ascribed here risk is a subjective construct - or using the words of the >Thomas-theorem $\langle: Risk is what people define as risk!^1$

Proceeding from the cognitive presence of risks, it is the goal of this contribution to extract from qualitative data material the semantic scope of risk in the public.

4.2 Material and methods

Qualitative data material offers the opportunity to obtain more detailed knowledge about the perception and opinion forming of people in a kind of >object-related cognitive process<. Closed standardized surveys do not provide this possibility.² The advantage of the qualitative approach is that the interviewees are not confronted with concrete risks which they must evaluate - as is the case in quantitative studies -, but that they can choose an approach entirely their own to the object of cognition.³ In the case at hand, a largely open interview strategy focusing on specific problems and themes, and complementing the survey's data was used as a basis from which to discover the >risk semantics< prevailing in the public (cf. Lamnek 1989: 3.4.2).

Between March and May 2001 a total of 62 qualitative set interviews averaging roughly 90 minutes were carried out. >Theoretical sampling< (cf. Strauss 1987) could not be realized due to time constraints. Instead, based on a quota plan, the attempt was made to select such persons of whom manifold and contrary attitudes towards risks could be expected. Among others, persons living in the vicinity of large-scale and high-risk technological facilities were selected, persons having to deal with risk due to their professions, be it that they eliminate the effects of risk or analytically calculate risks, but also people exposed to risks in the most varying ways, or people having become victims of harmful events. These groups of people were again complemented by >risk laymen< of highly diverse socio-demographic composition - from welfare recipients to industrial managers - of whom it could not automatically be presumed that they were creators or victims of risks in a special way going beyond the normal experience of everyday risks.

¹ In the wording extended by R. Bendix: »As long as men live by what they believe to be so, their beliefs become real in their consequences.« (cf. Helle 1977: 151). According to the Thomas-theorem subjective risk definitions such as this one become the starting and anchor point of risk evaluations, risk-related acts and decisions.

² On the specific advantages of qualitative paradigm see also Blumer 1979 and Glaser/Strauss 1979.

³ Due to the differing approach we intentionally dismissed the option of using the set interviews merely as a 'qualitative pilot study' in support of the survey. In our risk study it has the significance of an independent subproject.

In order to ensure the data's quality, the interviewers had to undergo thorough interview training comprising the carrying out and joint discussion of trial interviews as well as skilled techniques of enquiry. The interviewers were instructed to create an open, natural and >narrative< conversational setting, ensuring that the interviewee would actually speak exhaustively on all aspects of risks relevant to him/herself. The set interviews were carried out by the participants of a project seminar on risk pereception and evaluation of the University of Stuttgart at the Institute of Technology and Environmental Sociology and was transcribed in its entirety. Special thanks are due to them.

The centrality of statements and arguments

The evaluation strategy pursues the intention of determining the semantic scope of risk using the centrality of statements. By central statements we understand, for one, such aspects which do not remain singular but are found in the data material as repetitive motifs.⁴ For another, centrality also comprises that statements on risks are >marked < as relevant by the interviewees, either by explicitly assessing them as >important, as particularly threatening or promising benefits, as especially frequent, being significant currently or similar properties. The casual mentioning of certain risks - such as in syntagmatic enumerations of hazards without specific evaluations, explanations, examples or reasons - conversely signals only minor relevance. The placement of arguments and examples within the course of the interview also permits conclusions as to subjective relevance: Are certain risks only mentioned in the course of the interview, are they only talked about once the interviewer has started on the specific subject or asked for a concrete evaluation of the risk, or are these risks in a constant cognitive awareness, are they introduced at a prominent position and do they provide - without the interviewee being asked - occasion for enlarging on them with narratives and explanations?

The relevance of the initial question

If one wants to probe into the semantic scope of risks by way of their centrality, these considerations show that it is above all important to analyze the discourse on the initial question. The initial question read: *»What comes to your mind on the subject of risk?*«.⁵ Such an open entrance, which leaves the *»*framing*«* and structuring of his/her attitude

⁴ This approach seems justified due to the number of interviews, which is relatively large for a qualitative study.

⁵ The interviewers were instructed not to make any specific statements with regard to risk, neither during the arrangement of the interview nor during the preliminary conversation, so as to avoid distortion during the treatment of the subject by external boundary conditions.

entirely to the interviewee has special advantages for reconstructing the understanding of everyday risk. The ascription of relevance is based on the cognitive awareness of subjects and attitudes, but it can also be determined by the depth of the description or the conscious emphasis of aspects on the part of the interviewee.

Furthermore the following evaluations are based on the statements of interviewees evoked by the two following set questions: *»What do you perceive as particularly threate-ning in your everyday life?* and *»What is the most dangerous thing you experience in your leisure time?* Here, too, it was intentionally avoided to directly broach particular risk subjects. In contrast to the initial question though, framing and focusing of the subject of risk does take place: for one, by the placement of risks into two spheres of life, everyday life and leisure, for another by equating risk with threat or hazard; the initial question leaves open whether the interviewees wanted to see harmful and/or beneficial aspects in risks.

Method of evaluation

The relatively large number of set interviews made it necessary to encode all the statements made in answer to the first three set questions. It seemed reasonable to base the coding on somewhat more complex *argumentative structures* and not on *key words*, so that it would be easier to reconstruct the intended meaning. E.g., codes were ascribed according to the stated risk, the significance of the argument within the discourse, the perceived harm - what is affected? - and its assumed extent, the source of risk, its acceptability, but also according to which role the interviewee takes towards the risk, such as passively suffering, avoiding, protesting, risk-minimizing.

All in all codes were given to a total of 443 aspects which were stated on the first three set questions by the 62 interviewees both male and female in roughly equal proportions. In order to provide unambiguous markings to the statements, the index of the transcribed interview material was adopted and also encoded⁶. The thus compiled register makes it possible to immediately access the wording transcribed or on cassette tape on any risk and any combination of ascribed characteristics. The easiest method of meeting the requirements of encoding was with an Excel database and its high flexibility, moreover an excellent SPSS interface permitted counting according to selected characteristics and aspects. However, computer-based evaluation was only an auxiliary to systemize the data material at hand and to decide which aspects are central and which are peripheral. The analysis' main focus is to select and interpret >typical< and >central< statements.

⁶ Thus, R24.2.069 means interview on the subject of risk no. 24, tape side 2, tape position 69.

4.3 The semantic space of risk

This section introduces exclusively those statements evoked from the 62 interviewees by the initial question »What comes to your mind on the subject of risk?«.

Fig. 1 shows that in lay perception risk semantics are part of the >everyday world< and are dominated by perceptions close to the interviewees' sphere of experience: almost half of the interviewees first think of risks involved with mobility, with the better part presented by risks in road traffic.



Fig. 1: What do Interviewees Associate with »Risk«

Mobility risks

This risk aspect is composed mainly of the relatively wide range of risks of >driving a car<, >riding a bicycle< and participating in road traffic as a pedestrian: *»Well, at first you think: >Risk?< - When I cross the street I could get run over!* (R55.1.010) *»It is certainly always a risk or a threat to participate in road traffic.* (R04.1.020) *»Yes, basically anything can be dangerous, really - ... it can be dangerous to cross the street.* (R56.1.014) Experts

calculate risks as degree of harm multiplied by the probability of occurrence, but these short statements convey a qualitative aspect of >probability of occurrence<, in the sense of everyday, frequent and virtually ubiquitous hazard potentials. *»As soon as you get into the car and you imagine how many accidents happen all the time, that's a risk that you permanently expose yourself to as a car driver*« (R02.1.007) Even if the statements sometimes suggest a certain distance to road traffic risks, the consequences of road accidents can be serious - an allusion made in the first quote: in all cases where harm resulting from road accidents was mentioned, it was always harm to people, not one single time was material or financial damage mentioned.

Four patterns of origination emerge for hazards of road traffic. First of all there are those cases where one ponders the general dangerousness of road traffic without focusing on specific actors (see above R02.1.007). In this case road traffic appears as a rather abstract system with many actors, characterized by its potential hazards. Frequently, however, it is assumed that one's own person is exposed to a hazard caused by other traffic participants: »People here often drive aggressively, they tailgate, they overtake...« (R54.1.017) But risks are also created when »I am riding my bicycle ... [and] I am exposing myself to the hazard of being run down by some car driver.« (R17.1.019) Selfimperilment follows at a marked distance, e.g. by inattentiveness: »What do I consider dangerous? To me personally car driving would be dangerous, for example, because I am such a dreamer.« (R49.1.030) »I use my bicycle a lot to get about - even in the city. And when I *zip by between cars it's pretty close sometimes!* « (R52.1.023) These statements would easily permit the assumption that >the self< could be a threat to >the others<, but the interviewee wants to convey a different meaning. Indeed there is not one section of text where an interviewee admits to himself/herself becoming a risk to others due to his participation in road traffic. In all cases, the interviewee himself/herself is the victim, a victim of the faulty action of others or - more rarely - a victim of his own action. For example it is dangerous to »cross the street without looking.« (R29.1.012).

Much less frequently, motorcycling, off-road biking or aircraft are listed as sources of hazards, such as *»the hazard of flying«*. (R60.1.033) Mobility can also turn into a leisure risk and in doing so can sometimes assume the character of a challenge: *»What is dangerous is a hobby, for example - riding a motorcycle. That's dangerous!«* (R09.1.030) *»I love riding my mountain bike in rough terrain, but in road traffic, I think, this would be an increased risk, especially now in spring.«* (R19.1.29)

Finally, participation in road traffic is rationalized as an omnipresent and unavoidable »everyday risk« which must be suffered as *»it certainly always is a risk or a threat to participate in road traffic - I mean going someplace in a car - but that is a general risk in life which everyone has to take*« (R04.1.020) *»I don't think that I lead a particularly threatened*

life; and I don't think it's particularly high-risk... The everyday risks which everyone has, from driving a car to being robbed. But this is a risk I consider to be very low.« (R30.1.016) »*But I think it is also a high risk to drive a car; still, driving a car is an everyday event, everybody does it, I do too. Sometimes you have an accident, like I did yesterday, but otherwise, well, you do it anyway.*« (R01.1.008)

Material safety, risks in economic and business life

The second most frequent interactions occur in the section >material safety<, which also includes risks of the overall situation of the economy - *»Speculating in stocks would be such a risk!*« (R27.1.011), or risks emerging in the context of university or professional education: *»When I start going to university, I won't know how it will end, that's a risk, too.*« (R51.1.008) However, with only four and two listed aspects respectively, these two latter subsections are hardly significant.

