

Figure 2: Group differences in visual simultaneity thresholds. The standard deviations are also displayed for the different groups.

The results from experiments 1 and 2 are in line with previous findings (e.g. Elliott et al., 2006, Giersch et al., 2008). Brecher (1932) originally reported thresholds of 55.3 milliseconds in healthy controls, similar to the 46 and 47 milliseconds found in this study. Similar to Giersch et al. (2008), chronic schizophrenic patients were found to have higher thresholds compared to controls. FEP patients showed similar thresholds as controls, however, there was substantial variability in their thresholds suggesting that subgroups of FEP patients might actually experience difficulties in event-structure coding, similar to chronic schizophrenic patients. The fact that some patients did not produce results in line with a normal psychometric function indicates that they might have problems choosing appropriate criteria for judging simultaneity. This will be explored by increasing the range of SOAs in case their thresholds are higher than 110 milliseconds.

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## RISK JUDGMENTS: A PSYCHOMETRIC APPROACH

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### Abstract

*It is important to use a wide range of risk factors when studying how people perceive potential danger. The present study examined perception of 54 global risk factors in a human ecological perspective, using a psychometric paradigm and psychophysical scaling. The results revealed significant gender differences. The female subjects estimated risks as more serious than the males did. Also significant age differences were obtained. Discussion focuses on the meaning of gender and age differences in risk perception as well on both theoretical and methodological implications.*

Contemporary Western Society is often described as both economically developed and highly democratized, but also as the "risk society" (Beck, 1992). For instance, Schultz and Zelezny (1999) stated that there is a growing realization around the world that humans are harming the natural environment. In fact, the environment that we are living in today is uncertain, complex and changing. The international expansion and the trend of globalization, with further increases in technology transfer, lead to even more global risks problems and serious technological mishaps. According to Slovic (1987) is risk perception the term commonly used to refer to judgments made when people are asked to evaluate hazardous activities and technologies. But research also showed that many people seem to have difficulties in understanding and interpreting probabilities, especially when the probability is small and the risk involved is unfamiliar for them. They tend to be insensitive to uncertainty and to the validity of available information (Slovic, Fischhoff, & Lichtenstein, 1980; Kahneman, Slovic, & Tversky, 1982). Researchers clearly differ in their definitions of risk taking, but most refer to constructs such as goals, values, options, and outcomes (Slovic, 1987; Slovic, Fischhoff, & Lichtenstein, 1985). The act of implementing a goal directed option qualifies as an instance of risk taking whenever: (1) the behavior in question could lead to more than one outcome, and (2) some of these outcomes are undesirable or even dangerous (Byrnes, Miller, & Schafer, 1999; see also Eisler, Eisler & Yoshida, 2003).

The psychometric school of risk analysis expands the realm of subjective judgment about nature and magnitude of risks. It focuses on personal preferences for probabilities and attempts to explain why individuals do not base their risk judgments on expected values, as decision analysis would suggest. For instance, the well known prospect theory emphasizes the propensity for people to be risk prone when focusing on gains and risk averse when focusing on losses (Tversky & Kahneman, 1974; Kahneman & Tversky, 1979). It is recognized and accepted that risk varies by culture. The cultural theory claims that risk perception is based on cultural tradition, construction of knowledge - including factual knowledge - and how the knowledge is mediated through the cultural value systems and beliefs, which are the basis of people's understanding of the world. Cultural theory emphasizes the aggregation of

individual beliefs and values to a collective cultural level, which it achieves by linking social structures to world-views (Dake, 1992). Also Douglas and Wildavsky (1982) have argued that perception of risk is determined by culture. In different cultures, or even different social groups within cultures, leaders may underemphasize some risks and overemphasize others as a way to maintain or control the culture of the group. Gender and age roles are other important factors because they influence styles of behavior, attitudes, beliefs, opinions, values, learning, experience, etc. Men, are more likely to take risks than women (Byrnes et al., 1999), as is reflected in their perception and evaluation of risks. Research by Drottz-Sjöberg (1991) in which a series of risks was studied shows gender differences. Interestingly, the judgments of male participants tended to focus on the probability of a risk event whereas females focused on its consequences.

