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Chemicals in Daily Life

A representative survey among German consumers on products containing chemicals

Report of Findings

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1 Introduction

The EU directive dealing with chemicals, REACH, which strengthens consumers' rights in general and rights to access information in particular, is designed to enable consumers to be informed – or to seek information – on risks and dangers associated with the handling of chemical products. In Germany, the Federal Institute of Risk Assessment (BfR) is mandated to educate consumers about possible health risks posed by chemical products. The mission of the BfR is as follows:

"The BfR is mandated by law to inform consumers about possible, identified and evaluated risks, which food stuffs, substances and products may entail. The entire evaluation process must be transparent to all citizens. Through comprehensive, complete and transparent risk communication, the BfR renders science visible and usable to the consumer." [1]

To this end, since the establishment of the BfR in 2002, a number of ways of institutionalising and strengthening the idea of administrative risk communication were discussed; the range of risk communication was significantly expanded and tested. Some observers remarked on the emergence of a "landscape" of risk communication (see: Brauerhoch et al 2008). The successes, however, also demonstrate that the implementation of risk communication is very much dependent on conditions. One of the persistent weak spots of risk policies is the fact that the addressees of risk communication, the citizens, remain largely unknown to those responsible for risk policies. Therefore, the current study aims at resolving questions, which revolve around this weak spot with a special focus on policies regarding chemical products. The following will be the key questions: How do citizens perceive risks in specific areas? What do they know about the specific areas of risk? And how do they educate and inform themselves on those risks?

The BfR, as the central agency for risk communication on consumer products, needs to address the following questions, which this study will also focus on:

1. What do people in Germany know about REACH?
2. To what extent does their knowledge of chemicals and regulation of chemicals influence their risk perception?
3. Do the people in Germany emphasise the risk or benefit aspects of chemical products?
4. How do consumers evaluate the safety of consumer products?
5. Did recalls of contaminated consumer products influence risk perception among consumers?
6. What do consumers expect in regard of information on chemical products and their regulation?
7. What do consumers know about the regulation of products with chemical ingredients?
8. In what way, and where, do consumers seek information on the properties of certain substances and products?
9. Within the context of REACH, there is a strong link between the regulation of chemicals and the safety of consumer products. Do consumers even perceive this connexion?
10. Will the survey be able to determine, which factors influence risk perception among consumers; and what direction public opinion will take in regard to REACH and the safety of consumer products?

[1] Website of the BfR: http://www.bfr.bund.de/cd/7465, accessed on 20.09.2008; also see: The Federal Institute for Risk Assessment at a glance – Data, Facts, Background Information: http://www.bfr.bund.de/cm/221/das_bundesinstitut_fuer_risikobewertung_auf_einen_blick_daten_fakten_hintergruende.pdf, accessed on 20.09.2008

The current report presents the findings of the study „Chemicals in Daily Life – A Representative Survey among German Consumers on Products containing Chemicals;“ the survey was conducted jointly by Hopp & Partner and SINE (South German Institute for Empirical Social Research) in 2008/2009.

Data collection occurred in two research phases:

1. Prior to the representative survey, an exploratory, qualitative phase via Focus Group Discussions was carried out in order to structure the research problem and to arrive at relevant lines of inquiry in the quantitative survey. A total of four Focus Group Discussions determined to what extent and in which areas chemicals and REACH are relevant, i.e. experienced and tangible, to the public.
2. The nationally representative telephone survey (n= 1,004 respondents) measured the extent of knowledge of consumers on safety and regulation of chemicals and consumer goods and determined, whether chemicals and consumer goods are perceived as posing potential risks to health. Finally, consumers' expectations in future types of information and communication were identified.

In Chapter 4.1, the methodology of data collection is documented. The tabular results of the representative survey, including analyses by demographic sub-groups, are contained in a separate volume.

The following four chapters will present: Concept and implementation of REACH (Chapter 2); theoretical insights in regard to risk perception research (Chapter 3); detailed presentation of findings from the qualitative and quantitative research phases (Chapter 4), and a concluding discussion of the implications of this study for risk communication on products containing chemicals (Chapter 5).

2 Restructuring of Policies on Chemicals – Challenges for Risk Communication

The European Parliament passed the reform of the legislative framework on chemicals in December 2006; it is named REACH (Registration, Evaluation, Authorisation – i.e. also Restriction – of Chemicals). It became law throughout the EU on June 1st, 2007. The BfR, as the agency tasked with the health-relevant evaluation of chemicals and chemical products, was a key player in the reformulation of the legislation of chemicals.[2]

The reform of the legislative framework on chemicals implemented a number of innovations. The reorganisation by REACH does not only affect the re-allocation of tasks among the industry and the agencies; it was designed to increase the responsibilities of the industry. Henceforth, down-stream users of chemical substances will play a considerably stronger role in the evaluation of risks to human health and the environment. Furthermore, the creation of the European Chemicals Agency will establish a dedicated institution for the administration of knowledge. Finally, REACH is to improve the risk communication on the potential dangers of chemicals. As such, REACH will only be successful if it is able to restructure risk communication between players in the industry and the consumers of chemicals. Accordingly, in this paragraph, we will briefly describe the genesis of the legislation; delineate the regulation structures as well as the tasks of risk management; and, finally, point out the ensuing challenges to risk communication by sketching a "landscape of risk communications" in the field of regulation of chemicals. In so doing, we assume that the area of "B2B" has already been sufficiently explored, as this is important in establishing of a risk communication chain of command between manufacturers and users of substances. In stark contrast, the area of "B2C" had not yet been structured. Which standards in risk communication are actually necessary and effective?

2.1 The genesis of REACH

Three important developments led to the restructuring of policies on chemicals:

- First, the failure of the former system of regulating chemicals: this becomes evident when examining the assessment of existing substances by the national agencies. Of 100,000 substances, 10,000 of which are commercially relevant, a mere 100 were comprehensively assessed – over a period of 20 years (e.g. Scheringer 2004, p. 63).
- Second, in the meantime, hazard assessment had reached a stage, which led to wide-ranging discussions across the EU of new concepts in risk assessment of substances (e.g. EEA 1998).
- Third, the precautionary principle in the European health and environmental legislation was elevated to the status of a general principle (EU 2000; Appel 2005). It applies whenever scientific evaluation remains ambiguous, but justifiable reasons for doubt persist or conflict with the high EU levels of protection are anticipated (EU 2000, p. 2).

To sum up, these three important developments brought about the emergence of chemicals regulation in an entirely new form. Two questions now need to be answered. How did the science policy process unfold? And what political strategies for the evaluation of chemicals were finally adopted? We will shed light on these questions by examining two stages in the discussion surrounding this process: the "White Paper: Strategy for a Future Chemicals Policy" (EU 2001; also Nordbeck/Faust 2002) and the final version of REACH (EU 2006; also Köck/Kern 2006).

The White Paper's precautionary strategies continue the general directives on the implementation of the precautionary principle and specifies these according to problem areas (EU

[2] Also see: http://www bund.de/cd/9025

2001, p. 5; Appel 2003, p. 105). Five essential strategies for the reorganisation were developed (Jacob/Volkery 2005, p. 69):

1. Clearly defined deadlines for the discontinuation of the introduction of hazardous substances.
2. Clearly stated information obligation for producers.
3. Unambiguous guidelines for the implementation of the precautionary principle.
4. Prohibition of chemicals with irreversible toxic effects or substances which persist and accumulate in organisms.
5. The industry will bear the costs of risks assessments rather than exclusively the public.

The last item especially resulted in a heated public debate, which resulted in economic considerations compromising the radical implementation of the precautionary principle (see: Løkke 2006, p. 5). To a certain extent, the Commission counteracted this effect by opening up the political discussion. Rather than allowing lobbyists to exclusively influence the first draft of the REACH directive (EU 2003), the EU Commission organised an elaborate agenda, which made provisions for the inclusion and participation of members of civic society.

Thus, a number of innovations in the revised chemicals legislation were included in the REACH directive. We wish to emphasise the following issues:

1. In the division of tasks between industry and agencies, the new legislation has shifted emphasis toward greater responsibility of industry.
2. The link between producers and consumers of chemical substances is assigned greater importance in generating of risk-relevant knowledge; hence, this link is being systematically strengthened.
3. By following the PBT- and vPvB criteria of risk assessment, the problems of limited knowledge are acknowledged.[3] Thus, a re-orientation from factual risk toward potential hazard has been initiated. (compare Chapman 2006).
4. The establishment of a category for “phase-in”[4] substances the issue of existing substances is revisited; and a processing roster is put in place, which is phased by production volumes.
5. Finally, the European Chemicals Agency serves as a central institution for the administration of expertise; this can, for instance, prevent duplicate testing. Also, many animal tests can be rendered superfluous, while attempts are made to develop alternatives to animal testing. This further underlines the innovative character of REACH

Against this backdrop, REACH currently faces multiple Litmus Tests. The first is of a scientific nature and pertains to the scientific support for the individual indicators in REACH; the second has to do with the timeframe for the implementation of REACH; while the third is putting the quality of risk communication to the test.

1. *Science:* There are objections that established testing routines do not support the original intent of precaution, as they are guided by specific production volumes for substances (Scheringer et al. 2006); rather, prescribed test procedures make provisions for preventive evaluation only for substances with annual production volumes above 100 tons

[3] The acronyms refer to specific properties of substances. PBT denotes the criteria of persistence (the time a substance remains active in the environment), the bio-accumulative potential (the potential of a substance to progressively accumulate in organisms) and toxicity (the toxic effects on organisms). vPvB substances (very persistent, very bio-accumulative) are characterised by a heightened persistence and bio-accumulativity.

[4] “Phase-in” substances are those, which the former chemicals legislation described as existing substances; i.e. they are those substances, which have already been approved and are now introduced into the new REACH system and, thereby, at least registered. As there are a multitude of substances, a phased time-frame according to production volumes has been devised for the introduction of such substances into the REACH system.

(compare Schulte 2006) Furthermore, criteria for the regulation of new chemicals have been systematically lowered (compare Ruden/Hansson 2005).

2. *Timeframe:* This pertains especially to the regulation of phase-in substances. By creating this category and establishing timeframes the problem of existing substances has been extended. Certainly, the issue of existing substances could not be addressed without transition periods; yet, considering the precautionary principle, this issue remains problematic. The actual practice of dealing with phase-in substances will determine the efficacy of the system.
3. *Risk communication:* Risk communication will play a vital part. In respect of the production chain, will information channels also be created that reach the citizens and consumers, so that the prevention-based structure may become effective? However, the far-reaching "privatisation of risk expertise" on the part of companies (compare Fischer 2008) could hamper the tendency toward risk communication at every link of the chain.

In the following paragraphs, we will discuss the issue of communicating risks to the consumers; this is especially relevant since the restructuring of risk management primarily aims at restructuring risk communication.

2.2 Challenges to Risk Communication

Traditional forms of risk communication were guided by expert-based standards, which emphasise scientific knowledge and the scientific validity of statements. Apart from verbal description, expert codes (e.g. language of chemistry), formalised codes (e.g. R-/S-instruction codes)[5] and symbols based on properties (e.g. caustic substances) are employed. The already rather lengthy package inserts will probably become even more complex following the implementation of REACH guidelines. What is missing, however, is specific, usage-based information.

Usually, consumers can neither understand expert codes nor are they interested in detailed information on chemical properties. Rather, they require simple, user-friendly information on how to deal with the substances or how to react in dangerous situations arising from the use of certain chemicals (knowledge of simple "how to" guidelines).

The new GHS (Globally Harmonised System), however, is based on an expert system. GHS serves to classify and label chemicals and to devise package inserts. While this type of risk communication is necessary, it is successful only in those instances, when it addresses expert audiences, such as the chemical industry of professional users of chemicals. Given their expertise and professional training, they are in a position to decode the abstract codes and to respond accordingly. The "message space" and the "behavioural space" interconnect; within such functional contexts, problems with translating the information or uncertainty on how to react arise at best if the expertise is incomplete or uncertain.

Within "open contexts" (especially consumers) a multitude of problems with interpreting information arises, because of the lack of necessary expertise and professional training. In these cases, "message space" and "behavioural space" break apart. Thus, traditional risk communication directed at this audience overwhelms with too many detailed facts; on the other hand, it does provide too little in terms of behavioural advice or behavioural risks. If risk

[5] The R&S instructions (risk and safety) represent a legislative and normed system of statements on the hazards posed by specific chemicals (R instructions) as well as instructions for the safe usage of chemicals (S instructions); Among others, R-instructions inform on toxicity, explosiveness or inflammability; S-instructions, for example, provide recommendations for keeping containers closed, avoiding contact with air or abstaining from eating while working with certain substances. Thereby, these instructions provide comprehensive information on hazardous materials, which is complemented by hazard descriptions and hazard symbols.

communication is to reach this audience, it needs to bear in mind the “behavioural space” of users and consumers rather than merely the scientifically structured “message space.”

3 Risk Perception – in general and specifically in chemistry

Research into risk perception has become a highly differentiated field of research with a plethora of approaches, including interdisciplinary ones. In order to address the topics of our project, it is important to consider individual as well as cultural or sub-cultural perception patterns, but also to explore hierarchies of relevance and behavioural routines, which are meaningful in the area of chemistry to ordinary people.

3.1 Risk Perception

Interest in the risk perception among the populace has risen considerably since the 1980's – a phenomenon, which cuts across all industrialised countries. Frequently, the increased interest in the risk perception among the populace is interpreted as an indicator for the crisis of the late, or also reflexive modernity, whereby society, faced with unintended side effects and fall-outs, increasingly questions the capabilities of risk management (Beck 1986, Adam 1995). Risk management itself is forced to act, as it is confronted with scandals, implementation deficiencies, and representative surveys, in which the credibility of political decision makers as well as government institutions is increasingly called into question and a general distrust is voiced of all things political. The realisation has set in that decisions, involving possibly far-reaching and potentially negative consequences, which need to be borne by the citizens, can only meet with social acceptance, if affected people are involved in the process and if their emotions are taken into account. Against this background, the findings on risk perception among the populace become increasingly significant. However, the criticism has to be raised that although theoretical awareness on the part of risk management of the importance of risk perception research has risen dramatically; in actual practice, however, the findings of perception research are neither utilised in a systematic and consistent manner nor are they systematically tied into the decision-making process in risk management (compare Dowler et al. 2006, p. 55; Renn & Benighaus 2006, p. 3).

There are a number of approaches to probe into social risk perception. Depending on their origins, they tend to be inspired by social psychology, cognition psychology, anthropology or sociology and orientated accordingly. Various effort have been carried out to place these varying approaches in a system, e.g. within Project STARC (STARC 2006, p. 28) or within the on-going Project NoMiracle (NoMiracle 2006, p. 9). The following table derives from the latter project. The table differentiates five approaches, according to their level of argument as well as the characteristics of the respective approaches: cognitive heuristics, semantic images, psychometric factors, cultural approaches to risk perception and the approach to risk perception in reflexive modernisation.

Table 1: Table from: Ortwin Renn & Christina Benighaus (2006, pp. 22)

Approach	Level	Character
Cognitive heuristics	Anthropological	Common sense reasoning for making inferences about the world
Semantic images	Social psychological	Reduces complexity by four powerful images that help to affect information overload effectively and to cope with uncertainty
Psychometric factors (Qualitative Characteristics)	Psychological	Characteristics of risks or the risk-taking situation that help individuals to estimate the degree of seriousness and to delineate a judgment about acceptability
Cultural approaches to risk perception	Macro sociological	Risk is defined as a social and cultural construct, every culture or subgroup pursues its own risk perception patterns. Five subcultures have been defined that can be distinguished by two variables: Belief in hierarchy (grid) and intensity of group cohesion (group) distributing people into five classes due to their values and hierarchical attitude
Reflexive modernization approach to risk perception	Combination of micro (individual) and macro (societal structures) level	Production of wealth goes hand in hand with production of risks, risks have an equalizing effect on social structure risk actors need permanent reassurement of their goals and strategies with the outside world

3.1.1 Fundamentals of risk perception

3.1.1.1 Contextuality of risk perception

Across all studies, the realisation has taken hold that different cultures and societies perceive risks differently; i.e. that specific social, political, historical and institutional contexts determine, what is perceived as a risk by a society; or what not or differently perceived (e.g. Douglas & Wildavsky 1982, Thompson et al 1990, Johnson & Covello 1987, also see the term "risk-political culture; Dressel 2002[6]). Following this line of thought, Mary Douglas snd Aaron Wildavsky proclaimed: "the perception of risk is a social process." (1982, p. 6) Niklas Luhman states that risk perception is the result of a process of social communication (1986). "There is no such thing as 'real risk' or 'objective risk'. (Slovic 1992, p. 119) Adequate risk management, and in its wake, risk communication, which is comprehensible to members of the public, and, in turn, creates trust in risk management, needs to reconstruct and efficiently implement those ideas of what is perceived as risk within a given society.

