

**Who's Afraid of a Poor Old-Age?
Risk Perception in Risk Management Decisions**

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The initial decision to save anything at all, the consideration of plan providers and investment vehicles, the periodic examination and readjustment of one's investment portfolio, all constitute a risk management process with important individual and societal consequences. There is little question that the financial and social implications of low saving rates and of inappropriate investment strategies are significant and far-reaching. And yet the risk of being financially ill-prepared for one's sunset years keeps few of us awake at night, and it engenders little legislative enthusiasm among our politicians. This chapter argues that it is the lack of any visceral perception of risk or danger that is responsible for the inadequate allocation of personal and collective resources to deal with this issue. By inadequate allocation of resources, I refer to both financial resources and, perhaps even more importantly, attentional resources.

Behavioral decision research is well-positioned to predict the neglect we observe. In what follows, I review theory and empirical evidence to document two claims:

- Affect is the wellspring of action: When we encounter or anticipate consequences that engender positive affect, we act in ways that will maintain those consequences. Negative affect, on the other hand, serves as a trigger to take action that will avoid aversive consequences in the future. Fear, for example, motivates us to remove ourselves from the fear-provoking situation or to change the environment in ways that reduce the fear. Visceral reactions such as a fear or anxiety serve as an early warning system that some risk management action is in order.

- Perceived risk, and in particular, people's visceral reactions to risky situations, often has little correspondence to other measures of risk that consider either the information-theoretical uncertainty of outcomes or the magnitude and dispersion of material consequences. Instead, visceral judgments of risk (which fuel self-protective action) are determined by a small number of situational characteristics that elicit affective reactions as part of our evolutionary heritage.

In what follows, I show that the risk of providing inadequately for one's retirement years and the risk of being vested in underperforming assets are ill-suited on every dimension to elicit subjective *feelings* of risk. As a result, it is not surprising that people fail to allocate the attentional resources to retirement planning and retirement saving maintenance that they deserve, based on their financial importance to our lives. I conclude by considering the implications of psychological models of decision-making for the design of procedures or institutions that improve on the current state of affairs.

Behavioral Decision Research and Theory

Associative/Affective vs. Analytic Processing. People process information in two fundamentally different ways, mediated by different neural substrates when they make judgments or arrive at decisions (Chaiken and Trope, 1999; Epstein 1994; Sloman, 1996; Slovic, Finucane, Peters, and MacGregor, 2002). The first system, which is evolutionarily older and thus shared with lower animals, works by way of similarity and associations. It requires real world knowledge (i.e., experienced decision makers make better decisions than novices), but its basic mechanisms seem to be hard-wired. Experience-based thinking is intuitive, automatic, and fast. It relies on images and associations, linked by experience to emotions and affect (feelings that something is good or bad). This system transforms uncertain and threatening aspects of the environment into affective responses (e.g., fear, dread, anxiety) and thus represents *risk* as a

feeling (Loewenstein et al., 2001), which tells us whether it is safe to walk down a dark street or drink a strange-smelling liquid. The second processing system works by analytic algorithms and rules, including those specified by normative models of judgment and decision making (e.g., the probability calculus, Bayesian updating, formal logic, and utility maximization). It is slower and requires awareness and conscious control.

These two processing systems typically operate in parallel and interact with each other. Neuroscientists have demonstrated that logical argument and analytic reasoning cannot be effective unless it is guided by emotion and affect (Damasio, 1994). We become aware of the simultaneous presence and operation of the two systems mainly in those situations where they produce different outputs. Thus, the question of whether a whale is a fish produces an affirmative answer from the similarity-based processing system (“a whale sure looks like a big fish”), but a negative response from the analytic, rule-based system (“it can’t be a fish because it is warm blooded”).

Affect and Risk Perception. Much evidence from cognitive, social, and clinical psychology demonstrates that risk perceptions are influenced by association- and affect-driven processes as much or more than by analytic processes (Loewenstein et al., 2001). In cases where the outputs from the two processing systems disagree, the affective, association-based system usually prevails. Even in seemingly “objective” contexts, such as financial investment decisions, subjective and largely affective factors have been shown to influence perceptions of risk. For example, Holtgrave and Weber (1993), showed that both affective variables (e.g., dread) and cognitive-consequentialist variables (e.g., outcomes and probabilities) are necessary to predict people’s perception of risk in the financial and health/safety domain.

Differences in risk perception lie at the heart of many interpersonal and societal disputes about the best course of action. They appear to be the result of differences in affective reactions to risky situations as the result of prior experiences or general orienting disposition or worldview (Dake, 1991). Familiarity with a risk (e.g., acquired by daily exposure) lowers perceptions of its riskiness, with the result that technical experts perceive the risk of such technologies as nuclear power generation to be much lower than members of the general public (Fischhoff et al., 1978). Hertwig et al. (2003) describe the affective processing and updating mechanisms by which personal experience with rare events (e.g., negative consequences that have a low probability of occurrence) leads to a greater risk taking (and lower risk perception) than the statistic description of the same events. Numerous studies show differences in risk perception between men and women, with women judging health, safety, and recreational risks (Slovic, 1987; Finucane et al., 2000; Flynn et al., 1994) and also financial and ethical risks (Weber et al., forthcoming) to be larger and more problematic than men. This gender difference in perceived riskiness reverses only in the social domain, in which women have greater familiarity with risks and risk taking (Weber et al., forthcoming). This tendency of women to worry more about financial risks is consistent with the result observed by Iyengar et al. (this volume) to enroll in voluntary pension plans in greater numbers and make larger contributions. Weber and Hsee (1998, 1999) find differences in the perception of financial risks between American and Chinese investors—with Chinese investors perceiving the risks of investment options to be lower and showing greater willingness to invest in risky options—and then explain these differences in risk ratings and expressions of worry by cultural differences in social collectivism. Chinese investors tend to have larger social networks (family members and associates) to which they can turn for material

support than American investors; these networks provide implicit insurance against catastrophic risks, and thus lower both the objective and experienced level of risk.

