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This paper includes, with substantial revision, material presented at the Second Biennial Meeting of the Risk Analysis and Policy Association, Alexandria, VA, March 26, 1999.

Gender Differences in Risk Perception: Broadening the Contexts*

Jan L. Hitchcock**

Introduction

Gender differences in risk perception have been described in varied studies, with women more often reporting higher levels of risk as a concern than do men.[1] Women's greater sensitivity to and lower tolerance of risk has also been part of general cultural lore.[2] At the same time, it is not unusual to find research on risk perception which, while including both male and female subjects, does not mention that any check has been made specifically for gender differences.[3] Research on the framing of risk decisions is especially apt to not report any test for the effect of gender.[4]

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1 The most extensive body of work on risk perception, including gender differences therein, centers on environmental and safety risks. Debra J. Davidson & William R. Freudenburg, *Gender and Environmental Risk Concerns: A Review and Analysis of Available Data*, 28 Env't. and Beh. 302 (1996) remains the most comprehensive review and synthesis bearing on that literature.

2 *See e.g.* Karen Birchard, *A Debate in Britain: Exam Bias for 'Girls'?*, Chronicle of Higher Educ. 2 Feb. 2001, A44; Marc Pilisuk et al., *Public Perception of Technological Risk*, 24 Soc. Sci. J. 403 (1987); Susanna Styron, *Risk Management*, N. Y. Times Mag. 24 (Apr. 3, 1994).

3 *See e.g.* Pål Ø. U.Dåstøl & Britt-Marie Drottz-Sjöberg, *Varied Definitions of Risk Related to Sensation Seeking Trait*, 11 Risk: Health, Safety & Environment 197 (2000); Claire Marris et al., *Exploring the 'Psychometric Paradigm': Comparisons Between Aggregate and Individual Analyses*, 17 Risk Anal. 303 (1997).

4 For instance, only 8 of the 103 studies of framing effects undertaken since 1981 and as located by James P. Byrnes et al., *Gender Differences in Risk Taking: A Meta-Analysis*, 125 Psychol. Bull. 367, 370 (1999), included analyses of gender differences, and none of these mentioned in the article abstracts. Anton Kühberger, in *The Influence of Framing on Risky*

Fuller understanding of the extent and nature of gender differences in risk perception is needed, both to better characterize these differences and to contribute to theoretical models of risk perception. It may be, for instance, that associations found between gender and risk perception are the result, at least in part, of an underlying factor or factors transcending gender and relevant to processes of risk perception more generally. Given the pervasiveness of gender differences found in the literature on risk perception, more systematic attention to the nature of these findings should clarify understanding of the impact of "gender" and serve also as a useful intermediate step for wider inquiry into factors affecting risk perception.

Great variability exists in how gender differences in risk perception are studied and reported. "Risk perception" has been variously assessed, including through subjects' ratings or rankings of diverse dimensions of potential harms, "concern," "worry," "intent to take action," "confidence in hazard claims," and "dread of hazards." While risk perception is likely entailed in all of these conceptualizations, so too are a range of other affective and evaluative responses. One can commonly observe, for instance, that the same level of risk as initially perceived by two individuals may result in quite different levels of "concern," "worry" or "intent to take action." Yet one frequently finds reviews of risk perception — including the one before you — that consider as a set studies with quite different conceptualizations of the central risk perception variable and that do so without fully reconciling the potential significance of these variations.[5] The variations in

Decisions: A Meta-Analysis, 75 Organizational Beh. and Hum. Decision Process 23, 28 (1998), observed that "participant characteristics (e.g., age, sex) ... are rarely tested systematically in framing experiments."

A comparable focus on characteristics of the stimulus to the relative exclusion of characteristics of the person perceiving it can also be found in the early research on "stressful life change events." Over time, that research area — which could be characterized as the study of the effect of experiencing life events that many would categorize as "risky" (e.g., marriage, divorce, pregnancy, change in residence, beginning or ending a job) — shifted from a focus on the nature of "stressors" to include also demographic and psychological variables such as prior experience with comparable events, and individual resilience or "hardiness." *See* Thomas H. Holmes & Richard H. Rahe, *The Social Readjustment Rating Scale*, 11 J. of Psychosomatic Res. 213 (1967); Suzanne C. Kobasa et al., *Personality and Constitution as Mediators in the Stress-Illness Relationship*, 42 J. of Health and Soc. Beh. 368 (1981); George W. Brown & Tirril O. Harris, Life Events and Illness (1989).

5 The significance of the heterogeneity of concepts considered under the rubric of "risk perception" was brought into sharper focus by an anonymous referee of this article. A similar

conceptualizations and measurement within the field of risk perception add greatly to the interpretive challenge and may not be adequately resolved until a larger number of studies are undertaken using each of the different operationalizations. The variation found within the research on risk perception suggests also that the field could profit still from consideration of the lessons — and questions — generated in other research areas. Hence the present call for broadening of the research contexts considered as relevant to the study of risk perception.

The present review draws on literature from diverse social science fields relevant to the study of gender differences in risk perception. The goal is not a full review of the literature, but rather the presentation of a selection of varied perspectives and findings to provoke further investigation and discussion of gender differences in risk perception. The net has been cast widely to include perspectives familiar in the psychometric literature on environmental risk perception as well as literature on attitudes toward health, fear of nuclear war and crime; risk-taking and sensation-seeking; financial decision-making; and children and the development of their risk perception and behavior.

The utility of broadening the contexts of inquiry is apparent also when starting with consideration of the research most frequently identified as regarding risk perception: Some of the most important work on gender differences within the literature on perception of environmental and safety risks has occurred when researchers expanded the contexts of sociocultural variables and physical settings included in their research designs. Differences in risk perception are found not solely on the basis of gender, but with gender interacting with contexts of race, nationality, and/or socioeconomic resources and neighborhood characteristics. These results challenge any assumptions of a universal, including biological, basis for gender differences. The present review thus begins with these studies of gender and risk perception before

observation has been made by Lennart Sjöberg, *Worry and Risk Perception*, 18 Risk Anal. 85 (1998).

The present review will return to this issue and include, in sections, explicit attention to conceptual distinctions and interrelationships between different types of "risk perception" variables. At the same time, I have maintained the convention of considering together, without always including comment on the possible significance of the variations, studies that utilized different measures bearing on risk perception. In direct descriptions of these research results, my effort has been to adopt and report, from one study to the next, the variables conceptualized and labeled in the original research.

drawing on research literature less often considered within the field of risk perception.