3.1.1.2 Experts vs. Laypersons: Risk evaluation and risk perception

Experts perceive risks differently than non-experts. In evaluating a risk, experts are guided by the available scientific and technological knowledge base, the so-called facts. The perceptions among the populace, on the other hand, are only marginally informed by these facts. Due to the different bases for evaluation, risk perception by experts is less likely to be termed risk perception, but rather risk assessment (compare Renn & Benighaus 2006, p. 8). While in the past this discrepancy was described as the rationality of experts vis-à-vis the irrationality of laypersons, a number of studies have persuasively demonstrated that this position is not tenable (e.g. Jasanoff & Wynne 1998, Wynne 1992, Funtowicz & Ravetz 1992). Rather, different mechanisms lead non-experts to come to a different assessment of risk. In this, trust is an essential factor: whom do I trust and why? Thus: Which expired opinion is accepted, which measures taken by government meet with sympathetic reaction, which institution informed and communicated in what manner, etc. (compare STARC 2006, p. 21.; Alizon Draper et al 2006). Last but not least, the media play a decisive role in what is perceived as

[6] The term risk political culture refers to a particular framing and a specific negotiation process of risks, including what counts as a "risk" in a given society. Neither the framing, nor the negotiation process of dealing with risks is free, but bound to certain conditional contexts of shared histories, institutional set-ups, and political systems embedded in distinctive culture. It is hence contingent and diverse in different cultures and nations." (Dressel 2002, p.38).

risk by the populace. A study by Martin Bauer et al. on BSE (Bauer et al. 2006) demonstrated, that the peoples of Germany, Finland, Italy and the UK arrived at different risk conceptualizations due to the influence of the media.

3.1.1.3 Gender-specific differences in risk perception

So far, in risk research by the social sciences, gender played almost no role. The exception are studies on risk perception. However, the realisation that gender needs to be considered in risk research is slowly more widely accepted. The findings of risk perception research by the social sciences are unambiguous: men and women differ, at times considerably, in their perceptions of health risks. Groundbreaking studies on this topic were published by Paul Slovic; in psychometric studies he demonstrated to what extent the risk perceptions of men and women diverged in various areas of risk. In his researches of risk perception among Swedish and Canadian men and women, significant differences emerged in the perception of environmental and health risks, such as drugs, prescription medicines or food additives (Slovic 1992, p. 130). The French sociologist Claude Fischler carried out a number of informative studies on nutritional behaviour, in which results were compared by culture and gender. In one study he demonstrated that in all cultures he examined – France, USA, Japan and Belgium – women were by far more concerned about nutrition than the male control groups (Rozin et al. 1999). In all cases, the concern about healthy nutrition corresponded with greater awareness of health-related topics on the part of women. Women and men perceive health risks differently. Any research, which aims at arriving meaningful conclusions on risk perception among the population cannot evade discussing gender-specific differences in the perception and conceptualisation of risks.

3.1.2 Qualitative perception patterns of risks

Psychologists have made the distinction between two qualitative perception patterns of risks (compare Slovic 1987 and Slovic 1992 and Fischhoff et al. 1978), which determine the perception of risks and the extent of risk perception: risk-related perception patterns as well as situational perception patterns (compare Renn et al. 2007, p. 78).

3.1.2.1 Risk-related perception patterns

Risk-related perception patterns pertain to characteristics of the source of the risk, such as habitualisation to a certain source of risk; the potential of the risk to bring about catastrophe; the certainty about fatal consequences in case of crisis; the visibility of consequences; the evaluation of the reversibility of consequences; or the expected, or assumed, undesired effects on future generations.

3.1.2.2 Situational perception patterns

A different class of patterns can be distinguished from risk-related perception patterns; these pertain to the characteristics of risky situations. Among situational perception patterns are: degree of personal control of the risk; whether the risk is taken voluntarily; a fair ratio of risks and benefits; trust in public control of the risk; the credibility of information sources; and the straightforwardness of provided information on risks.

3.1.3 Integrated Model of Risk Perception

Within the framework of the NoMiracle Project, Ortwin Renn and Christina Benighaus developed an integrated model of risk perception. In this, they distinguish and integrate four contextual levels, which determine risk perception (Renn & Benighaus 2006, p. 39):

- Cultural background
- Socio-political institutions
- Cognitive-affective factors
- And heuristics of information processing.

Each of these levels represents a "substructure," which collectively and individually exert influence over risk perception: "Each level is embedded in the next higher level to highlight the mutual contingencies among individual, social and cultural variables." (ibid, S. 39).

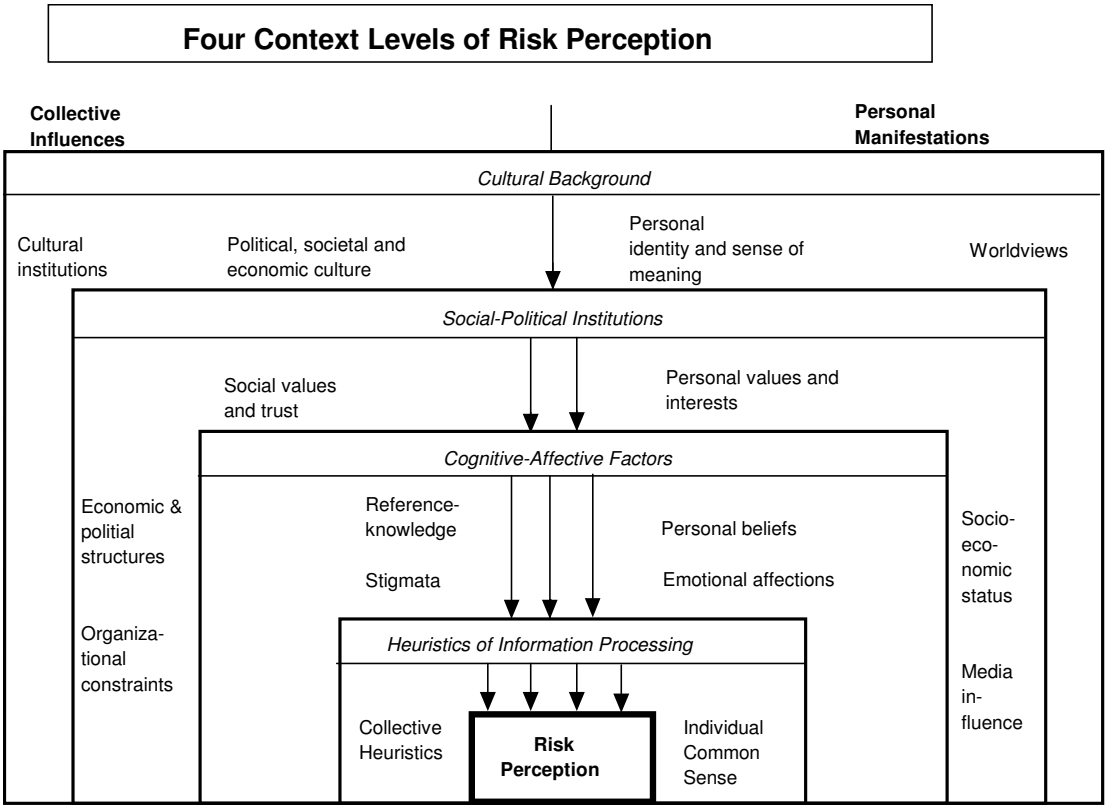

Figure 1: Four Context Levels of Risk Perception (Renn & Benighaus 2006, p. 39)

In order to facilitate effective risk communication it is essential to arrive at an improved understanding of perceptions as well as the actual handling of chemicals and consumer products, including information seeking. In this, risk communication is regarded as the key to close the gap between risk assessment and risk perception, thereby arriving at a more efficient risk management and improved regulation (Renn & Benighaus 2006, p. 3) Perception and relevance patterns among the population in regard to chemicals will need to be identified in order to achieve more mature consumers in respect of knowledge about chemicals and the appropriate handling of chemical products. Based on this, custom-designed, i.e. suited for the target audience, risk communication strategies would be developed – or selected from an existing pool of communication strategies.[7]

[7] Justified objections have been raised, that to date, no convincing concept has been developed for the implementation of findings of risk perception studies within the framework of an improved risk management (e.g. Renn & Benighaus, 2006; Dowler et al. 2008)

3.2 Risk perception in the field of chemistry

So far, only a very limited number of risk perception studies exist in the area of chemistry and consumer goods.

The literature on chemical risks (e.g. Renn & Benighaus 2006) described labels and associations by the general public of chemicals and chemical products as “artificial,” “hazard,” and “omnipresence of chemicals;” these were also observed in the Focus Group Discussions (compare Chapter 7).

A workshop, organised by the NoMiracle Project on risk communication and risk perception in autumn of 2007, has yielded interesting results.[8] International experts in risk communication arrive at the following five factors, which strongly influence the perception and communication of chemical risks (Benighaus & Renn 2007, p. 87).

1. The population’s low familiarity with and little knowledge of chemicals and their correct handling tend to prevent a realistic evaluation of risks.
2. “Artificiality:” as a matter of principle, chemicals are considered artificial and distinctions are made only rarely. But it is artificially produced risk that is perceived as especially threatening.
3. Most people question that exposure to chemicals is voluntary. Risk perception research has demonstrated that risks, which are confronted involuntarily, are deemed especially dangerous.
4. “Collective memory:” chemical accidents in the past exert strong influence on the risk perception among the populace (e.g. Bophal or Seveso; but also the recent recalls of toys manufactured in China).
5. “Negative reputation” of the chemical industry/lack of trust by the people constitute a problem not only to risk communication, but also an adequate risk management.

The last item – the fundamental popular distrust of chemistry in general and the chemical industry in particular – is discussed in an article by the expert in risk communication, David Zaruk (Zaruk 2008). According to Zaruk, the chemical industry cannot mend the lack of trust by merely increasing the amount of risk communication. Any attempt in that direction is doomed to failure, as people perceive only the risks posed by the chemical industry and its products, but not as an industry that creates prosperity. While people benefit from innovations in chemistry, the positive aspects are not associated with the chemical industry, but the downstream manufacturers. The Nokia cellular phone serves as an example: while users delight in the new technology, which was possible only through advances in chemical products, credit is given only to Nokia, not the chemical industry, which had facilitated these innovations in the first place. On the other hand, so Zaruk, in the case of an accident involving chemical products, most of the blame is heaped on the chemical industry and to a lesser degree on the actual culprits. The chemical industry is said to be trapped by its negative image; Zaruk recommends that it liberate itself from this negative spiral not by communicating more, but differently. The basic problem, according to Zaruk, is that chemicals are perceived as “man-made,” while “natural” products are preferred. Anything man-made meets with greater resistance than anything natural. We trust in nature, because we think we are familiar with it; while synthetic chemicals are perceived as something external. Zaruk sums up his argument: “...something needs to be done to stop the erosion of confidence in chemicals. More communication just won’t do it. The supply chain will have to work together to stress the benefits of chemicals in their products (or at least acknowledge them).” (Zaruk, 2008, p. 67).

[8] NoMIracle is a joint EU project, dealing with the cumulative effects of chemical substances with the aim of improving risk assessment. One segment, handled by DIAKOGIK GmbH in Stuttgart, is dedicated to such topics as risk perception and risk communication in the field of chemicals (Benighaus & Renn 2007).

The EU Project OSIRIS (Optimised Strategies for Risk Assessment of Industrial Chemicals through Integration of Non-Test and Test Information), which commenced in April of 2007, is dealing with the development of “integrated test strategies” (ITS), which, within the framework of REACH, are meant to enable risk management to base significantly more decisions on information, which was not generated by animal testing. The sustainability and acceptance of these integrated test strategies is being assessed and evaluated in stakeholder discussions (regulating agencies, members of the industry, and representatives of the public) (Renn et al. 2007a).

Empirical results on risk perception of chemicals and consumer goods in Germany will be gathered in this study.[9] The following pages will present the findings of the representative survey.[10]

[9] When writing up this report, no results of the Group Discussions were available yet.
[10] The report on the Focus Group Discussions (preliminary qualitative phase) is contained in detail in the interim report as well as in the Appendix.

4 Report of Findings

The basic objectives for the BfR commissioning this study centred on three topics: common patterns among the population as regards the dimensions of knowledge, perception and information-seeking behaviours were to be captured. It is for this reason that the results are broken down by these objectives. However, based on a review of relevant literature (compare Taylor-Gooby/Zinn 2006) as well as two basic assumptions as regards the topic of chemical products, this study expanded the scope by including questions on the behavioural dimension.

Two initial assumptions argued for this expansion: 1) the level of formal knowledge among members of the public about chemicals and the regulation of chemicals is low; 2) each consumer successfully handles chemicals on a day-to-day basis. The first assumption is supported by generally low levels of scientific knowledge (compare Wynne 1994, p. 366). The second assumption required validation with a view toward perceptual, behavioural and informational strategies, which are employed by the public. This line of questioning is supported, at least in theory, by the fact that current research into risk perception identified fundamental issues as falling into the area somewhere between psychology and sociology (compare Taylor-Gooby/Zinn 2006). The psychological line of inquiry, as described in Chapter 3 of this report, has relied heavily on methods inspired by theories of cognition and learning or methods adopted from social psychology; it is only recently that cultural conditions and emotions have been recognised as influential factors in risk perception. This was caused by the more or less heavy emphasis on the concept of the individual as a rational agent. However, this blueprint for the interpretation of behaviour was not shared by sociologists (compare Taylor-Gooby/Zinn 2006, p. 401); most sociological theories of risk stress constructivist aspects, thereby including contextual conditions in the perception and processing of risk. Thus, the connexion between these larger perspectives is made by behavioural strategies in the context of specific areas of risk. These strategies are likely to guide largely habitualised perception patterns and behavioural routines of individuals and thereby provide insight into individual problem solving activities and solutions already available on a societal level.

Against this backdrop, a number of insights are to be expected, especially in such areas as chemical products, which are marked by a long history of usage. The initial hypothesis was based on the assumption that most consumers successfully handle chemical products, usually at the household level, despite considerable risks (compare: Ruckart et al. 2004). Thus, it is assumed that most people possess well habitualised perceptual and behavioural routines, which need not reflect a general, abstract knowledge of chemical products. Consequently, successful handling of chemical products is not exclusively based on processes of conscious handling and decisions, but follows cultural patterns and emotional assessment strategies. In contrast to risk perception research, which which studied individual problem solving patterns and decision-making processes from the point-of-view of a faulty deviation from expert strategies, the current study acknowledges the capability of individuals to navigate complex environments and to develop successful behavioural strategies. Thus, the study represents a first step into this direction, because usage and attitude patterns were investigated in relation to actual products and product categories. By so doing, criteria can be generated for the structure of future typological research. At this point, we will summarise the characteristics of the four dimensions, which are central to the current study:

1. **Perception**
   Evaluation with affective character which alert to certain properties of products and thereby guide behavioural strategies to avert hazard. This dimension also includes specific attitudes towards products.
2. **Knowledge**
   Cognitive patterns, which structure the level of attention given to actions. Basically, this dimension comprises knowledge needed for handling chemicals (e.g. knowledge of hazard symbols) as well as formal expertise, which is expressed by the knowledge of legal guidelines and chemical formulae.
3. **Behaviour**
   Behavioural routines, which are applied during handling of chemicals and products containing chemicals; they include prior experiences in handling such products. It also comprises the actual handling of such products in daily life.
4. **Information**
   Elements which can be incorporated into cognitive patterns; i.e. able to expand attention levels or to re-structure behaviour.

In the subsequent section, the analysis of results will follow these four dimensions. The results of the representative survey will be discussed alongside the findings of the Focus Group Discussions. Whenever required, reference will be made to the theoretical section as well as other literature.

As findings of previous studies on this topic and the the Focus Group Discussions suggest, consumers often lack specific behavioural information. Information-seeking behaviour in regard to chemical products as well as utilisation of existing product information are, therefore, one of the central topics of the structured questionnaire. Since consumers are likely to assess product categories and certain products very differently as to their hazard potential, key indicators were measured by products and product categories. To this end, four separate categories were devised with typical products, ranging from four to eleven per category:

1. Building Materials
- Wall paints
- Lacquers/varnishes
- Solvents
- Wood preservers

2. Personal Care Products and Cosmetics
- Hand lotion
- Deodorants
- Body lotions
- Make-up such as mascara or lipsticks
- Hair dyes and tints

3. Cleaning agents and automotive care products
- Laundry detergents
- Fabric softeners
- Multi-purpose cleaners
- Toilet cleaners
- Dishwashing machine cleaners
- Oven cleaners
- Disinfectants
- Pesticides against household pests
- Rim cleaners
- Cockpit sprays
- Engine oil

4. Toys and children's products
- Toys
- Childrens clothing
- Pacifiers
- Nappies
- Furniture for the nursery

Thus, categories which traditionally were associated with chemicals, such as paints/lacquers and cleaning agents, were included in this study, but also categories such as personal care products and childrens care products; products, which are less likely to be associated with chemical products.

