific situations. This conceptual model is presented as Table 2 and includes some examples of how understanding the link between antecedents of risk perception can affect the manner in which we can improve the link between specific forms of risk and behavior.

Performance risk is the likelihood that the treatment will not perform as per prior consumer expectations, or that another alternative treatment may perform better than the chosen one. This construct has been explicitly referred to as "control" in prior work in the health field. Ajzen and Fishbein (1980) argued that beliefs about the how effective a behavior is in achieving a desired outcome may predict intentions and actual behavior. In a health domain, Block and Keller (1995) found that consumers uncertain about efficacy of taking preventive action against skin cancer, processed persuasive messages in greater depth, and were more likely to engage in preventive behaviors as compared to others. As many diagnostic procedures carry a performance risk (e.g., indicating a "false positive" for a test; Luce and Kahn 1999), and the efficacy and side-effects of treatments are also relatively ambiguous, the manner in which each of these are communicated to consumers could play a role in getting consumers to appropriately recognize their risk levels and take action (Block and Keller 1995; 1997). Table 2 summarizes various actions that will help consumers make different types of decisions about a corrective course of action by reducing their perception of performance risk.

Financial risk is the perceived likelihood associated with not getting the expected return (financial, utilitarian or hedonic) on a financial outlay (e.g., the price of the treatment). Typically, the higher the initial cost of a

treatment, the greater the financial risk and the lower the likelihood of trying, adopting or repeating the treatment. The high cost of medications and the high percentage of the under-insured or uninsured in the US and other countries make it pertinent for consumer researchers to examine the extent to which financial risk considerations in seeking diagnosis and treatment are a factor that inhibit consumer from wishing to recognize their actual level of risk. In other words, if a person knows that s/he cannot afford the treatment for AIDS, then s/he may prefer to not be diagnosed and may strategically underestimate her/ his risk of contracting AIDS to maintain positive mental health as argued by Taylor and Brown (1988).

Physiological risk is the set of beliefs that undertaking a product or service may cause harm (e.g., when introduced many consumer believed that microwaves could lead to cancer and were hesitant about buying them). Given that health risk almost always has a physiological aspect, and its testing can frequently be invasive (e.g., blood tests, x-rays, mammograms etc.), as can its treatment (e.g., side effects of medications) understanding the factors that inhibit people from being tested, starting treatment, and continuing treatment is key to understanding the psychology of health risk. Highlighting actual risks, and debunking common myths, as well as highlighting benefits will allow consumers to make informed health related choices.

Psycho-social risk is the belief that using a product or service will cause a reduction in the psychological well being or the social status of the consumer. Psychological risk can lead consumers to shut-down, deny risk, or delay taking preventive action. For example, consumers might find treatments that involve trading off between two important attributes (e.g., trade-off involving safety, Luce 1998) emotionally difficult and this might discourage them from taking preventive action. Risk perceptions involving self-positivity highlight the importance of mental well-being and usually have a psycho-social component. The most common psycho-social risk that has been studied is that of coping and social support mechanisms (e.g., Dunkell-Schetter et al. 1992, Taylor et al. 1986, Wood, Taylor, and Lichtman 1985). Psycho-social risk exists in many health domains, albeit it comes in a full range of flavors. Our discussion on social desirability bias also highlights the importance of social risk posed by health risk considerations. For example, many people believe that depression is a weakness of the mind rather than an illness, and this inhibits them from seeking diagnosis and treatment (Jamison 1999). Others are embarrassed about purchasing condoms and carrying them as it may signal promiscuity rather than being careful (Dahl et al., forthcoming). Yet others are socially embarrassed about refusing alcohol, drugs or cigarettes in a social setting. Reframing these behaviors as safe rather than wimpy, intelligent rather than unfashionable, may effectively reduce psycho-social risks in the health domain.