Gender Differences in Risk Perception: Environmental and Safety Risks

Based on a review of 75 studies that included analyses of gender differences in ratings of environmental and safety risks, Davidson and Freudenburg concluded that women more often rate many of these risks as being of more concern than do men.[6] However, this effect was not found uniformly across all types of risk. Specifically, Davidson and Freudenburg observed from these studies that women are more apt to express greater concern over "local facilities and/or nuclear and other technologies that are often seen as posing risks of contamination...."[7] The authors distinguished, further, between levels of support for several explanatory models for these gender differences in risk perception. They concluded that there was so little empirical evidence for the "Knowledgeable Support Hypothesis" that it can be "discarded": Differing levels of knowledge about environmental risks were not found to account for gender differences in response to risk information.[8]

Reports by Graham and colleagues have drawn additional attention to gender differences in risk perception, including the relevance of gender in how "experts" perceive risk and thus, implicitly, the "Knowledgeable Support Hypothesis."[9] In this research, gender differences in confidence in a variety of "hazard claims" were found in surveys of both the general population and professional scientists. Their finding of gender differences in confidence in hazard claims among professionals with comparable levels of scientific training casts further doubt on the hypothesis that women's greater concern over environmental and safety risks is due primarily to their having less extensive education in science. These results are consistent also with the findings of gender differences in experts' assessments of risks associated with nuclear technology reported by Barke, Jenkins-Smith, and Slovic

6 Davidson & Freudenburg, *supra* n. 1.

7 *Id.* at 302.

8 *Id.*

9 John D. Graham et al., *Measuring Confidence in Hazard Claims: Scientists Versus Laypeople*, 6 Tech. 77 (1999).

and with Slovic et al.'s findings of gender-based differences in risk perception among a sample of toxicologists.[10] In the earliest study of gender differences in risk perception among experts, Slovic et al. found "women tended to rate an item moderate or high in risk more frequently than the men, similar to the way that women and men in the general public respond."[11]

Davidson and Freudenburg found mixed support for two other hypotheses, that differences in men's and women's concern with economic factors or with parental roles underlie gender differences in risk perception and concern. There was moderate support for the "Institutional Trust Hypothesis," that "(a) women tend to be more distrustful than men of institutions, particularly those involving science, technology, and government; and that (b) levels of confidence and trust are negatively related to environmental concern."[12] The strongest support existed for a fifth hypothesis, the "Safety Concerns Hypothesis." This hypothesis states, "(a) health and safety are more salient to women than to men, and that (b) this heightened salience is reflected in higher levels of concern among women than among men about a given level of environmental risk."[13]

Drawing upon Flynn, Slovic, and Mertz's findings of a key differentiation in risk ratings between white men as contrasted with white women and both men and women of color, Davidson and Freudenburg's final conclusion is that we might do well to shift future research away from efforts to explain why "women worry so much," and towards the question of "why at least some white men do not."[14]

Flynn, Slovic, and Mertz's research did provide further description of the attitudes and characteristics distinguishing the especially "low-risk perception" white males in their sample from white females and

10 Richard P. Barke et al., *Risk Perceptions of Men and Women Scientists*, 78 Soc. Sci. Q. 167(1997); Paul Slovic et al., *Intuitive Toxicology. Expert and Lay Judgments of Chemical Risks in Canada*, 15 Risk Anal. 661 (1995).

11 Slovic et al., *supra* n. 10, at 664.

12 Davidson & Freudenburg, *supra* n. 1, at 319.

13 *Id.* at 323.

14 *Id.* at 332; James Flynn et al., *Gender, Race, and Perception of Environmental Health Risks*, 14 Risk Anal. 1101 (1994). A comparable interaction between gender and race was also reported by Graham et al., *Measuring Public Confidences in Hazard Claims: Results of a National Survey*, 6 Tech. 63 (1999), in a survey of confidence in "hazard claims" among the public.

nonwhite males and females. These white males were better educated, more affluent and more politically conservative with a profile of differences in attitudes that the authors characterized as "trust in institutions and authority and a disinclination toward giving decision-making power to local citizens in areas of risk management," differences consistent with "sociopolitical explanation" of differences in risk perception.[15] The authors speculated that "[p]erhaps women and nonwhite men see the world as more dangerous because they benefit less from many of its technologies and institutions, and because they have less power and control."[16] One could also add, to the extent that sectors of society benefit less from risky technology and have less power and control, that their "world" is, in fact, more dangerous.

Variations in other demographic characteristics and study contexts have yielded additional perspective on the nature of gender differences in environmental risk perception. Greenberg and Schneider's study of environmental risk perceptions of men and women from a range of socioeconomic backgrounds and races revealed relatively higher risk concerns among both men and women who were living in "stressed" environments (i.e., with multiple hazards such as landfills, hazardous waste sites, noise, deteriorating housing, crime).[17] Among subjects not residing in highly stressed environments — the experience, the authors point out, of most college students and general population samples participating in risk perception research — there was the familiar pattern of women reporting higher levels of concern with (phrased as "bothered by") environmental characteristics than did the men.[18]

In another study drawing on subjects from life contexts differing from those typically reported in the environmental risk perception literature — catering staff employed on offshore drilling platforms in the North Sea — Hellesøy, Gronhaug, and Kvitastein found no differences in hazard ratings among male and female respondents.[19]

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15 Flynn et al., *supra* n. 14, at 1106-1107.

16 *Id.* at 1107 (alteration in original).

17 Michael R. Greenberg & Dona F. Schneider, *Gender Differences in Risk Perception: Effects Differ in Stressed vs. Non-Stressed Environments*, 15 Risk Anal. 503 (1995).

18 *See id.* at 509-10.

19 Odd Hellesøy et al., *Profiling the High Hazards Perceivers: An Exploratory Study*, 18 Risk Anal. 253 (1998).

This appears to be another example of the powerful effect an inherently more threatening environmental setting can have in overriding potential gender differences in risk perception.

