

# Risk communication - a matter of

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**Trust is an elementary part of our life, so much so that, for the most part, we are not conscious of its importance. We trust in the fact that the alarm clock wakes us up every morning at the determined time and that the bus will arrive on time so that we will arrive at our workplace on time. We trust in the fact that our pilot will safely land our airplane at its destination, at the same time we place trust in the maintenance teams, airplane constructors and air surveillance. The philosopher Annette Baier [1] claims that we perceive trust as air - we notice them only when they are scarce. Trust means to expose oneself to the potential - though not expected - malevolence of others [1, p. 235]. Why do we take this risk of exposure? Because, according to the sociologist Niklas Luhmann [2], we would not be able to act in a complex and chaotic world otherwise. Trust serves the reduction of complexity.**

## Trust in sociological risk research

Since the early 90ies trust and credibility are a fundamental issue in sociological risk research. Many authors think that trust and credibility are key concepts for the understanding of social conflicts over risks and solving them [e.g. 3]. Science and technology and the risks resulting from their application - it is argued - are so complex that they are in large part incomprehensible and cannot be assessed by normal citizens. It is not surprising against this background that trust and credibility are seen to be of great relevance also in risk communication. According to Paul Slovic, one of the most influential risk communication researchers, the cause for the limited success

of risk communication is the lack of trust: „The limited effectiveness of risk-communication efforts can be attributed to the lack of trust. If you trust the risk manager, communication is relatively easy. If trust is lacking, no form or process communication will be satisfactory.“ [4, p. 677].

Of course trust is good and risk communication is relatively unproblematic, if there is trust in those responsible for health protection and sources of information are seen as credible. But this does not mean automatically that trust is necessary or at least important for (successful) risk communication. And it does not mean either that building trust is a meaningful aim of risk communication.

What is the basis of the conviction that risk communication without trust has barely a chance of being successful? For the most part case studies are presented as a confirmation that conflicts over risky technologies (e.g. nuclear power [5]) or concerns of the population over environmental risks (e.g. groundwater contamination by toxic chemicals [6]) cannot be removed or at least be reduced by purposeful risk communication of institutions responsible for health protection resp. risk management. Rather there is public mistrust in those who are responsible.

Fessenden-Raden, Fitchen and Heath [6] e.g. investigated cases of toxic contamination of drinking water at different locations in the USA in studies finding out which factors influence the reception and the acceptance of risk information on this problem by the affected citizens. A number of factors are listed that are relevant, according to their observation:

- health complaints unexplained until today are traced back to drinking water contamination,



# trust?

- low-level or lack of knowledge about toxicological correlations
- and just also a lack of trust in the responsible local authorities and health institutions.

The latter is seen as a basic reason why the efforts of authorities to inform about actual health risks failed.

Although such case studies may provide interesting insights, e.g. into the different perspectives and evaluations of the problem of different involved parties. They show as well that the conflicting parties in social conflicts over risks do not trust each other, and that the communication efforts of those responsible regarding the extent of potential risks as well as regarding the measures taken for risk reduction or risk precaution obviously were not sufficient to solve conflicts. But a causal association between a lack of trust in those responsible for health protection resp. risk management and problems or even a failure of risk communication could not be found.

In order to clarify how trust resp. the lack of trust become effective in risk communication it makes sense to think about the factors influencing the effectiveness of risk communication. And that means: which factors influence the reception of a message, i.e. the selection and cognitive procession of risk information by the recipients of risk communication? Where could trust play a role there? Three starting points can be derived from psychological research on risk perception in the reception of risk information regarding how trust might affect the reception of risk information:

1. via the correlation between trust (or lack of trust) and risk perception,
2. via the selection of sources of information due to their credibility, and
3. via the influence on the ways of information processing by (a lack of) trust.

## (1) Trust and risk perception

Risk perception can be a basic motivational factor behind dealing with a risk. When people are concerned over a risk and reach the judgement that they do not know enough about the risk, they will try to get informations [7]. If trust affects risk perception, it would be relevant as well - at least indirectly - for the reception of information and thus also for risk communication.