These studies and many others show that differences in risk perception but not (so much) differences in risk attitude are responsible for group or individual differences in risk-taking behavior, i.e., differences in preference for risky decision alternatives (Weber and Milliman, 1997). Risk taking and risk attitude have been conceptualized in several ways (Weber 1999, 2001a). The most promising and consistent approach seems to be provided by models that allow for the fact that individuals or groups may differ in their subjective *perception of risk* and in their *risk attitude*, (i.e., reaction to risk), which some people find exciting and pleasurable (and thus seek out) and most people evaluate negatively (and thus avoid). While there are individual differences in risk attitude (i.e., positive or negative reaction towards risk, as it is perceived), probably mediated by biological differences in optimal arousal levels, differences in risk perception (mediated by culturally determined differences in worry and concern about possible adverse consequences) are a far better predictor of risk taking.

Measuring Risk Perception. At least three different paradigms have studied subjective risk perception, with the goal of explaining individual and group differences in perceived risk (Weber, 2001b). Studies within the first measurement paradigm, known as axiomatic studies, have focused on the way in which people subjectively transform objective risk information (i.e., possible consequences of risky choice options such as mortality rates or financial returns and their likelihood of occurrence) in ways that reflect the impact that these events have on their lives (c.f., Weber, 2001b; Palmer, 1996). The conjoint-expected risk model, for example, allows for the possibility that upside variability in financial returns has a different and usually smaller effect on perceived riskiness than downside variability (Luce and Weber, 1986). Studies within

the second paradigm, called the socio-cultural group, have examined the effect of group- and culture-level variables on risk perception (e.g., Douglas and Wildavsky, 1982). Research within the third or psychometric paradigm is of greatest interest to our discussion, since it explicitly addresses people's emotional reactions to risky situations. It shows that these psychological/affective risk dimensions strongly influence judgments of the riskiness of physical, environmental, and material risks in ways that go beyond their objective consequences (Fischhoff et al., 1978; Slovic et al., 1984).

Dread and Predictability as Determinants of Perceived Risk. The psychometric paradigm uses psychophysical scaling and multivariate analysis techniques to identify the characteristics of hazards that affect people's quantitative judgments about their perceived riskiness. Figure 1 shows a two-dimensional factor space that has been replicated across numerous studies covering both lay people and technical experts judging large and diverse sets of hazards in multiple countries (Slovic, 1987). Factor 1, labeled "dread risk," captures aspects of the described hazards that speed up our heart rate and make us anxious as we contemplate them: perceived lack of control over exposure to the risk, with consequences that are catastrophic, and may have global ramifications or affect future generations. At its high (right hand) end, we find such hazards as nuclear weapons fallout, nuclear reactor accidents, or nerve gas accidents or attacks. Factor 2, labeled "unknown risk," refers to the degree to which exposure to a hazard and its consequences are predictable and observable: how much is known about the hazard and is exposure easily detected? At the high (top) end, we find chemical hazards and radiation, which might kill exposed parties without their awareness, and DNA technology which has unforeseeable consequences not yet tested by time.

Figure 1 here

Perceived Risk of Inadequate Pension Saving. It is an interesting and instructive exercise to place the hazard of not having adequate financial means in one's old age into the two-dimensional space of Figure 1. Most people would probably characterize it as a risk that is controllable, non-fatal, observable and predictable, which would place it into the "harmless—harmless" lower-left quadrant, comparable to such hazards as riding a bicycle or owning and operating a home swimming pool.

Yet in addition to its psychological risk-dimension profile, other factors also contribute to the fact that the prospect of financial destitution in old age carries low emotional intensity and perceived threat. Trope and Liberman (2003) argue convincingly that people construe future events differently, depending on their temporal distance to them. In particular, events in the distant future (an invitation to give a conference paper two years from now, or retirement 20 or 30 years from now) tends to be construed in terms of abstract features, whereas events close to us in time (the upcoming trip on Monday to attend the long-scheduled conference, or the possibility to escape winter chills for a week with an advertised last-minute travel special to Bermuda) are construed in very concrete terms. A number of interesting behavioral phenomena derive from this construal difference. One difference between the abstract vs. concrete representation of the consequences of possible actions important for our discussion lies in their discrepancy in affective strength, or visceral salience and impact. Abstract representations of consequences in the distant future (e.g., "living on 60% of your current income") lack concrete associations connected to emotional reactions, essentially by definition. In contrast, concrete representations of choice alternatives in the present or in the near future (e.g., "buying the 5-bedroom, 4 bath, ocean-front bungalow you saw last week, that will provide space and recreation for your growing family") tend to be saturated with affective associations.