Gender differences were examined also in a subset of the studies included in Boholm's cross-national comparative review of psychometric research on risk perception:[20] While patterns of gender differences very similar to those observed in white United States samples were reported by one study in France and in another of Romanian men and women, very few gender differences were found in a Bulgarian sample. Further, data from Japan suggested a "cross-cultural cross-gender reversal," with Japanese men and American women similar in their tendencies to report high "vulnerability" to risks, and including a general tendency to view more risks as involuntary. Sjöberg, in another comparative study, this one drawing from cross-national surveys of respondents from Poland, Sweden and Brazil, noted a pattern of greater worry about risk in economically distressed countries and social strata.[21]

These studies of risk perception broaden their samples beyond predominantly white middle class Americans. Analogous to the findings of Flynn, Slovic, and Mertz,[22] gender in these studies does not operate as a monolithic variable. Results from this set of studies reinforces the need to seek out underlying contextual factors contributing to perception of greater risk — factors that might underlie the experience of being female, a person of color, a resident of a highly stressful environment, or a person from a specific culture and that may also transcend any single demographic variable. In calling for new research on such factors, Flynn, Slovic, and Mertz proposed that these variables might include power, status, alienation, and trust.[23]

Some work has proceeded in investigating such underlying socio-political variables. Siegrist has proposed, for instance, that the variable of "trust" in institutions and "perceived benefits" are key causal factors: There was no independent effect for gender on perception of risk

20 Åsa Boholm, *Comparative Studies of Risk Perception: A Review of Twenty Years of Research*, 1 J. of Risk. Res. 135 (1998).

21 Sjöberg, *supra* n. 5.

22 Flynn et al., *supra* n. 14.

23 *Id.* at 1107.

associated with genetic technologies when these two variables were controlled in analyses of data from a questionnaire study at 1000 Swiss adults.[24] Savage, analyzing data from a telephone survey in the Chicago, Illinois area, concluded that feelings of heightened personal exposure to risks contributed to the greater dread of safety and health hazards as reported by women, blacks, the young, and those with lower levels of income and schooling.[25]

Just as including a wider range of demographic backgrounds and life contexts of research subjects in the above studies results in new perspectives on the nature of "gender differences" in risk perception, further insights can be gained by widening the net to include the contexts of more diverse research literature and paradigms — even if these investigators have not cast their studies as primarily of risk perception. These other areas of research can shed light on the underlying variables related to observed gender differences in risk perception and also broaden the types of questions and interpretations one might consider. Towards these ends, illustrative studies and results from research on attitudes about health and "health behavior," prospects of nuclear war, and crime are considered, as well as from research on "risk-taking" and sensation-seeking, studies of financial decision-making, and research with a developmental perspective on risk. Unless noted, these studies included primarily white subjects and/or did not report on the effects of the statistical interaction of gender by race or other sociocultural variables on risk perception.

Perception of Risk in Different Domains: Health, Nuclear War, Neighborhood Crime

The literature on risk perception in these different domains suggests additional factors contributing to gender differences and offers examples of research that directly tackle distinctions between varying conceptualizations of risk perception and related evaluative responses (e.g., "fear," sense of vulnerability).

Research on perception of risks to health, including through individual "health behaviors,"[26] has yielded robust findings of

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24 Michael Siegrist, *The Influence of Trust and Perceptions of Risks and Benefits on the Acceptance of Gene Technology*, 20 Risk Anal. 195 (2000).

25 Ian Savage, *Demographic Influences on Risk Perception*, 13 Risk Anal. 413 (1993).

"unrealistic optimism": We tend to believe that our own health risks are lower than those of others and that we will be less apt to become ill or die if exposed to the same risk factors.[27] Several of these studies suggest gender differences: Among a sample of college students, men were less likely to perceive risk associated with alcohol and drug use.[28] Drawing on a sample of adolescents and adults, age fifteen to sixty-five, Lee found women were apt to rate the health risks — for self or for others — of cigarette smoking as higher than did the men in that study.[29] Hampson et al., surveying adults, found that women perceived greater health risks from the combination of cigarette smoking and exposure to radon than did men.[30] Among the college students surveyed by Bell et al., women perceived greater risk in sexual behavior.[31] Fontaine and Smith, however, reported no significant difference between men's and women's estimations of their risk, more generally, of any form of cancer.[32] While the data from research on attitudes toward health do not establish unequivocal gender differences in "unrealistic optimism," this phenomenon merits further consideration in studies of other domains of risk perception.

Bell et al.'s study is notable also for its multivariate analyses of the nature of gender differences in perception of sexual risks.[33] They found support for a "difference in pattern hypothesis," namely, that "women engage in sexual risk for different reasons than do men."[34]

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26 Examples of "health behaviors" found in the literature, with varied directions of impact on health, include tobacco, alcohol ,and drug use; exercise; "compliance" with medical treatment regimes; condom use; and diet.

27 *See e.g.* Neil D. Weinstein, *Why It Won't Happen to Me: Perceptions of Risk Factors and Illness Susceptibility*, 3 Health Psychol. 431 (1984) (hereinafter Weinstein (1984)); Neil D. Weinstein, *Unrealistic Optimism About Susceptibility to Health Problems: Conclusions From a Community-Wide Sample*, 10 J. of Beh. Med. 481 (1987) (hereinafter Weinstein (1987)).

28 Charles Spigner et al., *Gender Differences in Perception of Risk Associated with Alcohol and Drug Use Among College Students*, 20 Women and Health 87 (1993).

29 Christina Lee, *Perception of Immunity to Disease in Adult Smokers*, 12 J. of Beh. Med. 267 (1989).

30 Sarah E. Hampson et al., *Conscientiousness, Perceived Risk, and Risk-Reduction Behaviors: A Preliminary Study*, 19 Health Psychol. 496 (2000).

31 Nancy J. Bell et al., *Gender and Sexual Risk*, 41 Sex Roles 313 (1999).

32 Kevin R. Fontaine & Sylvia Smith, *Optimistic Bias in Cancer Risk Perception: A Cross-National Study*, 77 Psychol. Rep. 143 (1995).

33 Hampson et al., *supra* n. 30, at 316.

Specifically, among their findings of differences in patterns of reasons they noted, "sexual risk for women compared to that of men is characterized by the absence of a strong sensation seeking component...."[35]

Though public concern over risks of nuclear war, and research thereon, has abated since the 1980s, it presents another very specific form of risk perception and another area of relevant literature. Fiske, reviewing that research, found little difference between men's and women's levels of concern over the risk of nuclear war.[36] When a study did indicate a gender difference, it was towards higher concern among women. Fiske offered an interpretation of this difference that is relevant also to consideration of findings of gender differences in other domains of risk perception: that there is a response bias at play attributable to the greater social acceptability of women revealing anxiety.[37]

Studies of attitudes towards neighborhood crime also find that women consistently express higher levels of concern.[38] Within this research, also, there have been attempts, with mixed results, to tease out varied components and conceptualizations of risk perception and fear. The studies by Rountree and Land and by Smith and Torstensson involved large survey data sets and included background variables of race (Rountree and Land), socioeconomic status, and neighborhood characteristics.[39] The reported gender differences held up in each study across their sub-samples, with, as described below, interactions between educational achievement and gender being reported by Smith

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34 *Id.* at 317.