Frequently, professional risks are framed as everyday or common risks: »All of life is a risk - nothing is for eternity. That starts with road traffic, in one's relationship, in your life at work. You meet with risk every day, be it in the shape of an unfriendly boss or problems concerning projects, whether they can be concluded successfully or not. So, you come across that everywhere.« (R71.1.010) Risks are universal, »be it in road traffic, be it when doing our job, be it in the household.« (R10.1.018) »Risks are everywhere: at the workplace there are for example ... risks of having an accident.« (R24.1.012)

Job-related risks can be divided into several classes. The risk of accidents, such as in the previous case, is thought of more seldomly. Ms. N., too, a police officer, associates professional risks with the danger of having an accident: *»Risk? Spontaneously, that makes me think of professional risk. In my job I have a rather high exposure to risk. You can get shot or stabbed real quick.«* (R46.1.020)

Where professional risks are concerned, however, fears for life and limb play just as marginal a role as psychosocial disadvantages, such as *»in the shape of an unfriendly boss«* (R71.1.15) or *»Risk with regard to respect. If a company is not successful within a short period of time, you're easily considered a failure«* (R58.1.004). Instead, fears revolving around finding the right profession, holding one's job position and ensuring sufficient income prevail: *»What comes to my mind is risk in your professional choice or by chosing the wrong profession to expose yourself to the risk of no longer finding a job on the so-called employment market.«* (R28.1.007) *»Profession always involves risks. Getting a new job, too. My first job was an absolute catastrophe. That's a risk … But it's mere coincidence.«* (R33.1.20) In the following statement job-related core themes are reduced to a common

denominator: »Not to get a real job, to become unemployed or to be poor. Society just is highly polarized into rich and poor.« (R55.1.019)

But professional life does not only hold risks for employees. Risk is mentioned in connection with independent entrepreneurial activities at least just as pointedly: *»Risk? Founding a company. Becoming self-employed involves a high risk!* « (R29.1.005) *»When you turn independent, risk first of all means financial loss.* « (R58.1.004)

In contrast to dependent employment whose risks are perceived as threats caused by external or incidental factors which appear to be practically unalterable, the statements of those self-employed have a much more active quality to them. Moreover, it is notable that here risks are no longer presented one-sidedly as being dangers to the chances of financial gain but as conscious decisions and acts based on a balancing of chances for profit and risks of loss: *»The term of risk really is quite a positive term to me,* because in my field it is relatively easy to assess or estimate risk, thus there is hardly any risk at all. I mean, frequently the question is, how risky is it to take a new direction in the economy or with some sales. Will I do that? Will I take the risk, will I be successful or a failure? In that case, the risk is no risk to me, it is relatively easy to contain.« (R35.1.035) »Well, as a businesswoman the first thing I think of is of course the business risk, entrepreneurial risk in the sense that I live with it every day. Can I market this product? Is it worth it? Do I have enough purchasers? Or do I have to face the fact after a few years, >I am getting into the red, *I have to discontinue this project, look for a new one*.« (R43.1.006) Despite the fact that the risk seems all the lower, the higher the individual's conviction of being in control, the statements on the subject of self-employment make it generally clear that there is no guarantee of success. »Financial risk is what comes to my mind spontaneously: if I want to become self-employed, I run a risk«, (R17.1.006) and in the case of a failure it is not only the decision makers themselves who can be affected but also individuals from their immediate social environment: »For a family, for example, ... it can definitely be a risk to become self-employed instead of being an employee, and then you no longer have the economic basis for a family.« (R04.1.012) Only to a few privileged individuals do the effects of risk not seem to entail any substantial disadvantages: »Then there is the field of risk in everyday business: Then of course you have managers and executives making budget-related decisions, they also take risks when deciding - but in those cases it's not quite clear whether they really take a risk at all« (R42.1.025)

Analogous to the subject of mobility, the majority of interviewees place those risks concerning work, profession and quite generally material gain into the category of ubiquitous *everyday risks*. The subject is devoid of anything abstract or exotic, so-to-speak, it is in the realm of people's immediate experience, and not only of the working population but also of those who had not (as yet) started working at the time of the

interview. As in the case of mobility, the question of material gain is a topic with relevance and risk for almost everyone. There is an indication that individual risk semantics are characterized above all by topics which can be experienced everyday, which are omnipresent and have a high mental awareness. The statements on professional risks reflect two types of >logic<: with employed individuals it is a feeling of being exposed to an external threat which can only be influenced with great difficulty, while self-employed individuals justify their entrepreneurial risk with the chance of making a profit; with them, risk is not an *external threat* but a challenge and the *opposite of security* - as they do not presume as given a guarantee for entrepreneurial success.

Health risks

Risks relating to the health of the interviewees constitute the third large category mentioned by one in four interviewees when answering the initial question. These include - from birth to death - diseases of all kinds of which some can be directly subsumed under the >conditio humana<: *»At the very top I place the risk of life in the sense of risk to my health. Which means, ultimately, the aim and object of man is to live or even to survive. In that respect one is permanently accompanied by risks, from birth to death.« (R38.1.017) »All of life is a risk. When we are born it's already a risk: we don't know whether we will be born healthy or sick.« (R51.1.030)*

Health hazards include the occurrence of diseases, some of them incidental, >inexplicable ones. »By risk I also mean that one could get a disease which cannot be treated simply.« (R23.1.015) "They just found out that I have an allergy which is very strong...It worries me and it is a risk.« (R23.1.032) But not all health risks are interpreted as incidental blows dealt by fate, as the threatening sword of Damocles⁷: The probability of an occurrence of other impacts on good health is structural, i.e. caused by old age, such as. »... things which can just happen because it's your fate, where you maybe didn't play any part yourself, which come over you. If an old person takes a fall... Maybe one should give some thought to what could happen... They are hard to reckon with, are risks.« (R41.1.041) Other syndromes seem to increase, no concrete reasons can be said, at the most speculations can be made: »There are an increasing number of people suffering from allergies. Statistically, there is a really great number of people suffering from neurodermatitis, which in my eyes does not necessarily have anything to do with the psyche, but with the environment. Even in the case of diabetic children... with diabetes type I - statistics show sharply increasing numbers. There are a lot of younger children who must take injections, ...who must live with an insulin pump at half a year of age.« (R72.1.011)

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Regarding risk semantics relating to figures of Greek antiquity see also Klinke/Renn 2001.

In addition, the subject is also mentioned in discussions when health is impaired as a result of human decisions and acts, such as by a certain behavior in consumption, nutrition or the intake of stimulants such as caffeine, nicotine or alcohol: *when you eat or smoke, you also expose yourself to a health risk that way.*« (R02.1.032) First of all, the risk of smoking must be mentioned here, almost a *risk classic*, so-to-speak. It is a consciously taken risk even though considerable damage to health is to be expected from it. *Well, to me personally ... the most dangerous is my smoking, probably.*« (R49.1.045) *And, smoking, that's clear, one should really be aware of that risk, that you can severely damage your body.*« (R02.1.032) Other behavior, too, can entail undesired side effects: *It is dangerous to have unprotected intercourse, like I did for example and then to become suddenly pregnant... But you can also get AIDS.*« (R55.1.020) *»Risk, the first thing I can think of: sex without protection, as it is apparently done again nowadays increasingly. Then what comes to my mind, risk in choosing your food, which is front-page news right now.*« (R28.1.007)

Frequently, nutritional risks are mentioned. For one, risks based on false nutrition: »Risks [...] by false nutrition, but I never really had a closer look at ... nutrition. I am sure there are a lot of risks involved there.« (R02.1.033) For another, the threat caused by special substances contained in food is taken notice of, for example the BSE risk, which is occasionally touched upon in interviews. »At the moment, what is particularly threatening in everyday life is a) all those crises concerning BSE, foot-and-mouth disease...you can't really call it catastrophes, but ... you don't really know any more how to behave as a consumer.« (R03.1.025) »Buying meat at your butcher! ... Basically everything involves a risk somehow, smoking! All of life is a risk somehow.« (R32.1.005)

And finally, medicine itself can turn into a threat to one's health, be it through therapeutic measures or through drugs and their potential side effects: »Yes, well, you first think of some drugs or medication - regarding risks and side effects.« (R03.1.016) Observations daring to venture on human genetics research or the field of medical ethics are clearly more abstract, »such as in the medical field nowadays life-prolonging >measures<, those things which always hold risks for man and which have to be dealt with more consciously.« (R41.1.18) However, risks can also arise from »medical research without limits. I am thinking of biogenetic research, of ... embryonic research. For example, I am thinking of research of the womb... Then of course the risk of euthanasia, which has been ... approved in Holland, which will probably cross borders to us, it has two sides. Euthanasia can of course be a relief if it is done out of one's own free will and when the disease is extremely serious and painful. But it can also be - and that's the danger, that's a real risk! -, that it is done too early and not out of the free will of the dying person. That is, I believe, a really important point.« (R07.1.012)

These statements illustrate to what a comprehensive and complex extent >health as a risk is dealt with in the public opinion. The subject of health, however, as a risk semantic to be researched, brings comparatively great difficulties. On the one hand, people consider health as an >autonomous< sphere which itself becomes a risk: health as cause and at the same time object of harm. On the other hand, the field of health emerges at the point of intersection between risks, some of which are caused by the individual himself, sometimes they are attributed to other spheres: the environment, inadequately produced foodstuffs, side effects of drugs etc.. The, if rare, identification of medical therapy and research as health risks can prove in a special way how difficult it is to keep apart cause and effect where the subject of health is concerned. Moreover, strategies of dramatization and dedramatization are wider spread than with the subjects analyzed previously. This circumstance provides neither a clear profile nor a clear judgement where the assessment of health risks as everyday risks and the question of the acceptability of those hazards are concerned. Thus, the smallest common denominator of the subject of health and of the previous fields of >mobility< and >material security< seems to be the fact that this subject, too, is very intimate to the interviewees and becomes the ever present companion >from cradle to the grave <: despite the heterogeneity of its cause-and-effect fabric, the seriousness of its consequences and the varying willingness to accept, the subject of health is - in the best sense of the word - an >everyday subject<.

Marginal risks

There may also be varying psychosocial risks. Be it, that one feels threatened by the reckless acts of others: *»Occasionally I feel threatened by other people who don't think much about what they do and thus expose others to danger.*« (R25.1.08) Be it, that one has had bad or disappointing experience with certain circles: *»I have made many bad experiences with people over 40.*« (R49.1.043) Moreover there is the wide field of risks resulting from relationships, with problems being listed both with having no relationship (R71) and problems within relationships. And even falling in love can be put into a category of risk: *»What comes to my mind off-hand is that it is ... dangerous to fall in love. It is dangerous because your feelings [get] all mixed up.*« (R45.1.040)

Evoking only seven listings, the subject field *>environment<* obtains surprisingly little attention. The subject was related to risk in two types of variant. The first is related to natural disasters, where nature itself becomes an uncalculable hazard potential: *»... various earthquakes have shown that.«* (R16.007) The other and much more central aspect relates to anthropogenic environmental destruction. Some interviewees included this causative logic, false treatment of the environment, in their arguments. *»Environmental disasters, i.e. climate changes ... from air pollution to waste put into the sea - it is wasteful*

and destructive exploitation of nature. There will come a time when all that [will] take its toll.« (R36.1.012) It is remarkable, that for the interviewees global environmental risks such as climate change or the ozone hole are more cognitive present than personal health hazards resulting from environmental influences.