A systematic bias in perceptions of absolute or relative levels of any of these forms of risk can lead to non-optimal purchases, decisions, and behaviors. In this chapter, we focus on one type of risk perception: *health risks*. Health-risk perceptions embody physiological, performance, psycho-social, and financial risk in a single construct (see Table 2). Thus, not only are they interesting to examine from the point of view of public policy and social welfare, they also provide a theoretically interesting construct incorporating the many facets of consumers' risk perceptions.

Most of the extant work in marketing has examined how risk perceptions are formed, and how these can assist in getting consumers to try preventive courses of action. The links to the other later behaviors in the various stages of consumer decision-making chain are a rich future source of enquiry. For example: What strategies are effective to get people to stay on a course of action? What are the primary reasons for their dropping out – is it fear of failure or fear of success? What is needed to get consumers to encourage others? How does a health movement get momentum? How can health messages be best framed to make goals achievable?

CONCLUSIONS

The objective of this chapter was to review the extant literature on health risk perceptions, with the aim of: (a) deriving a conceptual framework that addresses how the different antecedents and consequences of risk perceptions identified in the literature tie together, and (b) examining the importance for more research in this area . In Table 1, we summarize some of the key findings and implications of these findings for both academicians and social marketers, and list a few areas for future research.

While we made an effort to include most of the current research in health risk perceptions that is pertinent to consumer psychologists, we do not claim that this is chapter is comprehensive by any means. We hope that our conceptualization will foster more directed research in the area of health perceptions as this domain is quickly becoming a mainstream one which speaks to both social and commercial marketers and those who examine questions from the consumer welfare as well as the public policy point of view. One of our goals was to demonstrate that health risk perceptions and decisions have a lot in common with other mainstream consumer decisions that are well studied but are arguably of less consequence for a consumer, and conceptualizing them as such will assist not only a systematic investigation into health perception, but will also draw bridges between what have heretofore been distinct streams of academic research.

ENDNOTES

[1] http://www.m-w.com/cgi-bin/dictionary?book=Dictionaryandva=risk

[2] National Health Council Statement, *Direct-To-Consumer Prescription Drug Advertising,* January 2002, http://www.nationalhealthcouncil.org/advocacy/dtc.htm

[3] www.nimh.nih.gov

[4] P(Yes) = [P(Answering 1st question) x P(Answer to 1st question is yes)] + [P(Answering 2nd question) x P(Drug Use)]
➔ P(Yes) = [(0.5 x 0.5)] + [.5 x P(Drug Use)] ➔ P (Drug Use) = [P("Yes" responses) – 0.25) / 0.5]

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FIGURE 1: CONCEPTUAL MODEL OF THE ANTECEDENTS AND CONSEQUENCES OF RISK PERCEPTIONS