Thus the expectation is that perceptions of risk will vary systematically across different cultures as well as across gender and age. The globalized interdependencies of production, consumption, and geopolitical arrangements mean that people everywhere are coming to share a common set of risks. No one could escape a nuclear holocaust, ozone depletion, and the consequences of monoculture and species extinction. Toxic chemical exposure, industrial accidents, and global climate change pose increasing threats (Jaeger, Renn, Rosa & Webler, 2003). Risks are often misjudged, either by overestimating or underestimating. It seems that these misjudgments may be due to the use of mental strategies, heuristics, in making the judgments. For instance there is a tendency to overestimate risks of dramatic causes of death partly because they are memorable and easily imagined (Lichtenstein, Slovic, Fischhoff, Layman, & Coombs, 1978; Lowenstein, Hsee, Weber, & Welch, 2001). Furthermore, perception of risk varies with the perspective of the perceiver. This subjectivity is reflected in generally accepted definitions of hazards and risk. Hazards are threats to people and to what people value (Kates & Kasperson, 1983). Risk is an assessment of the possibility of some adverse effect resulting from hazards (Lowrance, 1976). However, risk is understood to be an interaction between the physical and the psychosocial. It is appropriate to note that we can never directly know many of the risks that we face, although we have to act as if we do (see Douglas & Wildavsky, 1982). Systematic risk analysis was undertaken as long as 3200 B.C. (Clovello & Mumpower, 1985). But it is important to note that what may differ today in the perceived landscape of global risks is that they are more difficult to manage because of their non-localized nature. In the past, risks were more perceptible and thereby easier to identify. In this perspective the challenge posed by a global risk society is that the problems can no longer be marginalized to particular subgroups. Importantly, the risks do not just affect the poor, workers, women, emigrants, marginalized citizens, etc. Global hazards can eliminate all the protective zones and social differentiations within and between nations (see also Beck, 1992). Indeed, one of the most conspicuous implications of globalization is the recent experience of the tsunami disaster in 2006. But also several disasters caused by technological hazards and by human activities indicate the complexity of neglected risks. A warning about serious risks is often overlooked and disregarded. The consequences of large-scale hazards where the disaster became apparent because the warning was ignored, were particularly evident at many places, for instance in the Bhopal, Seveso and Chernobyl accidents (see Eisler, Eisler, & Yoshida, 2004). This tendency could be illustrated by the story in Homer's *Iliad* based on ancient Greek mythology about the Trojan War. Cassandra warned of and predicted the tragic end of Troy. But nobody believed her (Graves, 1958). The Cassandra syndrome is a term applied to prediction of doom about the future that is not believed – or is refused to be believed (see Eisler et al., 2004). It is a well-known psychological tendency that both experts and lay people neglect warning signals and disbelieve bad news. *Also today, as in Troy, Cassandra speaks, but who is listening?*

In general, it is time to begin evaluating the lack of learning from experience to neglect of warnings of high probabilities of approaching or predicted disasters. As mentioned before, it is also recognized that culturally, gender and age – or different social group - based attitudes, values and experiences can influence general orientation toward risk and uncertainty. Thus people in different cultures, genders, ages or social group select different risks to be concerned about. Why are so many individuals in industrial societies so upset about the dangers associated with technology? Why is a given technology feared in one culture, or in one century, and not in another? *To what degree are different people equally worried about the same dangers*, or to what extent do some persons perceive as great certain risks that others think of as small? The globalization trend has been accompanied by the diffusion of technological risks beyond national borders. With the future internationalization of national economies and with the further division of production processes across national boundaries, there likely will be even more global diffusion of risks. Human ecology focuses on the cultural, behavioral, and subjective components of our interactions with the natural world; its objective is the clarification of interaction between ecological (physical environment, resources, etc.) and sociopolitical contexts, which may influence lifestyle, attitudes, values, perception, behavior, etc. (see Eisler et al., 2003). Thus our goal in this study - a part of a comprehensive project - is to enrich our understanding of gender and age variations in global risk perception focusing on human ecology. In the present study we examined the perception of global risk factors in four different groups, young and older female and male subjects.

## Method

**Participants.** The sample consisted 112 participants (71 females and 41 males aged 18-85). The participants were divided into two age groups: 18-45 years and 46-85 years. They were not paid for participating and all lived in the Stockholm area. They completed the questionnaires anonymously. The questionnaire required approximately 20 minutes to complete.