Numerous studies have investigated the correlation between trust and risk perception in the last years. In a Swedish study, participants assessed 22 different sources of risk (e.g. alcohol consumption, AIDS, greenhouse effect, nuclear power) related to the general and the personal risk as well as trust [8]. Trust was operationalized as specific trust in the responsible authorities and as general trust resulting in very different correlations between specific trust and general risk assessment for the different sources of risk. They ranged from  $r=-0.01$  for alcohol consumption to  $-0.46$  for high-level radioactive waste from Swedish nuclear power plants, the correlations were even smaller for generalized trust. Overall, the expla-

natory value of trust was not particularly high for the risk perception: considered over all sources of risk, specific trust does explain only about 10% of the variance in risk perception.

In a much larger study conducted in four European countries (France, Spain, Sweden, United Kingdom), Viklund [9] reaches a similar result. In this study, 19 risks were assessed each related to the participant and the general public, and a distinction was made between general and specific trust as well. However, results were reported only for the data aggregated over all 19 risks. The correlations between (aggregated) risk perception and specific trust as well are in the range of -0.32 (for United Kingdom) and -0.17 for France; for Spain the correlation even was zero. In contrast to the Swedish study [8] however higher correlations resulted (correlation between two or several statistical variables) between (aggregated) risk perception and generalized trust: -0.45 (for United Kingdom) to -0.23 (for Spain). In this study as well trust explains only a moderate percentage of the variance of risk perception, between 20 and 5 percent per country.

In an analysis of 45 studies on the correlation between trust and risk perception, Earle, Siegrist and Gutscher [10] found correlations between zero and -0.64 resp. beta weights between -0.13 and -0.82 in regression analyses. These results show considerable variability the authors explain by context factors that were not considered in the single studies. Such context factor e.g. is the knowledge of the interviewees about the observed risks, which can affect the correlation between trust and risk perception as a moderating variable. So Siegrist and Cvetkovich [11] found out that strong and statistically significant correlations between trust and risk perceptions resulted only for risks the study participants did not know much about. The correlations for risks the par-

ticipants did know about in contrast were low and statistically not significant.

A study directly investigating the correlation between trust and the need for information besides the association trust/risk perception is the study of Jungermann, Pfister and Fischer [12]. It is about the risk perception related to a chemical industry plant, the trust in the risk management of the plant as well as the interest in information about the risks of the plant and about appropriate behavior in the case of an emergency. Study participants were persons living near a large chemical plant in Western Berlin. As in other studies on the correlation between trust and risk perception, a moderate negative correlation between trust and risk perception (path coefficient: -0.22) was found. The need for information was mainly affected by risk perception (path coefficient: 0.35), whereas the influence of trust on the need for information was low (path coefficient: -0.16). That means: the lower the trust in risk management and the higher risk perception, the higher the need for information.

It is important for the interpretation of these results to note that all studies on the correlation between risk perception and trust are cross-sectional studies observing correlative associations, i.e. one cannot directly recognize from these data whether there is an actual causal association and to determine its potential direction. Many studies assume that trust influences risk perception: low trust in those responsible for risk regulation resp. risk management results in higher risk perception [e.g. 13, 14]. The inverted causal relation is not less plausible however. People perceive a risk of a certain technology (e.g. mobile communications) and therefore do not put trust in the persons responsible for risk regulation resp. risk management, as they permit the use of this (from their perspective: risky) technology. But there may



be also a third possibility: There is no causal relation between trust and risk perception; the found correlations are rather an expression of a factor underlying both: the general attitude toward a technology. In studies on the assessment of food technologies resp. genetically modified food, Eiser, Miles and Frewer [15] as well as Poortinga and Pidgeon [16] found out that the correlations between trust and risk were clearly reduced if the general attitude toward these technologies was considered in the statistical analysis.

Overall, this overview shows that the correlation between trust and risk perception - if it really exists - is dependent of different margin conditions and rather is moderate in strength. If trust actually affects risk perception, this influence will be inverted: the lower the trust, the larger the perceived risk. And the result for risk communication is: the larger the perceived risk, the larger the need for information.

## (2) Selection of risk information

Another possible influence of trust on risk communications refers to the evaluation of **sources of information** disseminating risk information. How is the credibility of the sources of information judged: Is the information objective or are contortions or misinformation may be expected? At first glance it seems plausible to think that information provided by sources that are seen as non-credible are not noticed and hence not received either. However, one look at everyday behaviour toward information shows that this is not so. People do permanently receive information of sources which are seen as non-credible. According to recent interviews, e.g. newspapers and politicians are not given much trust [17]. In spite of that newspapers are read and politicians listened to (and even are elected).



