Integrating competing conceptions of risk: A call for future direction of research

Adital Ben-Ari and Keren Or-Chen
School of Social Work
University of Haifa
Haifa Israel 31905

Corresponding author: Prof. Adital Ben-Ari, Ph.D. School of Social Work, Faculty of Welfare and Health Sciences, University of Haifa, Haifa Israel, 31905, adital@research.haifa.ac.il

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Abstract

The goal of this paper is to propose a theoretical framework that integrates between what has been traditionally presented in the risk literature as two opposing perspectives: the probabilistic and the contextualist. Acknowledging the differences between the two, we argue that a reconciliation of both could deepen and expand our understanding of risk, enlarge the scope and utilization of research methodologies, and bridge between lay people's and experts' notions of risk. This line of thinking reflects a dialectical approach in suggesting integration ("synthesis"), while acknowledging the existence of differences and oppositions ("antitheses"). Bruner's conceptualization (1986) of two irreducible and at the same time possibly integrated modes of thought can serve as a promising line of research in studying risk. We claim that the two perspectives, the probabilistic and the contextualist, represent two different approaches to understanding and studying risk and that any attempt to reduce or ignore one at the expense of the other would result in a limited understanding of the phenomenon.

Key words: risk, probabilistic, contextualist, competing conceptions, integration

The goal of this paper is to propose a theoretical framework that integrates between what has been traditionally presented in the risk literature as two opposing perspectives: the probabilistic and the contextualist. Acknowledging the differences between the two, we argue that a reconciliation of both could deepen and expand our understanding of risk, enlarge the scope and utilization of research methodologies, and bridge between lay people's and experts' notions of risk.

Our paper follows the line of reasoning suggested by Jerome Bruner (1986), who presented a conceptual integration between what traditionally has been thought to be two opposite paradigms, the logico-scientific (paradigmatic) and the narrative. Acknowledging the differences between the two, Bruner argued: "There are two modes of cognitive functioning, two modes of thought, each providing distinctive ways of ordering experience, of constructing reality. *The two (though complementary) are irreducible to one another. Efforts to reduce one mode to the other or to ignore one at the expense of the other inevitably fail to capture the rich diversity of thought."* (p. 11) [Italic added].

In his thought provoking volume, Bruner goes on to characterize these two modes of thought, implying that each mode has its own operating principles, criteria of well-formedness, ways of functioning, and procedures for verification. The former verifies by appealing to procedures for establishing formal and empirical proof, while the other establishes verisimilitude. These two paradigms also differ in the ways in which they approach causality: The former attempts to present universal truth conditions, whereas the latter suggests a possible and particular connection between two successive events, as exemplified by the different function of the term *then* in the logical proposition "if x then y" and in the narrative statement "The king died and then the queen died."

Within this framework, the underlying assumption is that although two paradigms are conceived as different or opposites, it does not necessarily mean that one precludes the other; rather, there are ways in which both can be integrated. This line of thinking reflects a dialectical approach in suggesting integration ("synthesis"), while acknowledging the existence of differences and oppositions ("antitheses"). Starting with a consideration of definitional and epistemological issues pertaining to the concept of risk, the paper then presents three major theoretical perspectives which contributed to viewing these conceptions as competing, followed by a summarized presentation of each. The paper ends with the rationale for the conceptual integration of the probabilistic and the contextualist conceptions of risk.

Any attempt to study risk has to confront the question of "What is risk?" (Slovic, 1999). Risk has been defined in a number of ways. A dictionary definition maintains that risk is "the chance of injury, damage or loss" (Webster, 1983). One may distinguish between the meaning of the concept in technical and non-technical contexts. In technical contexts, the concept of "risk" has several specific meanings which are widely used across disciplines, ranging from "the cause of, the probability of, or an unwanted event which may or may not occur" to a decision that has been made under the condition of known probabilities. Rosa (2003, p. 56) added to this notion the element of uncertainty by defining risk as "a situation or an event where something of human value (including humans themselves) is at stake and where the outcome is uncertain."