4.1 Questionnaire and Methodology of Data Collection

The questionnaire was developed based on the findings of the preceeding Focus Group Discussions. It comprised eight modules, which will be described below. The questionnaire is appended in Chapter 7.1

Module A – Attitudes towards Chemicals
During the Focus Group Discussions it became apparent that consumers distinguish between products with natural ingredients and products with chemicals; this aspect was covered by questions A1 and A3. Furthermore, the degree of awareness of the presence of chemicals in daily life and the presumed responsibilty for product safety will be measured in this module.

Module B – Actual Affectedness
To provide the basis for analysis, actual usage of the various products will be measured in detail. For each product category, indices will be calculated from the individual products; these indices will represent the degree of actual affectedness. As the Focus Group with professionals expectedly demonstrated diverging information-seeking behaviour, professional affectedness by chemical products is also determined in order to analyse this segment separately.

Module C – Perceived Affectedness
The measurement of subjective uncertainty of consumers will follow the same pattern as Module B, i.e. specific by products; indices will be calculated. Thus, based on these results, correlations between product usage and risk perception can be analysed.

Module D – Accessing and Processing Information
Previous results suggest that this issue is of low relevance among many population segments. Thus, this module first seeks to determine the need for information; All sources of information that have been used so far will be inquired after by product category. In order to devise future communication strategies, the preferred communication channels will be identified.

Module E – Handling of Product Information
The Focus Group Discussions demonstrated that, on the whole, product information is read rarely and hazard instructions are not always observed. Nevertheless, product information provided by manufacturers remain the most important source of information on risks and proper usage of products. Accordingly, the questionnaire will treat this topic in depth. A precondition for the observance of safety instructions is the perception of risks (Questions E1 and E2). Furthermore, the extent to which risk warnings and safety instructions are adhered to during usage will be quantified (Question E3). The impact of product information and the hazard posed by a product on the purchase decision will be measured by individual products (Question E4 – E7).

Module F – Supposed Potential Hazards
In order to render the abstract topic "product risks" tangible, Module F will inquire after perceived negative effects (e.g. headaches, allergies, cancer). Personal experience of compromised health is likely to influence risk perception considerably and, thus, will also be measured.

Module G – Handling of Chemicals
Usage patterns and behavioural strategies as regards chemical products will be covered by Module G. In the Focus Group Discussions, a high tolerance was observed of minor effects on health caused by the use of chemical products; this will be measured by Question G1. The varying degrees of credibility of product information provided by media or friends will be quantified in Question G2a/b. Question G3 will measure the importance of risk signals such as smell, colour of the product, packaging and positioning in the shop, as they emerged prominently during the Focus Group Discussions.

Furthermore, prompted awareness of REACH will be measured; the level of aided awareness is suspected to be very low. Intentionally, those questions were placed at the end of the questionnaire.

Module S – Socio-demographics
In addition to standard demographics, questions on the migration background (i.e. first or second generation immigrant) were included in Module S to analyse possible variations in levels of knowledge or information-seeking behaviour.

Positional bias in multiple response questions was counteracted by randomizing the order of response options. Positional bias in serial questions on product categories was neutralised by randomising the order of questions (e.g. Questions C2 to C5: Safety Concerns and Subjective Uncertainty).

The questionnaire was devised to allow for comprehensive analyses by sub-groups or multivariate analysis. Indices, which were calculated from single questions or entire clusters of questions, form an essential element in analysing the survey data. These condensed variables in the form of indices provided a valid and flexible option to examine connexions or relationships between key characteristics. These analyses occurred mainly in the form of sub-group and correlation analyses. For instance, safety concerns about chemical products were not measured by a single question, but via subjective safety evaluation of 21 individual products across four product categories. The following charts, therefore, not only depict per-

centages, but frequently also index values, which were scaled from 0 to 100 in order to enhance comparability. Potential relationships were detected between the following issues:

- Safety concerns about chemical products
- Actual affectedness by chemical products
- Degree of being informed about chemical products
- Information needs on chemical products
- Information-seeking behaviour as regards chemicals
- Compliance with safety instructions
- Images of chemical products
- Health problems experienced personally
- Attitudes towards chemical products
- Socio-demographics

4.1.1 Methodology of the Representative Survey

Fieldwork was carried out via computer-assisted telephone interviews (CATI = Computer Assisted Telephone Interviewing). Hopp & Partner has more than 20 CATI-stations at its disposal and used only its own, especially trained interviewers. All interviewers were briefed in a personal briefing session and also received written instructions. During data collection, a supervisor monitored quality at all times.

Respondents were defined as persons, who speak German, live in private households with fixed line, reside in Germany and are aged 14 and above. A total of 8 contact attempts were made for each selected household. A total of 1,004 interviews were achieved.

The selection of target household occurred through random selection, which assured the representativeness of the sample. Telephone numbers were selected via the Gabler-Häder method, which assured that fixed-line numbers in German households had the same probability of being sampled – regardless of whether the number was listed or not. Unlisted numbers were generated through the RDD process.

The selection of the final respondent at household level also followed random procedures (Last-Birthday-Method). Therefore, all household members are equally likely to be selected. The survey was carried out only between the hours of 4:30pm and 8:30pm, in order to cover all segments of the population; throughout duration of fieldwork (01.10.–17.11.2008), interviewing took place between the hours of 4:30pm and 8:30pm from Monday to Friday and from 11am to 4pm on Saturdays.

18% of the net sample resulted in achieved interviews. The average duration of an interview was 23 minutes, with a further 25 minutes for the screening Module; thus, on average, an interview took 48 minutes.

Table 2 Termination Record and Yield of Sample

Termination Record and Yield of Sample	Cases	% of initial sample	% of net sample
Initial sample	**10,000**		
Contacted	6,922	100%	
Neutral terminations	**1,188**	**17%**	
Not valid number	588	8%	
Not business line	0	0%	
Not private line	90	1%	
Fax or Modem	47	1%	
No response	49	1%	
Busy signal	2	0%	
Over quota	368	5%	
Others	44	1%	
Net Sample	**5,734**	**83%**	**100%**
Terminations	**4,730**	**68%**	**82%**
Refusals	4,265	62%	74%
Termination of interview	121	2%	2%
Open appointments	26	0%	0%
Open interrupted interviews	5	0%	0%
Contact limits	301	4%	5%
No appointment within field time	12	0%	0%
Accomplished Interviews	**1,004**	**15%**	**18%**

4.1.2 Data Capture and Analysis

The statistics software SPSS was used for data capture and analysis; all consistency and plausibity checks, which are standard in social research, were performed.

The data were weighted by age and sex. Weighting may result in absolute numbers, listed in the tables, being different from the actual number of cases.

To better compare household of different sizes on income, the “net-equivalent-income” was calculated. This method weighs disposable income by size and composition of the household (Number/Children/Adults). Thus, the total disposable income is divided using a weighting matrix (equivalence scale). The weighting matrix contains the following factors:

- Weight 1: first adult person
- Weight 0.5: second adult person
- Weight 0.3: children below the age of 18

The results of the survey are representative of the population of German-speaking persons, aged 14 and above, living in private households with fixed-line telephone in the Federal Republic of Germany.

The margin of error is ± 3 percent for the total sample. Skip patterns sometimes reduce the number of respondents and, accordingly, the margin of error increases. By the same token, the margin of error will be higher for the sub-groups listed in the tables. The margins of error are given at the 95% level of confidence.

4.2 Perception of Chemicals

The focus of the representative survey is the question after risk perception of chemicals and consumer products among the German population: how are chemical products perceived by consumers? Is the focus on benefits or risks? What attitudes toward chemicals exist? How is the presence of chemicals in everyday life being perceived? Which product categories are perceived as more risky, which as less risky and why?

In summary, the following key results emerged in respect to the variable “perception of chemicals and consumer goods”:

1. Chemicals and “natural products” are perceived as equally efficacious.
2. However, chemicals tend to be associated more with negative properties, while natural products are perceived more positively.
3. Even if used correctly, consumers associate risk with the usage of chemicals.
4. The intensity of risk perception depends on the product category.
5. Frequent users tend to feel safer than infrequent/occasional users.

The following chapter is divided into four subchapters: first, attitudes towards chemical products will be compared with attitudes toward natural products and an image-profile will be presented (4.2.1). Then, across product categories (building materials, personal care products, toys and children’s products and household cleaners), safety concerns of consumers will be discussed (4.2.2). The following subchapter examines risk perception in daily life; e.g. respondents were asked whether products can pose risks even if used correctly (4.2.3). Finally, findings of the quantitative survey will be compared with results from the qualitative phase of the current study, but also with results of other studies (4.2.4).

4.2.1 Attitudes: natural versus chemical products

This cluster of questions focused on the comparison of perceptions of chemical and natural products. It was already known that chemical products are perceived very negatively (compare Renn & Benighaus 2006). Thus, in the representative survey, the German population’s perceptions of these products was profiled.

Consumers had to assign the following attributes: dangerous, modern, effective, fragrant, useful, expensive, pleasant, and healthy. The following chart depicts the image profiles of both natural and chemical products.

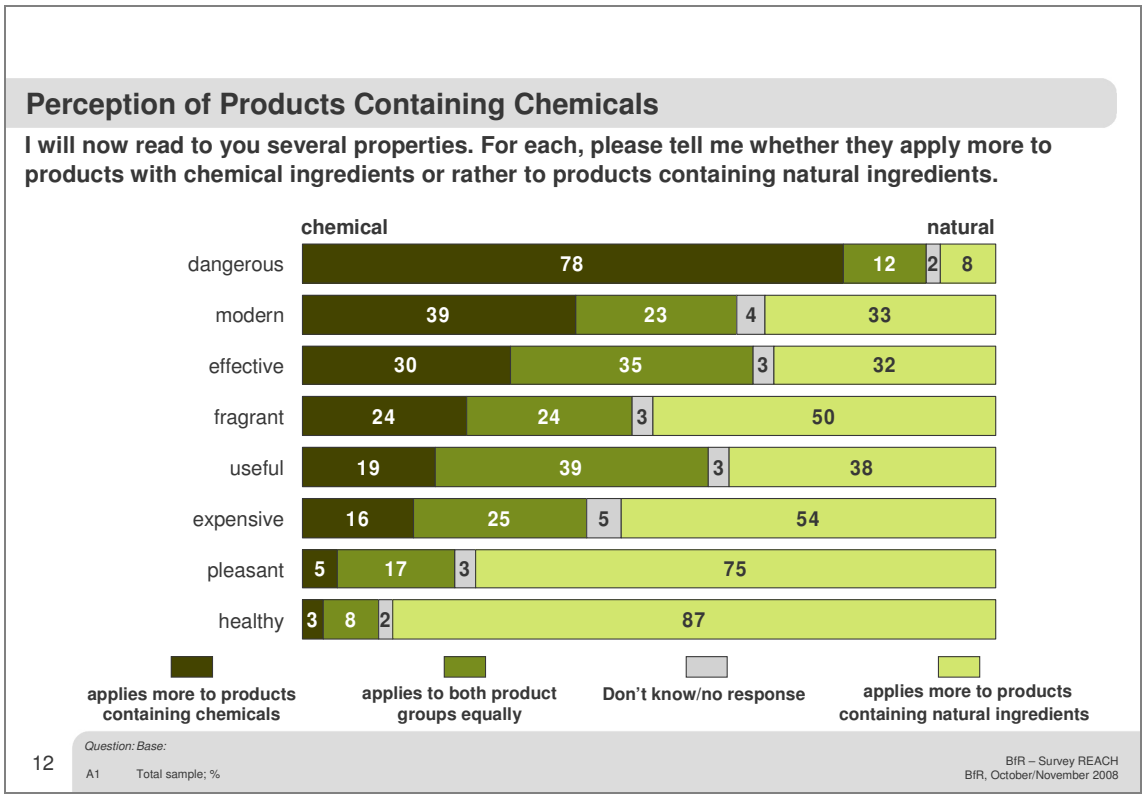

Figure 2: Perception of Products Containing Chemicals

Consumers perceive chemical products decidedly more negatively than natural products: positive characteristics (healthy, pleasant, but also useful) are assigned more to natural products, while the negative "dangerous" is ascribed more to chemical products. Both types of products, however, are perceived as equally effective. And natural products are perceived as more expensive than chemical products (54% vis-à-vis 16%).

A further question delved deeper into the attitude toward chemical and natural products.

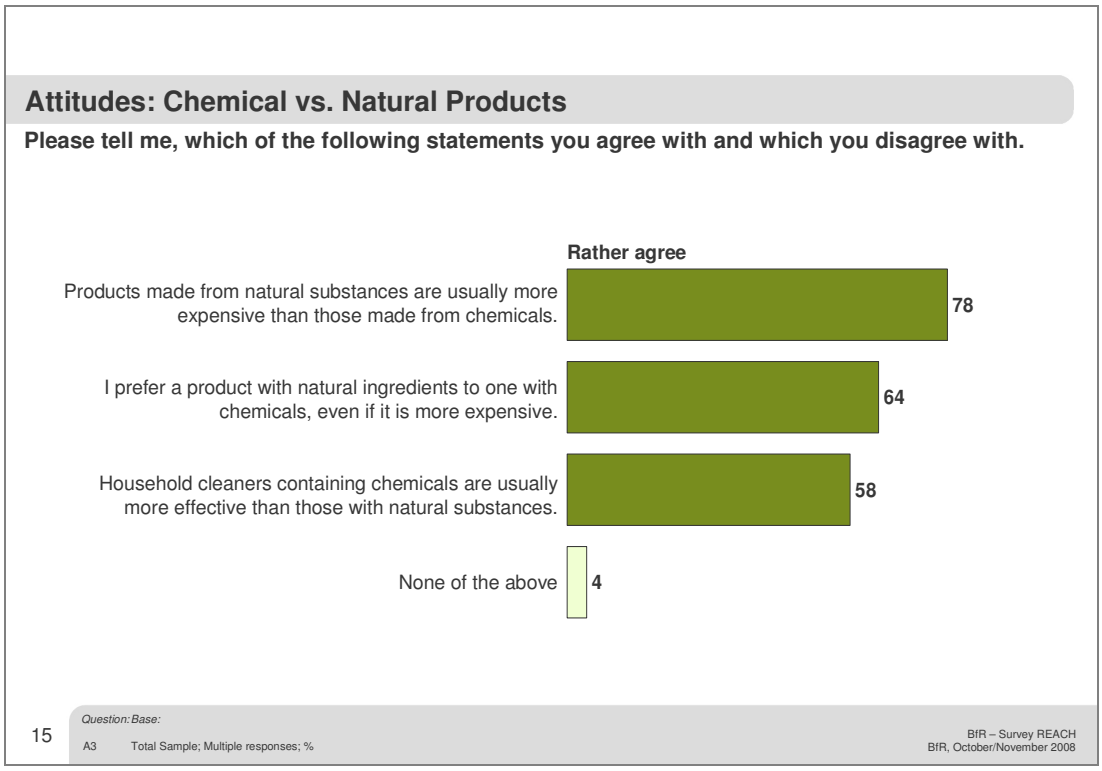

Figure 3: Attitudes: Chemical vs. Natural Products 1

Compared to chemical products, 78% of consumers perceive natural products as more expensive; that notwithstanding, almost two thirds (64%) prefer natural substances to chemical products. And just 58% agree that chemical cleaning agents tend to be more effective; i.e. more than 40% of the population consider natural cleaning agents as equally effective. Broken down by sex, however, some differences emerge.