**Materials and Procedure.** Subjects completed a survey (Yoshida, 1998) that listed 54 serious risk factors: deforestation, ozone hole, air pollution, overpopulation, global warming, lack of fresh water, abnormal weather, river pollution, desertification, reckless hunting, environmental hormones, energy problems, industrial waste, unemployment, aging population, soil contamination, food problems, acid rain, racial segregation, land mines, economic crisis, religious fanaticism, ocean pollution, ethnical conflict, hunger and poverty, political instability, heinous crime, sexual discrimination, nuclear weapons, migration problems, the ethics of life (cloning etc.), territorial problems, damage caused by drugs or medical mistreatment, terrorism, robbery, nuclear power plant accident, AIDS, suicide bombers, third world war, racism, growing gap between the rich and the poor, social marginalization, biological weapons, radioactive waste, corruption, euthanasia, etc. These global risk factors included a broad range of global risks - not limited to social, environmental and technological problems in a human ecological perspective. The subject's task was to rate the listed 54 global risk factors on a 5-point scale, ranging from no risk at all (a rating of 0) to an extremely high risk (a rating of 4). The participants were asked at the end of the questionnaire to add risk factors they considered serious that were not included in the list, as well as to write free comments (Yoshida, 1998; see also Eisler et al., 2003).

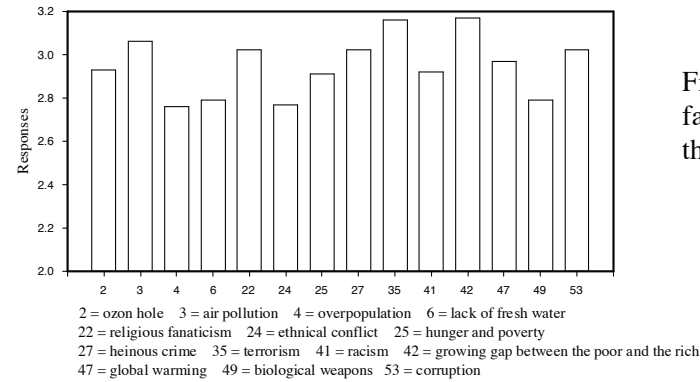


Figure 1. Means for the 14 risk factors, which were perceived as the most risky

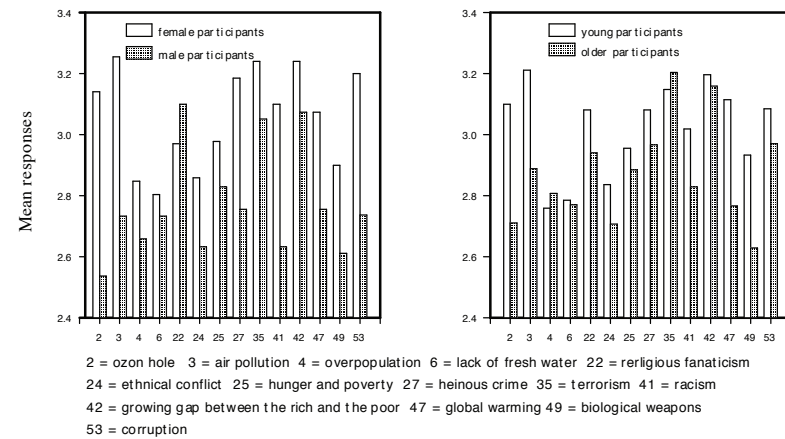


Figure 2-3. Mean responses for the most risky factors between gender (left) and age (right).

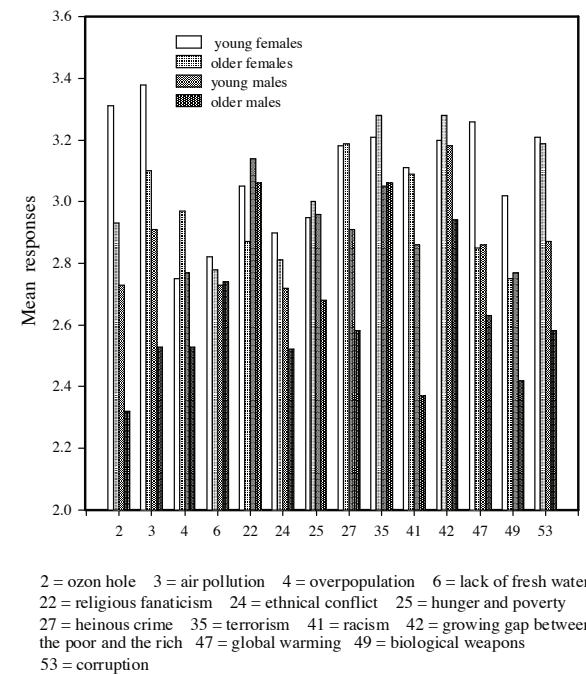


Figure 4. Mean responses for the 14 most risky factors showing gender and age differences