Psychological research offers different explanations [18] for this **trust paradox** - i.e. the discrepancy between trust expressed verbally and the trust actually demonstrated through action. A first explanation is that people have only very limited insight into the motives, emotions and thoughts underlying their behaviour. This is an old topos in psychology, which is addressed not only speculatively (as in psychoanalysis), but also explored experimentally. Twyman, Harvey and Harries [19] e.g. investigated in an experiment whether the expressed trust in a source of information is equivalent to the extent to which the source of information is really used for the assessment of risks. They found a clear discrepancy: the participants used the sources of information to a clearly higher extent than was to be expected from their assessment of trust in them. So it cannot be derived from the fact that sources of information are not given much trust that these sources of information will not be used.

The second explanation states that people are very well conscious of their motives and thoughts and also know that their behaviour is not always in line with their motives and thoughts, but that they scarcely have the possibility of behaving otherwise. In many areas of life we must trust in others „to do a good job“. This is true also, and particularly so, in risk management. Often we have no other choice than to trust institutions responsible for risk management. However, this trust, as Poortinga and Pidgeon [20,

p. 971] state, rather is some sort of „practical trust“, coupled with a „portion of healthy scepticism“. The low-level trust expressed in interviews has to be understood rather as evidence of the dissatisfaction e.g. with risk regulation from this perspective. This explanation does not suggest that a lack of trust in an institution results in people not using its information either. It is just the „healthy scepticism“ that makes us expect that such information is used.

A third explanation points to a methodological problem in the empirical analysis of trust - it is not an alternative to, but a completion of the explanatory approaches described above. In interviews on trust or credibility of institutions or sources of information these are presented in a more or less long list and judged one after the other. So a specific context for judgement is created where not only the judgement of the respective institution or source of information regarding trust or credibility is relevant, but also the comparison to all other listed institutions or sources of information affects the judgements.

In a study on sources of information about potential risks of mobile communications, White [18] has examined how different judgemental contexts affect the assessment of trust and credibility. The sources of information to be judged were: independent scientists, environmentalists, government institutions, media and mobile communications industry. One group of participants (students; N=61) had to rate the listed sources of information on a 7-step scale (0 - no trust; 6 - complete trust). The result was the following ranking (mean values in brackets): independent scientists (4.13), environmentalists (2.85), government institutions (2.02), media (1.46) and mobile communications industry (1.15). The mean values for the assessment of trust in sources of information differed in a statistically very significant way, except for media and mobile communications industry. The second

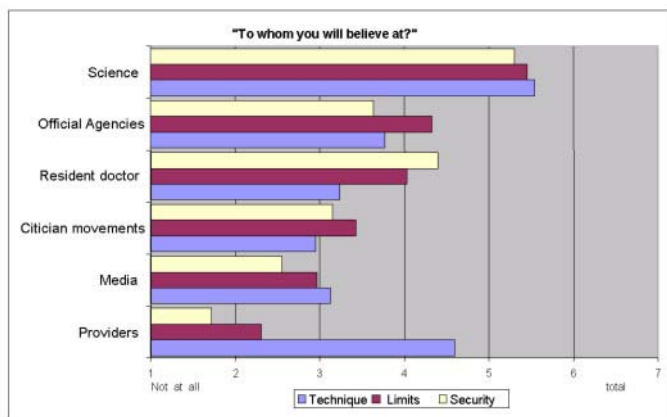
group of participants (students; N=125) was divided into 5 subgroups (N=25), which were to judge only one of the sources of information each regarding trust in a 7-step scale. Under this condition of separate rating slightly changed rankings were the result: independent scientists (2.68), activist environmental protection (2.40), media (2.16), government institutions (2.12) and mobile communications industry (1.48).

It is more important however that the assessment of the sources of information regarding trust are clearly closer to each other (mean values) here. There are statistically significant differences only between rank 1 and rank 5, independent scientists and mobile communications industry. The usual way to rate trust using a list of several institutions or sources of information possibly results in a sort of contrast formation and thus to a distortion versus extremely high resp. low assessments of trust. No direct evidence of the relevance of trust and credibility for the selection of risk information can be derived from this third explanation of the trust paradox. But it shows that the differences in the assessment of trust and credibility reported from interviews possibly are less drastic than data suggest.