Thus, the prevailing notions are that the essence of risk consists of the probability of an adverse event and the magnitude of its consequences (Graham & Rhomberg, 1996) and that all conceptions of risk share a distinction between reality and possibility. Such definitions represent the basic concept that equates risk with the

probabilities and consequences of adverse events resulting from physical and natural processes which can be objectively quantified.

In more informal and non-technical contexts, the word risk is commonly understood as the possibility of an event occurring that will have an impact on the achievement of objectives. It refers to situations in which it is possible, but not certain, that some undesirable event will occur. In real life situations, even if we act upon a determinate probability estimate, we are not fully certain that this estimate is exactly correct; hence, there remains uncertainty. These two types of definitions reflect an inherent distinction between "objective" and "subjective" meanings of the construct of probability, implying that the term probability may refer to objective chances or subjective possibilities.

It should be noted, however, that when there is a risk, there must be something which is unknown or has an unknown outcome. Therefore, from an epistemological stance, knowledge about risk involves knowledge about lack of knowledge. This observation reflects the complexity embedded in the scholarly debates about risk, as exemplified in the discussion about the relation between probability and certainty. The very notion of probability implies some degree of uncertainty, since only very rarely are probabilities known with certainty.

Recent developments in risk research point to the discrepancy between experts' and lay people's notions of risk. It has been argued that experts' perceptions of risk do not reflect the dimensions of risk which appear to be significant for the public. Scholars in the social sciences have gradually come to realize that equating risk with probability of harm is misleading inasmuch as this approach fits engineering-type considerations and practice, but is quite inappropriate at a broader, more intractable level of societal risk management (Rayner & Cantor, 1987). Rejection of the

probabilistic conception is based on the argument that it ignores the subjective nature of risk, which is an inherent attribute of the phenomenon. Furthermore, the public conception of risk goes beyond probability and consequences and includes qualitative and complex considerations, such as uncertainty, catastrophic potential, controllability, equity, and danger to future generations. This discrepancy may partly explain why risk statistics often do very little in changing people's attitudes and perceptions (Slovic, 1999).

Risk appears to mean different things to different people (Brun, 1994), and actions and understandings about risks are learned by socially and culturally structured conceptions and evaluations of the world, what it looks like, and what it should or should not be (Boholm, 1998). Common knowledge suggests that people evaluate risk in different ways and take different approaches to mitigating risk issues. These differences may be based on different information, different interests, or different perceptions about reality and how we come to perceive it.

Indeed, there are multiple conceptions of risk (Slovic, 1987; Rayner, 1988), some of which are competing (Morgan, 1981; Douglas & Wildavsky, 1982; Shrader-Frechette, 1991). That there are competing conceptions of risk means first that when experts analyze or study risk, they are appealing to a general concept that unifies all uses of the word according to the broadest patterns of language. It also means that the concept of risk can be interpreted in at least two distinct ways and that such interpretations form the basis for philosophically incompatible statements about risk. Disputes about competing conceptions of risk take the form of principled and reasoned disputes, as opposed to simple misunderstandings (Thompson & Dean, 1996). Competing conceptions not only differ in their definitions of risk but also reflect philosophical differences that are longstanding and systematically linked.

Historical overview of competing conceptions of risk

Traditionally, two main characteristics of the body of knowledge on risk could be identified in the literature. First, the literature proposed or presupposed a general conception of risk, whereby a definition and qualifications of the favored conception were provided. Second, each of the risk conceptions failed to acknowledge the existence of the alternative ones. The combination of these two characteristics yielded a dichotomous outlook for the study of risk which dominated both theory and research about risk.

Three theoretical frameworks which present dichotomous perceptions of risk are recognized in the literature: the positivist versus the relativist (Shrader-Frechette, 1991); the positivist versus the constructivist (Hornig, 1993); and the probabilistic versus the contextualist (Thompson & Dean, 1996) perspectives of risk. Especially with regard to the positivist scientific model of risk, the three frameworks share common perceptions of risk; however, they differ in their presentation of the competing perception, be it a relativist or contextualist or constructivist stance.

