



First comes eating, then comes morality? Risk communication for the food industry

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- ▶ In a perfect world, there would be no need to quarrel about risk information. Because clever scientists, prudent entrepreneurs, risk-aware consumers, calm non-governmental organisations and journalists concerned with the truth alone would not let things get to that point. But unfortunately, that is not the case; the world is not perfect.
- ▶ In the world of science, the gentle pressure of the better argument does not always get a chance. There are black sheep in the business world. Citizen initiatives sometimes overhype phantom risks and the media exaggerate risks into risk plagues for sensationalism. Knowledge of risk among consumers is rarely sufficient to take appropriate decisions. Under these conditions, risk communication is difficult and can have paradoxical effects.
- ▶ The most important question is what must be considered from a scientific perspective in risk communication. Yet at the same time, the focus should lie exclusively with the consumers. The other parties involved, and above all their interaction, cannot be more closely considered here for reasons of space.

What is good risk communication?

Risk communication simply means providing information about risks. Good risk communication should be correct, i. e. based on expert knowledge, it should not manipulate and it should also offer emotional support. It should be comprehensible and accessible. That is easier said than done.

Certainly the most important prerequisite of all risk communication is that a risk actually exists. No risk equals no risk communication. This fact seems trivial, but it is not. More on that later. For now, we will clarify what we mean by the existence of a risk. The existence of a hazard is essential, i. e. a substance that can cause harm. As a rule, we do not need to establish a strict causal link, but a probable link. The harmful effect of a hazard is not inevitable, instead it is only probable. Someone who smokes a cigarette is not going to die from it immediately and not for certain. Smoking only increases the probability of developing lung cancer. This harm does not have the same inevitability as when a plane crashes from a height of 10,000 metres. And it does not necessarily apply to everyone who is exposed to the hazard. However, the simple existence of a hazard does not generate a risk. There must also be exposure. To stay with the example of smoking: the cigarette is the hazard and smoking is the exposure. No hazard equals no risk, but no exposure also equals no risk. Finally, we must

recognise how the risk changes with the extent of exposure, to be able to determine the extent of the risk for a certain – given – exposure. To stick with the example: You must know how the risk increases when consumption increases from 5 cigarettes per day to 15 cigarettes per day. In many cases, our knowledge is too limited to be able to make such exact predictions about the increase in risk.

Good risk communication must take account of this uncertainty. It must provide information on how certain we can be. It must, if possible, describe what level of exposure is critical and what level is (still) insignificant. It is also important to clarify the existing uncertainties. And finally, it is relevant to know how the extent of the health risk changes in accordance with the extent of the exposure. The uncertainties should also be indicated here.

The question regarding the hazard and the harm potential is the most important, because, as already mentioned, no hazard equals no risk. Therefore it would be useful for the hazard to be clearly identified, before any risk communication can commence. But that is not always the case, because in hazard identification, there is often no clear yes/no decision, rather only a “possible”, “probable” or even an “impossible to say”. In this way, caffeic acid and pickled vegetables are possibly carcinogenic and acrylamide, which is contained in chips or crisps, is probably carcinogenic.

But even then, although it must be assumed that a harmful effect exists, it is often difficult to estimate the risk precisely. This difficulty was illustrated in a report from the *Bundesinstitut für Risikobewertung* (BfR, German Federal Institute for Risk Assessment) on the content of pyrrolizidine alkaloids in teas. The BfR states [1]: “In spite of the unexpectedly high content in the samples in individual cases, acute health damage in the event of short-term

exposure for adults and children is improbable. In the event of long-term consumption of above-average high amounts of products with the mean-measured medium and high content of pyrrolizidine alkaloids, however, if the initial findings prove correct, a risk of danger to the health could exist, particularly among children, pregnant and breast-feeding women. However, the content of individual samples also fluctuates significantly within the same tea types, so that reliable statements on the health risk for regular consumption of these tea infusions are currently still not possible.” [original citation: „Trotz der in Einzelfällen unerwartet hohen Gehalte in den Proben ist eine akute Gesundheitsschädigung bei kurzfristiger Aufnahme für Erwachsene und Kinder unwahrscheinlich. Bei längerfristigem Verzehr überdurchschnittlich hoher Mengen von Produkten mit den derzeit gemessenen mittleren und hohen Gehalten an Pyrrolizidinalkaloiden könnte aber, wenn sich die ersten Daten bestätigen, ein Risiko einer gesundheitlichen Gefährdung, insbesondere bei Kindern, Schwangeren und Stillenden, bestehen. Allerdings schwanken die Gehalte einzelner Proben auch innerhalb der gleichen Teesorte erheblich, sodass sichere Aussagen zum gesundheitlichen Risiko bei regelmäßiger Aufnahme belasteter Teeaufgüsse derzeit noch nicht möglich sind.“] In other words: We still do not know exactly, because the situation is complex. Reliable statements are not possible.