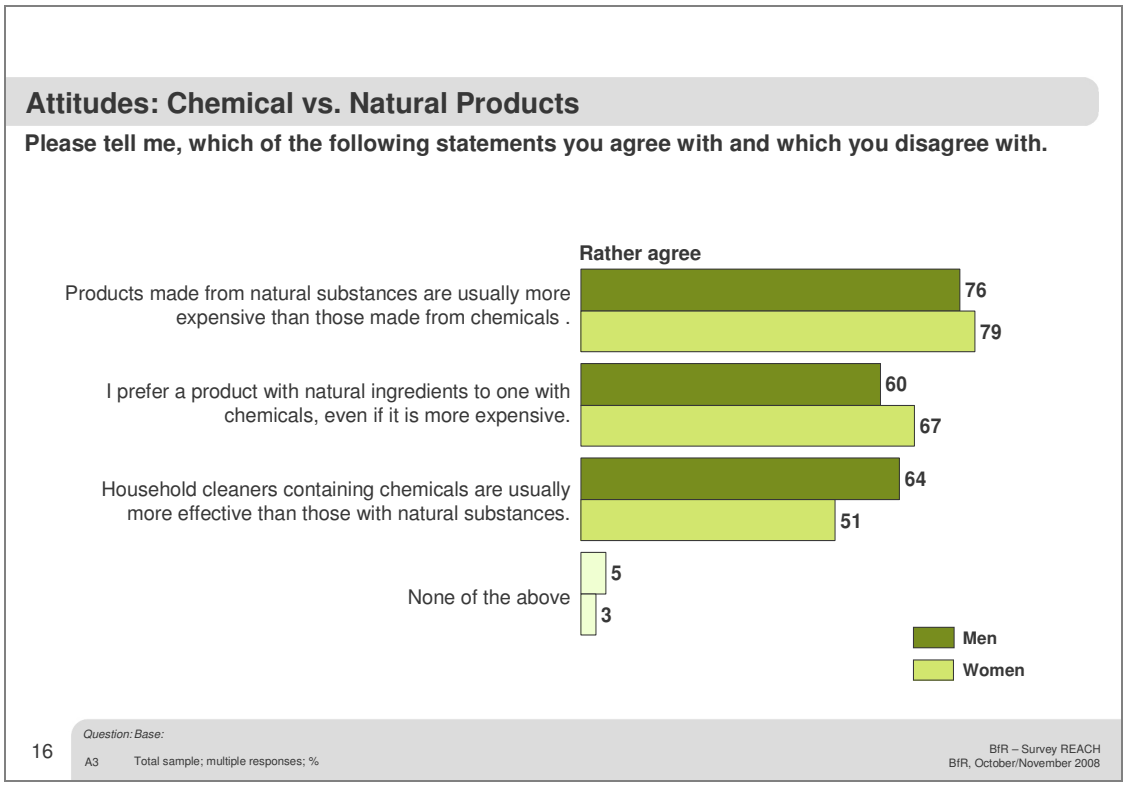

Figure 4: Attitudes: Chemical vs. Natural Products 2

Although there are few differences between men and women in respect of their attitudes toward prices of products, women tend to prefer natural products to a somewhat greater degree (67% vis-à-vis 60%). The difference is much more pronounced when it comes to effectiveness: men (64%) consider chemical cleaning agents more effective than natural products, while just 51% of women share that opinion.

What is the importance of chemicals in the daily lives of the German population? This question added another dimension to the risk perception of consumers: rather than providing a general evaluation, they were asked to rate the importance of chemicals and chemical products in their daily lives. Again, respondents were asked about their extent of agreement to the following statements:

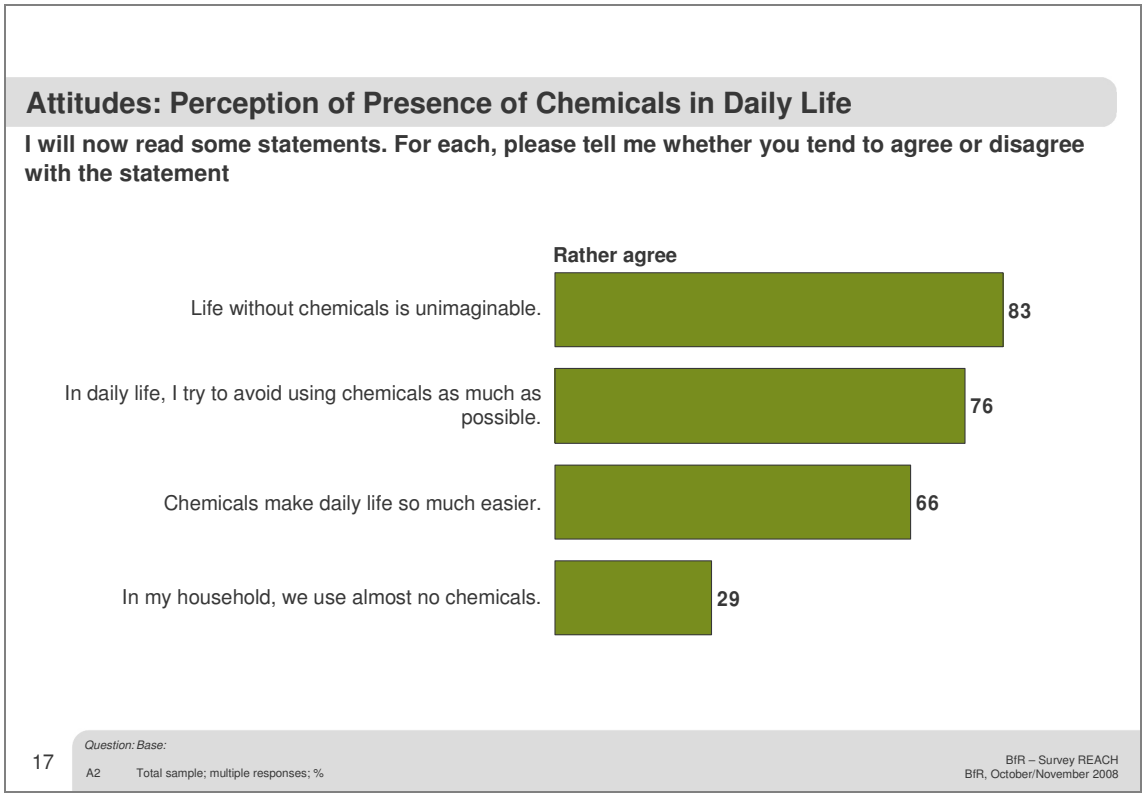

Figure 5: Attitudes: Perception of Presence of Chemicals in Daily Life 1

The initial observation that chemical products tend to be viewed more negatively than natural products is put into perspective: more than 80% of the population admit that they could not conceive life without chemicals. Although 76% attempt to minimise the use of chemicals as much as possible, two thirds admit that the use of chemicals makes daily life easier. Just 29% of consumers claim that almost no chemicals are used in their households. Again, a comparison by sex is revealing:

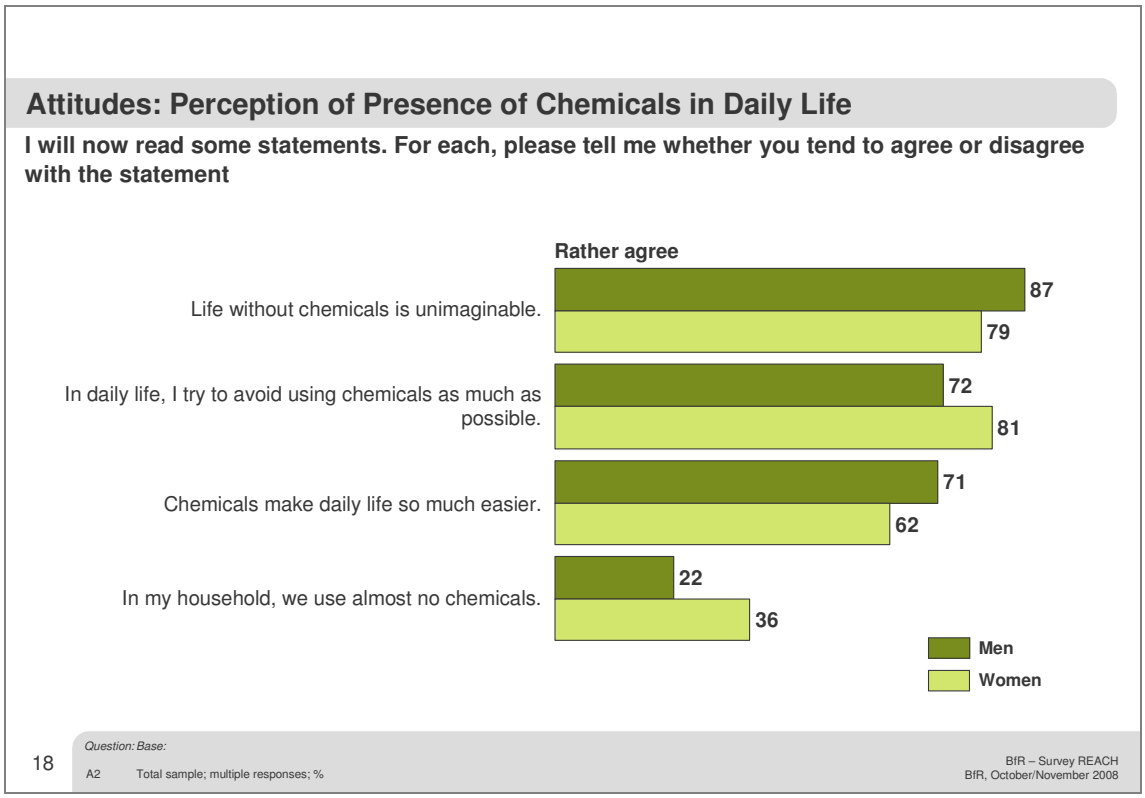

Figure 6: Attitudes: Perception of Presence of Chemicals in Daily Life 2

More men (87%) than women (79%) agree that life without chemicals would be inconceivable; also, more men (71%) than women (62%) feel their daily lives are made easier by chemicals. On the other hand, it is women more so than men who try to minimise the use of chemicals: 36% of women claim that almost no chemicals are used in their household against 22% of men.

Using a variable extracted from Module B[11] it was possible to correlate attitudes ("tending toward natural vs. tending toward chemical products) with actual affectedness. Actual affectedness relates to products across four product categories – cleaning agents. building materials, children's products and cosmetics – which are used by consumers in daily life. An "image index" was calculated, using 15 variables of Module A; i.e. all 15 answer options in Questions A1, A2 and A3 were assigned an index point, if respondents tended toward natural products. Thus, the image index can range from 0 points (decidedly pro chemicals) to a maximum of 15 points (decidedly pro natural products); i.e. the lower the index value, the stronger the pro chemical attitude.

[11] The questionnaire was structured by modules, which captured perceptions, usage habits, actual affectedness or socio-demographics. A description of the various modules is provided in section 7.1.

Plotting the image index against factual affectedness, the following relationship emerges: the higher the actual affectedness (i.e. the greater the number of products used), the likelier a pro chemicals attitude. The graph below visualises this relationship.

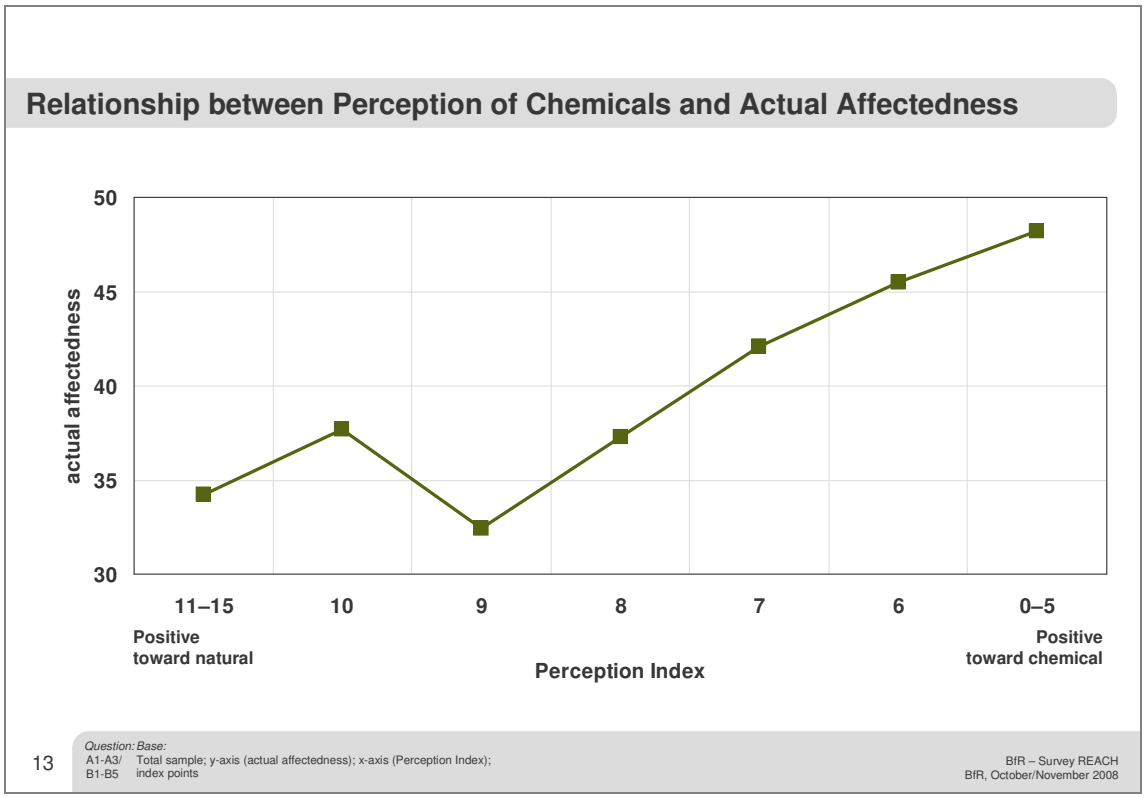

Figure 7: Relationship between Perception of Chemicals and Actual Affectedness

Correlating the image index with income yields the following result: affinity to natural products goes along with lower income; or, the higher the income, the likelier a pro-chemicals attitude becomes among consumers.

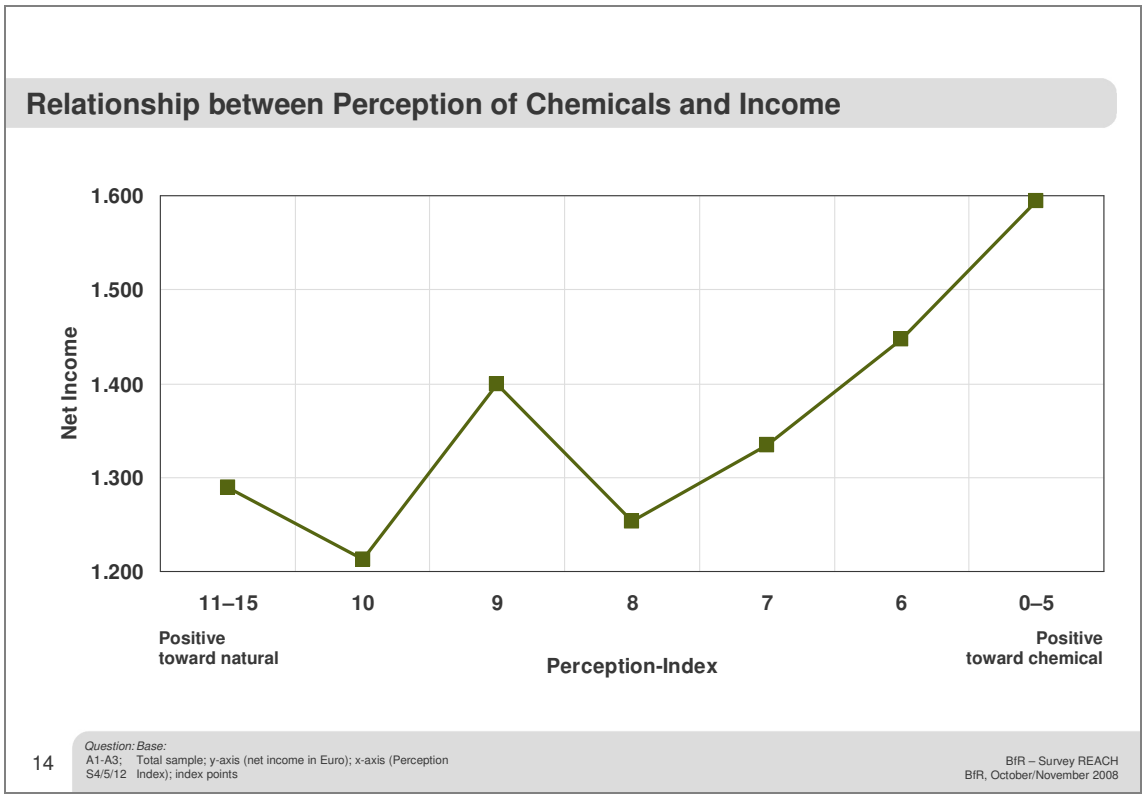

Figure 8: Relationship between Perception of Chemicals and Income

What other conclusions can be drawn from these findings? What relationships exist between socio-demographic variables such as gender, age, household income or level of education?

a) Considerable differences exist by sex of the respondents; Men are more positive about chemical products than women. Women tend more toward avoiding products containing chemicals, both in daily life and their households, even if products with natural substances are more expensive. Accordingly, there are fewer chemical products to be found in female single households than in male ones. Men generally consider chemical products to be more effective and less hazardous; they can hardly conceive life without chemicals. Men feel that their daily life becomes easier through the use of chemicals to a greater extent than women.

b) Young consumers, in contrast to older ones, tend towards using chemical products. While older consumers frequently seek to minimise usage of chemicals, younger consumers feel that chemicals make their lives easier.

c) Accordingly, younger consumers are using a decidedly larger number of chemical products. Consumers with higher incomes could afford a preference of higher priced natural products to chemical products; in fact, however, they are less interested in eliminating chemicals from their lives. It is consumers with lower purchasing power that seek to avoid them due to their negative attitude toward chemical products.

d) Surprisingly, the level of formal eduction does not impact on attitudes toward chemical products (compare the summary in section 4.2.4).