In this context finally another aspect is relevant: Institutions or sources of information are rarely completely non-credible or credible. Rather, for the most part, **certain aspects** are non-credible, whereas others can be fully credible. This was shown by several investigations of the credibility of sources of information regarding risk information. The aforementioned study of Jungermann, Pfister and Fischer [12] on risk perception e.g. showed that different sources of information are preferred according to the object of information. The respective manufacturers were preferred e.g. as a source of information regarding product-specific information, environmental protec-



tion organizations and scientists regarding information about potential health risks, and police resp. firefighters were the selected source of information regarding emergency warnings and the adequate behaviour at an emergency.



Reliability of different information sources classified by issues [from: 21]

A similar result was reached in a study of Wiedemann and Schütz [21]. The **credibility of different sources** of information involved in the debate on mobile communication was examined regarding three topics: „safety of mobile communication“, „mobile communication technology“ and „local adherence to limits“ (see the figure above). Science was the most credible source of information regarding all three topics for the interviewees (151 citizens from Innsbruck and the surrounding area). The lowest credibility was given to the media and the operators of mobile communication systems, the operators having the clearly lowest credibility ratings regarding safety and limit adherence, but the second best regarding technical issues. Also citizen groups are given rather low credibility. „Official“ agencies receive the second best rating regarding the topic of limit adherence. The same is true for local physicians regarding the safety resp. possible risks of mobile communication. It seems rather implausible against the backdrop of

these research results that people would not use information because they think that the source of information was (partially) not credible.

### (3) Influence of trust on information processing

That people also notice information, if they think that the source of information is not credible, does not mean that they will be affected by the information. What is the relevance of trust and credibility for the way risk information is processed? Psychology often differentiates two ways of processing information, a content-related, but resourceconsuming and a superficial, easy way.

A model widely used in psychology of such „**dual**“ **information processing** is the **model of heuristic-systematic information processing** (heuristic-systematic model, HSM) of Eagly and Chaiken [22]. The systematic information processing is a cognition-consuming effort to understand and evaluate contents. Both cognitive abilities necessary for understanding the information and the possibility to apply these cognitive abilities, as well as the motivation to go to such lengths are required. In contrast, the heuristic information processing is characterized by a less strenuous approach to deal with the content of a message on the basis of already available structures of knowledge, simple rules of decision or cognitive heuristics in order to reach an assessment. According to the HSM the processing of risk information should be the faster and more systematic the higher the perceived risk - provided the recipient has the cognitive abilities to understand the risk information. Inversely, a lower risk perception would result in a more heuristic information processing. The way of processing information is essential for the influence of information on risk perception or other relevant judgements (e.g. acceptance of a technology). Jud-

gements based on heuristic information processing are less solid and relevant for the behaviour than judgements resulting from systematic information processing.

One can imagine (at least) two possible ways in which trust and credibility influence information processing: On one hand the extent to which the risk management of an institution is trusted or a source of information is seen as credible, affects whether information are processed heuristically or systematically. On the other hand, trust and credibility could differently affect information processing, according to whether information is processed heuristically or systematically.

The first possibility was examined by Trumbo and McComas [23] in a study on risk communication regarding cancer clusters in the proximity of industrial plants. Study participants were residents living close to the industry (N=696). Using a path model, they checked the extent to which the credibility of three sources of information (state institutions, citizen groups, industry) affected information processing and risk perception, i.e. the assessment of the cancer risk caused by the industry. It was shown that the assessment of the credibility of the three sources of information does explain only a very small part of the variance in heuristic (8%) and systematic (4%) information processing. The type of information processing as well as the credibility of the source of information explain as much as 36 % of the variance in risk perception, the systematic information processing with a path coefficient of 0.35 having a clearly larger influence than the heuristic information processing (path coefficient: -0.19). Also the credibility of the sources of information (state institutions, citizen groups and industry) have a statistically significant influence on risk perception (path coefficients: -0.18, 0.23 and -0.13). The signs of path coefficients show

that systematic information processing in this case led to a higher risk assessment, whereas heuristic information processing led to a lower risk assessment. That does not mean of course that a systematic, i.e. content-related and thorough information processing per se results in higher risk assessments. In this case, those with a high risk assessment obviously tended to systematic information processing, whereas persons with a rather low risk perception processed information heuristically.

The results of this study of Trumbo and McComas clearly show that trust and credibility have no relevant influence on the type of information processing. This doesn't exclude that trust and credibility differently affect information processing, according to whether risk information are processed heuristically or systematically.

Systematic information processing is done if the recipients are both motivated and cognitively able to process the risk information (and have the temporal and/or material resources to do so; see above). Under this condition, trust and credibility should not play a role, as the recipients can judge the information themselves regarding the content related to each risk factor. As it depends on this content-related judgement, the risk information will more or less affect risk assessment.