Other subjects with low cognitive presence suffering a surprising marginal existence are socio-political problem fields in general and fear of *crime* in particular. For one we're dealing with the *»brutalization of society«* (R35.1.060). For another criminal incursions are listed as personal risks, where the fear of physical violence clearly prevails over financial crime or damage to property: *»Nowadays they kill you for five marks.«* (R59.2.42) *»Yes, crime! … The change in society, that nowadays you can't go out in the street without [exposing] yourself to … some risk«.* (R56.1.020)

Considering all the controversial discussions on large-scale and *risk technology* - such as nuclear, genetic engineering, chemical and weapon technology or technical facilities for waste disposal -, but also when technical products and their infrastructure are in the crossfire of criticism by the public and the mass media, as is the case in the cellular network technology debate, it is highly surprising that such subjects play such a marginal role when people are generally asked about risks. It may be that all these hazards are invisible creeping risks which cannot be perceived with one's senses. Their perception thus requires sensitivity and knowledge in order to be able to ascribe vague indications of damage to a certain creeping technological risk. Their hazard potential is less tangible and thus maybe too abstract to enjoy high cognitive presence. What do the few statements focus on? Genetic engineering and nuclear power are mentioned most: *»Risk, I would say, [has] ... for example something to do with nuclear power, or with ... genetic manipulation. All those are things which are very risk-prone.« (R04.1.008)*

>All of life is a risk< - an intermediary recapitulation

»All of life is a risk - nothing is for eternity.« (R71.1.010) In a series of interviews this statement emerges as the quintessence of those individual subjects subsequently elaborated. Even though it was mentioned explicitly in only 14 cases as an answer to the initial question - and implied implicitly in several other cases - it has a significance by far surpassing its frequency: Among other aspects, *»*all of life is a risk« is used to semantically anchor and assess risks. This sentence serves to mark such risks which are neither rare nor exotic in their nature. It rather places risks and hazards into an everyday ubiquitous frame, which is in some instances linked to the *conditio humana*, as could be shown with the example of health risks, in other cases it is based on the living conditions of a functionally highly differentiated industrial and labour-oriented

society. Mobility-related risks or risks focusing on the question of material and employment security are examples of this.

Normalized risks

Moreover, this attitude of life itself being a risk stands for the inevitability of hazards or, in a reverse conclusion, for the fact that these risks must - perforce - be accepted: *»…but that is a general risk of life which everyone bears anyway.*« (R04.1.020) Seen from this perspective, the general statement serves the purpose of playing down risks as everyday risks which must be suffered, regardless of the feared extent of the damage, which can be considerable in traffic accidents or armed robberies. Pointedly, this strategy could also be called the *>*normalization of risks<*. »Car driving is an everyday activity, everybody does it, I do too. Sometimes you have an accident, like I had yesterday, but otherwise, well, you do it anyway.*« (R01.1.008) *»Everyday risks, which everyone has, from driving a car to being robbed. But I think this risk is a very small one.*« (R30.1.016)

The risk concept of lay individuals - and this seems essential - is linked neither to the dread of risk consequences, but to the - qualitatively applied - frequency of risks, the latter being considered ubiquitous or as an everyday normality. By this, the risk semantics of lay individuals is diametric to both the risk concept of experts⁸ and to many psychometric risk characteristics by means of which risk evaluation is to be explained. The key to understanding the differences between insights gained from standardized data and those gained from qualitative data is obvious: in standardized interviews the risks to be evaluated are given, as are the characteristics for their evaluation and assessment, whereas in qualitative interviews there is complete openness with both respect to risks and their scales of assessment. Especially after the open initial question it is nothing but the cognitive presence of subjects and examples, as well as the ability to develop aspects to explain and criteria to assess risks, on the spur of the moment. This process is supported by orientations based on experience made during the individual's life - so-called >assumptions of normality - which were learned in the process of the >accumulation of biographic experiences⁹.

⁸ For a summary see also Renn/Zwick 1997: 3.1.1.1.

⁹ For a detailed description of the term >accumulation of biographic experiences< cf. Alheit 1989 and Hoerning 1989.

4.4 Risks in everyday life

The results of the qualitative study took us by surprise. As it was, due to lack of time, neither possible to make a sequential selection of interviewees nor to revise the handbook, all interviews were carried out with the previously compiled handbook. After the open introductory question the question was asked, what the interviewee would assess as especially dangerous in everyday life and what would be considered particularly threatening during leisure time. This guideline dramaturgy was chosen because it was assumed that technology-related and environmental risks would clearly dominate in the risk perception of the public. However, climate change and the ozone hole, risks of nuclear power, genetic engineering or cellular phone networks, all these hazards are treated as exotic, abstract risks far from everyday life and personal experience - it is obvious that within the data material they hold only a marginal position! As the introductory discourse referred mainly to everyday risks, the question about the perception of risks in everyday life was particularly unfortunate.



Fig. 2: What do Interviewees Associate with »Risks in Everyday Life«

Source: 62 Qualitative Interviews on the Risk Perception of the Public Answers to the question: "What do you perceive as particularly threatening in everyday life?" As is shown in Fig. 2, it hardly produced new insights but frequently led to redundant answers. The *risk of mobility*, above all, was picked up again by many interviewees and dominates - as the *>everyday risk par excellence*< - all other risks.

4.5 Leisure risks

Responses to the >leisure risks< cue turned out to be more specific. Variations of the subject of traffic do dominate, true, but closely followed by the fields of sports and leisure activities - among them 42 statements focusing on sports and 8 on activities relating to hobbies (Fig. 3).

Persons (62) Aspects (162) **Mobility risks** 41 36 Sports/leisure risks 50 34 **Psychosocial risks** 16 18 Health 8 10 7 Crime 6 Profess./mat. security 5 **Risks at home** 3 **Environmental risks** 3 Life as a risk 1 **Technological risks** 1 60 50 40 30 20 10 0 10 20 30 40 50 60 Source: 62 Qualitative Interviews on the Perception of Risks of the Public

Fig. 3: What do Interviewees Associate with »Leisure Risks«

Favorite examples are fun and risk sports - the risk of bungee jumping being the most frequently mentioned - even by people who do not practice any risk sports themselves: »*In leisure time I find it dangerous, for example, when somebody thinks that he absolutely has to do paragliding or free-climbing. Or bungee jumping. But these are things which do not*

concern me personally. These are general things which I think are high risk and threatening

Answers to the question: »What is the most dangerous thing you experience in your leisure?«

to the one who is doing it... In my leisure time I would try to avoid being exposed to threatening situations.« (R04.1.028) »I can only think of risk sports, they are in fashion right now, like bungee jumping and paragliding.« (R31.1.007) However, conventional fitness and sports practised in clubs are hardly mentioned at all. »Due to the fact that I am a risk-shy person the only thing that can [happen] to me during sports activities is that maybe I could somehow break a leg while jogging.« (R47.1.019)

In the text material sport-based activities imply different >sport styles<. While some individuals act very carefully and are more inclined towards conventional very low-risk types of sport, others more inclined towards risk act according to the idea that in order to achieve something one must also put something at stake. In these cases, the concept of risk is used in the sense of a personal challenge.¹⁰ It is the goal of such athletic activities to master situations by consciously taking risks: *»In sports, you run the risk of injury which you can't avoid when you do sports. Then [you try] to go to your limits, be it in tennis or soccer, … to go to your limits and in that moment you don't think about the possibility of injury.« (R02.1.020) Apart from this conscious acceptance of risks which finds its special intensification in the potential of going beyond those limits, sports >in itself< is considered dangerous by some interviewees: <i>»Sporty things - I mean, they are all dangerous*!« (R49.1.045) Obviously, what comes to the mind here is Churchill's >no sports<.

Analogous to mobility risks, here, too, dangers emerge from the individual's own decisions or from the behavior of others: Risks arise ... *»actually only during some athletic activities, that I could break a leg, during bicycle riding, inline skating, skiing or something like that.*« (R30.1.022) *»I could be swimming in the swimming pool and someone could jump on top of me.*« (R60.1.103)

In rare cases, sport accidents can also occur in the shape of an >Act of God<, such as when a piece of equipment fails or breaks. *»Of course I am doing sports right now, and the cable holding the weights could snap and I could break God knows what.* (R55.1.039)

On the whole, however, it becomes apparent that sport-related risks are largely selfinflicted and are considered to be under the individual's control. Risk varies positively in the case of such >styles of sport< where limits are looked for or exceeded, it varies negatively with the use of safety equipment or the avoidance of risky behavior, whereas a feeling of high >athletic competence< can have a deceptive effect: *»Since I am working in a snowboard division and teaching snowboarding and do a lot of snowboarding myself, I tell myself: >I am good at this<, and I overrate myself to a certain degree. That's why*

¹⁰ In his Greek risk mythology Renn would in this case reclaim the >Hercules< type (1993).

I just bought myself a helmet in order to reduce the risk.« (R39.1.032) »As far as riding a bike is concerned or doing inline skating or some such, I mean any kind of sport ... [needs] a certain type of equipment, like helmet, knee and elbow protectors. [Without] good equipment I would really see quite a high risk there.« (R72.1.044)

Occasionally a remark was made that others assess the risk as much higher than the interviewee oneself, namely due to the much higher individual convictions about control: *»My parents are always saying that climbing is dangerous. Or that I take unnecessary risks that way. But I think that I can handle those risks relatively well as I know what I am doing.«* (R17.1.029)

Of the eight non-sport-based leisure activities considered risky the subject of >vacation in foreign countries< is at the top. Risks are seen as a combination of uncalculable and only poorly controllable situations, with a simultaneous lack of sufficient cultural competence and infrastructural resources which would permit the handling of risk consequences without problems. *»What maybe others consider dangerous is when you travel on your own, when you travel far, … and when you have to rely largely on yourself: Absolutely new situations, which are entirely unfamiliar. Languages you don't speak. Maybe you can express yourself only to a very limited extent, …maybe when you become sick, … in this completely foreign environment.« (R71.1.083) But travelling can involve other risks too: <i>»When I am travelling and I carry everything on me - including dough for a few weeks - that's of course a greater risk than going for a walk here.*« (R42.1.052)

4.6 Summary and outlook

Despite the manifold facets showing in the numerous quoted statements, the risk semantics of the lay public can be characterized by a few, but central properties. Cognitive presence is given to obvious everyday risks which can be experienced by the individual's senses and which are even >normalized< as more or less acceptable everyday risks even in those cases where they harbor considerable potential for harm.

The citizen always considers his perspective to be the foremost one. Based on this everyday perspective he or she tackles the risk-related questions of the world. But neither high personal or social potentials for harm or catastrophe, nor the explicit emphasis of beneficial aspects are the prominent characteristics determining the attention given to risks or their recollectability. Rather it is the omnipresence of risks which are seen as an integral component of life in a modern industrial society oriented towards work and performance: its risks are everyday risks, present at all times and all places. This is above all manifested in those risks which concern mobility and material reproduction, whose consequences get under the skin, be it as harm to one's health or as damage concerning material survival. In the perception of the individual, traffic accidents and risks in the employment market or work place coagulate into system-inherent risks of modern industrial societies. Other risks which could be described by similar characteristics - such as environmental or technological risks - are not directly perceivable due to their creeping nature. As latent risks, however, they can nevertheless be of high relevance¹¹. Latency, however, usually means low priority and obviously low cognitive awareness. This is the really surprising part of the findings of our analyses.