To summarise the results of the image index with a view to exploring therelationship between perception and evaluation, the following picture emerges: those with an affinity to nature, in contrast to those with an affinity to chemical products, are characterised by higher actual and perceived affectedness. Affinity to nature is linked to lower income and a perceived, but not actual, high level of information. They are also more interested in information on product

risks, demand more information from the manufacturers – but they do not wish to be "educated" (since they already feel educated); rather, they call for more specific information. Finally, those with an affinity to nature tend to rely more than others on subjective risk perception; they believe they can detect risks by smell, colour, type of packaging and position in the store.

4.2.2 Safety Concerns

Safety concerns vary depending on product category. The more commonly used chemicals are in daily life, the less they give rise to safety concerns. Routine usage of chemicals seems to convey a feeling of safety. In the obverse, the more rarely certain products are used, the higher will be the safety concerns among consumers (e.g. building materials, lacquers/varnishes, specialised cleaning agents)

The following chart depicts safety concerns by product category:

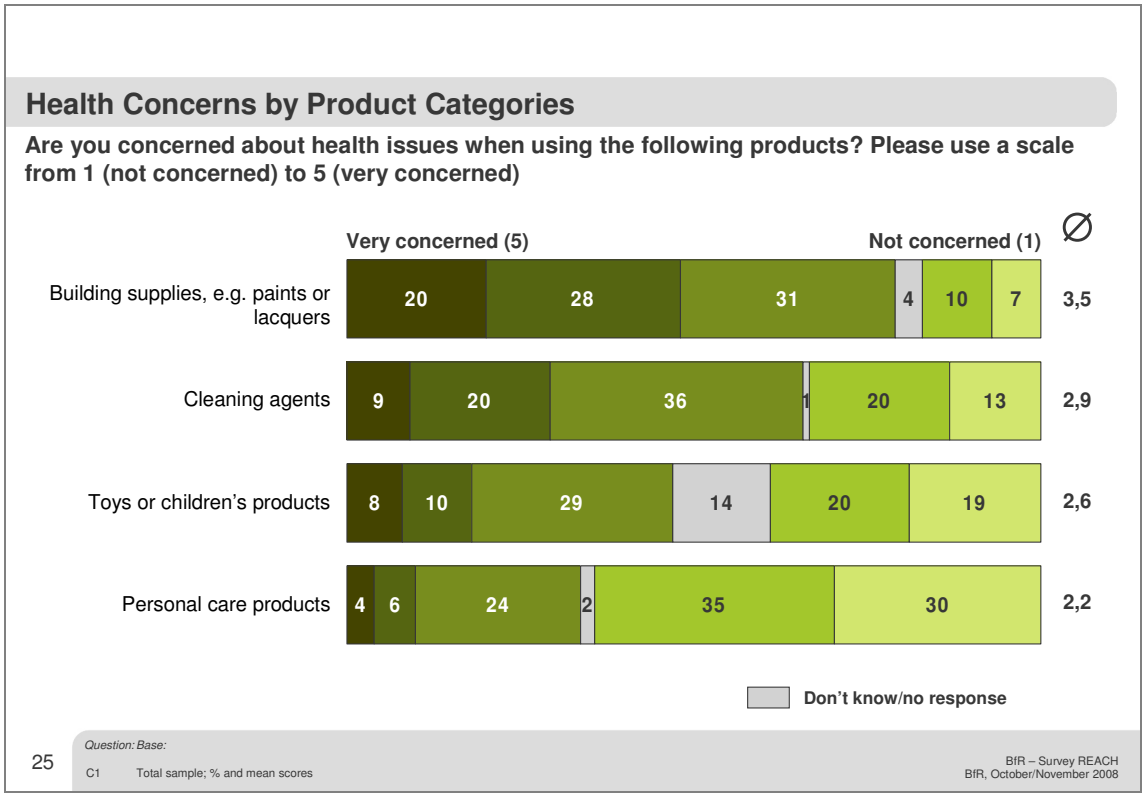

Figure 9: Health Concerns by Product Categories

Using a scale from 1 = not concerned to 5 = very concerned, respondents were especially concerned about building materials (mean score: 3.5). Concern is just average (mean score: 2.9) for cleaning agents and also toys and children's products (mean score: 2.6). The least concern was voiced for personal care products and cosmetics (mean score: 2.2).

Again, an index was calculated to express safety concern across product categories. A total of 21 individual products were considered in calculating the index. The more products were rated as "rather concerned", the higher the index became. Across the four product categories, comprising a total of 21 products, the Index of health concerns amount to 52 index points; i.e. on average, consumers were concerned about 10.8 of the 21 products.

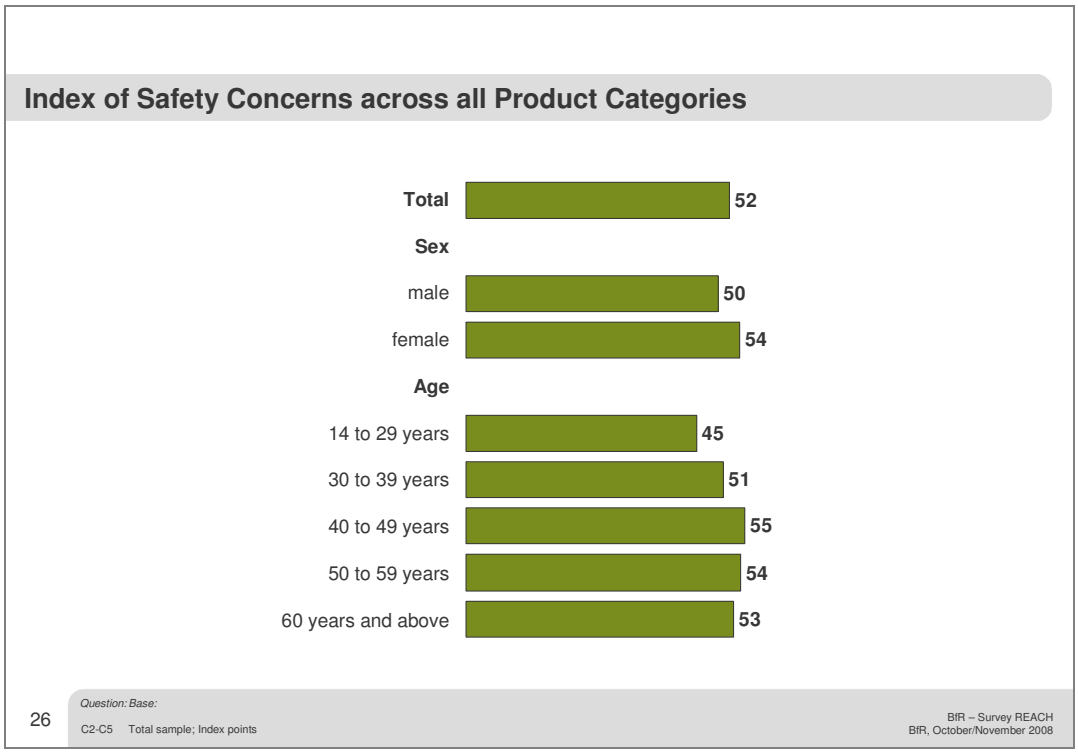

Figure 10: Index of Safety Concerns across all Product Categories 1

Compared against the average index of safety concerns, men, with an index value of 50, are significantly less concerned then women (index value: 54). Turning to age, the lowest safety concerns are registered among the youngest group of 14 to 29 year olds (index value: 45). Safety concerns then rise with increasing age and peaks among the 40 to 49 year olds (index value: 55); and then declines among older respondents (among the group of 60 years and above, the index value is 53). These results can be examined in more detail for individual product categories.

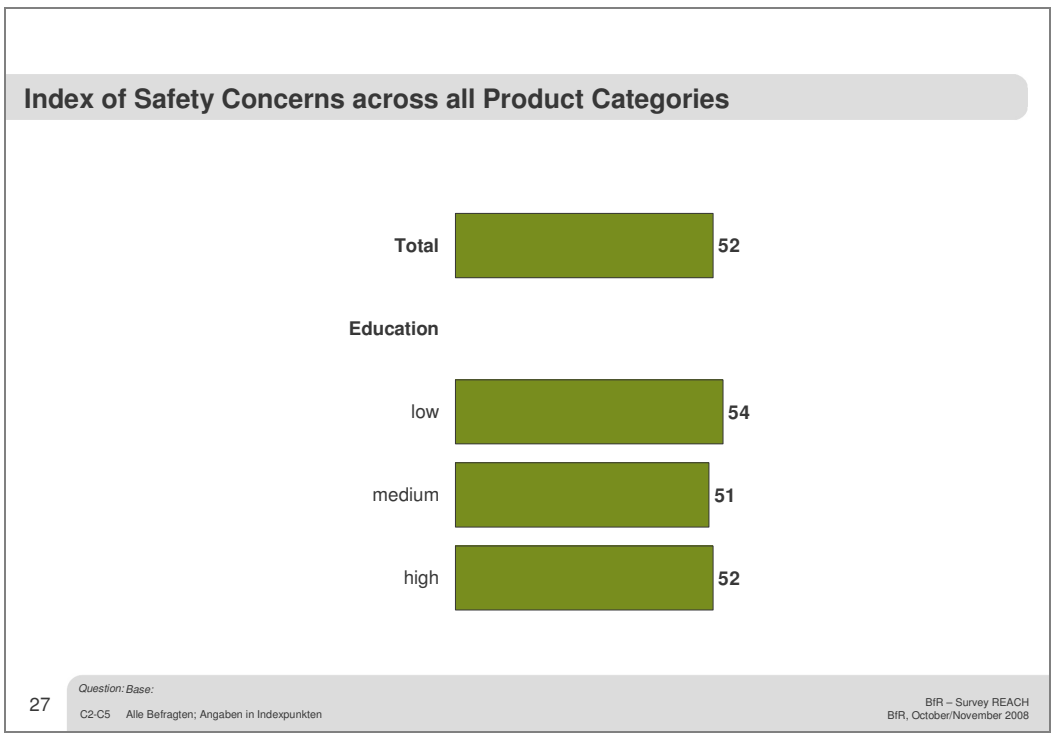

Figure 11: Index of Safety Concerns across all Product Categories 2

Safety concerns remain largely unaffected by the level of formal education. The variations are not statistically significant. This observation holds true both across all product categories and for each of the four individual categories.

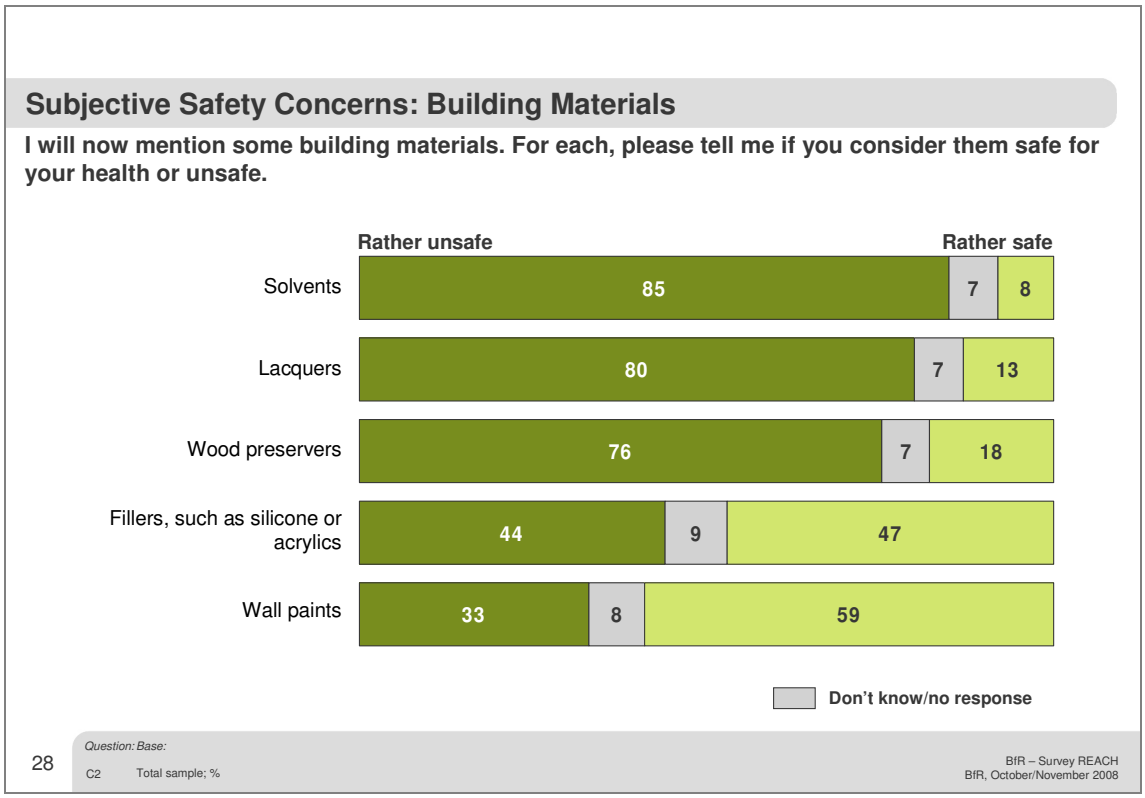

Figure 12: Subjective Safety Concerns: Building Materials

Specifically asking after individual products across the four product categories revealed that especially solvents were considered rather unsafe in the category of building materials (85%); this was followed by lacquers (80%) and wood preservers (76%). In contrast, the majority of consumers considered fillers such as silicone and acrylics (47%) and wall paints (59%) as rather safe.

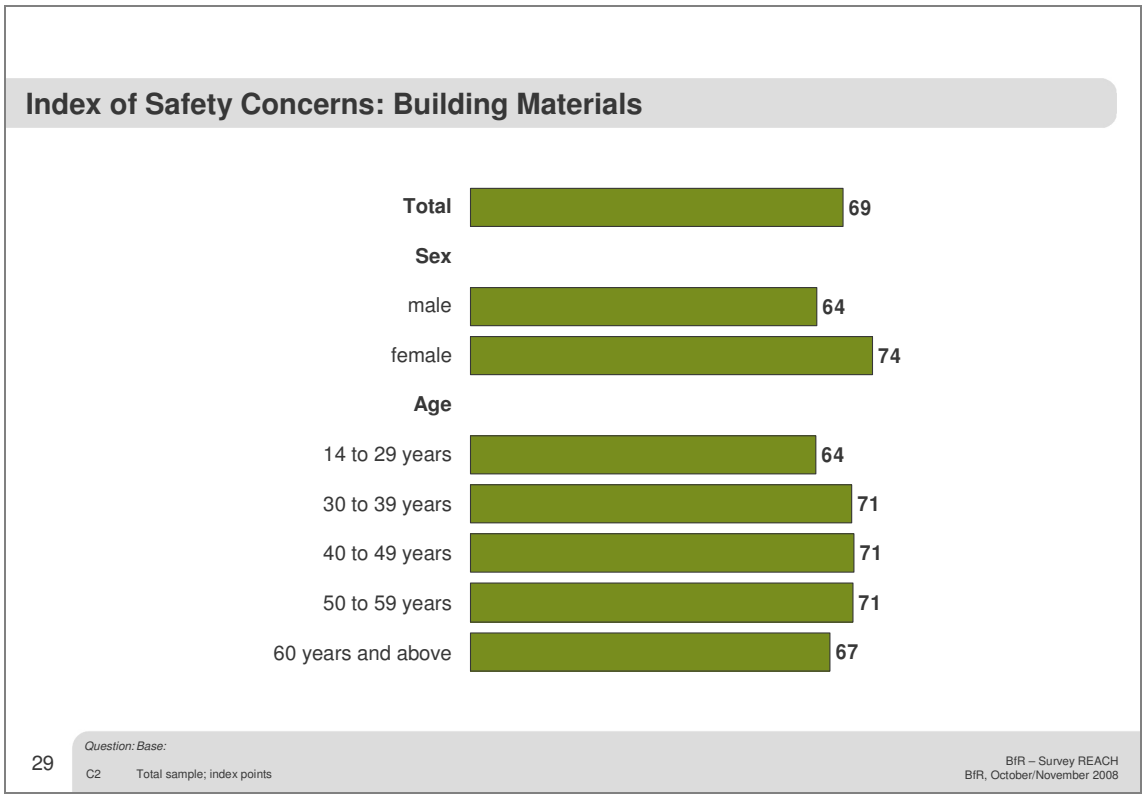

Figure 13: Index of Safety Concerns: Building Materials

Individual safety concern indices were also calculated for each product category. In the case of building materials, the index comes in at 69 (against 52 across all categories). Thus, building materials raises the most concerns among the categories. Expectedly, differences by sex come into play: women consider building materials significantly less safe than men. Age is less important: while the youngest age group has the same index as men, namely 64, the following age groups come in at 71; among the oldest age group the index slightly falls again to 67.