35 *Id.* at 325.

36 Susan T. Fiske, *People's Reactions to Nuclear War: Implications for Psychologists*, 42 Amer. Psychologist 207 (1987).

37 This tendency would be consistent also with one interpretation of a long-observed gender difference in self-reported rates of depression: women's greater willingness to report psychological distress. *See e.g.* Eugene S. Paykel, *Depression in Women*, 158 (suppl.) Brit. J. of Psychiat. 22 (1991).

38 *See e.g.* Pamela Wilcox Rountree & Kenneth Land, *Personal Risk Versus Fear of Crime: Empirical Evidence of Conceptually Distinct Reactions in Survey Data*, 74 Soc. Forces 1353 (1996); William R. Smith & Marie Torstensson, *Fear of Crime: Gender Differences in Risk Perception and Neutralizing Fear of Crime: Toward Resolving the Paradox*, 37 Brit. J. of Criminol. 608 (1997).

39 Rountree & Land, *supra* n. 38; Smith & Torstensson, *supra* n. 38.

and Torstensson.[40] Rountree and Land found "generally insignificant interactions" between the contextual variables they checked.[41]

Results from Smith and Torstensson's sample of Stockholm-area residents indicated women were apt to perceive more risk.[42] The differences between women's and men's responses were greater, however, on the dimension of "fear" than for "risk perception." Gender differences in fear lessened at higher levels of perceived risk. The authors interpret their results as evidence of an underlying female "ecological vulnerability," as well as of a trend towards male discounting or "neutralization" of fear and risk: "... women perceive more risk [of crime] in their own living areas and are consequently more fearful in response to specific context than men. Women's fear of specific contexts may be a reflection of their vulnerability, while some men, particularly those with either low or high educational achievement, think they are invulnerable, leading them to discount risk."[43]

The curvilinear relationship between educational achievement and risk perception among men in Smith and Tortensson's sample suggests a multi-factorial basis for the tendency towards discounting risk. The authors suggest that a "machismo" gender-role socialization may be at play among the less highly educated men, while the economic and political advantages of the men with more education may contribute to that subgroup's "neutralization" of risk.[44] Within the subsample of women, only higher educational achievement tended to correlate with lower levels of several measures of concern with risk of crime.

Rountree and Land, analyzing survey data from respondents in Seattle, Washington, found no gender difference in what they conceptualized as the more emotionally-based "burglary-specific fear" (assessed in terms of "worr[ying] at least once a week about his/her home being burglarized"), but did in the case of the more general risk perception variable concerning neighborhood safety; this latter measure, "perception of crime/victimization risk," the authors conceptualized as

40 Smith & Torstensson, *supra* n. 38.

41 Rountree & Land, *supra* n. 38, at 1374.

42 Smith & Torstensson, *supra* n. 38.

43 *Id.* at 609.

44 *Id.* at 623-24, 626.

the more "'cognitive' fear."[45] Rountree and Land's findings of gender difference on the wider measure of risk perception, as opposed to the more specific assessment of one's own individual risk of burglary, could suggest that key differences between men's and women's risk perceptions are not necessarily experienced narrowly around the likelihood of specific events involving the self, but may occur in more inclusive territories of concern — to the whole neighborhood, for instance, versus just one's own home.

Differences in the use of the term "fear" by Rountree and Land and by Smith and Torstensson and in their selection of specific variables of crime make it difficult to directly compare results from these two studies[46]; however, taken together, one of the most important contributions of these studies is what they reaffirm: One must consider if a reported difference in concern over a given risk is based primarily on an estimate of the likelihood of that risk or on other narrower — or broader — evaluative concepts, including affective responses and/or differences in judgment of the sphere of one's "vulnerability" to a given risk. In one such related line of inquiry, not specific to neighborhood crime, Sjöberg has found that "worry" showed only modest correlation with more specific measures of perceived risk.[47]

Risk-Taking and Sensation-Seeking

Research on risk-taking, as categorized in a comprehensive review by Byrnes, Miller, and Schafer, includes self-reports on and observations of a person's behavior, as well as responses to hypothetical choice situations.[48] This latter category includes studies of framing effects, studies which can be found in the risk perception literature as well. The literature on risk-taking more explicitly differentiates from that on risk perception when it emphasizes individual styles of risk-taking, including the variable of "sensation-seeking." Studies of risk-taking, as reviewed by Byrnes, Miller, and Schafer, suggest a number of points of more general relevance to considerations of gender differences in risk

45 Rountree & Land, *supra* n. 38 at 1353, 1357-358.

46 Paykel, *supra* n. 37.

47 Boholm, *supra* n. 20.

48 Byrnes et al., *supra* n. 4.

perception. They suggest cohort differences in the association of gender with risk-taking, the significance of "differential locations" for gender role socialization, and what appears to be a qualitative nature to some gender differences in risk-taking and perception.

Arch's review of the literature on risk-taking emphasized gender differences in motivation to participate when there is the presence of risk: Women are likely to strive to reduce risk (especially to their "social units") and to underrate their ability to respond to risks; men are more apt to see "challenge" in a risky situation and to overrate their ability to succeed.[49] Consistent with a more positive orientation towards the "challenge" in risky situations, men are also more apt to score higher on sensation-seeking measures.[50]

In a study of attitudes towards risk-taking, Boverie, Scheuffele and Raymond found that women gave statistically higher risk magnitude estimates to 15 of a total list of 118 risk-taking behaviors.[51] While this difference was found in only a minority of the risk-taking areas surveyed, these fifteen behaviors share a common element: they were more apt to entail physical risk. Multi-dimensional scaling of the data revealed that women's levels of concern clustered around the extremes on the two central dimensions of "consequences" and "personal costs" and that men's rankings tended to range over more of the continuum of possible responses. The authors offer limited interpretation of this difference other than to comment that it confirms an earlier report of different patterns of clustering of risk ratings for males and females.