In the end it turned out that the concept of >risk< is predominantly associated with threat and expectations of harm or loss. Merely where leisure or entrepreneurial risks were concerned, expectations of benefit and venture aspects showed clearly.

Moreover it is not only the interviewed risk laymen who attach risk semantics predominantly to the practical ability to experience hazards. Our comprehensive sample also included interviewees - self-employed individuals, scientists or individuals employed by insurance companies - who should be familiar with risk calculations.¹² It is surprising here too that - with the exception of some vague marginal considerations approaches of analytical risk concepts are equally >covered up< by everyday considerations and examples. Thus, the attitude that life - as a kind of conditio humana - is full of risks, in many cases becomes the basic stance of risk perception. Thus, the reproach occasionally directed to the German public, that individuals in this country have a fixation on nature, that they are risk-shy and averse to technology, practically holds no water: »In our country, it is above all hazards and threats which are seen in new technologies, and less their benefit. The word >fear< has become a global synonym of the German attitude. The call >back to nature< sets a trend which is a fundamental threat to countries like Germany which are poor in natural resources.« (Büchel 1995: 4) In their entirety, the set interviews show neither fearful resignation nor a fixation on environmental problems and just as little a decisive resistance against seemingly unacceptable risks, but rather an accedence, a submission to the unavoidable. Merely where leisure risks are concerned individual control convictions can be seen and likely applied in practice.

Our results substantiate that it was justified to remove qualitative research of risk perception from the category of insignificant >preliminary studies< for quantitative >principal studies< and to consider them as an equally important instrument for the

¹¹ The following contribution by Ester Höhle proves this by using the perception of anthropogenic environmental risks.

¹² However, the concerned individuals were not interviewed in their professional capacity.

finding of knowledge. This much became clear: Many survey studies on risk perception and evaluation select risks and provide properties for their characterization, that are highly oriented to actual or apparent *political* or *economic relevance*, or mass-mediabased attractiveness. And yet they more or less miss the understanding of risk of the lay public: the sometimes highly controversial discussions of nuclear power, genetic engineering, global climate risks or hazards caused by cellular network technology may result in differing assessments also by the lay public, - however, they only have central significance to a minority at the most. Conversely it would be interesting for future risk research to vary risks more and to use everyday risks - such as road traffic- and work-related risks - to compare and to >standardize< the perception and evaluation of other, less tangible risks.

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5. Global Climate Change as Perceived by the Public¹ (Ester Höhle)

5.1 Introduction

The results of the risk survey on the perception of global climate change make one sit up and take notice: All in all the public experiences global climate change as a serious threat: Compared to much discussed topics such as crime rate, genetic engineering in food production, nuclear power or even BSE, which had triggered a massive boycotting of beef products in 2000, the fear of climate change takes up the top position in the evaluation of our survey's interviewees. But this is not the whole extent of the matter: more than half of the interviewees associate with climate change a high potential for catastrophe, and that even though Germany in general and Baden-Württemberg in particular do by no means count as being particularly disaster-prone areas. Two remarkable natural disasters, namely hurricane >Lothar< of December 26th, 1999, which claimed 15 lives and 5 % of the country's indigenous forests, and the flooding of the Oder in July 1997 are matters of the past and are not reflected in the 62 qualitative interviews. Thus, the ascription of disasters hardly seems covered by primary experience. All the more the question emerges: What do people really understand by global climate change? What makes them afraid? And how can it be that despite the stated fears, thinking and acting differ as widely where climate protection is concerned, as in hardly any other sphere of life? (cf. Preisendörfer/ Franzen 1996, Tanner/Foppa 1996, Renn/Zwick 1997: 13) The survey's data prove that the individual and social benefit of motorized passenger car traffic - one of the main factors causing the release of greenhouse gases - is assessed as being very high, maybe high enough to consider the climatic risk caused by it, among other factors, as inevitable.

The following analyses refer to the qualitative data material described in the previous chapter by Heinßen/Sautter/Zwick. The answers to two sets of questions out of the comprehensive manual will be evaluated in the following. For one, statements made on the introductory open question: *»What comes to your mind on the subject of risk?«.* For another the interviewees were, in the course of the interview, shown small cards with symbolic representations of the surveyed risks - among others a picture of the earth's globe surrounded by smoking industrial smokestacks and smoking exhaust pipes.² The interviewees were then asked to make statements on the risk in question.

¹ Many thanks to Ortwin Renn and Michael Zwick for suggestions which were of great help in the making of this paper.

² See appendix.

Finally, more detailed questions were asked on the specific risk, when necessary, in order to learn what makes a risk appear as especially dangerous, what causes the risk, which damage is expected at what time, whether the risk is increasing or decreasing, who are the main groups of persons affected by it, who is made responsible for the development, but also for the potential control and reduction of the risk and how the acceptability of the climate risk is assessed. The interviewers were instructed to create a conversational setting as open and natural as possible, leaving a lot of space for descriptions and explanations.

5.2 Statements on climate change in the open introductory question

»What comes to your mind on the subject of risk? « The qualitative interviews were opened with this question. The statements evoked by this question are of special interest as they reflect the cognitive presence of themes. On the subject of >risk<, most interviewees think of everyday, so-to-speak >tangible < hazards, which can be perceived with one's senses, such as road traffic, followed by health and leisure risks. Climate change - in the widest sense of the word - was mentioned eight times by the 62 interviewees in the course of their answers to the first open question. Thus, climate risk - analogous to nuclear power, BSE or genetic engineering - is one of those risks which were rarely stated spontaneously. As a rule, climate change was not mentioned explicitly, but rather more or less loosely related symptoms. Thus, the subject was embedded into a wider semantic context. In part, however, it will remain a question of interpretation whether statements relating less specifically to *»environmental development, i.e. concerning* all the resources, and energy« (R24.1.022)³ can be referenced to climate or not. Other statements generally speak of »contaminated air« (R35.1.088), »environmental pollution«, »the destruction of nature« (R22), »acid rain«, »trees are losing their leaves« (R35), »sky poisened by kerosene«, »destruction of the ozone layer« (R07), or »environmental risks and the ozone hole« (R50.1.019). It is doubtful, whether these statements can be interpreted as related to climate change, since the respondents were free to state all sorts of conceivable aspects of risk.⁴

But there were also more specific statements on *»the stance of the USA in the Kyoto Protocol*« (R07), *»global warming*« (R31), *»climate change*« (R36), *»climate catastrophe*« (R42), *»climate summit*« (R71) or the perception of *»a too mild winter*« (R72). On the

³ R24.1.022 signifies Interview No. 24 on the subject of risk, 1st side of tape, tape section 022.

⁴ The difficulty is that the point cannot be to measure the statements of the interviewees on environmental changes against a scientifically founded definition of climate change, but to reconstruct whether a mentioned phenomenon can be considered as belonging to climate change or not *from the point of view of the interviewees.*

whole it seemed appropriate to use those eight interviews which from the beginning related to the >climate change syndrome< relatively clearly.⁵ In all these cases risk is evaluated relatively negatively or is at least put into a pejorative context, its consequences are assessed as risky or threatening: of the eight interviewees initially speaking of climate change, six counted climate change among the worst threats. It is noticeable that climate risks are frequently mentioned in combination with other rarely remembered risks: i.e. Ms. P. (R72) also mentions, apart from the too mild winter, BSE, oldage pension politics, Chernobyl, poverty and social welfare. Ms. R. (R35) states, apart from the environmental risk and others, the decline in social values. Mr. X. (R42), who already mentions during the introduction that he is interested in *»things like ecology,* the consequences of technology, nuclear power« includes under the subject of environmental influences, apart from climate catastrophe, also problems resulting from nuclear power and BSE. In addition to climatic changes, Mr. V. (R71) also speaks of the industrial nations' handling of resources, of BSE and the safety of food. Apart from contamination of the environment, the ozone hole and American climate politics, Ms. K. (R07) considers euthanasia, genetic engineering and chemical substances contained in cleaning agents and food as being risky. Finally, Ms. R. (R50) mentions, apart from the ozone hole, environmental risks and the transportation of radioactive material.

It is conspicuous that in the statements the majority of the mentioned subjects are frequent topics in current media reporting. Thus it is not implausible to assume that persons who spontaneously cite climate risk are particularly well-informed individuals attentively following the daily events reported in the mass media. It is likely that they have an increased interest in political and ecological matters, or a special sensitization for more abstract problem fields. Despite indications of the higher educational level of these interviewees⁶, the qualitative material hardly prooves the conjecture that >global warming< is associated with high political interest and special attention for political matters.

All in all it becomes obvious that climate risk, compared to risks which can be experienced directly in everyday life, has a markedly *lower cognitive presence*. Thus it is fair to assume that this is more a *latent subject* concealed by daily political events, but which can be >activated< easily in case of harm or relevant communication.

⁵ R07, R31, R35, R36, R42, R50, R71 and R72.

⁶ R07: female pensioner in her mid-seventies with college-degree; R31: male teacher in his mid-fourties; R35: female manager of several travel agencies; R36: male owner of a financial consultancy business in his mid-fourties; R42: male software developer in his mid-twenties who had occasionally worked in the German branch of >Friends of the Earth<; R50: female insurance clerk in her mid-twenties studying business sciences in addition to working; R71: male graduate engineer in his early fourties working in the IT field and R72: female employee in her mid-fourties working for a cellular phone company.