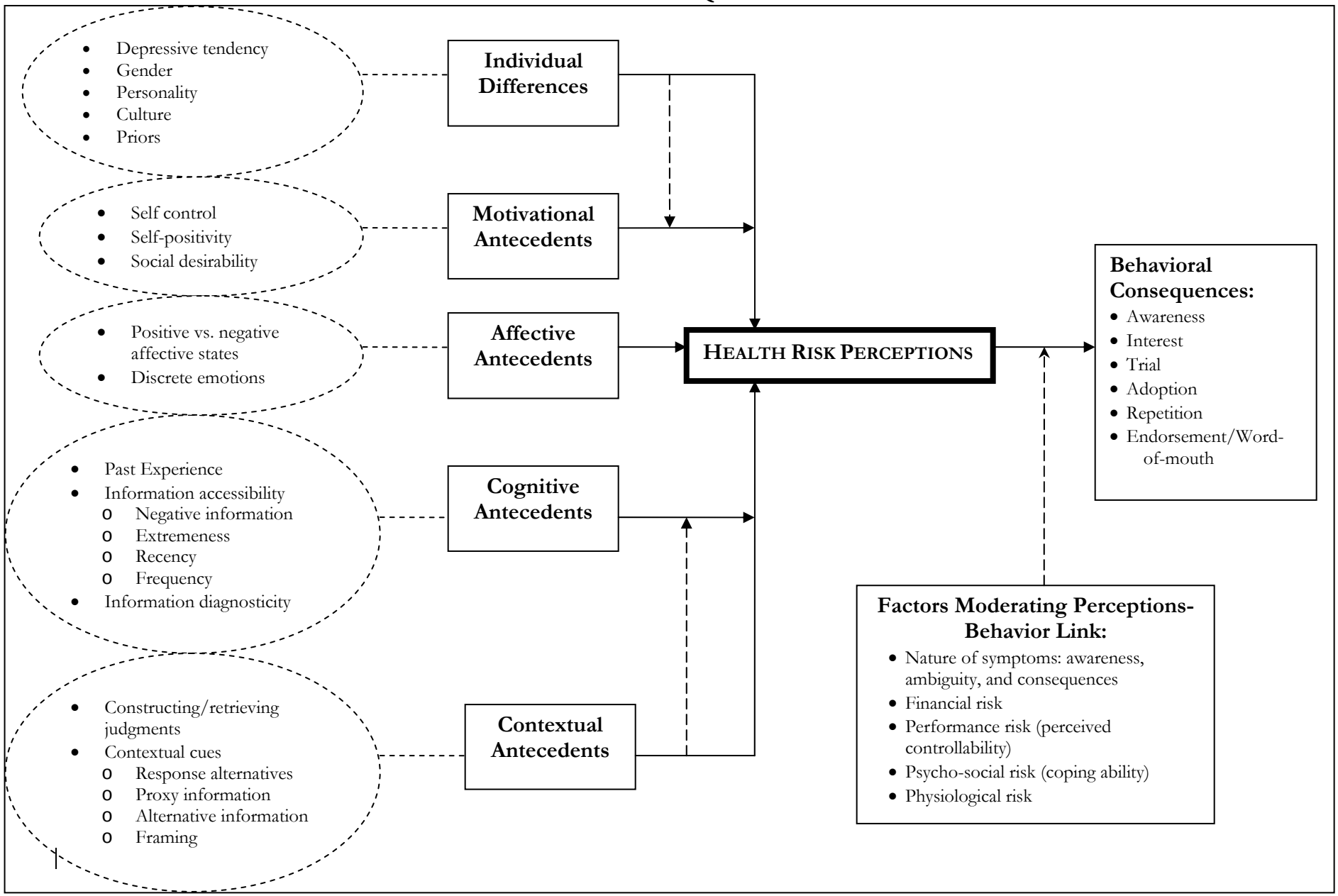

TABLE 1: HEALTH RISK PERCEPTIONS – ANTECEDENTS OF RISK

ANTECEDENTS OF RISK	Key Findings	Implications	Some Prescriptions for Theory	Selected Prescriptions for Practice	Some Open Questions for Future Research
Motivational	Short-term rather than long-term goals often lead to under-estimation of risk.	Encourage consumers to focus on long-term goals like self-efficacy and improvement rather than immediate goals like mood and self enhancement.	Consider the goals that might get activated while considering risk.	- Make consumers feel good and focus on benefits when health messages may trigger mood or image management	What factors influence what type of goals are activated? Are there short term goals that encourage risk acceptance?
	Self-Positivity Bias: People estimate they are less at risk than others, especially known and similar others	Absolute measures of risk may be over or under stated compared to actual rates, but relative measures best show whether a person believes they are less likely to get a disease than a target reference group	- Elicit relative measures of risk: self, average person - Counterbalance the order of elicitation - Increase the accessibility of own causal behaviors to encourage accuracy in risk estimation	- Goal should be to bring self-perceptions in line with perceptions of the risk of others, rather than increase or decrease absolute levels of perceived risk. - Highlight that issues that people feel could only happen to others could also happen to them.	Which estimates are more tensile: self or others? Which would be easier to change? And what would be the effect of a change in either on behavioral intentions and actions?
	Social Desirability Bias: People under- (over-) report the extent they engage in a risky (preventative) behavior.	Self-reports need to be adjusted.	Identify occurrence of a problem or symptom through different methods	Improve accuracy through use of counter-biasing, indirect questioning, camouflaging and the randomized response technique	Examine if improving accuracy would follow through to behavior.