The first framework was suggested by Shrader-Frechette (1991), who contrasted the positivist (Starr, 1969) and relativist (Douglas & Wildavsky, 1982) perceptions of risk. On the one hand, the positivists claim that risk is a purely scientific concept deserving the application of scientific quantitative methods of data collection and analysis. On the other hand, the relativists hold that risk is a purely subjective reaction to phenomena encountered in personal or social experience. Thus, the positivists interpret risk as referring objectively to the circumstances of the physical world, whereas the relativists refer to risk as a purely mental construct expressing emotional, moral or political reactions within the subjective human arena.

Following Shrader-Frechette, (1991), Hornig (1993) presented a similarly

dichotomous framework of risk using the scientific positivist view. However, she defined the competing conception as contextualist or constructivist, maintaining that the social context in which issues or decisions arise determines the dimensions of risk that are most important. Moreover, she accepted that experts' assessments of risk are quite likely to be more accurate in measuring dimensions of risk which are considered important by the scientific community, but at the same time, they may ignore the importance and relevance of other dimensions in a given context. In so doing, she highlighted the rift between experts' and lay people's understanding of risk.

In 1996, Thompson and Dean contrasted the probabilistic perspective of risk with the contextualist perspective. It should be noted, however, that probabilistic and contextualist conceptions of risk are both extreme views at either end of a schema for charting conceptions of risk. In early stages of risk research, risk was largely equated with likelihood, which gave rise to the probabilistic conception of risk. Studies within this framework focused mainly on estimates of probabilities, rational and irrational behavior, certainty and uncertainty. The opposite extreme is defined by the contextualist conception, connoting that no single attribute is essential to characterizing every instance of risk. That is, there is not one necessary condition which defines the existence of risk, implying that some instances of risk involve no elements of probability or chance. Thus, there are cases in which estimation and calculation of probabilities are largely irrelevant to understanding risk.

To illustrate the difference between the two perspectives, scholars have used the example of an earthquake (Jackson, Allum, & Gaskell, 2006). When a probabilist talks about the "risk of an earthquake" occurring, this refers to the probability of the event occurring. By contrast, a contextualist would speak of the risk of an earthquake according to the particular danger relevant from a given subjective perspective. As

such, the risk would be perceived differently by someone who had no choice but to live in a hazardous area versus a geologist who chose to move to the area in order to study it. Deciding between these competing conceptions has significant theoretical and methodological implications. Such a decision sets the theoretical background not only for the definition of risk, but also for the nature of the data and the analytical procedures used in any research dealing with risk. Researchers working within the probabilistic perspective would use quantitative methodologies, while those working within the contextualist perspective would employ mostly qualitative methodologies.

In 1999, Slovic concluded that: "…polarized views, controversy, and overt conflict have become pervasive within risk assessment and risk management. This dissatisfaction can be traced in part to a failure to appreciate the complex and socially determined nature of the concept 'risk'" (p. 690). Before attempting to integrate these two competing conceptions of risk so as to reach a broader understanding of the phenomenon, we must first take a more in-depth look at each one separately.

The probabilistic conception of risk

The probabilistic conception of risk evolved from the assumption equating risk with likelihood. Researchers accepting that risk represents a relationship between probability and future events started to focus their attention on such concepts as probability estimates, rational and irrational behavior, certainty and uncertainty (Thompson & Dean, 1996). This probabilistic conception gained increased scholarly recognition because of its apparent contribution to the analysis of rational risk-taking behavior for purposes of investment, games, economic cost-benefit tradeoffs, and gambling choices. Since this approach is more cost-effective and the results are, at least in principle, easier to communicate to decision-makers and the public, it

continues to be widely accepted as a standard of rationality by scholars and decision-makers alike (Gaskell et al., 2004).