In one of the few studies to include consideration of gender in the effects of the framing, Fagley and Miller found that women were more affected by variations in the framing of risky decisions than were men.[52] When options were framed negatively in terms of baseline expectations of mortality or losses, females, and not males, in their sample of college students made riskier choices. This finding of greater

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49 Elizabeth C. Arch, *Risk-Taking: A Motivational Basis for Sex Differences*, 73 Psychol. Bull. 3, 9 (1993).

50 Bell et al., *supra* n. 31; Jeffrey Arnett, *Sensation-Seeking: A New Conceptualization and a New Scale*, 16 Personality and Individual Differences 289 (1994).

51 Patricia E. Boverie et al., *Multimethodological Approach to Examining Risk-Taking*, 13 Current Psychol.: Res. & Reviews 289 (1994-1995).

52 N.S. Fagley & Paul M. Miller, *The Effect of Framing on Choice: Interactions With Risk-Taking Propensity, Cognitive Style, and Sex*, 16 Personality and Soc. Psychol. Bull. 496 (1990).

effects of negative framing on females' risk-taking choices is not found uniformly across the several other studies. Kowert and Herman, also examining framing effects and gender among undergraduate students, found that gender-based differences in framing effects varied depending on the content of the choice (economic, medical or policy).[53] In that study, gender had a significant effect overall, however, with males preferring riskier options regardless of how the options were framed. Byrnes, Miller and Schafer found no significant effect for gender across the eight studies of framing effects included in their review.[54]

Aside from their review of studies of framing effects, Byrnes, Miller, and Schafer's meta-analysis of 150 studies of risk-taking did find significant gender effects for fourteen of the sixteen other types of risk-taking studies considered, with variations in effect size depending on the content area.[55] Among these fourteen types of risk-taking studies, the gender difference — all towards men choosing more risk — was greatest in the areas of mathematical and spatial reasoning, "risky experiments" presenting a chance of physical or psychological harm, and physical skills. The gender differences were least in the areas of alcohol use and driving.

Byrnes, Miller, and Schafer also commented on what they had observed across studies of risk-taking as an [56]

> apparent lack of discernment on the part of men and boys. In one of our analyses, we showed that males took more risks even when it was clear that it was a bad idea to take a risk. The same analysis revealed the opposite was true for women and girls: that is, they seemed to be disinclined to take risks even in fairly innocuous situations or when it was a good idea to take a risk (e.g., intellectual risk taking on practice SATs).

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53 Paul A. Kowert & Margaret G. Hermann, *Who Takes Risks? Daring and Caution in Foreign Policy Making*, 41 J. of Conflict Management 611 (1997).

54 Byrnes et al., *supra* n. 4.

55 *Id.*

56 *Id.* at 378.

They suggest also[57]

> that gender difference may be more likely to emerge when people have to actually carry out a risky behavior than when they have to simply consider the pros and cons of two options. If so, then the process involved in the translation of cognitions to behavior (e.g., fear responses) may explain gender differences in risk taking more adequately than the cognitive processes involved in the reflective evaluation of options.

This is consistent with the interpretation by Smith and Torstensson that the primary gender difference may reside not on the level of cognitive appraisal of risk, but with the more complex processes of how the individual responds, emotionally and behaviorally, to that information.[58]

A final provocative finding of Byrnes, Miller, and Schafer's meta-analyses is the suggestion of a cohort effect. The magnitude of mean gender effects found in studies conducted between 1964 and 1980 versus between 1981 and 1997 declined significantly.[59] This finding raises the question regarding risk-taking — and more widely with risk perception also — of which shifts in gender role experiences and socialization occurring over recent decades might be relevant to the development of responses to risk.

Financial Decision-Making

Financial decision-making was not a specific category or focus in the meta-analyses of the risk-taking studies by Byrnes, Miller, and Schafer and, in fact, this domain tends to be bypassed also by most of the literature reviews on risk perception.[60] Perhaps this is due to financial "risk" not being conceptualized solely in terms of likelihood of a hazard. Rather, risk is accepted in the context of finance as inherently involving the potential for both gains and losses.

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57 *Id.*

58 Smith & Torstensson, *supra* n. 38.

59 Byrnes et al., *supra* n. 4.

60 *Id.*

Women's more conservative stance towards taking financial risks has been documented in research and popular literature.[61] Schubert et al., however, have challenged this view of gender differences in financial decision-making, suggesting that differences observed in the past are not a reflection of risk aversion per se on the part of women, but are due to differences in their associated "opportunity sets." Specifically, they found in a laboratory study of undergraduates that, when presented with financial decisions in the same detailed context (e.g., investment or insurance choices), men and women took comparable risks. When financial risk-taking decisions were framed more abstractly, however, they found results consistent with the commonly held view of women's greater conservatism.[62] Schubert et al.'s finding of the "traditional" gender difference in response to more general appraisals involving risk-taking and money still leaves open the question of how it is that men and women may differentially weigh potential benefits of financial risk-taking in the presence of an "abstract" potential for loss.

Jianakoplos and Bernasek, analyzing survey data from the 1989 Survey of Consumer Finances, reported that single women, as compared to single men and married couples, maintained a more conservative proportion of risky assets. In examining subgroup differences in their sample they also found that "single black women are willing to hold a larger proportion of risky investments on average than single white women, single men and married couples."[63] This latter finding was discussed in terms of single black women's greater involvement in investing and risk-taking as compared to that of single white women. The authors did not take on the full challenge this finding posed to their general conclusion regarding "single women." The gender difference they report would seem not merely, as stated in the article's abstract, "influenced by" race. From their findings it would appear more accurate to state that single women's greater financial risk aversion was found only among the white respondents and that, across all racial and demographic groups studied, the highest

61 *See* Nancy Ammon Jianakoplos & Alexandra Bernasek, *Are Women More Risk Averse?*, 36 Econ. Inquiry 189 (1998); Renate Schubert et al., *Financial Decision Making: Are Women Really More Risk Averse?*, 89 Am. Econ. Rev. 381 (1999).

62 Schubert et al., *supra* n. 61.

63 Jianakoplos & Bernasek, *supra* n. 61, at 629-30.

proportion of risky assets may be found among the subsample of single black women. Jianakoplos and Bernasek's findings reinforce the need to approach "gender" as one of several interacting sociocultural variables affecting financial decision-making.