5.3 The global climate risk in direct questions

When enquiring directly about global climate risk the interviewees were shown the small card with the symbol for global climate change and the word *»climate change«*. After the interviewees had studied the symbol the specific question was asked: *»What comes to your mind on the subject of climate change?«*

Fact or Fiction? Climate change as an evident event

Uncertainties as to whether there is a climate change at all seem to be a thing of the past. Almost all interviewees take it as a fact: »That it [the climate] changes is no question to me.« (R04.1.169) It is remarkable that in the qualitative material the individual's own primary sensual experience markedly dominates the expert opinions communicated by the mass media: »The climate change can even be felt here nowadays...« (R48.1.126) »I mean, even here in Europe it has become noticeable that something has changed « (R60.3.750). »There is a shift - there is no longer a real winter here!« (R50.1.198) »When you just look at our forests, ... over the years. Years ago ... we didn't have such mild winters and all the forests, they weren't so sick. Today there are only sick forests and yes, you can tell by the storms. They are real hurricanes, we never used to have those before. And all the landslides and, and floods.« (R72.1.024) Although the interviewees describe climate change and its consequences as directly perceived, obvious events, it is nevertheless plausible to assume that the mass media play at least a small role where the perception or perceptibility and ascribability of events representing climate change is concerned. I.e., that symptoms recognizable as effects of climate change can only be interpreted as such with sufficient knowledge about changes in weather patterns: »You know, I don't watch much television. But the Swiss mountains, they're melting. ... That thing with climate change, that's out of balance, you can see that ... I mean I just interpret it that way.« (R21.1.533)

Opposed to this, interviewees consider expert opinions on climate change with some skepticism: *»I believe even today scientists still do not quite agree with each other whether this is global warming that we have here.* (R35.1.258) Climate change is included in the list of topics where it is important *»which study was >in< just then, who the scientist was who just proved that there is global warming - >oh no! Not as bad as you think, quite the contrary!* (R27.2.004) The perceived uncertainty and conflicting expert opinions cause some interviewees to speculate about effect, extent and course of climate change and the risks involved. In most cases, the stated visions are outright horror scenarios: *»Basically [this is] a time bomb!* (R36.2.475) *»Climate change? You know, I don't want to walk around with a gas mask, but I think it's quite possible that this will happen some day.* (R46.1.704) *»... then there will be a fiasco. And then it are the later generations who will have to go through all this or maybe won't even survive it. I mean, it is not only that the sea level*

will rise and a few islands will be inundated ... that will be a catastrophe: the ozone hole and skin cancer will increase massively!« (R07.1.433) »I find it really bad. You just don't know where it will end. At some point we will live in the desert or everything will be iced over. Climate change is a big issue.« (R55.1.248) Unclear and conflicting expert opinions and, as a consequence of those, communication by the mass media of uncertainties, ambivalences and contradicting findings are prone to cause feelings of insecurity and fear; they open the scope for speculation, dramatization and apocalyptic visions. That lack of knowledge and uncertainty about risks may cause the public to fill >gaps of knowledge< with speculation, aspects and assessment criteria gained by everyday experience, has already been proven by qualitative research on the risks of genetic engineering (Zwick: 1998) - such mechanisms are also recognizable here. They illustrate that communicated uncertainty seriously interferes with the rational perception and assessment of risks; consequently this is an important responsibility of science and those institutions involved with risk communication.

Only sporadically climate change is perceived as an artefact or as being staged: *»Sometimes I have the impression that this is a summer-gap-filler: you always hear different things but it no longer registers with me. That's why it is no conscious risk.«* (R62.1.303) *»The whole thing is played up a little too much, I think it is a natural process of the earth.«* (R58.1.140) However, such opinions are the exception in the interview material.

Atmospheric disturbance instead of climate change - the wide semantics used with climate risk

Global warming, the threatening melting of the polar caps, the increasing frequency of storms and floods, the spread of the deserts or the rising sea levels are the effects of global climate change mentioned the most frequently. In doing so, climate change is put into a wider semantic context by the interviewees. »Climate change is a huge problem. For years there have been prognoses which seem to come true: that it is a high risk, the whole ecosystem >earth< is at stake, it may be threatened, and it can at least massively endanger highly developed life.« (R42.2.599) In about one in three interviews, the ozone hole was mentioned in the same breath as climate change: »Yes, well, the greenhouse effect - that's really bad and I think it will become steadily worse. One knows nowadays that the earth is warming up faster than thought before and that meanwhile icebergs are melting too... The ozone hole, one knows that too, has grown much bigger than one had thought that it would.« (R03.2.344) Climate change is understood as the generic term for anthropogenic damage of the atmosphere in general, a circumstance which makes it seem justified to retrospectively classify - in the interpretation of the initial statements - those text sections aiming at the ozone hole rather than global warming, as belonging to climate risk<.

Bad outlook - the evaluation of climate change

Almost all interviewees agree that climate change represents a massive risk. Answers concerning this point show a surprisingly narrow bandwidth. Even those individuals who did not think of climate risk in the open statement at the beginning assess climate change as an >important subject< and >considerable danger<: *»I think, [...] that this is one of the most threatening problems of all.*« (R53.1.112) *»I consider this ... - let's use the term* >*pressing*<.« (R37.1.190) Two other properties mentioned in the interview material are characteristic and basic for assessing climate change: *»The risk will increase - global warming is progressing!«* (R58.1.150) and *»The way we treat the environment is irreversible!«* (R57.1.080) Both statements are typical evaluations of the interviewees.

Almost without exception the interviewees speak of a dreadful, looming and growing risk and differentiate between space-related and temporal aspects of being affected by the climate risk.

Insidious risk

Generally the interviewees are unsure about when the starting point of climate change was. Fearful expectation of serious events threatening one's living space is held mainly for the following generations, i.e. climate change is perceived as an insidious risk with long-term consequences. Here, assessments as to when precisely climate change will occur or when it will assume threatening proportions vary. For some the time is so far away that they themselves will not be affected, but future generations will. *"The word climate change makes me think - in the extreme case - that we will destroy ourselves. But that will take some time... So seen in the long run - in centuries - it will probably become even more dangerous. But as I said, we are not affected yet. [The risk is] so insidious it's imperceptible.« (R09.1.280) "[Climate change] is a horrible risk. Because it is so insidious. Because people are not aware of it... and they don't see the consequences contained in it. That is why it is such a big risk.« (R17.1.254) <i>"I am thinking the whole time, thank God that my children will probably not be so affected, because I believe that climate change will be a slow process."* (R04.1.168)

To others the time will come earlier. They assume that it will be within their lifetime: *»Climate change is naturally something which causes great fear as you don't know how the weather will be here in 20, 30 years and whether we will all still be here or whether will all be frozen or burnt.«* (R55.2.111) Still others believe to be able to perceive alarming effects even today, which do by no means have disastrous properties but which are nevertheless perceived as threatening *»signs« and interpreted as symbolic harbingers of potential looming disasters: »In the meantime the climate change can even be felt here. For*

example on Christmas Eve or one day before Christmas Eve we had 16 or 17 centigrades. That is a clear sign to me.« (R48.1.126) »I believe that it is not reversible. I think, the risk has taken its course. That's dramatic!« R38.1.090)

To not few of the interviewees the dynamics of this risk, classified as irreversible and as having a high disaster potential, give rise to fatalism and a profound pessimism regarding the future: *»It will boil down to the fact that I won't even be able to say whether there will be a place to live for my own child… If they don't find a solution within the next say 20-30 years you no longer need to have any children at all.«* (R24.1.200) *»I think it is really awful. You simply don't know where this will end. At some point we will live in the desert or we will all be iced over.«* (R55.1.248) *»Well, a lot of things will have to happen, otherwise our children or our grandchildren will have nothing left of the earth the way we knew it.«* (R30.1.110).

Globalization of the risk

The question of who will be affected most by the effects of climate change resulted in three response patterns. Type 1 assumes a risk which is >equalized< even today without positive or negative disparities in distribution: According to this opinion, risk nowadays is completely globalized ..., >as we all live on the same earth and climate changes everywhere. That is why really all of us are affected.« (R55.1.260) >I think that we are all in the same boat.« (R38.1.084)

Type 2 sees the effects of climate change restricted to particularly risk-prone areas and populations. They localize particularly affected population groups to either geographic regions, such as easily flooded areas, regions with an increased ozone hole problem - Australia, the polar areas -, to regions where nuclear tests are carried out (R36.2.511) or to places where obsolete production facilities emit climatically harmful gases: Such as *»the whole East«* as people there *»fiddle around with old facilities«* (R36.2.512). However, developing countries such as India are listed, too. Moreover, some interviewees consider certain population groups as being particularly threatened by climate risk due to their health-related vulnerability, e.g. the elderly and the sick, people with bronchopathies or persons who are particularly predisposed to heart attacks and collapses (R35.1.279). It is noticeable, that those who identify especially threatened groups do not count themselves as belonging to these threatened groups of individuals. This ingroup-outgroup pattern also implies that predominantly non-European regions are considered endangered zones: It are mainly >the others< who are affected, not the interviewees themselves: »It rather seems [to be a risk] for people living in tropical areas, close to the sea. They will then be affected by the rising waters, by hurricanes - I believe it is North America where they are more frequent, and in Southeast Asia. I believe in Europe we

are in one of the safest places as far as climate change is concerned.« (R42.2.071) »Well, I can really deal with it quite well. I can accept it. There are of course people who are more affected than I am. For example the inhabitants of the Netherlands or of the Maledives.« (R58.1.152).

Type 3 interviewees assume a temporal differentiation of affectedness. Analogous to Type 1 they feel caught up in the terminology of Ulrich Beck and assume a globalizing >world risk society< (1996: 44): »For a long period of time everyone is equally exposed to risk; only some are affected earlier than others.« (R20.1.275) »Of course, people living somewhere in the Carribean are [especially affected]. On a small island which will be inundated within three years. Naturally they are affected first. We may be affected later. Because we're simply lucky enough to live here, where we are not directly affected. But ultimately it will hit us as well.« (R17.1.263)

The acceptability of risk

Type 2 >outgroup< interviewees prevail in numbers over Type 3 >globalization< interviewees. This indicates that spatial and temporal risk distribution is an important key to understand the perceived impression - high disaster potential, moderate subjective affectedness and high ambivalence. This spatial and temporal distribution permits maintaining the difference between >global consternation< and >individual reserved-ness<: *»For us personally - i.e. in Europe - prognoses are quite good, which means that not so much will happen here. And as far as one can assess the situation it will not happen within the next 30, 40 years: So it really doesn't concern me! ... To me this is no risk, I am not afraid!« (R34.2.195) »Yes, I can accept [the risk]. I think it won't come that fast, that it would be a risk to me.« (R09.1.280) In a highly individualized society the individual lifespan can easily become the all-dominating reference point. Under these circumstances the demand for sustainable economization with the goal of an ecologically sound intergenerational justice should hardly be able to develop motivating power.*

What does risk consist of?

The following effects were mentioned the most frequently as consequences of climate change: the ozone hole, global warming, floods and destruction, occasionally the greenhouse effect, melting glaciers, El Niño, changes in weather patterns - e.g. onsets of winter-type cold weather in the Near East, no snow for Christmas in Germany -, extinction of animals species - corals, amphibians; animals in general -, and of plants - plants in general; forests -, natural disasters, earthquakes, air pollution (R36.2.438), the collapse of the earth as an ecosystem and - as a result - consequences for food and the chances of mankind's survival (R42.2.599). Social effects such as diseases, poverty and increase in crime are seen as effects of changes in the climate. Reflected as basic

tenor of this potential imperilment of the essential living conditions by humans themselves, the interviewees' interest to preserve nature or the environment can be heard in some statements, not so much due to a biocentric motivation >for one's own sake, but rather from an anthropocentric point-of-view, in order to maintain health and prosperity. From the understanding *»that the ozone hole is there and that the risk of* cancer is increasing, which directly concerns people, where you can't say: >oh well, now we're missing a couple of animal species, that may not impress some people very much - but when their health is at stake, then it must be relatively simple to recognize that this is a very important issue.« (R41.1.340) »And of course you can argue that first comes man and then nature, but ultimately this is shortsighted. Because at some point in the future there will be no more people if we keep on as we do.« (R30.1.139) Climate change is »really one of the most important subjects at all, I think, as it simply affects every person, nature, animals, plants, our whole preconditions for living.« (R41.1.333) According to the opinion of the majority of interviewees global climate change ultimately affects the whole ecosystem of the earth. Moreover, some interviewees see long-term, profound effects on health and social politics, where a separation of the ecological and social system would no longer make any sense.