An adequate probabilistic conception of risk would be based on the quantification of probabilities and would entail formulae, estimates, correlations, and predictions to suggest useful guiding tools and procedures for individuals in "risky" situations. As such, risk is defined by a set of criteria that enables the mutual replacement of the concept "risk" by mathematical calculations and statistical estimates (Thompson & Dean, 1996). According to this perspective, the likelihood of the occurrence of an event can be quantified by employing random processes and using different methods of probability and statistics. In so doing, probability and its negative or unwanted consequences are viewed as the most essential and defining characteristics of risk. The probabilistic stance can be summarized by the following three propositions:

Risk is purely a matter of the probability of an event or its consequences (Thompson & Dean, 1996). It is typical for a probabilist to refer to risk in a way that permits direct substitution of the word "probability" without a substantial shift in meaning. In reference again to the example of an earthquake, the term "risk" can be easily replaced by the word "probability," which then functions as a synonym. Thus, the estimation of probabilities is the *sine qua non* of risk, equating risk with the likelihood of the occurrence of a negatively perceived event and its consequences. Knowledge of the probability of events is therefore the basis for any informed claim about risk (Starr & Whipple, 1980).

If it is assumed that probability is the essential or primary dimension of risk, then other dimensions are rendered inessential or accidental (Thompson & Dean, 1996). Nevertheless, there are some characteristics of risk that may seem to be

inessential or accidental, but turn out to be extremely influential in the formation of attitudes toward risk. Even while recognizing their influence, however, accidental dimensions do not serve as criteria for determining whether something is or is not a risk. Understanding risk is contingent upon understanding probabilities.

Risk involves decision making under uncertain conditions (Einhorn & Hogarth, 1981). Probabilistic results are generated on the basis of a continuous awareness that "certainty" is actually a rather rare situation. There is an agreed upon probabilistic estimate for "statistical certainty" (0.95, i.e., a 19 in 20 chance that the result is certain), and anything less likely would be considered uncertain and insignificant. Humans are constantly faced with options of choice, most of which are uncertain. Since life experiences are inevitably shaped by uncertainty, and since the decision-maker does not possess all the information pertaining to all possible outcomes, then almost any decision made under conditions of uncertainty involves risk-taking.

Risk is real, objective, and independent of a subjective perception (Thompson & Dean, 1996). One of the major theoretical implications of the probabilistic conception relates to the "objective" nature of risk and the fact that it is embedded in the real world, subject to objective standardized measures, and unaffected by values or subjective interpretations. Risk in its broadest sense is to be determined by a scientific quantitative analysis of potential harm per segment of the population (Starr & Whipple, 1980). As such, it yields itself to "scientific" methods of inquiry and measurement, reducing risk assessment to purely a matter of fact-finding and assigning probabilities.

Given that the intuitive analysis of risk is not considered as a legitimate form of knowledge, lay people's understanding of the concept of risk is accorded very little credence. Differentiating between the soft judgments that lay people make and the

hard technical systems that experts employ, both implicitly and explicitly, to assess likelihood and consequence ascribes a privileged status to expert judgments and hence to the probabilistic conception of risk. By taking a probabilistic stance, one would argue that quantified forms of estimated probability should serve as the key point in any debate about risk (Starr & Whipple, 1980).

The contextualist conception of risk

The introduction of contextualist modes of thought into the body of research and theory on risk originated from the recognition that the very nature of the phenomenon requires the adoption of a wider framework for the study of risk. This perspective was built on the realization that risk can not be fully understood only in terms of probabilities, rational and irrational behavior, and conditions of certainty and uncertainty. Contextualists are interested in the ways in which individuals and groups make claims about risk and in the ultimate impact that such claims have on how risk is understood at the individual and societal levels. Moreover, scholars have come to realize that lay people understand risk as implying things other than probabilities or decision-making processes under conditions of uncertainty and that the risk experiences of lay people may not be aligned with the scholarly definitions and conceptual categories proposed by theorists. Hence, more research is needed on the lay definitions and naturalistic processes involved in individual and group experiences of risk.