ANTECEDENTS OF RISK	Key Findings	Implications	Some Prescriptions for Theory	Selected Prescriptions for Practice	Some Open Questions for Future Research
Cognitive	Greater accessibility of Negative Information Extreme information Recent information Frequent behavior	Negative, extreme, recent, and frequent behaviors are likely to be given more weight in aggregate risk judgments, even though they may be no more diagnostic of risk.	Risk perceptions are tensile and can be changed depending on prior questions.	Ask consumers to recall few vs. more symptoms; provide common symptoms on list (rather than unusual or extreme ones); Increase awareness of symptoms	Are the four constructs distinct, or do they have interactive effects? Are constructs perceived to be correlated? Can their effects be disentangled?
	A behavior will be incorporated into risk estimated to the extent to which a behavior is perceived to be diagnostic	Increasing perceptions of diagnosticity increase the likelihood that if a symptom is identified it will enter through to risk judgments		Increase communication about the diagnosticity of various symptoms and behaviors for a disease.	Can providing information about diagnosticity lead to long term belief change? What is the best way to frame such information for it to have maximum impact?
Affective	Positive vs. Negative Affect	The level of fear follows an inverted-U shaped curve, with low and high levels of fear backfiring. Consumers in a negative affective state are more likely to update risk estimates	Control and measure affective states.	All communication should include elements of hope to counteract fear and anxiety.	Identify roles of fear, hope, regret and others in the decision calculus that consumer used to trade off a current affective state over a future affective/ physiological state.
	Discrete emotions	Emotions such as hope are savored, while those such as anxiety are not.	Emotions of the same valence do not lead to the same effects.		Examine the interplay between affective and cognitive and physical and mental health.

ANTECEDENTS OF RISK	Key Findings	Implications	Some Prescriptions for Theory	Selected Prescriptions for Practice	Some Open Questions for Future Research
Contextual	Alternative information	Consumers construct rather than retrieve judgments using contextual cues making their risk judgments tensile and easily changed. While survey methodologists can use this information to improve response accuracy, social marketers can use this information to increase estimates of risk so as to encourage behavior change.	Test order effects and counter-balance.	Increase the salience of alternate information that consumers could use to make risk judgments (such as the accessibility of their own behavior)	Does measuring risk increase likelihood of performing a desirable behavior?
	Response alternatives		Measure subjective symptoms using subjective response scales.	Define ambiguous behaviors and symptoms carefully.	Can changing response alternatives formats increase perceptions of risk?
	Proxy information		Proxy Information is typically based on self-estimates.	It may be easier to frame communication in terms of a "close other" to reduce defensive tendencies	Are proxy reports subject to the same biases as self reports?
	Framing		Consider the frame surrounding estimates.	Frame base-rates, actual risks in ways that make them real and personal.	What kind of frames affects base-rate estimates?
Individual Differences	Demographic variables (*e.g.*, gender, culture)	Men have a greater sense of controllability and are more prone to self-positivity; Collectivistic cultures are less prone to self-positivity in some domains	Measure individual difference variables.	Separate out analyses by individual difference variables and identify different methods to increase compliance towards a desirable behavior for different segments.	Identifying other individual difference variables that moderate the extent of self-positivity and those that moderate the risk perception-behavior link.
	Personality (*e.g.*, depressive tendency)	Depressives are less prone to self-positivity; optimists are less likely to update risk estimates.			

ANTECEDENTS OF RISK	Key Findings	Implications	Some Prescriptions for Theory	Selected Prescriptions for Practice	Some Open Questions for Future Research
Factors affecting the risk perception-behavior link	Perceptions of controllability of disease	More controllable events are more prone to self-positivity and have a higher likelihood of risk judgments translating into behavior.			Identifying other moderators and mediating mechanisms, as well as identifying ways of mitigating or exacerbating these. These could include contextual cues, advertising, framing effects and other methods.
	Awareness of symptoms	Increasing awareness of symptoms, increases risk perceptions			
	Ambiguity of symptoms	The more ambiguous the symptom, the less likely it will be incorporated into judgments, and the more likely it will be prone to context effects			
	Extremity of consequence of symptoms	Consumers may use the presence of an extreme symptom on an inventory to categorize themselves as "not at risk"			
	Risk: Financial, social, performance, psychological and physiological	The higher the risk, the lower the likelihood of risk judgments translating into behavior.			