Anthropogenic influence

Except for one single (female) interviewee who interprets global warming as natural variations which were just not detectable before (R58.1.136), all interviewees have no doubts that climate change is caused by human activities. The socio-technical system in combination with certain basic social values are responsible for the creation of this risk. Only in some individual cases interviewees believe that the responsibility lies with industry or politics: »Climate change? ... That concerns the chemical industry, the power industry, in fact everything that has to do with processing or production.« (R57.1.100) When technical artefacts or technical progress are mentioned as originators, then with the connotation of social utilization rather than in combination with ascriptions of guilt to industry or politics: The item mentioned most frequently is the motor car, however, this could also be explained by a reactance effect caused by the cards shown. Other causes mentioned are flying (e.g. R07.1.032; R28.1.332), the emission of CO₂, nitrogen oxides, exhaust gases (R59), or CFCs, and quite generally »the combustion engine«, heating (R55), refrigerators (R18), and finally technical progress in general (R36.2.438). Some of the interviewees (R04.1.240; R07.2.429; R24.2.002; R36.2.511) also counted nuclear power plants and nuclear tests among the causes for climate change. Finally, there were also arguments about values (e.g. R.71.1.532), e.g., that climate protection and the pursuit of profit are conflicting issues.

The naming of general patterns of action or products used in great numbers illustrates that it is not the technical product itself which is identified as the cause of climate change but its embedding in a certain socio-technical system, namely western industrial society. The citizens of the western world with their lifestyles full of amenities, comfort, mobility and consumption are considered mainly responsible, whereas developing countries are seen as victims but not perpetrators, if one disregards the cutting down of tropical rain forests: *»Here in the western world we committed the whole thing in the last century due to industrialization.*« (R57.1.105) *»It can hardly be stopped now, that's why I think that it's becoming increasingly dangerous. I think it's just too late to change anything, as everyone drives a car, we all heat with the same natural gas and the rainforest is gone too.*« (R55.1.262) *»I mean, so far, poor countries were not in a position to contribute very much, I think the major contribution is made by the industrialized countries, all the CO₂ comes from the industrialized countries after all.«*

The following commentary expresses the fascinating aspect that we are >captives of a seemingly autonomous development of the modern industrial age, a development which can intensify curse and blessing equally, and from which an escape hardly seems possible, both on the benefit side and the side of globalized risks<: (cf. Zwick 2001: 29) *»Climate change - well, what do I think of climate change? Our life is based on the industry! … Basically I consider the risk as not acceptable, but we just can't live without industry, without car!«* (R56.1.112)

The *climate risk* challenge: fatalism or required activism?

When assessing the acceptability of climate risk, opinions differ just as much as with the question of how to deal with this risk in the future and which institutions or actors ultimately hold the responsibility for the management of this risk. But let us first take a look at the acceptability of the risk.

Three argumentative patterns can be made out here. *»Not affected*« is the first line of argument: due to the time lag and the, for the time being spatially limited damage, one considers oneself as not (yet) affected. Accordingly, the acceptability of the risk is high and the urgency for risk minimization measures is small: *»Yes, I can accept [the risk]. I think it will be quite a while before this will be a risk to me.*« (R09.1.280) This attitude is rather an exception.

To the majority of interviewees the risk is not acceptable⁷, an attitude which can result in two different strategies. For one: a fatalist attitude >you can't do anything about it<

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In this issue the qualitative findings do not correspond with the survey's data.

because *»the individual person will not be able to change anything.«* (R16.1.209). *»I think, it's simply too late to still change anything...«* (R55.1.262). *»Climate change? I have to live with it anyway no matter what, it's already happening.«* (R09.2.212)

Due to the lack of acceptability, the third strategy demands for action and countermeasures. It can be found even more frequently: *»It is highly urgent that some action is taken here!« »A lot of things will definitely have to be done here!«* (R30.1.113) The risk *»can not be accepted. We are living and we have an obligation to our descendents - no matter whether these are mine or yours. One should simply try, here too, to preserve some things.«* (R36.3.004) Here the question comes up as to who is responsible for the demanded measures.

Responsibility and problem solving strategies

Three groups are listed as being potentially responsible for risk minimization: the citizens themselves, politics (with a differentiation made between national and international politics) and industry (groups, companies, economy). Other actors, such as environmental organizations, local groups etc. were not listed.

The economic sector is made responsible only in individual cases and if so, with a critical undertone: *»Industry only provides solutions - and this is proven by the automobile - when the pressure becomes too high. Then they change it.* (R37.2.385) *»Where climate change is concerned there are some approaches, …in nuclear power plants, with desulphurization facilities… Or now the automobile industry or the oil and gasoline prices. But only when pressure is exerted, otherwise they don't - not voluntarily! … And probably more would be possible … in the industrial sector.«* (R37.2.410) The following statement is markedly more critical: *»Of course, as small consumers we are not to be blamed for the climate change, but really the big business bosses of the economy who give orders such as building cars and cutting down the forest. That's what comes to my mind. I think that the big business bosses are to be blamed for it, and you can't trust these people where this issue is concerned. It is just not right to expose us to such a risk.« (R55.2.176)*

Most interviewees, however, believe that climate protection is primarily a political goal. Industry is indirectly included in this too. It is expected that legislation sets limits for the economic sector ... The public however is ascribed the narrowest margin to act and thus the lowest responsibility.

The responsibility of private citizens is mentioned only in individual cases. The citizen's own possibilities to become active oneself are considered small. Proposals and appeals are usually directed to the >generalized other person<: *»I mean, everybody can of course do something: less car driving, use more public transportation, take the bicycle, go*

on foot and such things. Insulate your house better in order to use less fuel, put solar panels on your roof, don't buy any nuclear power and so on. Of course everyone can do something personally. Logically!« (R30.1.131) But the performance of citizens is judged ambiguously where environmental protection is concerned. Some consider their fellow citizens quite capable of environmentally benign behavior, others are quite skeptical: »There are some people who take it seriously and actually say >I accept the disadvantages (or >I'll just pay more money so that the environment will be less burdened. But then there is a large number of people who simply don't care.« (R31.1.279) »I can only say ..., that I consider the majority of people as being relatively ignorant with respect to this issue. Otherwise they would, I think, behave differently in a lot of cases.« (R38.1.073) However, statements such as this one are as rare as attempts trying to ascribe citizens a decidedly political role: namely that the responsibility of the individual citizen should consist of the exertion of »pressure on politics. That one says nowadays: >I accept a policy which takes this up as a global issue - on the one hand. On the other hand this also means to be aware of the problem in the personal sphere and, say, to do without the car when it is possible.« (R31.1.273) Occasionally taking political influence by way of elections is also made an issue (e.g. R53.1.417; R53.4.059).

Most interviewees emphasize that climate protection is not the task of private citizens but a political affair and that legislation should take the responsibility for it: *»I think that you can't do very much as a private person, because most of what can be done has been done already … I simply think that the government should intervene too, particularly where industry is concerned. I do think that the government is the institution which should take care of it.« (R18.1.234) Legislation should, on a national level, provide binding regulations requiring environmentally benign behavior which industry and citizens should abide by. <i>»Certain laws should be passed in order to make the emission of ozone lower than before. Certain poisonous substances should also be prohibited.*« (R10.1.281) Politicians are expected to *»pass concrete laws, that the [environmental pollution] caused by factories must be decreased, that alternative energies will be supported, that fuel for flying will be taxed. This is a very, very important point to me. This cannot be seen only in relation to Germany but on an international basis. And that an energy source which is dangerous will simply become so expensive that we will handle it a little more sparingly.« (R43.2.117)*

However, the interviewees are skeptical as to whether politicians will tackle this task with responsibility and dedication: *»I think, that this is a political issue and above all an economic one and as money determines everything it is difficult to get a grip on this issue.«* (R14.1.286) *»I have an ambiguous attitude towards politicians, because it is conspicuous that the least of them … could care less about what is really happening. The main thing for them is that their own issues are on the agenda and that they will be re-elected!« (R16.1.411). Dishonesty and the tendency towards >symbolic politics< are also mentioned critically*

in the following statement: "Well I think the biggest risk ... is dishonesty: Just to invent empty word husks in order to deceive others.« (R37.2.378)

Citizens' criticism is not better where international politics are concerned. In this case, above all, the politics of the USA are given poor ratings. The ascription of high state responsibility coincides with poor state performance which leads to the articulation of political frustration and dissatisfaction: »What I would like to do most now is complain about the Americans, and about our wonderful politicians meeting at great climate conferences for a lot of money where they ultimately produce nothing but hot air. I am very disappointed in that respect!« (R54.1.303) »When I hear that the great nation of America turns away from the climate conference, from what has been agreed upon in Japan - been agreed upon two years ago - that there is a world climate conference and that people all join forces because we're in the same boat, about the gases, the ozone hole which is becoming bigger all the time. And that at the moment America is withdrawing completely and no longer wants to participate in the world climate conference simply just to go easy on the economy. I think that's an absolute scandal, to say it straight, in this case really all countries should join forces for one purpose, as agreed upon, not only Europe on its own.« (R19.1.168) According to the interviewees' opinions national and economic interests prevent the implementation of collective ecological benefit and an effective problem-solving approach: »I don't even think that it's the individual person's fault. Most of the time it's big countries, big businesses, causing the whole thing here. What is about with all the conferences, what was decided at the highest level? That some countries think they don't have to stick to it. So I think there are many national interests in the game.« (R24.1.196) According to Zwick, these findings show »that there is a credibility and trust gap between the ascription of responsibility to politics and industry as well as the expectations of the citizens regarding the problem-solving ability on the one hand, and the capacity of these institutions on the other hand. The fact that the public does not feel to be taken seriously in its concerns and worries, neither by the actors of the economy nor by those of the political system, can be interpreted as an indication of the self-referential closure of social systems described by Niklas Luhmann: They revolve around their specific codes and programs respectively - political power here, economic success there - and in their perception of the citizens, seem to have lost the ability to communicate with sensitivity with other systems - in this case with the worries of the public.⁸ (2001: 31) This is also expressed in the following opinion of one of the interviewees: »I think information is withheld, reports are suppressed which would maybe lead to even greater discontent in the population...« (R04.2.097)

On this issue see also Luhmann's development of the concept of resonance (1990: IV).

Even more radical is the perspective assuming merely >symbolic politics< behind the climate conferences without concrete intentions of problem solving: It is the *»industrial nations and also the future industrial nations which deal with the environment, namely to mercilessly exploit resources and then call climate conferences which do not change anything, because they don't really want to change anything at all. It is about options, it's not really about climate change!« (R71.1.061)*

5.4 Summary and outlook

In the qualitative interviews climate change is described with highly pronounced properties: People see it as an anthropogenic, maybe even irreversible risk with disastrous potentials for harm. This risk seems acceptable to a certain limit, only as the risks are opposed by high potentials of benefit expressed in a modern life of consumption and standard of living. This balance judgement is reinforced by the fact that the interviewees assume a distribution of the expected harm which will be uneven in space and time: Owing to a geographically privileged position, the majority of interviewees believe themselves to be less threatened in the medium term and expect disastrous damage only for the coming generations. Despite individual starting points for a behavior going easy on the climate, the main responsibility for the solution of this problem is ascribed to politics, but it is given only little credit for its willingness to solve this problem and its competence to actually do so.