The literature on financial decision-making may offer some particularly promising new directions for research on risk perception given its consideration of "risks" that can be as likely anticipated in terms of benefits as in terms of potential losses. In this way, the literature on financial decision-making prompts further explicit consideration of how people may differentially perceive and weigh the potential losses and benefits associated with a risk.

Developmental Perspectives on Risk

Developmental perspectives on risk perception and risk-taking among children and adolescents may also generate further understanding of the nature of gender differences observed (and not) among adults. While this body of research is more fragmentary, findings of gender differences among children and adolescents highlight a pattern of marked variation in how some young males and females approach risk. An early study by Slovic of risk-taking among children aged six to sixteen years found gender differences in children eleven and older "in the direction of social stereotype: boys are bolder than girls."[64] No gender differences in risk-taking were observed, however, in the two younger groups of children (six to eight and nine to ten). This field study involved observations of how children responded to the progressively greater odds of losing earlier winnings as a game of chance proceeded. Boys were more apt than the girls to keep playing as the odds against them increased. Another finding from this study revealed a potential threat to study design when subjects self-select for studies of risk-taking — and an important finding of gender differences in its own right: Girls were less apt to want to play the game at all, even though their decision not to volunteer to participate in this free game at a county fair meant foregoing a chance to win the M & M candies. The discrepancy in numbers of boys and girls volunteering to play the game increased with the children's age.

64 Paul Slovic, *Risk-Taking in Children: Age and Sex Differences*, 37 Child Dev. 169, 169 (1966).

Ginsburg and Miller, in a naturalistic observational study of girls' and boys' behavior at a zoo, reported that an equal number of boys and girls visited the zoo, but found a pattern, comparable to that found in Slovic's study, of far more males engaging in behavior the authors identified as "risky": riding elephants, climbing up a steep bank in the park, unassisted feeding of animals in a petting zoo, and touching a burro advertised as having a reputation for biting.[65]

In their literature review on the development of risk-taking in children, Hargreaves and Davies report a "clear" gender difference, especially among younger children, with boys suffering more road accidents than do girls.[66] Their review of the relatively limited experimental research on children's "riskiness" utilizing laboratory games uncovered mixed results. In one study of children age eleven to fifteen, girls chose the riskier bets. In another of children age five to thirteen, there were no gender differences, and in a third among younger children, age eight to ten, males made riskier bets.

For present purposes, Hargreaves and Davies' identification of factors that may lead to gender differences in children's risk-taking may be as informative as the still to be determined direction of the findings. They suggest, for instance the influence of gender-associated differences in "temperament" and in the socialization of gender stereotypes, as well as another level of variable appropriate also for considerations of adults' "riskiness": the "differential locations into which their play interests lead them."[67] The concept of "differential locations" entails specific and contextualized consideration of the experience, opportunities, and constraints vis-a-vis risk-taking that males and females are apt to encounter in their most likely social and physical environments. For instance, the greater exposure to outdoor play and sports that, at least, earlier cohorts of boys have experienced could expose them to a greater range of opportunities for skill-building around physical challenges and risk-taking. Extending the concept of "differential locations," one might one ask if adult males', again

65 Harvey J. Ginsburg & Shirley M. Miller, *Sex Differences in Children's Risk-Taking Behavior*, 53 Child Dev. 426 (1982).

66 David J. Hargreaves & Graham M. Davies, *The Development of Risk-Taking in Children*, 15 Current Psychol.: Res. & Reviews 14 (1996).

67 *Id.* at 23.

historical, greater involvement in workplaces involving physical risk and/or a wider range of possible financial losses and benefits based on performance affects, in turn, their perspective on and response to risk.

Utilizing a study design comparable to much of the current research on adults' risk perceptions, Hillier and Morrongiello asked girls and boys age six to ten years old to rate pictures according to the risk of injury each situation posed.[68] Girls assigned greater risks of injury to the situations than did the boys. The authors suggested that the females' ratings of "risk of injury" were influenced by their answer to "Will I get hurt?", specifically whether there is any chance of being hurt. Males, on the other hand, tended to assign ratings based on how much injury would be entailed — their answer to "How hurt will I get?"[69]

In another study, conducted by Riechard and Peterson, of children (age ten to seventeen), females rated eight of a list of twenty environmental risks more highly than did the males.[70] Consistent with Hillier and Morrongiello's suggestion that girls were apt to register more concern when there was any risk in a situation, even if it were at a quite low level, all but one of the risks that were rated more highly by females than by males in Riechard and Peterson's study were in the "lower half" of the list — those risks rated on average across all subjects as being less serious.

The findings from these last two studies, that girls' risk perception appears especially sensitive to the presence of any risk — as opposed to the apparent tendency among males to make more differentiated responses based on an assessment of the magnitude of risks — converge with the interpretations of Arch's review of literature on risk-taking that men and women respond very differently to the presence of risk.[71] These findings are reminiscent of those of Boverie, Scheuffele, and Raymond that men's responses to risk fell more along a continuum of concerns, while women's responses tended to "cluster" in a more discontinuous manner, the latter pattern consistent with the appraisal of

68 Loretta M. Hillier & Barbara Morrongiello, *Age and Gender Differences in School-Age Children's Appraisal of Injury Risk,* 23 J. of Pediatric Psychol. 229 (1998).

69 *Id.* at 235.

70 Donald E. Riechard & Sandra J. Peterson, *Perception of Environmental Risk Related to Gender, Community, Socioeconomic Setting, Age, and Locus of Control,* 30 J. of Envtl. Ed. 11 (1998).

71 Arch, *supra* n. 49.

there being any "risk" or not.[72]

A final topic from the developmental literature which may yield insights and useful questions into the nature of observed gender differences in adults' risk perception is that of age-based differences among children — that is, at what ages and why, according to the investigators, do gender differences appear? Data in this regard are not conclusive. Slovic did not find evidence of gender differences in risk-taking until children were age eleven years and older.[73] Byrnes, Miller, and Schafer, however, found that the effects of age were not consistent across all categories, nor in the same direction.[74] Pending further research, including utilization of longitudinal designs, one can only speculate how differential results by age and the associated causal factors such as intellectual and physical maturation, cognitive styles, and different socialization experiences bear on consideration of adults' risk perception and risk-taking, across, or specific to, any subgroups.