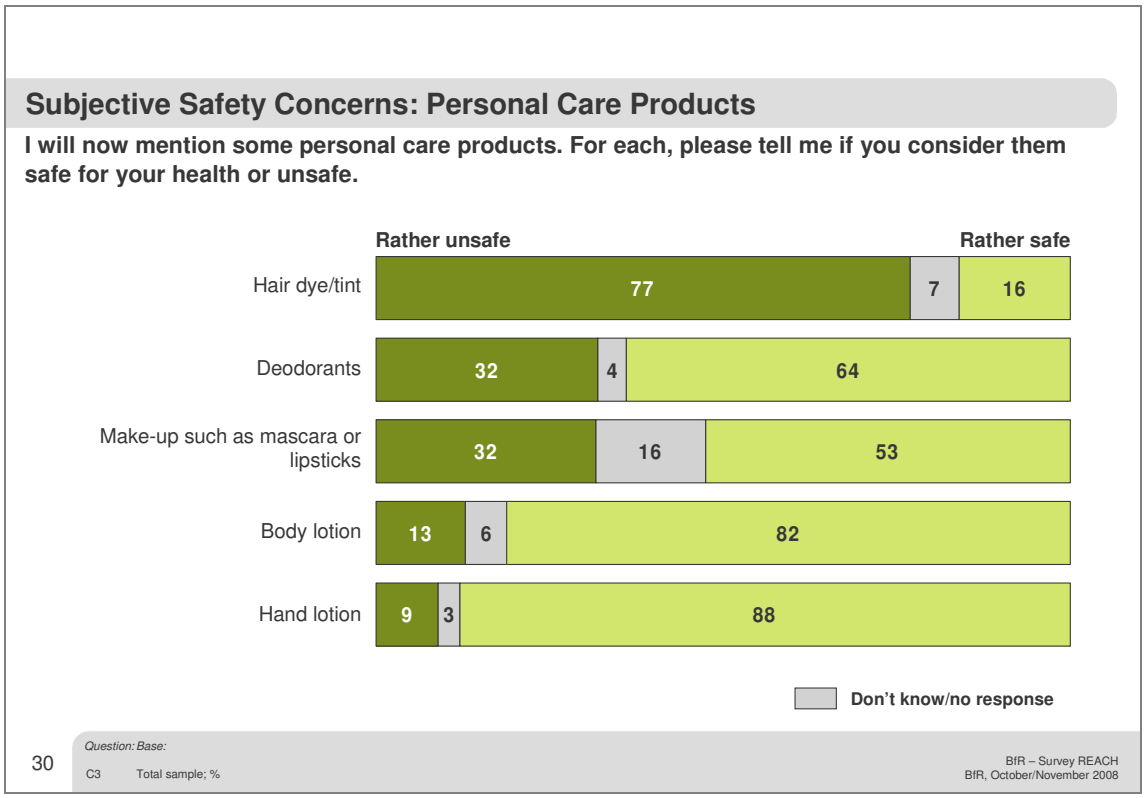

Figure 14: Subjective Safety Concerns: Personal Care Products

In the category of personal care products and cosmetics it is mainly hair dyes and tints which raise concerns among 77% of consumers. Just 32% of consumers are concerned about deodorants and make-up (64% and 53% respectively consider them rather safe). 16% could not pass any qualified judgement on make-up. Body and hand lotions are considered unsafe by just one in ten consumers (13% and 9%, respectively).

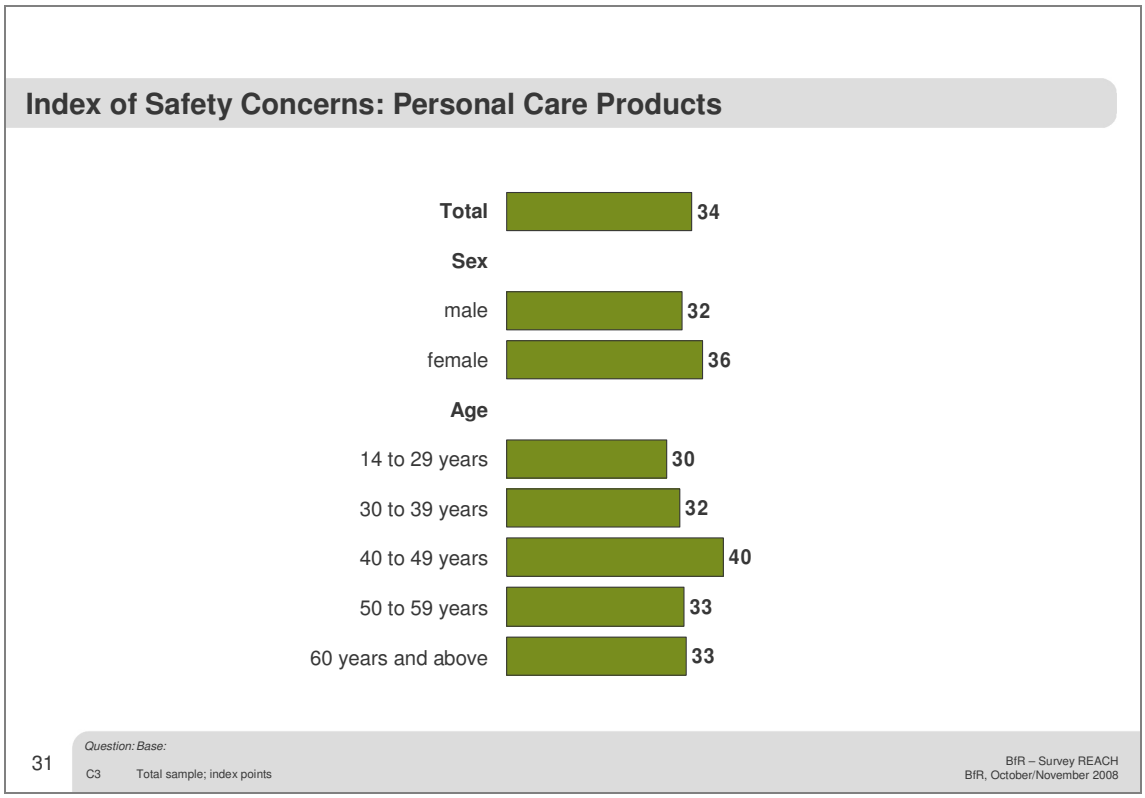

Figure 15: Index of Safety Concerns: Personal Care Products

With an index of 34, personal care products and cosmetics rank third among the product categories.[12] Even in this category, women tend to be more concerned than men (36 vis-à-vis 32). Few differences exist between age groups, although the index peaks at 40 among the 40 to 49 year olds (versus 30 to 33 among the other age groups).

[12] A summary chart on safety concern indeces for the four product categories is presented in Figure 10

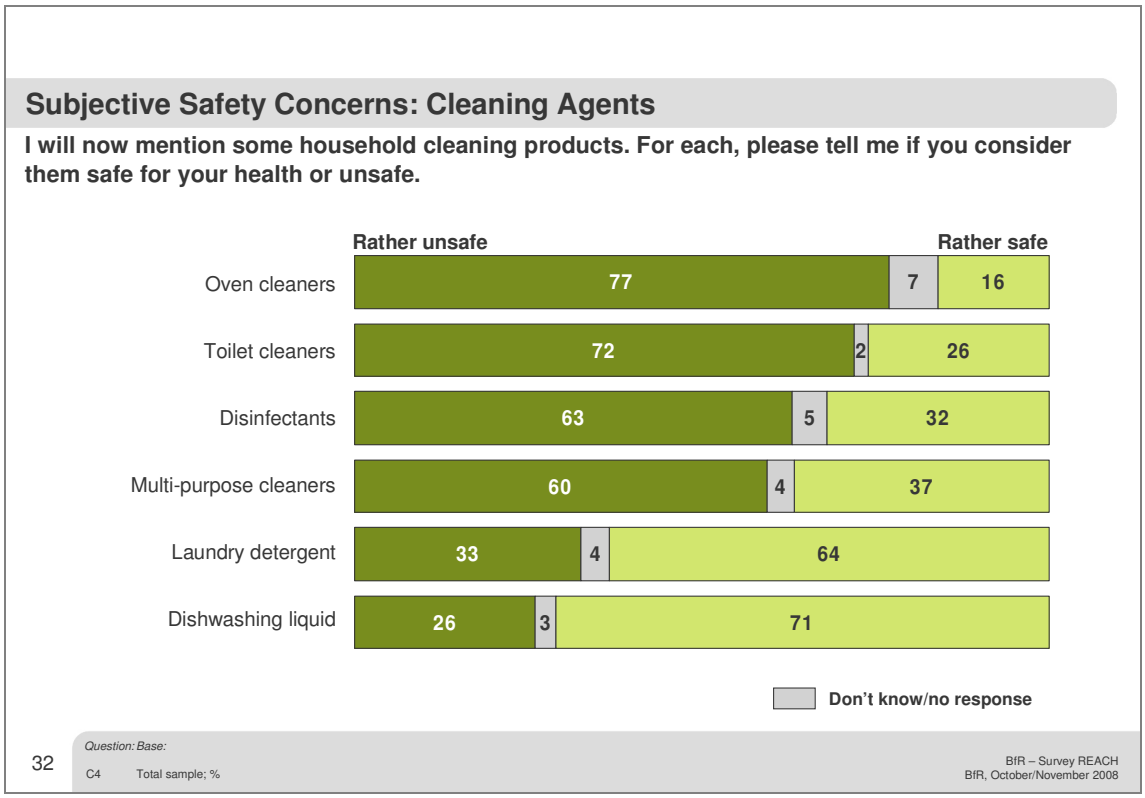

Figure 16: Subjective Safety Concerns: Cleaning Agents

Among household cleaners, oven cleaners are considered rather unsafe (77%). Compared to oven cleaners, all other products, such as toilet cleaners (70%), disinfectants (63%) and multi-purpose cleaners (60%) are considered unsafe by fewer consumers. Laundry detergents (64%) and dishwashing liquids (71%), on the other hand, are considered rather safe. These evaluations do not pronounce products safe or unsafe; they only reflect proportions of consumers, who consider them rather safe or rather unsafe.

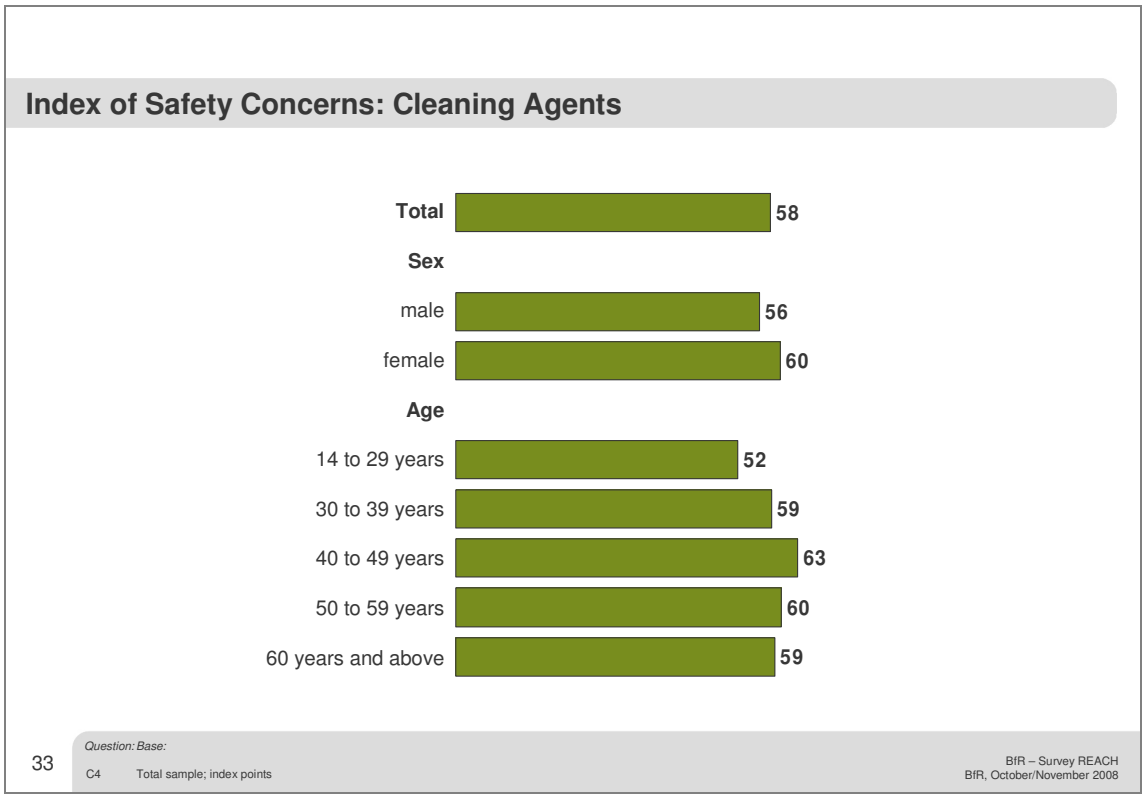

Figure 17: Index of Safety Concerns: Cleaning Agents

Cleaning agents occupy the second position in terms of safety concerns: the safety concern index across all six products is 58; again, women tend to be more concerned than men (60 vis-à-vis 56). Among 14 to 29 year olds, the index is 52 and rises to 63 among 40 to 49 year olds; it then contracts to 59 among those above the age of 59.

Figure 18: Subjective Safety Concerns: Toys and Children's Products

Among the products of the toys and children's products category, health concerns exist mainly for toys: 43% are concerned, while 48% consider them rather safe. About a third of consumers consider pacifiers (32%) and nursery furniture (30%) rather unsafe. 24% are concerned about children's clothing; 16% about diapers. The overwhelming majority (74%), however, consider nappies safe.

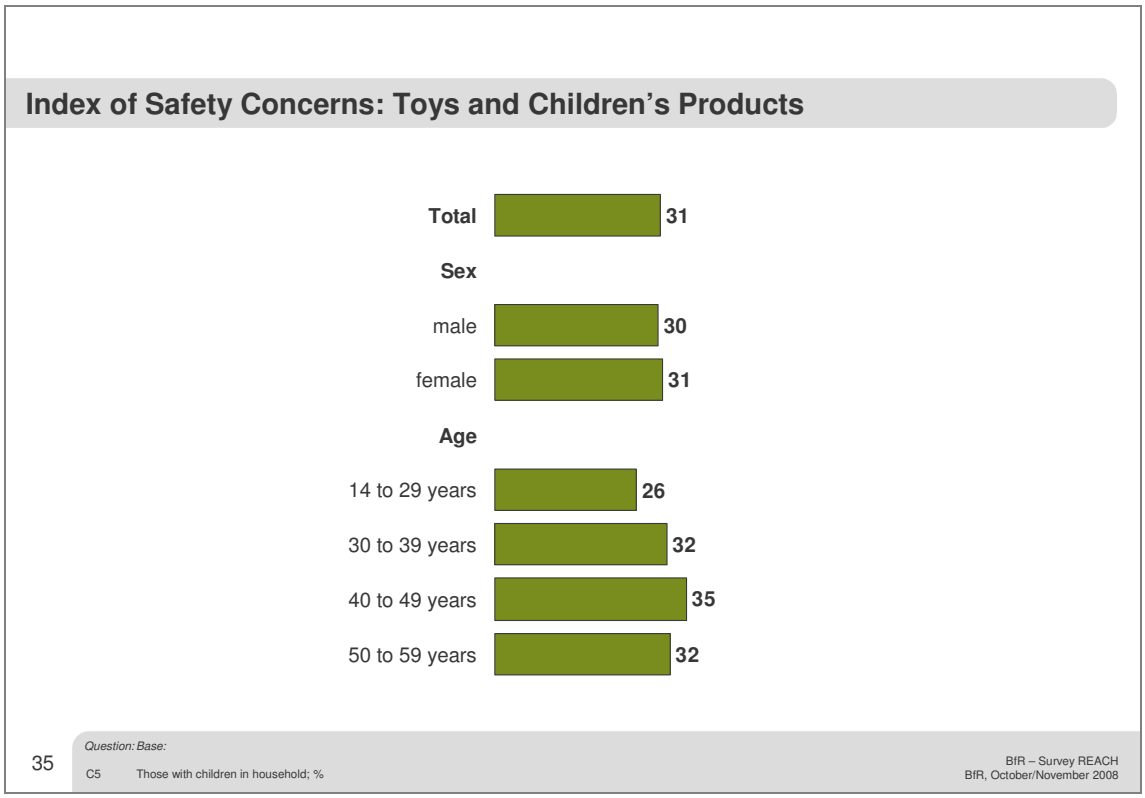

Figure 19: Index of Safety Concerns: Toys and Children's Products

The five children's products come in at 31 index points, the lowest index among the four categories. There are virtually no differences by sex. As was the case in the household cleaners category, uncertainty rises with increasing age, reaching its peak at 35 index points among 40 to 49 year olds; the index contracts among older consumers.