Another picture emerges, if one of the two conditions - motivation or cognitive ability - is not given. Then there will be heuristic, i.e. not content-related, but superficial information processing based on simple rules of decision or heuristics. It is plausible to assume that trust in risk management or the credibility of sources of information may play a role here. Verplanken [24] found out just this in a field experiment on the influence of risk information about the environmental and health-related consequences of the



extensive use of coal with regard to energy supply on the risk perception of recipients. The credibility of the source of information affected the risk perception only under the condition of heuristic information processing. If there was instead systematic information processing, credibility had no influence on risk perception [25].

As most people are not able to judge most risks adequately due to a lack of knowledge - and this is true also for experts, as experts of course are laypersons with regard to most risks, usually there is no other alternative as to process risk information heuristically. Trust in the risk evaluations of certain institutions, organizations or also persons can replace lacking knowledge here. So trust serves - as said before - the reduction of complexity.

But why are persons or institutions trusted or what sources of information are seen as credible? What does it depend on? There are numerous studies on this (see [10, 20]) for overviews). Renn and Levine [26] e.g. list the following components of trust based on an extensive literature analysis: perceived competence, objectivity, fairness, consistency, sincerity, and faith. The extent to which these aspects of trusts are seen as given determines the trust in the source of information.

In contrast, Earle, Siegrist and Gutscher [10] distinguish in their „Trust, Confidence and Cooperation“ (TCC) model social trust and confidence. Social trust is largely equivalent to the initially cited definition of trust: the readiness to rely on others. The basis of this trust are above all shared values: we trust in those who share our basic values and therefore would act as we would ourselves. In contrast, confidence is based on our experience, it expresses our expectations that certain things will happen in a certain way. In the TCC model, (risk) information is evaluated as

to whether they are related to our own values (social trust) and to past experiences regarding the source of information (confidence). Just as the knowledge necessary for the assessment of risks or the evaluation of risk information is lacking, the social trust has special relevance, according to Earle, Siegrist and Gutscher, as it affects the evaluation of confidence. Both, social trust and confidence, influence how risk information affects risk perception. Due to them, it is therefore of utmost importance in risk communication to create trust [10, p. 34]. However, the empirical evidence for the TCC model and especially for the relevance of social trust for risk communication is not fully clear. Although some studies support the TCC model [27, 28], others could not confirm the relevance of social trust [20].

But even more important for the assessment of the relevance of trust in the reception of risk information is that it is true for the TCC model as well as the other concepts of trust presented before for the association between risk perception and trust: **There is some evidence that there is no causal relation between trust and risk perception, but that both are dependent of the general attitude toward risks and/or the technology associated with the risk.** A study of Frewer, Scholderer and Bredahl [29] on the influence of risk and benefit information of different sources of information (EU Industry Association, EU Commission and EU Consumer Protection) on perception of risks and benefits of genetically modified food supports this opinion. The authors also examined (in samples from Denmark, Germany, Italy and the United Kingdom; N=1405) whether the trust in the expert knowledge of the sources of information (from the perspective of study participants) affected the assessment of risks and benefits of genetically modified foods. It became evident that the perception of risks and benefits was scarcely influenced by the given information; trust in expert knowledge

played not a role here. They explain less than 1% of the variance in the assessment of risks and benefits of genetically modified foods. The preexisting attitudes toward genetically modified foods were shown to be the basic influential factor that explains between 92% and 95% of the variance in the benefit perception and 86% to 90% in risk perception according to countries. It was also shown that assessments of study participants relating to trust and the expert knowledge of sources of information were also essentially (87%-90%) influenced by preexisting attitudes. So there is some evidence that trust does not play a special role in heuristic information processing either. **Rather, preexisting attitudes seem to be of special relevance here.**

## Conclusions

**It is not justified on the basis of available evidence to speak of particular relevance of trust and credibility in risk communication.**

The relation between preexisting attitudes, trust/credibility and risk perception cannot be seen as fully clarified - insofar there is still much research work to do.

This contribution looked at the relevance of trust in risk communication with regard to a special aim of risk communication: **Inform about and explain risks.** But there are other aims related to risk communication [30]: initiating changes in behaviour and precautionary measures, information about emergencies and catastrophes as well as joint problem and conflict resolution. It remains to be examined to which extent trust and credibility may be relevant for these aims.

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