Summary and Conclusions

This essay is a call both for more focused attention to gender differences in risk perception and for a broadening of the contexts in which we do so. The topic of gender differences in risk perception is worthy of further scientific and policy attention in its own right, but also as it leads to greater appreciation of sociocultural and other contextual factors influencing risk perception. At minimum, subgroup differences based on gender (and other demographic and sociocultural variables) should be monitored when one interprets the representativeness of any data set, be it based on research subjects or citizens providing "public input."

From the sampling of the research literature discussed above, the following summary of the central findings — and types of questions — is posed with the intention of provoking continued inquiry into gender differences in risk perception. The first summary point concerns broadening contexts by including research subjects with a variety of demographic and life backgrounds. The second set of points (two through five) emerged from broadening the context of the types of

72 Boverie et al., *supra* n. 51.

73 Slovic, *supra* n. 64.

74 Byrnes et al., *supra* n. 4 .

research literature considered. Note that these other studies largely did not include analyses of gender differences in the context of race, culture, neighborhood, or economic variables. In light of findings suggesting that gender differences in risk perception — specifically, women reporting higher levels of perceived risk and more concern — may be restricted to white respondents living in non-stressed environments, the conclusions and questions generated by these other studies regarding "gender" can and should be tested in future research with other sociocultural variables, independently and in interaction with gender. The sixth and final point concerns the meta-context of assumptions underlying research and policy bearing on risk perception and gender.

1. *The importance of wide representation in demographic and sociocultural backgrounds of research subjects* (i.e., gender along with characteristics of economic, neighborhood, cultural, and/or racial backgrounds): Within the research on perception of environmental risks, studies that expanded the range of subjects beyond white, middle-class college students and neighborhoods yielded critical challenges to a unitary concept of gender and highlighted the importance of social contexts beyond gender.[75] Findings from these studies suggest also the need to identify underlying characteristics and experiences of gender, race, culture, economics, harsh environments, etc., associated with different perceptions of risk.

2. *Distinguishing appraisals of the magnitude of risk from other evaluative responses:* The research on "fear of crime" that strives to distinguish component processes of risk perception — in particular, the appraisal of the magnitude of potential harm from other evaluative processes and responses such as "fear" and "vulnerability" — would appear a fruitful direction for the risk perception field more generally.[76] Byrnes, Miller, and Schafer also suggested a distinction

75 *See e.g.* Flynn et al., *supra* n. 14; Greenberg & Schneider, *supra* n. 17.

76 *See e.g.* Smith & Torstensson, *supra* n. 38; Rountree & Land, *supra* n. 38. One cautionary note should be entered regarding any efforts, as seen in the studies cited on fear of crime, to strictly differentiate cognitive and emotional component processes of risk perception. As observed in the studies on fear of neighborhood crime, researchers may work with quite different conceptualizations of which measures are cognitive or emotional. What may appear to be an emotional response (as in relatively greater fear over a given level risk) may be based on very accurate cognitive appraisal of other relevant contextual variables. And while cognitive

between cognitive appraisals and the evaluative processes involved when a person makes a behavioral response.[77]

"Perceived vulnerability" appears a particularly promising variable to distinguish in this regard. Drawing on Warr's "vulnerability hypothesis," Smith and Torstensson have suggested that women's greater feelings of "vulnerability" in response to the same level of perceived risk underlie the reported gender differences in concern over crime: "When men and women have the same level of perceived risk, women have higher fear levels due to greater sensitivity to risk...."[78] Hillier and Morongiello concluded that a greater "perceived vulnerability" influenced girls' higher ratings of risks of injury.[79] Bord and O'Connor have also suggested that a variable of "perceived vulnerability" underlies gender differences in responses to environmental risks.[80] "Feelings of heightened personal exposure to risk," as identified in Savage's survey data, may also be relevant.[81]

As noted by an anonymous referee of this article, however, we must also maintain awareness of the extent to which groups of individuals (varying by gender, race, socioeconomic status, etc.) may differ in terms not just of perception of risk or vulnerability, but in their actual likely exposure to hazards, in the buffering resources they have access to and/or in the potentially compensating benefits associated with any risk of harms. Surely any such differences have a primacy that is not adequately addressed through discussion of solely perceptual/cognitive, emotional, or evaluative processes.

3. *"Qualitative" differences in risk perception:* Research on attitudes towards health included efforts to characterize the underlying quantitative and qualitative nature of observed gender differences.[82]

processes may appear to predominate when a risk assessment is based on and phrased in the findings of scientific research, a variety of motivational and emotional influences may be also at play, consciously or not. *See* Kristin Shrader-Frechette, Risk and Rationality (1991), for a compelling presentation of the interplay of "objectivity" and "value judgments," including potentially emotive, in the technical risk assessment process.

77 Byrnes et al., *supra* n. 4, at 378.

78 Smith & Torstensson, *supra* n. 38, at 621; M. Warr, *Fear of Victimization: Why Are Women and the Elderly More Afraid?*, 65 Soc. Sci. Q. 681 (1984), *cited in* Smith & Torstensson, *supra* n. 38.

79 Hiller & Morrongiello, *supra* n. 68.

80 Richard J. Bord & Robert E. O'Connor, *The Gender Gap in Environmental Attitudes: The Case of Perceived Vulnerability to Risk*, 78 Soc. Sci. Q. 830 (1997).

81 Savage, *supra* n. 25.

Following the logic of that research, differences in pattern, or on a more qualitative basis, could be operating when the observed gender differences in risk perceptions involve configurations of quite different sets of correlates. In that instance, it may become necessary to examine the experiences and characteristics differentiating in a more qualitative manner some men's and women's experiences with risk.[83]

The operation of another qualitative level of gender differences was suggested by the findings in varied literatures of what appear to be relatively "dichotomous" versus more evenly distributed risk perception responses. The findings of several studies of children and adults suggested that females tended to cluster their risk responses, reporting relatively higher levels of concern than do men upon registering the presence of any level of risk[84] The responses of males tend to be distributed over more of a continuum of risk ratings and levels of concern. The extent of this difference in pattern of gender differences deserves additional scrutiny, including through testing in samples with wider variation in subjects' racial, neighborhood, and other sociocultural backgrounds.

4. *Additional factors contributing to gender differences in risk perception:* Review of the wider set of research literatures revealed additional candidates for variables underlying observed gender differences in risk perception. These factors, related to tendencies to perceive "less" as well as "more" risk, could join variables such as "institutional trust," "worry," and "vulnerability," already being investigated in studies of environmental risk perception:

a) "*Unrealistic optimism*": Research on attitudes towards health has highlighted a phenomenon warranting consideration also in studies of risk perception: "unrealistic optimism."[85]

b) *Willingness to express anxiety or worry*: Women's greater willingness to express anxiety and concern has been observed in

82 *See e.g.* Bell et al., *supra* n. 31.