»It is amazing with which >awareness< the public perceives the issue of climate change, its conditions of origin, its effects and the paradox, maybe even unavoidable consequences of modern industrial times. It is mainly politics and industry which are made responsible for solving the climate risk, even though the public concedes that the climate is highly important, but that individual motorized transportation and energy intensive amenities offered by modern industrial society are very dear to them too. The fatalism with which predominantly somber perspectives as to redemption from the climate problem are mentioned, is founded by three aspects. With the poor problem-solving ability of politics and industry, with the fact that the development (of the climate change) has maybe even developed dynamics of its own, and finally with the fact that an aversion of disaster would possibly require a quick, radical and possibly not acceptable about-face in thinking, deciding and acting. Hence, one of the interviewees sums up: >Basically the risk is not acceptable. Basically it is not acceptable as we would have to completely change our overall ecological self-comprehension in the whole world and effect a complete change of society and all that is behind it, oneself, the environment, production, the pursuit of profit... All values of which we are aware or not so aware, they would have to be radically changed and considered in a totally different perspective. But nobody

is willing to do that. Due to that I think that the risk is really not acceptable but that we will continue to move towards chaos.< (R71.1.532)« (from Zwick 2001: 31)

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6. Conclusions (Ortwin Renn and Michael M. Zwick)

Discussion of empirical results

The overall picture emerging from our study reveals some important insights into the mechanisms of risk perception and points to several major implications for risk management as well as risk communication. In addition, the results may lead to a new phase in risk perception research, in particular to new studies that rely on open and qualitative research designs.

In a world characterized by globalized markets and international competition, many analysts assume that the public at least in affluent nations such as Germany would be risk-averse, afraid of innovative technological practices and resistant to new developments and changes (Büchel 1995, Mohr 1996). Our findings do not support this view. Our qualitative data show that the respondents focus primarily on those risks that characterize their everyday life such as traffic accidents, hazards to economic reproduction, risks to their personal health and threats of identity, i.e. the loss of primary social networks. Risks of large technologies such as nuclear power, genetic engineering or electro-magnetic radiation were not mentioned at all when our respondents were openly asked about their first association in connection with the term >risk<. The public's semantic image of >risk< is mainly related to every-day experience; more distal and abstract risks come into consideration only when these risks were explicitly mentioned in the qualitative interviews by the interviewer.

In the qualitative interviews and - to a lower extent - in the quantitative survey people made a clear distinction between those risks that they personally feel exposed to and those risks that are of social relevance to the population at large. Thus the juxtaposition of personal versus social risks proved to be a useful distinction when it comes to the prevalence and relative importance of risks in the perception of the respondents (cf. Sjöberg 1996).

Both, our qualitative and quantitative survey data point to different strategies that people employ when coping with risks: Everyday-life risks – such as traffic-accidents - tend to be >normalized<, i.e. evaluated as severe but regarded as acceptable and unavoidable. With respect to larger social risk and technological risk, the public refuses to take personal responsibility for their existence as well as their management. To a considerable extent, industry and politics were made responsible and accountable for regulating, controlling and reducing large-scale technological hazards. In the public eye, however, these institutions fail to handle risks in a reliable way, and as a consequence, people express little confidence in most risk managing institutions. Maybe this

loss of trust is also caused or amplified by insufficient risk communication and the lack of opportunities to participate directly in risk management decisions. Since our survey was not focussed on risk communication it did not include questions that could demonstrate whether there were correlations between perceptions and risk communication practices or participatory opportunities. Earlier work of the two authors on the acceptability of new technologies support, however, the hypothesis that confidence in risk management institutions correlates with satisfaction with risk communication performance and opportunities for stakeholder involvement (Renn/Zwick 1997: 87-144).

In general people in our survey displayed much fewer concerns and fears than we had expected from viewing the literature on this subject (for an overview: Slovic et al. 1981, Slovic 1987, 1992, Renn 1990, Rohrmann/Renn 2000). This was particularly true for radiation-risks emerging from mobile phones and the respective base stations as well as for the risks stemming from >mad cow disease< (BSE), the two hot issues in Germany in the year 2001. Global climatic change topped the list of respondents' concerns. Although regarded as a high and threatening risk, most respondents acknowledged that the risk of global climate change was off-balanced by the benefits associated with modern life styles, comfort and consumption patterns. In addition, damages resulting from climate change were perceived as being unequally distributed: An actual threat was foreseen for remote areas in the developing world, while the bulk of the population including the German society would be affected in a distant future worsening the living conditions for the following generations. These arguments and perceptions reflect high ambivalence - it even seems that respondents felt like being prisoners of industrial modernization. They obviously enjoy the outcomes of modernization and globalization, but also fear the risks and vulnerabilities that accompany these changes. At the same time, the unequal distribution of benefits and threats over time makes them believe that there is no need for them at this point of time to take personal actions. Possibly, this point of view will become even more popular if the current trend of individualization continues to dominate society (Beck 1999).

The example of the conflict between the perception of serious social risks such as global climate change and the lack of motivation for changes in personal behavior, tends to reinforce the notion of rational action in the classic philosophical sense (Jaeger et al. 2001). Rather than being driven by fear and anxiety we found that respondents showed strong tendency for balancing information on risks and benefits and for designing personal strategies that incorporate time discounting and deal with the dilemma of marginal inputs. When asked to judge the acceptability of risks, people performed a mental balance between expected harm on the one and expected benefits on the other hand. Naturally, the extent to which benefits and potential damages were

assigned to specific risk agents depended on subjective assessments and judgements. We had little evidence that emotional factors such as stigma or symbolic associations exerted a large influence on the perceived seriousness of risk or the perceived riskbenefit balance (see discussion on stigma below). However, one should keep in mind that our attempts to operationalize these emotional factors may have been inappropriate, insufficient or at least incomplete.

If people react so >rationally < in the sense of being able to balance pros and cons, why is there a distinct difference in the evaluation of risks between many technical experts and large segments of the population as indicated by many publications on risk perception (see review in Slovic et al. 1982, Covello 1983, Borcherding et al. 1986, Rohrmann/Renn 2000)? The answer may lie in the composition of the beliefs that form the arguments for the pros and cons. Whereas most technical experts define risks as a linear combination of probability and harm, most members of the public associate a whole set of situational and hazard-related characteristics with the term risk and use these characteristics as heuristics for perceiving and evaluating risks. Thus, our results do not invalidate studies that point out that social and individual risk perceptions are often in opposition to experts' results of formal risk assessment or environmental impact statements (Allen 1987, Breyer 1993). First, social risk experience seems to be stronger influenced by exposure than by actual casualties on which most risk assessment studies are based (Burns et al. 1993). Second, the survey revealed clearly that people judge the acceptability of risks on the basis of a large set of criteria of which expected benefits and the extent of damage were only two criteria among many others. The criteria on which most people evaluate the seriousness of risk includes value orientations as well as the perception of institutional performance in managing risks. As long as professional risk assessment continues to focus primarily on probability distributions of adverse effects, risk perception will always deviate from the results of technical risk assessment studies.

Beyond any doubt, one can infer from our study as has been confirmed by a multitude of previous studies on the subject that the perception of risk is governed by more than the two dimensions: probability and magnitude of harm. Although risk perceptions differ considerably among social and cultural groups, the multi-dimensionality of risk and the integration of beliefs related to risk, the cause of risk and its circumstances into a consistent belief system, appear to be common characteristics of public risk perception in almost all countries in which such studies have been performed (Rohrmann/Renn 2000). Furthermore, the experience of risk is not limited to the threat of facing harm in the future. It includes subjective predictions of possible outcomes, the social and cultural context in which the risk is experienced, the mental images the risk situation evokes, the perception of the players who are involved in the risk situation and the judgments about fairness and equity related to the distribution of potential hazardous events (Kasperson/Kasperson 1983, Slovic 1992).

In our survey, some of these qualitative characteristics had a high, others only a weak influence on perceived seriousness of risk or the judgment on risk acceptability. Most influential were variables such as personal control, voluntariness of risk-taking or perceived fairness of distribution between those who gain the benefits and those who may suffer the damages. With regard to the judgment on risk acceptability, the most important qualitative characteristic was catastrophic potential. In several cases, the catastrophic potential was almost identical with the perceived seriousness of risk.

Surprisingly, the degree of knowledge (in our survey tested as subjective estimate of feeling informed) was quite a weak predictor for risk acceptability and failed the regression test for being included into the multivariate models. This finding is irritating in light of the previous risk perception work, since knowledge is one of the classic items, deemed important throughout the history of risk-perception studies (cf. Gould et al. 1988, Slovic 1992). More recent investigations, however, reflect inconsistent empirical findings and claim a more complex relationship between risk perception and knowledge (see in particular Schütz et al. 2000). This finding will also disappoint those economic and political stakeholders who believed that education programs to enhance public knowledge could change risk perceptions in one or another direction. Knowledge, however, is only marginally related to the judgment of risk acceptability. Thus undertaking educational projects to shape risk acceptability will probably be in vain.

With respect to the *causal models* between risk acceptability and a set of independent variables, we encountered a strong relationship between the classic qualitative variables and the judgement about acceptability as we had indicated above. We were able to reproduce the influence of many qualitative risk characteristics that Slovic et al. had identified, and were supported by other studies (for example: Vlek/Stallen 1981, Gould et al. 1988, Borcherding et al. 1986, see review in Rohrmann/Renn 2000). However, path analyses revealed considerable differences in the configuration of variables explaining risk acceptability. First, qualitative risk characteristics explain much, but by far not everything with respect to both perceived seriousness of risk and risk acceptability. In particular, when new risks such as genetic engineering or the radiation risks from mobile phones and transmitter stations were appraised by the respondents, the variable institutional trust - operationalized as satisfaction with perceived managerial performance - proved to be a strong predictor. In contrast to this specific result, the degree of generalized trust or confidence played only a moderate role in explaining risk acceptability with respect to most of the other risks included in our survey. The debate over the importance of trust for risk perception has remained controversial over

the years (Kasperson et al. 1992, Slovic 1993, Earle/Cevtkovich 1995, Sjöberg 1996, 1997). Sjöberg's investigations, for example, indicate that trust seems to be of less importance than often assumed. However, we have used a different concept of trust (perceived performance) while Sjöberg's analyses rely on the concept of credibility (Sjöberg 1997). In addition, the differences may be caused by different interpretations of what is regarded as a low or high correlation. Our direct correlations between risk acceptability and trust in politics or industry range between .25 and .48 thus reflecting a significant but not overly strong connection. We should emphasize, however, that in our survey trust turned out to be the second most important predictor for risk acceptability after the qualitative characteristics.