TABLE 2: TYPES OF CONSUMER DECISIONS AND STRATEGIES TO ENHANCE HEALTH

TYPES OF CONSUMER HEALTH DECISIONS/BEHAVIORS		Awareness	Interest/ Desire	Trial	Adoption	Repeat Behavior	Endorsement/Word-of-Mouth
Characteristics of different types of decisions	*Examples in the Health-Cycle domain*	*Identification of symptoms or behaviors that are related to the disease (and diagnostic means of identifying them).*	*Using presence of symptoms to make diagnostic judgment regarding risk level, whether to seek diagnosis, engage in prevention*	*Decision to go to a doctor/undergo a test to seek diagnosis or to try out new regimens for healthy living.*	*Starting preventative action/starting a course of medication*	*Continuing prevention strategies and/or medication*	*Increasing awareness, identifying those at risk, persuading others to engage in desirable behaviors (prevention, diagnosis, medication etc.).*
Performance Risk	The risk that a test, medication, or behavior will not be as effective as expected, be difficult to use, and have false-positives or missed diagnoses.	Increase the awareness of the link between a symptom/ behavior and a disease/ consequence (*E.g.*, "*Supersize Me"* highlights the link between fast food and obesity).	Increase the perceptions of the controllability with appropriate courses of action (*E.g.*, "The risk of pregnancy with the use of a condom is less than 1%.")	Specify the hit-rate of a diagnostic course of action (*E.g.*, "Depression is curable in 80% of the cases with medication and therapy.")	Highlighting the risks associated with taking versus not taking a particular course of action (*E.g.*, the ease of use and effectiveness of blood sugar monitors for diabetics to regulate intake).	Reminder advertising and communication from health practitioners (*E.g.*, the use of "You are Due" postcards from the dentists for regular dental check ups).	Using existing consumers who suffer from a problem and are committed to a course of action as a missionary force to convince others who are different stages of recognizing their symptoms/ identifying their risk level/ and choosing to take action using methods like: • Testimonials to reduce performance risk • Proxy Reports ("Do you or someone you know suffer from …") • Support groups such as Alcoholics Anonymous and WeightWatchers.
Financial Risk	The cost of tests/ medication	Increase insurance coverage and encourage low-cost options. Identify different price framing methods to equate the costs of treatment with other consumer expenses allowing for a cost/ benefit analysis.					
Physiological Risk	Fear of side-effects.	Identify beliefs that are spurious versus accurate and estimate and communicate the risk of side-effects (*E.g.*, identify whether the nicotine patch is not used because it is perceived to cause skin irritation, and then document the incidence of this problem.)		Allow the product to be scalable (*E.g.*, Use of samples to allow trial and measure side-effects.)	Highlight ways to reduce the risk of side effects (*E.g.*, liver checks ups for those taking cholesterol medications.)	Encourage repurchase through use of reminders, price promotions and other marketing methods.	
Psycho-Social Risk	Fear of stigma, embarrassment associated with a problem or using a corrective course of action.	Reduce the fuzzy boundaries between socially acceptable behaviors and problems (*E.g.*, define irregular "social smoking" as unhealthy).	Reframing (*E.g.*, "Depression is not a weakness, it is an illness.") and highlighting risks (*E.g.*, different impact levels at 35mph vs. 42 mph).	Legislate and highlights costs associated with not following a course of action (*E.g.*, penalties for not wearing a bicycle helmet).	Reminder advertising highlighting costs associated with a single error (*E.g.*, penalties for drunk driving for a one-time offender).	Testimonials through celebrities and others.	