Statements such as “this beer increases your risk of developing intestinal cancer by 15 % with regular consumption” are hardly to be expected in risk communication about food. Naturally, it is hardly surprising, as food safety is one of the most important functions of consumer protection. No adverse health effects may originate from food. Preventing risks, even when they are only probable and not reliably proven, is the highest priority. Therefore, health risks in foods, which are ma-

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manufactured according to the strict safety conditions stipulated in the EU, are rather improbable. The problem is, however, that in spite of all efforts we can never be 100 % certain that risks will nonetheless appear. In addition, the non-existence of a risk is not provable. A suspicion of risk is therefore difficult to disprove. As a lack of proof of risk does not equal proof of the non-existence of a risk. This encourages suspicion of risk and makes every promise of safety vulnerable.

Risk warnings

The Bundesamt für Verbraucherschutz (Federal Office of Consumer Protection) released a total of 51 food warnings for the whole of Germany in the period from 1.1.2014 to 25.8.2014 [2]. Most of these relate to bacterial contamination or foreign bodies in foods. Other food risks, such as violations of limit values of toxic chemicals and residues, are the subject of only a few reports. But these are on the radar of the European Food Safety Authority (EFSA), which e. g. monitors pesticide residues in food. It concluded that in 97.5 % of analysed food samples pesticide residues fall within the limits permissible in the EU [3]. Nevertheless, 80 % of those questioned in a study by the BfR believe that there is a very high or high health risk from pesticide residues in foods [4].

These risk anxieties are set against more than 200,000 actual food poisonings in Germany, which, however, – according to the Robert Koch-Institute (RKI) – only represent the tip of the iceberg, as there is no reliable data on the numbers of illnesses caused by food infections [5]. There is more consensus about their causes. Firstly, “hygienic handling of food in mass catering establishments and in consumer kitchens is not error-free” [original citation: “*der hygienische Umgang mit Lebens-*

mitteln in Einrichtungen der Gemeinschaftsverpflegung und im Küchenbereich der Verbraucher nicht fehlerfrei stattfindet”] [6]. And, secondly, the trend towards consuming untreated foods without preservatives [7].

Would it be easy to communicate these risk factors more clearly? In principle, yes, but this is prevented by the defensive decision-making of some authorities. The protection of their own good reputation is a primary objective [8]. They refuse to accept it; they downplay the risks. This then encourages – alongside other good reasons – worst-case scenario statements, which could lead to risk overestimations.

Moreover, we should always report on risk potentials in comparative terms. We should not lose sight of the whole picture. If we only focus on synthetic pesticides, we convey a one-sided view. There are also organic, i. e. natural, plant protection agents, which can be no less hazardous to health [9]. Not the origin, but the chemical structure is the crucial factor.

Risk communication should highlight and emphasise such basic connections, where the same dangers lie in wait. It is not predominantly pesticides, genetic engineering and other “devil’s work”, which impose risks on consumers. Risk potentials that may stem from pesticides should not be underestimated. But the relevant pesticide exposures apply more to farmers and people who come into contact with pesticides at work [9]. Consumers are usually significantly less affected [3]

Is clarification always possible?

The German *Risikokommission* (German Risk Commission) [10] states that the aim of risk communication is to enable risk sovereignty among consumers. This means the ability “to make a judgement of the respective risks on the basis of knowledge

of the actual demonstrable consequences of risk-triggering events or activities, the remaining uncertainties and other risk-relevant factors, which correspond to one’s own criteria or to criteria regarded by oneself as ethically imperative for society.” [original citation: “*auf der Basis der Kenntnis der faktisch nachweisbaren Konsequenzen von risikoauslösenden Ereignissen oder Aktivitäten, der verbleibenden Unsicherheiten und anderen risikorelevanten Faktoren eine persönliche Beurteilung der jeweiligen Risiken vornehmen zu können, die den eigenen oder den von einem selbst als für die Gesellschaft ethisch gebotenen Kriterien entspricht.*”] [11]. Whether risk communication can genuinely fulfil this objective is an open question.