Even the work of Kahneman and Tversky (1974, 1981), which is typically considered to represent a probabilistic line of thought, found great differences between calculated probability and the intuitions that people had about probabilities (Sjöberg, 1979). Emphasizing the subjective reaction to the assessment of risk, as well as the context within which the phenomenon of risk is situated, further led to the

construction of risk as a blend of science and judgment with psychological, social, cultural, and political factors. The contextualist stance can be summarized by the following three propositions:

No single attribute is a necessary condition for the existence of risk. This proposition is in direct opposition to the basic assumption of the probabilistic perspective, which claims that probability is the essential or primary dimension of risk, rendering other dimensions inessential or accidental. According to the contextualist perspective, no single attribute is an essential characteristic of every instance of risk and no universal set of characteristics can be used to define risk. Some researchers have argued that perceptions of risk are dependent upon context and that risk is characterized by alternative combinations of attributes, including intentionality, voluntariness, probability, and equity (Plough & Krimsky, 1987; Slovic, 1999).

Thompson and Dean (1996) suggested the analogy between "risk" and "game." Games have time limits, rules of play, opponents, and criteria for winning or losing, but none of these aspects are essential to the concept of a game nor are they characteristic of all games. Similarly, risks are characterized by some combination of attributes, but no one of these attributes is essential. According to this perspective, any estimation of probability is irrelevant to determining the existence of risk, much less for understanding it or communicating related information to others (Green, 1995).

Risk is socially constructed. Slovic has proposed that "while danger is real, risk is socially constructed" (1999, p. 690). This means that danger and risk are not identical and that risk is not a part of the objective reality, but rather a social construction. Viewing "risk" as a social construction implies that the subjective meanings associated with any particular event are what transform the event into a risk. This process involves the occurrence of events within the context of social

interactions, along with the meanings and interpretations attributed not only by the interacting partners themselves, but by the larger social context as represented by its values, symbols, history, and ideology (Weinstein, 1989).

Risk cannot be fully understood independent of its social and cultural context. Many scholars reject the notion that risk represents the chance of injury, damage, or loss and argue instead that risk does not exist "out there" independent of human minds and cultures (Boholm, 1998; Plough & Krimsky, 1987; Slovic, 1999). Rather, people have invented the concept "risk" to help them cope with the uncertainties and dangers in life.

Plough and Krimsky (1987) distinguished between the symbolic definition of risk and the conventional view. While the former includes cultural and experiential inputs, the latter generally is reductionist, focusing on quantifiable variables. In order to fully understand the symbolic meaning of risk, we have to study its social context to determine which dimensions of risk are most relevant (Plough & Krimsky, 1987). For example, saying that something is risky may not imply any associated hazards, but rather may be a way of indicating that something is unfamiliar. Understanding risk as defined by its social context implies that it can not be reduced to quantitative measurement because probability instruments do not have the same meanings to individuals living in different social contexts (Boholm, 1998).

Thus far, it has been shown that two competing conceptions of risk have traditionally dominated the professional literature. The two conceptions are presented either in diametrical opposition (Hornig 1993; Shrader-Frechette, 1991) or in dichotomous terms representing opposite ends of a continuum, where each represents an extreme and logically incompatible view (Thompson & Dean, 1996). Within this framework, we argue that what may appear as a conceptual dichotomy or diametrical

opposition may in fact be integrated to achieve a more comprehensive understanding of the phenomenon of risk. In other words, the fact that two conceptions are perceived as opposites does not mean that they can not be integrated.