## Results

The factors rated as the highest risks can be summarized as follows: Growing gap between the rich and the poor, terrorism, air pollution, religious fanaticism, corruption, heinous crime, global warming, ozone hole, racism, hunger and poverty, biological weapons, lack of fresh water, overpopulation and ethnical conflict (see Figure 1). The analysis of variance (SAS program) showed significant differences between gender  $F(2,213) = 11.85, p < 0.001$ , and significant differences between the older and the younger group  $F(2,213) = 4.72, p < 0.031$  (see Figures 2 and 3). Gender conceptions and role behavior are the products of a broad network of cultural and social influences in many societal systems encountered in everyday life. Thus we expected differences between females and males in judgments of risks. We predicted that males, because of attributes of masculinity, would judge risk factors as less serious than females. In agreement with this prediction the female subjects perceived the global risk factors as more serious than did males, with the exception of religious fanaticism (see Figure 2). Moreover, the results also revealed significant age differences (see Figure 3 and 4). Interestingly, the younger subjects perceived the risk factors as more serious than the older group, except for terrorism and overpopulation. Unexpectedly, the subjects were most concerned about a growing gap between the rich and the poor. Another interesting finding is that the subjects also rated as high risk factors hunger and poverty, and overpopulation. This is in agreement with previous cross-cultural studies by Eisler et al. (2003) in which Swedish students were compared with German, Japanese and the United States students.

## Discussion

The current research provides substantial evidence that cultural values, gender, age and experiences are significant predictors of perceived risk factors. One important reason to study global risk perception is to achieve a better understanding of the social, cultural, gender and age mechanisms that might account for variations in the perception of risk. It seems likely that more attention should be paid to the process of the ongoing internationalization of national economies, the environmental and ecological problems, resources, etc.

We believe that our results have potential applications in international and national practices regarding political, economic, educational, and environmental decisions. But also the results contribute to our understanding of how people presently cope with the perceived global risk factors and with the existential challenge of a world that offers both threats and opportunities - more or less in the same package.

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## SUBJECTIVE METRICS OF HOSTILE AND FRIENDLY FACIAL EXPRESSIONS: AN ISSUE WITH SCHEMATIC FACES.

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### Abstract

Visual search studies employing threatening and friendly schematic faces have been justified on the ground that strict geometric control of visual features can thereby be achieved. The happy face advantage (lower RTs) observed with realistic photos has accordingly been attributed to perceptual uncontrolled factors, while the opposite threat advantage obtained with schematic faces was taken to reveal an evolutionary “preparedness” for threat detection. We surmise that such claims can only be properly addressed through an approach distinguishing between value-perceptual and importance-emotional parameters. Eyebrows, eyes and mouth were taken as factors in two integration tasks with schematic faces asking for judgments of “expression intensity” and “friendliness-hostility”. An averaging rule was found in both cases. Functional measurement was used to estimate independent “value” and “importance” parameters. Outcomes disavow the perceptual fairness of schematic stimuli, while still revealing higher importance of hostile features. General implications are pinpointed to the study of facial expressions.

The threat advantage effect documented with schematic facial expressions in visual search tasks (the face-in-the-crowd paradigm) has been taken to imply a threat detection module established by evolutionary pressure and relying closely on the circuit of the amygdale (Öhman et al., 2001; 2007). However, this influential interpretation must come to terms with the opposite finding of a happy face advantage arising with realistic photos of faces (Juth et al., 2005). The most often heard account of the happy advantage is that uncontrolled perceptual factors (e.g., greater distinctness) are actually concealing a true attentional advantage of threatening faces, mediated by emotion (Öhman et al., 2001; Juth et al., 2005). The argument turns into a methodological defence of schematic stimuli as a way to achieve perceptual control, meaning the equalisation of geometrical deviations from “neutral” across different emotion expressions (Kirita & Endo, 1995; Lundqvist et al., 1999).

We contend herein (1) that spatial-geometrical control is not perceptual control and confuses physical and subjective metrics. Also, (2) we claim that the whole matter of “emotion-based” versus “perceptual-based” advantages needs recasting in a framework where the psychological notions of “value” and “importance” become both central and operationally distinguishable. Specifically, we suggest that “perceptual” in the debate is referring to the perceptual scale value of the stimulus (feature or whole face), while “emotional-attentional” is used to refer to importance (in Öhman’s evolutionary account, biological/survival importance) of the stimulus.

In the following, we illustrate the use of functional measurement (FM) methodology to obtain independent estimates of scale values (perceptual) and weights (importance) of three schematic features widely employed in the “face-in-the-crowd” setting, as regards conveyed