More abstract risks like climatic change and risks with high mobilization potential such as nuclear energy, show a significant but not dramatic association with the value orientations of the respondents. In the study we had included three different scales for testing value orientations. Only one of the three concepts yielded adequate results. Inglehart's materialism-postmaterialism scale did not perform well on any of the risk agents included in our study. Due to its narrow conception of values and sparse operationalization, the test scale resulted in more than 60% unclassifiable cases and accounted for too little of the variance in socio-cultural differentiation in order to explain risk perception. The same was true for the scale of cultural prototypes designed by Dake and others (Wildavsky/Dake 1990). The empirical test in our survey did not produce any relationships between the cultural prototype scale and acceptability of risk for any of the risk agents included in our study. There was no single case in which the scale value exceeded the default threshold for entering into the regression model. On this point we agree with Sjöberg (1997) that the explanatory value of the cultural prototypes has been overrated in some of the risk literature (Rayner 1990, Thompson et al. 1990, Schwarz/Thompson 1990). Most studies on the empirical relevance of these cultural prototypes that were not performed by the >true believers< show small to moderate correlations (Sjöberg 2000).

The last scale designed by one of the authors, Michael Zwick, showed a modest amount of explanatory value. As most respondents voiced temperate, sometimes sceptical or ambivalent positions towards the various risks included in our study, distinctive value patterns are expected to be of only minor importance to explain composite and differentiated risk judgements. This expectation was confirmed when looking at the results of the Zwick scale. If respondents had high scores on extreme value clusters – such as belonging to the group of modernization-critical alternatives on one hand or to the liberal upward orientated technocrats on the other hand – one could detect reasonable correlations between these value commitments and a rather sceptical respectively positive judgement of risk acceptability. The scores for the other value groups in between the two extremes failed to discriminate among the different levels of acceptability.

Another class of predictors that we investigated referred to *stigma* effects (Kasperson et al. 1988, Slovic et al. 1991, Gregory et al. 1995, Flynn et al. 2001). We tried to test for such effects, but we were not able to detect any statistically significant results. We had operationalized stigma by juxtaposing frightening images of the risk with verbal >neutral< terms in a split-half design: We presented one half of the total sample with the images, the other half with the verbal descriptions (shown in the appendix). There was no significant change in responses for any of the risks covered by the survey. We are not sure, however, whether images do indeed evoke more stigma impulses than verbal descriptions. If they do, they certainly had no effect on the perceived acceptability of risk. Possibly, our operationalization was inadequate, possibly none of the risks included in the survey were actually stigmatized at the time of data collection. Stigmatization is highly dependent on situational context, as for example media coverage, which might induce an avalanche-like emergence of panic and subsequently avoidance of risk-related locations, technologies or products. We assume that stigma effects are less potent as soon as other social issues such as blame, manageability or accountability dominate the public debate. During the winter months of 2000/2001, for example, consumption of beef dropped dramatically due to the fear of BSE. At the time when we started data collection in the middle of February 2001, people had already become more familiar with the threat of BSE and started to worry more about management options and health protection. In addition, no case of the new form of Kreuzfeldt-Jacob disease (a fatal illness linked to the consumption of BSE-contaminated beef) was detected in Germany, what made the threat less severe. Many people also felt that the government was reacting to the threat and protective measures had been taken. Starting with February 2001, consumption of beef increased to normal levels again. During the data collection period there were no other hot spots within the broad risk debate that we expected could cause considerable stigmatization. Perhaps the failure of finding stigma effects in our data set indicates how short-lived emotional reactions to a new threat have become in modern life.

Another class of independent variables include the personal dispositions to take or reject risks. In our survey personal dispositions played a role only when the respondents evaluated voluntary risks such as smoking. These examples prove, that - in contrast to Sjöbergs hypothesis (1997) - also >distal< variables such as values, trust or personal dispositions may contribute some explanatory power. Last, not least our multivariate analysis demonstrated that all measured *socio-demographic characteristics* had also no explanatory power with respect to risk acceptability.

This result is not surprising. In the course of modernization and globalization, the German population has been moving along the trajectory of individualization and differentiation (Luhmann 1990, Beck 1999). Rather than aligning oneself to traditional class structures or belonging to a specific social stratus, most people move within a diverse spectrum of socio-cultural and socio-economic milieus (over time and space), while traditional institutions of class and social status as well as stable social reference groups have lost importance in society. Subsequently one can expect increasing heterogeneity among public orientations. This, in turn, explains the diminishing influence of socio-demographical variables for explaining attitudes or risk perceptions.

Consequences for future research on risk perception

Risk perception variables have been the focus of many studies in the past. The vast literature on biases in processing probabilities (Ross 1977, Tversky/Kahneman 1976) and in identifying lists of qualitative risk factors (Slovic et al. 1981, Vlek/Stallen 1981, Renn 1990) suggest that most people, including experts, have difficulties in dealing with stochastic events and use a variety of qualitative dimensions for making judgements about risks. Our study supports this claim to a large degree, but shows also that these relationships are embedded in a larger context of perceived institutional competence, social influences, and personal life situations. Looking over the array of results from the qualitative and quantitative studies we can draw the following insights:

First, our qualitative data revealed some interesting semantic images of risks and provided valuable insights into the life-world surrounding risk perception. The narrative interviews indicated that the cognitive presence of risk starts with the mental relationship between the risk and the individual respondent. People associated with the term >risk< common threats linked to their daily activities and their personal lifeworld such as health care, the potential loss of primary networks, traffic accidents or problems of socio-economic reproduction. Thus qualitative data is an indispensable corrective to quantitative survey data, since it sheds light on the different levels of experiencing risk in everyday life and points to the importance of coping strategies that allow individuals to navigate through the waters of uncertainty and ambiguity. Quantitative survey data does not grasp this dimension adequately because the measurement of this dimension depends on the capability of the research instrument to put risk in the context of the life-world of each individual respondent. Often, survey data reflects no more than responses to pre-given stimuli (those are often social and/or technological risks since most funding organizations have most interest in these issues), while qualitative data - if done properly - focuses on the context in which risk is shaped by individual experiences in everyday life. It was also a surprise for us that technological risks played such a minor role in the public's intuitive understanding

of risk. Only when large-scale technological risks were mentioned to the respondents they did place them into the risk portfolio.

Second, our questionnaire included lots of variables that we hypothesized to be powerful predictors for risk perception, evaluation and acceptability. From a methodological point of view, two insights are of relevance here:

- A listwise question-design will normally produce answers to every stimulus presented to the respondents, irrespective of the relative importance and cognitive representation of the issue within each individual's mental model. This tendency to provide some kind of reaction to each stimulus even if the reaction is constructed at the time of the interview can be partially overcome by asking respondents to rank-order choices or activities. We asked our respondents, for example, to rank-order six places with different risk profiles (question: if you were forced to move which one would you select?). One of the risks, exposure to crime, appeared completely inconspicuous in the list mode of responses (since most people felt being safe in their neighborhood), but gained a protruding importance when it was used as a qualifier for making a rank-order of places to move to. People were not overly concerned with crime in their present location, yet when asked to rank six locations with different risk profiles, four out of ten interviewees gave the location with a higher than normal crime rate last priority. This example demonstrates the importance to include different methodological concepts and operational designs into the questionnaire, each of them displaying specific advantages and shortcomings.
- It turned out to be advantageous to include in one survey instrument five different concepts explaining risk perception and acceptability. Although the explanatory power of each concept depends clearly on the quality of the operationalization of each class and a single survey may not be adequate to cover all five concepts in full depth, the decision to place them together in one survey offered the unique opportunity to test each concept's explanatory value in a variety of multivariate competitive models. One of the most interesting findings is that there appears not a unique pattern explaining the acceptability of all the risks covered in our study, but rather different profiles of explanatory power for each specific risk. Personal and voluntary risks, for instance, were perceived quite differently from global risk or risks emerging from new and not yet well-known or managed technologies. This result provides new insights for better concepts of risk communication as well as political participation in risk-related matters, since general models for communication and participation may need to be fine-tuned or even tailored in line with the distinct perception patterns of the risk in question.

The role of risk perception for policy making

What is the practical relevance for risk perception studies such as the one that we described in this paper. The ordinary view here is that public knowledge is always thought to be inferior to the systematic knowledge of the experts and that the experts should not place their values into the decision process (more politely phrased in Breyer 1993). Several decades of participation research and its critical evaluation have demonstrated that such a simple division does neither work nor does it do justice to perceptions or expertise (Wynne 1989).

In many decision making contexts, anecdotal knowledge is often as important as the systematic knowledge of experts, and the reflections of experts are most often a valuable input for the evaluation of options. At the same time, however, all knowledge claims need to be tested against the accepted rules of methodology, as well as all value judgments need to reflect the distribution of the potentially applicable values within the affected population (Kunreuther/Slovic 1996). The two criteria >truth< (as fuzzy as it may even appear in many scientific contexts) and >representativeness< are neither interchangeble nor replacable by each other. All collectively binding decisions need to meet both criteria. Democratic societies need procedures of conflict resolution if the two criteria suggest different options as it is often the case in decisions on risk issues.

From this normative position it is obvious that decision makers should not use risk perceptions as normative guidelines for managing risks. Perceptions are partially based on false knowledge claims, cognitive biases, distortions, and non-generalizable anecdotal evidence (Breyer 1993, Okrent 1998, Sjöberg 2001). Having said this, one should also acknowledge, however, that these experts do not represent the scope of values and interpretations that characterize the horizon of legitimate values within the affected population. Any decision on the acceptability of a given risk implies crucial value judgments on three levels. The first set of value judgments refers to the list of criteria on which acceptability or tolerability should be judged, the second set of value judgments determine the trade-offs between criteria, and the third set of values should assist in finding resilient strategies for coping with remaining uncertainties (Renn 1998). Using methods of public participation on all three value inputs does not place any doubt on the validity and necessity of applying the best of technical expertise for defining and calculating the performance of each option on each criterion. Public input is an essential contribution for determining the objectives of risk policies and for weighing up the various criteria that ought to be applied when evaluating different options. To know more about perceptions can help to create a more comprehensive set of decision options and to provide additional anecdotal knowledge and normative criteria to evaluate them.

The necessity to base risk decisions on plural value discourse has been highlighted in a the report by the U.S. National Academy of Sciences (Stern/Fineberg 1996) which emphasized an *analytic-deliberative process*, by which technical expertise and public value input should be integrated. Democratic values can provide the means to construct this dialogue and the social science perspectives can help to make these forms of dialogue work, i.e. to make sure that each group can bring their own interests and values to the process and yet reach a common understanding of the problem and the potential solutions (Fiorino 1989).

The crucial question in risk management is not who is justified to make decisions but what rationale is used when imposing risks on others and making choices with farreaching consequences under the condition of uncertainty (Webler/Renn 1995). Studying risk perceptions can assist risk managers by providing the legitimate concerns and dimensions that people associate with different risk sources (Webler 1995). They also can demonstrate the potential trade-offs that people would make in setting priorities for their life. But they cannot replace scientific judgment about the nature and likelihood of the consequences of human actions nor the political accountability of those elected officials who have been legitimately appointed to make responsible choices. What is needed is an integration of knowledge, public preferences, and political responsibility (Jasonoff 1993). The study of perceptions is one important input towards such an integration.

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