Scepticism is permitted, as this is based on an idea of man, which the reality of humanity does not fully reflect. An appropriate example is the concept that the EU reports in its regulation on consumer protection. Council Directive 84/450/EEC dated 10.09.1984, still applicable today, assumes that the average consumer is “well informed, reasonably observant and prudent.” [original citation: “*normal informiert, angemessen aufmerksam und verständig ist*”]. This may sometimes be doubted in relation to everyday purchasing decisions; in relation to the reception of risk information it is rarely the case. Man is not only a cognitive being. Above all he is not a calculating machine. He is emotional; he often makes gut decisions and he is also susceptible to misleading statements. Sometimes he is also stubborn and unrelenting in his prejudices. So it must be stressed that supporting informed judgements is a noble objective, but one that is difficult to achieve. Moreover, it is not the only purpose of risk communication. Risk communication should also provide emotional support and protect people from unnecessary anxieties.

Consumer as information hunter

According to a Eurobarometer study carried out in 2010 [12], 21 % of German participants were worried about food safety to a high extent and 41% to a certain extent. The Germans, so it seems, are uncertain. And the range of risk fears is broad: consumers worry about pesticide residues, chemicals in food, new viruses and salmonella, genetically-engineered foods and nanoparticles in food. But this is an absolute muddle. Real risks, possible risks and those which are sometimes adamantly asserted are all mixed up together. How can that be explained?

Could BRECHT still write in his *Dreigroschenoper*: "First comes eating, then comes morality" [original citation: "*Erst kommt das Fressen, dann die Moral*"]. Today, it seems to be the reverse: morality comes before eating. A glimpse at our time budget helps to understand this U-turn. In Germany, 105 minutes are spent on mealtimes (eating and drinking) per day [13]. In contrast, in 2012, audio-visual media, including the PC, were used for more than 477 minutes per day [14]. The hunger for information has a higher value – in terms of time – than the hunger for food. We are no longer food hunters and gatherers; instead we hunt every day primarily for information. And our appetite for information in the form of news, stories and gossip is insatiable. That includes the risk story. The media sound the alarm and the risk spiral turns ever faster.

The consequences are obvious. Previously: A burger is a burger and it tastes good or not. Today in contrast we ask: Will this burger make me fat? Does meat make you ill? Does eating burgers not increase the threat of climatic disaster? How many chemicals does it contain? Are there perhaps even genetically-engineered ingredients? And is eating meat immoral? Would I be better off

being a vegetarian? It is clear that the excessive consumption of information can have an effect on the consumption of food [15]. If you believe that eating fish involves risks, this will be a purchasing factor. And if you believe that preservatives cause harm, you will purchase food which contains none as far as possible. In other words: Perception creates reality, thus influencing the effect of risk communication. It depends not only on the sender, but above all on the receiver.

Stumbling blocks in risk communication

A message may be understood in a different way by the receiver than was intended by the sender. This also affects risk communication, which shall be further illustrated based on examples, relating to the disclosure of ingredients in foods, the labelling of products, numerical information and information on limit values. Something that is well intended can prove to be a stumbling block to risk communication.

Is aspirin regarded as less risky than acetylsalicylic acid, although it is the same substance? Yes. In a study entitled "If it's difficult to pronounce, it must be risky", the psychologists SONG and SCHWARZ [16] demonstrated that laypeople regard unknown and difficult to pronounce names, e. g. Magnalroxate or Hnegripitrom, which were given as ingredients in foods, as evidence of a higher health risk – in comparison to ingredients with simple names. Essentially, this leads back to a simple mental rule of thumb: what is unknown is considered as more risky than what is known. The foreign element is the risk. Lists with unknown ingredients increase the perceived risk. Transparency is good, but it has side effects. Foods have a variety of labels. The label jungle continues to proliferate: from organic logos and Fairtrade symbols to marks indicating the use