83 Identifying other possible qualitative differences in risk perception between men and women, Per E. Gustafson, *Gender Differences in Risk Perception: Theoretical and Methodological Perspectives*, 18 Risk Anal. 805 (1998), has advocated an expansion of empirical approaches to include more use of qualitative methodologies.

84 Hillier & Morrongiello, *supra* n. 68; Arch, *supra* n. 49; Boverie et al., *supra* n. 51.

85 Weinstein (1984), *supra* n. 27; Weinstein (1987), *supra* n. 27.

other areas of social science and clinical literatures — including attitudes toward nuclear war and in studies of depression.[86] This "response bias" is also likely relevant to self-reports of concern about environmental and other risks.

c) *"Differential locations" as related to gender and other sociocultural variables*: The suggestion from developmental research of the import of "differential locations" of boys and girls and how this affects the opportunities they have for certain types of interactions and skill-building around risk is one example of an underlying component of gender socialization that can cross-cut experiences associated with race, culture, neighborhood characteristics, etc.[87]

d) *Choosing "not to play"*: If, as Slovic found, females are less apt to want to engage in risky games,[88] then one must question the generalizability of findings from prior based on samples of self-selecting volunteer research subjects — women or men — who may have had a greater than average attraction to risky situations. Lack of interest in, or avoidance of, situations with an identifiable component of "risky play" — be it touching a burro known to bite,[89] or pursuing increasingly risky gambling and investment strategies[90] — may be related to other findings that women and girls register higher concern upon the detection of any level of risk, and should lead to sustained scrutiny of the composition of, and recruitment strategies for, research samples and groups of "public participants" in the policy-making process.

5. *Cohort differences in the magnitude of gender differences*: As reported in Byrnes, Miller, and Schafer's meta-analysis of studies of risk-taking, evidence of cohort differences lends further support to the importance of sociocultural contexts of gender differences in risk perception and also offers opportunity to consider which changes over the decades may account for a lessening of these gender differences.[91]

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86 Fiske, *supra* n. 36; Paykel, *supra* n. 37.

87 Byrnes et al., *supra* n. 4.

88 Slovic, *supra* n. 64.

89 Ginsburg & Miller, *supra* n. 65.

90 Slovic, *supra* n. 64; Jianakoplos & Bernasek, *supra* n. 61.

91 Byrnes et al., *supra* n. 4.

6. *Assumptions underlying risk perception research and policy*: In studies of risk perception, the traditionally studied context and implication is that citizens will tend to react inconsistently to risks of many kinds, the central issue often phrased in terms of how to explain the discrepancies from scientific risk assessment data. Johnson has suggested suspending the use of the term "risk perception" given its implicit assumption of this focus upon differences between how the "public" and "experts" perceive risks.[92] While multiple writers have challenged the assumption that "risk" can be adequately conceptualized as primarily a function of expert-derived "technological knowledge,"[93] it remains very easy to adopt as a central scientific and policy objective "bringing along the public" to greater levels of technological literacy. A lack of familiarity with the scientific method can indeed hinder any discussions of risk, but restricting the goals of citizen participation to their education may be misguided — or, more pointedly, as put by Flynn and Slovic, perpetuation of "paternalistic decision-making."[94] Differences in risk perception do not rest exclusively on technological understanding, but on cultural and other contextual levels as well.

The tendency of those studying risk perception — or involved in policy-making concerning risk — to focus on the public's deviation from scientific assessments is consistent, in turn, with too ready acceptance of findings of greater deviation by women, a bias fitting societal expectation, with some basis in history, that women will have relatively less familiarity with the relevant science. This despite the empirical evidence now in hand regarding analogous gender differences in risk perception between female and male scientists[95] and the theoretical work described above challenging the dominant model of "technical knowledge" as the complete foundation for risk assessment.

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92 Branden B. Johnson, *Advancing Understanding of Knowledge's Role in Lay Risk Perception*, 4 Risk: Health & Safety 189 (1993).

93 *Id.*; Alonzo Plough & Sheldon Krimsky, *The Emergence of Risk Communication Studies: Social and Political Context*, in Readings in Risk (Theodore S. Glickman & Michael Gough, eds.), 223 (1990); Shrader-Frechette, *supra* n. 76; Paul Slovic, *Perception of Risk: Reflections on the Psychometric Paradigm*, in Social Theories of Risk (Sheldon Krimsky & Dominic Golding, eds.), 117 (1992); Paul Slovic, *Trust, Emotion, Sex, Politics and Science: Surveying the Risk Assessment Battlefield*, 19 Risk Anal. 689 (1999); Kathleen J. Tierney, *Toward a Critical Sociology of Risk*, 14 Sociol. Forum 215 (1999).

94 James Flynn & Paul Slovic, *Seeking Common Ground in Evaluating Technological Risks*, 10 Risk: Health, Safety & Environment 333 (1999).

95 Barke et al., *supra* n. 10; Graham et al. *supra* n. 9; Slovic et al. *supra* n. 10.

Attempts, explicit or not, to re-frame all variations in people's risk perceptions, be they found along dimensions of gender, race, economic, or other sociocultural variables, as inadequate utilization of technical knowledge will neither further our understanding of risk perception nor, to the extent that it is a goal, efforts to "bring along" the public. Nor will it strengthen policy-making processes in which a range of non-technical variables will also influence experts, overtly or not. By relying on policy and scientific experts for not only the technical data but also the sociocultural standards in judgment-making, without consideration of the full range of factors influencing variations in the public and experts' risk perceptions, we run a risk comparable to questioning only how culture affects "other people" — including no appreciation of the impact of culturally-based experience and perspectives on one's own judgments and behavior. We also limit attention to the extent to which different groups of people may indeed be exposed to greater levels of risk, have fewer protective resources and/or experience fewer associated benefits from accepting the risk exposure.

Within this broader context of the assumptions shaping research and policy on risk perception, gender has remained an oft-sighted and cited but less than fully examined, variable. Greater attention to gender, involving wider contexts of sociocultural variables and fields of research, is advocated here as a means of more accurate characterization of the nature of observed gender differences and, ultimately, of the fundamental influences on risk perception underlying and possibly transcending this one demographic variable.