Are there links between subjective affectedness and other variables? In deed, there are; and first among these is the link between safety concerns and actual affectedness.

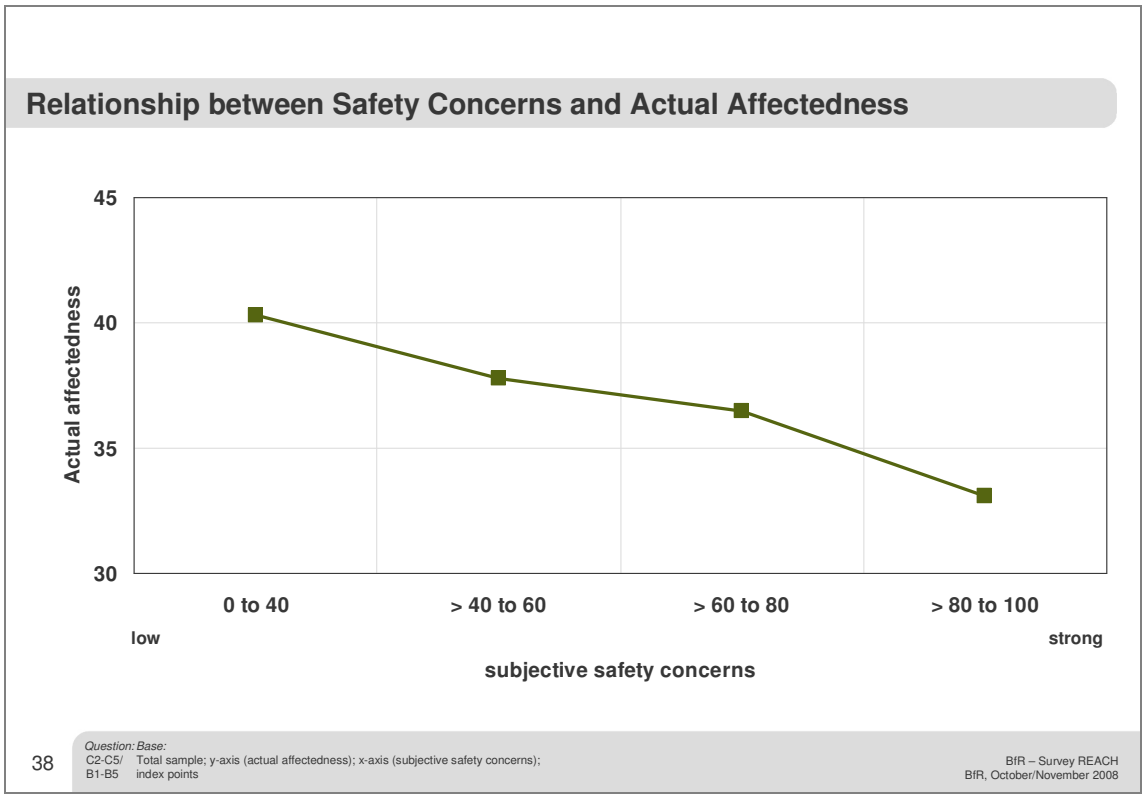

Figure 20: Relationship between Safety Concerns and Actual Affectedness

There is a negative correlation between safety concerns and actual affectedness. The more frequently products are used, the lower will be the health concerns about using those products. This may be explained by positive experiences consumers may have had using those products; or, in an attempt to reduce cognitive dissonances, consumers may ignore possible concerns about purchase and usage of such products. Furthermore, risk perception research has demonstrated that risks, which were taken willingly, are more likely to be deemed tolerable and acceptable. On the other hand, consumers who are more concerned tend to be affected to a lesser extent; i.e. they also reduce cognitive dissonances by not acquiring and using such products in the first place. Furthermore, it is conceivable that prior, negative experiences with a product may have given rise to increased concerns.

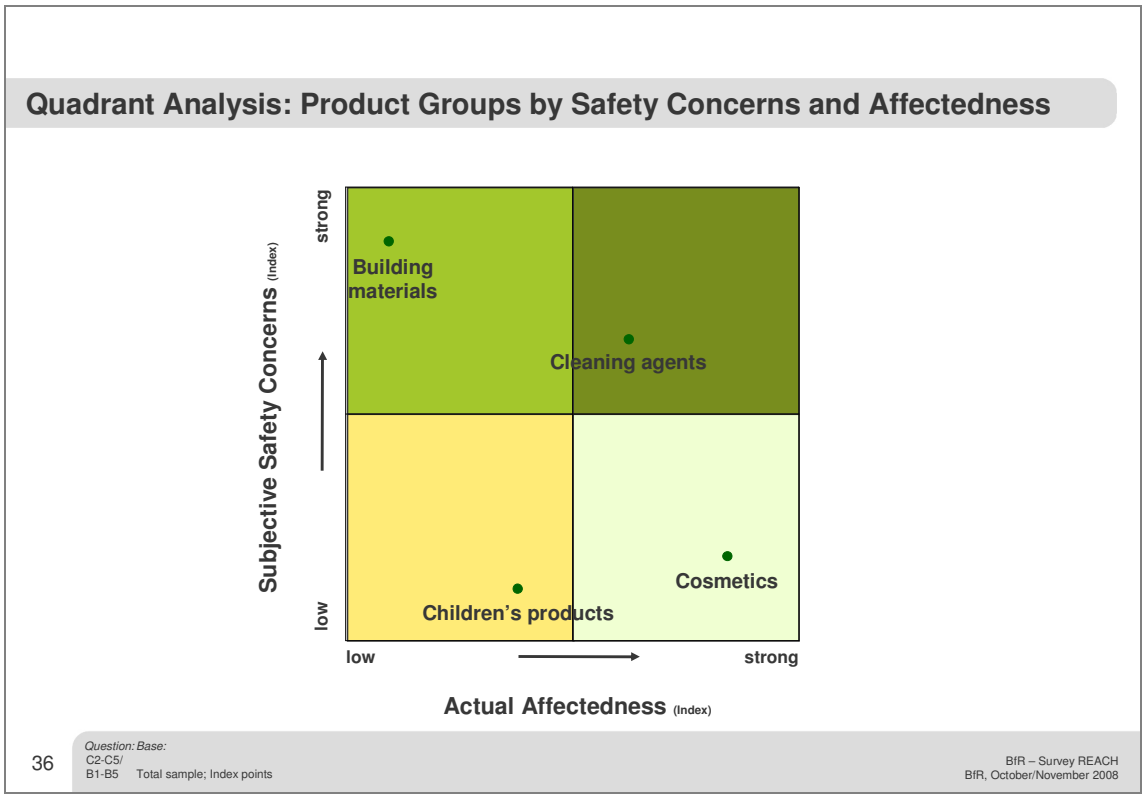

Figure 21: Quadrant Analysis: Product Groups by Safety Concerns and Affectedness

A key finding is the link between actual affectedness and subjective safety concerns depending on the product category. There exist distinct differences, which support the hypothesis that perception patterns and behavioural strategies among consumers are pragmatic; i.e. are structured by frequency of usage and context.

As depicted in the matrix above, cleaning agents are the most relevant category of chemical products: they are used frequently (high factual affectedness) and they are considered as relatively dangerous (high safety concerns). Children's products are near the bottom end of either scale. The level of safety concerns about cleaning agents is exceeded by those about building materials. In this instance, lower frequency of usage and, therefore, lower familiarity, may bring about this sceptical view of building materials. Personal care products are the most frequently used and, therefore, are characterised by a high degree of pragmatic acceptance. In contrast to cleaning agents, however, consumers are less prone to categorising them as chemical products.

Contrary to the assumption in risk perception research that differences exist in the risk perception of experts and laypeople, such differences could not be confirmed by the current study. Professional exposure to chemical products was measured through respondents classifying themselves. Persons who use chemical products in their line of work are subsequently termed professionals. There were no differences in the risk perception of professionals and the population as a whole: although there were marginally higher safety concerns, especially about cleaning agents, among white collar workers[13]; blue collar labour, i.e. working in crafts or trades or operating machines or working in health care, did not increase concerns about certain products; as such, professionals are comparable to the rest of the population. By the same token, professional affectedness did not correlate with actual or subjective safety concerns. This could be explained by the fact that in this study, professional handling of chemicals was taken as criterion for professional affectedness and, thereby, was used in classifying professionals. Professionals, therefore, are not strictly speaking scientific experts, but, as experts in practical handling of such products, would need to demonstrate different perceptions. This, however, was not the case.

In what way does the extent of subjective affectedness impact on other attitudes and experiences? Persons with increased subjective affectedness prefer “pro nature” attitudes and feel less well informed about product risks. They are more likely to demand more information on product risks as well as manufacturers’ safety instructions on the packaging. Persons with higher subjective affectedness frequently have experienced prior health problems; accordingly, they are convinced that risks to health exist despite correct product usage. They access a greater number of sources of information on product risks, tend to be more cautious when alerted to risks (by friends/media), would be more likely to take countermeasures in acute situations and, understandably, have fewer cleaning agents in their households.

[13] The label “white collar” worker was made prominent by C. Wright Mills (1951), who thereby developed a central category for the description of professional activities in service-oriented society. He described the increase in white collar activities; i.e. activities focused on office work in the areas of sales, administration or coordination; and analysed the concommittant phenomena of alienation among the American middle class. Blue collar activities, in contrast, describe manual labour.

4.2.3 Risk despite Correct Usage

To examine risk perception among German consumers at greater depth, the suspected potential for risk was also captured. What is the potential for danger of products, especially chemical products, even if used as instructed? And what specific risks does public perception associate with those products?

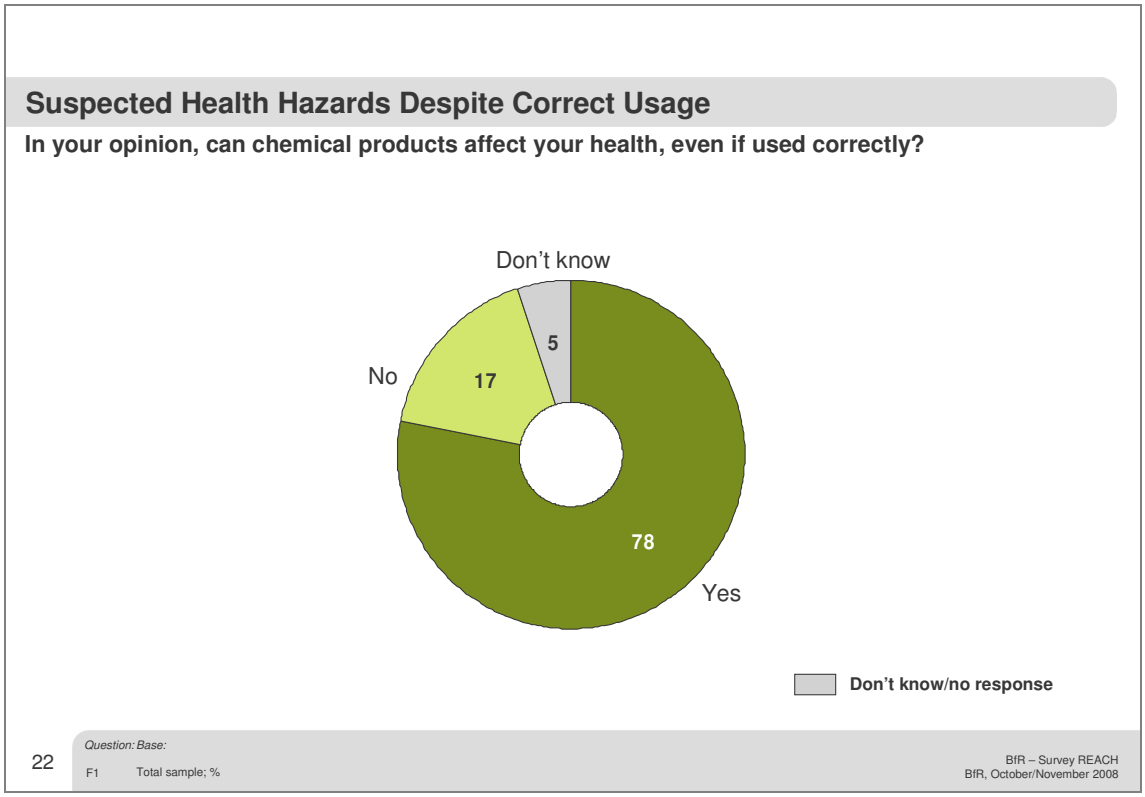

Figure 22: Suspected Health Hazards Despite Correct Usage

The overwhelming majority, more than three quarters (78%) of the German population, believes that health may be compromised through usage of a chemical product – despite using it correctly. Just 17%, i.e. less than one in five, assume that safety standards for chemical products are sufficiently high to preclude health hazards through correct usage. Against this background, it is legitimate to ask what specific negative effects are expected.

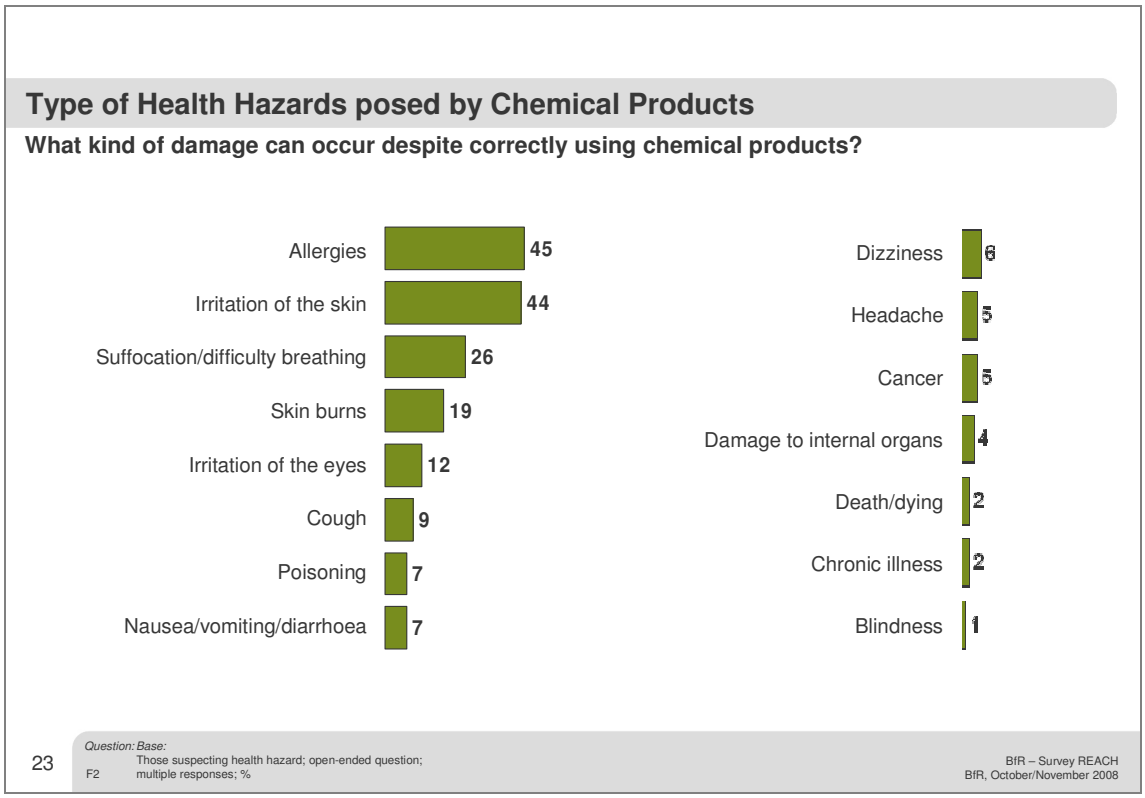

Figure 23: Types of Health Hazards posed by Chemical Products

Especially allergies (45%) and skin irritation (43%) were identified by consumers as potential risks of chemical products. Furthermore, they associate difficulty breathing (27%), skin burns (20%) and eye irritation (13%) with these products. All other mentioned risks, such as cough, poisoning, diarrhoea, cancer and others remained at single digit percentage levels. Thus, it is those effects, which can be directly observed and causally linked by the affected themselves, which are especially important. Issues like “endocrine disruptors” – as an eminent example of potential long-term effects – are insignificant in this context. Long-term effects and cancer achieve very low percentages at the very bottom of the list of mentioned problems. In summary, consumers are geared toward perceiving short-term, i.e. direct effects.