of genetic engineering. SCHWARZ and colleagues demonstrated in two interesting studies that adding organic and Fairtrade labels to food can influence the consumer's perception. For example, American consumers believe that organic snacks have fewer calories and therefore make you less fat than conventional snacks [17]. Ethical labels have a similar effect. Fairtrade chocolate is regarded as less calorific [18]. SIEGRIST and KELLER [19] demonstrated that information on nanoparticles in sunscreen lotions increases risk perception and diminishes benefit perception. It is completely plausible to expect similar effects with regard to nano-additives in foods. Labels which are added to give consumers more freedom of choice also influence the risk and benefit perception. Distortion can occur at this point, because consumers draw false conclusions. The same psychological mechanism is in action here, as when people assume that those who wear glasses are clever or that those who are ugly are stupid. There is a halo effect, which has an unconscious influence [20]. The existence of one characteristic is deduced from the existence of another characteristic, without any evidence. Labels which convey information rapidly can therefore produce undesired effects. There are no neutral labels. Every designation is also always an evaluation.

Are numerical data any better? Unfortunately not, as numbers are not everyone's cup of tea. People have difficulty dealing with numbers. And this is more widespread than is widely believed. The Pisa Study for Adults in 2012 made it clear that numeracy skills in the German population are somewhat poor [21]. 18.5 % of those surveyed in Germany only mastered the most basic procedures, such as counting, sorting and basic calculation. Calculation of percentages and basic probability caused difficulties for a fifth of those surveyed. Interpreting risk

information thus causes huge problems for a significant proportion of the population [22]. It must be concluded that many people cannot accurately understand numerical risk data due to their limited mathematical abilities. In addition, the relevant literature shows that analysing limit values is not just difficult due to mathematical weaknesses [23]. In conjunction with the numerical data, the units of measurement used also generate difficulties in comprehension. Furthermore, the intuitive perception of limit values is shaped by an idiosyncrasy: the exceedance of limit values is regarded as a sign of danger. However, values falling below a limit value do not suggest safety [24]. The indication that you are complying with the limit values does not help to calm risk fears.

What to do?

Risk communication remains risky, primarily because consumers often lack the necessary skills to understand risk information. As a result, such information can also produce strange effects. What is difficult to pronounce must not be a risk. Information transparency without the transfer of analysis skills can do more harm than good. This gives rise to a real communication dilemma. Obviously it would not be appropriate to pull the emergency cord and abandon all risk information and only associate food with contented cows. Information which provides guidance for consumers and enables them to make realistic risk assessments is important. However, risk communication must be turned upside down. In other words, the priority objective is first to create a reliable foundation.

The following tasks are therefore particularly urgent. Firstly, consumer protection should provide guidance on a critical reflection of unconscious prejudices. The problems relating to the equation "organic equals pure" must be explored. The previously-mentioned warning

Principles of evidence-based consumer information

Information should:

- support an informed decision on health questions about food safety,
- improve knowledge about how diet-related health risks can be avoided through one's own actions,
- encourage critical use of health-related information sources, esp. on the internet,
- improve comprehension of medical and scientific risk information,
- focus on risk comparisons and avoid manipulation through selective risk data.

Box 1: Evidence-based consumer information

from the BfR on the health risks of pyrrolizidine alkaloids in teas is a good example. In this case it was camomile and melissa teas, which exhibited the highest content levels. As pyrrolizidine alkaloids are part of the plant's own active substances, nature – not an industrial addition – can be the cause of a health risk. Risk communication should therefore explicitly examine the intuitive moral evaluation principles of naturalness and purity.

Secondly, – and this is particularly important – consumers should be made aware of self-made risks. In particular, information must be conveyed that food infections, which make up the majority of health risks, are a consequence of inadequate hygiene, including gaps in the refrigeration of food, which can be avoided. There is also another task for risk communication. It must clarify that health risks depend substantially on eating habits [25, 26].

Too much food, too fat and too salty can make you ill. The goal of communication is to raise awareness. It's about conveying risk proportions: what should we worry about most? Communication also aims to change behaviour, i. e. to change eating habits.

Finally, it is a matter of risk sovereignty and risk competence. It would undoubtedly be useful if consumers could distinguish between hazard

and risk and if they knew that individual studies – even if they are sensational – should be regarded with caution, as it is the overall scientific picture that matters. And it would certainly be desirable if consumers were not intimidated by relative risk data (200 % risk increase!). For this may mean that a risk has risen from 1 in a million to 3 in a million. Such risk knowledge would be the icing on the cake for risk communication. Clarification is urgent, but only once risk proportions and one's own share in risk provisioning are understood.

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