Integrating the competing conceptions of risk follows the quest by Jost and Kruglanski (2002) to integrate social constructionism and experimental social psychology with the aim of creating a well-balanced discipline of social psychology. They maintain that social constructionism, which is closely related to contextualism, and experimental social psychology represent two complementary paradigms for understanding human social behavior, but are oddly and unnecessarily perceived as estranged from each other. In order to justify their claim for integration, they highlight the similarities in the underlying assumptions as well as in the intellectual origin of both paradigms. The guiding assumptions of both perspectives are similar: both hold that people actively and collectively construct representations of their social environments. Because of these commonalities, the social constructionist perspective has benefited from the theory and findings of mainstream social psychology, and at the same time has enriched mainstream social psychology in significant ways.

Jost and Kruglanski's (2002) analysis is largely based on the work of Campbell and Russo (1999) and McGuire (1983), who demonstrated that constructionist and empirical insights can be usefully integrated with social psychology. Empirical studies in various areas of social psychology, such as situated self-concept, social identity, collective representation, communication, shared reality, and cultural psychology, have benefited and progressed from the incorporation of constructionist themes.

We believe that the study of risk could likewise benefit by following this line of thought in order to provide new integrated research avenues. In adopting a dialectical

approach, we argue that the probabilistic and contextualist "antitheses" can be integrated into a synthesis. Such an integration may benefit our theoretical understanding of the phenomenon inasmuch as it invites the utilization of both quantitative and qualitative methodologies to study risk among individuals in different cultural contexts.

Lau and Ranyard (2005) contend that probabilistic thinking can only partly explain cultural differences in risk taking. In this regard, our study meets their call to investigate the competing explanations and conceptual frameworks which underlie cultural differences in the experience of risk. Plough and Krimsky (1987), who have taken a contextualist stance in reaction to the reductionist nature of the probabilistic perspective, also suggest that any effective discussion about risk would benefit from the inclusion of both scientific and cultural lines of thought.

Bruner's conceptualization (1986) of two irreducible and at the same time possibly integrated modes of thought can serve as a promising line of research in studying risk. We claim that the two perspectives, the probabilistic and the contextualist, represent two different approaches to understanding and studying risk and that any attempt to reduce one mode to the other or to ignore one at the expense of the other would result in a limited understanding of the phenomenon. Thus, for example, understanding risk only in terms of probability and decision-making under uncertain conditions would fail to include the subjective meaning and interpretation of individuals. Likewise, any attempt to develop uniform measures of likelihood for estimating risk-taking behavior would inevitably ignore the varied meanings ascribed to risk-taking behavior by individuals of different cultural groups. At the same time, ignoring the role of the positivist/probabilistic perspective in predicting human behavior under uncertain conditions would neglect the significant contribution made

by this conception to understanding certain aspects of risk assessment and risk-taking behavior.

Each one of the competing perspectives implies different methodologies, be it quantitative or qualitative. We hold that with respect to risk, the utilization of both is crucial to integrating the insider's and the outsider's perspectives in order to better understand risk as a complex individual and social phenomenon. We know a great deal about the probabilistic mode of thinking related to risk and the utilization of measures of estimation, statistics and mathematics gaining from game theory and other theoretical formulations (Fishburn & Kuchenberger, 1979; Osborne, 2004; Tversky & Kahneman, 1981; Von Neuman & Morgenstern, 1944). However, we know much less about how risk is socially constructed, how it is experienced, and what meanings are associated with such experience among individuals of different cultural groups. In this respect, we are in agreement with Shrader-Frechette's (1991) claim that risk evaluation is not solely a matter of positivist/scientific investigation, but also a procedure that needs to be negotiated among experts and lay people.

We believe that an attempt to integrate the two competing conceptions of risk may be based on the following argument. Within technical and non-technical discourses, it is clear that the construct of risk is closely related to probability. However, the term probability has both subjective and objective meanings that are at the basis of the two competing conceptions of risk. Our proposed conceptual reconciliation is derived from the recognition that the objective and subjective meanings of a construct can in principle be integrated and that the word probability, which to a great extent captures the essence of the construct of risk, has such subjective and objective meanings. Integrating the competing conceptions of risk is also in accordance with Jost and Kruglanski’s (2002) proposal to integrate two

different paradigms towards the goal of creating a well-balanced discipline.

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