Do links exist between suspected risks despite correct usage and other attitudes? Significantly more frequently, persons with high levels of safety concerns, personally experienced health problems and low levels of feeling informed, will suspect such risks. Frequent users tend not to agree and also tend to feel safer. Belief in risk despite correct usage also correlates with the image index: the more positively consumers rate natural products, the deeper the conviction that risks exist despite correct usage.

4.2.4 Summary

It may come as a surprise that risk perception seems unaffected by level of formal education. Different effects may come into play. For one, the assumption may be erroneous that better informed people will be less prone to suspecting risks, especially if they have not been scientifically demonstrated. Not only do better informed people know more, but, because they know more, they also tend to be more sceptical and cautious. Increased knowledge comes with increased scepticism. On the other hand, various survey results may overlap and cancel each other out. This may imply that influences other than the captured dimensions may have to be considered, i.e. factors on a deeper level, sociological or psychological patterns which shape individual perceptions and behaviours. That this may indeed be the case is supported by the fact that factor analysis did not yield a valid factor model. Furthermore, there exist numerous indications, for instance from research into risk cultures, that lifestyle patterns, personal philosophies or social milieus structure safety concerns and, thereby, risk perception. And this hold true generally, not just in the field of chemicals and their regulation. This issue may have to be revisited in future research projects (compare 5.2.2).

The results on the perceptual dimension may be further discussed by making recourse to perceptual patterns identified in the Focus Group Discussions. The ambiguity surrounding chemical products emerged even more distinctly in the Focus Groups than in the representative survey. The link between desired effects on one hand and possible side effects on the other was brought into sharper focus. This ambiguity is especially important in the perception of chemicals. Two perceptions occur side by side: for one, chemicals are effective – they are designed and intended to be effective; secondly, there is no effect without side-effect – powerful effects constitute massive intervention and, therefore, cause side-effects. It is for this reason that consumers weigh benefits and risks to allow them to balance desired effects against expected side-effects.

Another essential aspect in the perception of chemicals and the safety of products containing chemicals is the evaluation of the general hazard they pose. Initially, consumers will assume that they are safe; this assumption is based on the rationale that chemicals available at retail level would not be overly dangerous. Consumers expect that products are sufficiently tested before being made available. Nevertheless, potential side effects are acknowledged. Three quarters of consumers are convinced that chemical products may have side effects that are hazardous to health even if they have been used correctly. The representative survey revealed that consumers not only anticipate side effects, but that 39% have personally experienced them, especially when using cleaning agents. As was the case with ambiguity of chemicals, on the topic of basic trust in the safety of chemical products, the Focus Group discussions provided a sharper focus. In the representative survey the issue of basic trust is less obvious, but can be deduced via pragmatic behavioural strategies.

Products, which are used routinely and frequently (e.g. cosmetics and personal care products, laundry detergents) are associated with health hazard to a much lesser degree than products which are used infrequently (e,g, building materials, but also aggressive cleaning agents such as oven cleaners). In this regard, the findings of the representative survey confirmed the results of the Focus Groups. Rarely used products are evaluated and warning labels, whenever present, read more carefully. This conforms with a further perception strategy identified in the Focus Groups: frequently used products require less attention. Only safety and usage instructions are given some attention.

To place the findings of the current study into the context of other studies, chemicals appear far less negatively perceived as in other studies. This holds true for both the qualitative and quantitative research phases. The ‘Sofia-Study’[14] identified “resigned handling of risks” (Stef-

[14] This was a study sponsored by the Federal Ministry of Economy and Technology (BMWi) on “New approaches in risk communication against the background of REACH, GHS and nanotechnology” (compare Steffenson et al. 2009). This study also

fenson 2008); this could not be confirmed in the current study. Furthermore, relevant literature presents a markedly more negative perception of chemicals (e.g. Renn/Benighaus 2006). In our study, the ambiguity of chemicals emerges, without an exclusive emphasis on risks, but as a combination of risk perception and opportunities. This ambiguity can be resolved and results in a pragmatic acceptance. The omnipresence of chemicals is accepted, although side effects are acknowledged.

4.3 Knowledge about chemicals

The factor “knowledge” takes an eminent position, due to the importance of scientific knowledge in risk regulation; it has always provided the general framework for risk studies (compare Renn et al. 2008). Accordingly, laypersons and consumers were asked about their knowledge of chemicals and the regulation of chemicals. It usually became apparent that formal knowledge of laypersons was far from solid; and not even the knowledge of experts. Using the concept of “intuitive toxicology”, research was conducted into the impact on risk perception of general perception patterns beyond formal expertise (compare Kraus et al. 1992). However, since the porblem of knowledge gaps remains acute in formulating risk communication, knowledge remained one of the key variables even in the current study. The study was based on the premise that knowledge about chemicals and the regulation of chemicals is unlikely to conform to standards of expert knowledge; consumer knowledge serves a different purpose, namely coping with handling chemical products on a daily basis.

What are the key findings drawn from both empirical phases of this study? First, it is important to note that consumer knowledge is fundamentally pragmatic. This entails that knowledge about chemicals is better communicable via symbols of appropriate behaviour than via abstract lists of substances. Hazard symbols are especially important, but also other systems, which use simple, non-scientific codes to convey essential information. Knowledge about the regulation of chemicals is low; REACH is virtually uknown to consumers. Nonetheless, or even because of this, consumers expect relevant institutions to take the initiative. It may come as a surprise that it is mainly manufacturers that are tasked with providing usage instructions. According to consumers, they are directly responsible for product safety and should provide information on product risks and safety evaluation. Consumers task government and consumer protection agencies with monitoring adherence to safety regulations. Thus, consumers implicitly concur with the intentions of REACH, as this directive aims at reassigning responsibilties for the provision of risk information and also assigns greater responsibility to the industry.

The following statements summarise the key findings, which will be presented in this chapter:

1. Consumer knowledge is pragmatic.
2. Knowledge about chemicals is retained via (danger) symbols rather than abstract knowledge.
3. From the point-of-view of the consumer, the main responsibility for product safety lies with the manufacturer.
4. Government and consumer protection agencies are held responsible to enforce compliance with regulations.
5. Consumers are not aware of REACH.

captured key characteristics of consumer behaviour in dealing with chemicals (purchase criteria, attitudes), in order to extract guidelines for risk communication on this topic.

The following pages are divided into three sections: First, knowledge of hazard symbols will be discussed (4.2.1). Then we will deal with the question, whether safety regulations are deemed sufficient and who should be held responsible for providing information on product risks (4.2.2). Finally, consumers' levels of awareness of the regulation of chemicals will be presented (4.2.3).

4.3.1 Awareness of hazard symbols

The orange-coloured hazard symbold were at the centre of this series of questions, as we learned from the Focus Groups that many consumers base their risk evaluations on these symbols. It is for this reason that the awareness of hazard symbols on the packaging of chemical products is a valid indicator of knowledge.

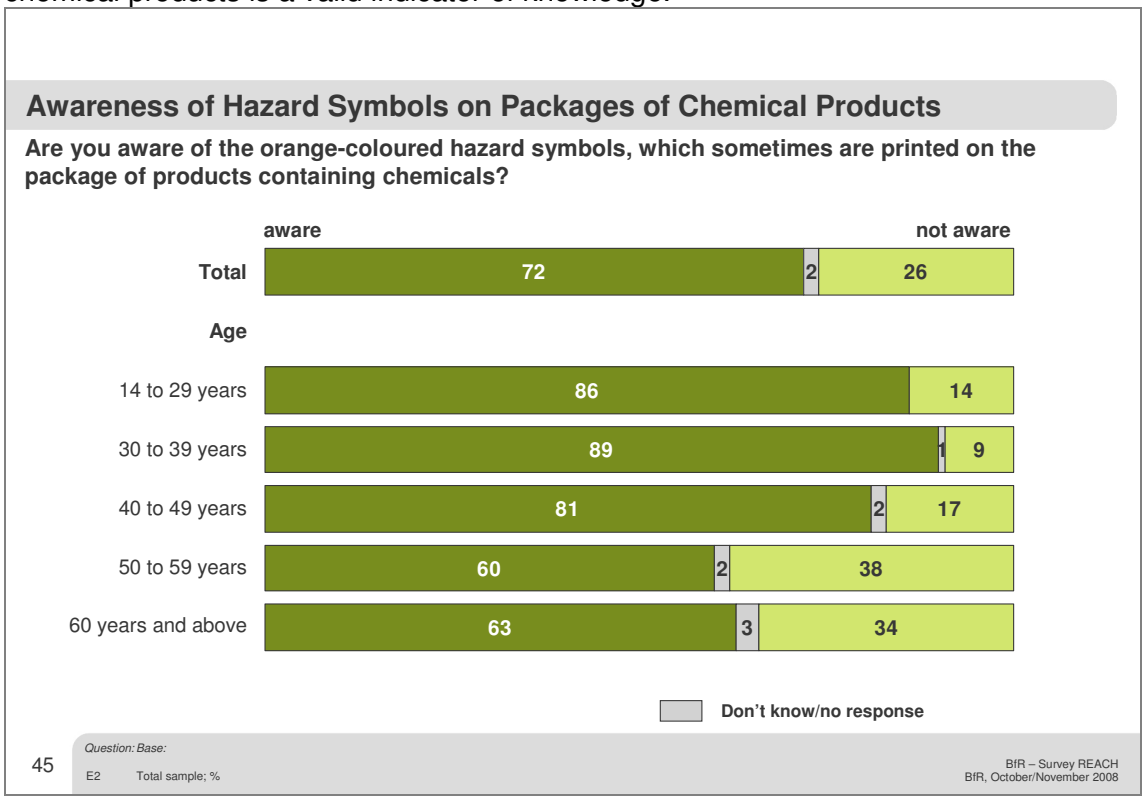

Figure 24: Awareness of Hazard Symbols on Packages of Chemical Products 1

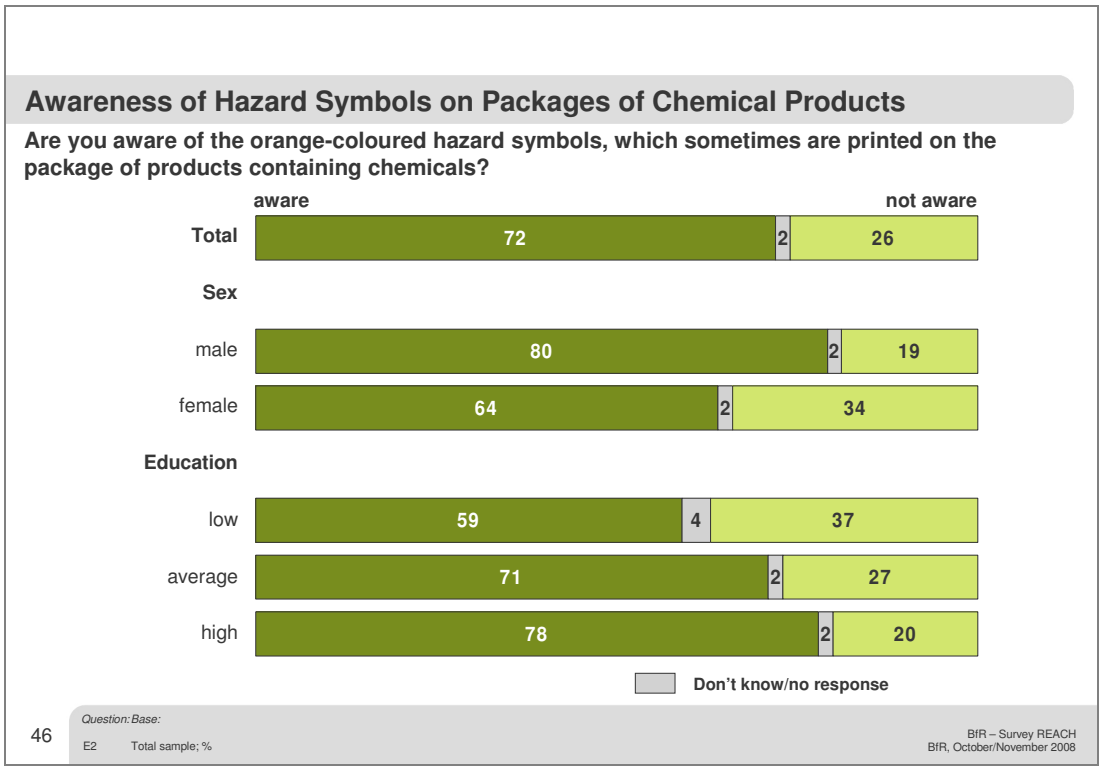

Figure 25: Awareness of Hazard Symbols on Packages of Chemical Products 2

Obviously, awareness of these symbols is very high (72%). However, levels of awareness vary considerably by age, sex and education.

Further questions inquired after the awareness of safety instructions.

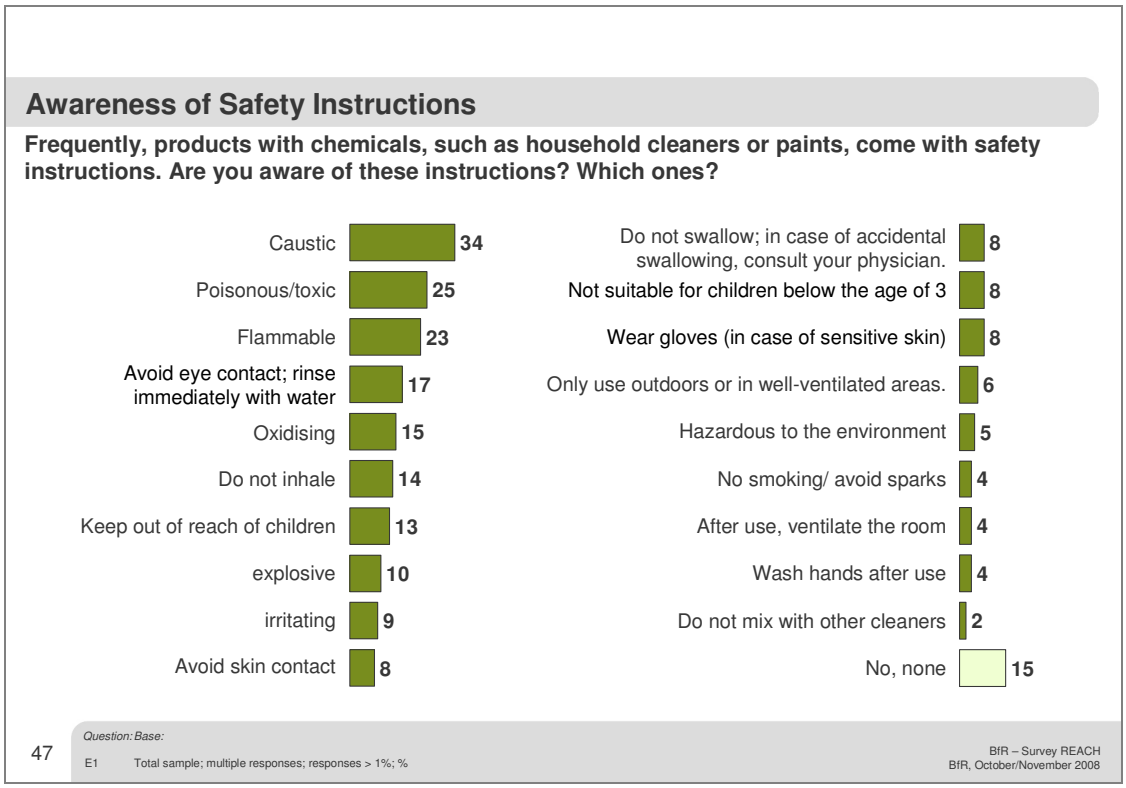

Figure 26: Awareness of Safety Instructions

What general conclusions can be drawn from these findings? First of all, it is worth noting that awarness of hazard symbols varies considerably. Furthermore, a quarter of the population is unaware of hazard symbols on the packaging of chemicals or chemical products. In the five “new German states” (former GDR) there exists a need to catch up as regards awareness of safety instructions and hazard symbols – frequently, they are less known.

As detailed in the table volume, there are some interesting regional differences in the awareness levels of safety instructions. 73% of consumers across the 11 “old states” (former FRG) are aware of hazard symbols, whereas just 61% are aware of them across the 5 new states. Furthermore, consumers in the former East Germany spontaneously recall a lower number of safety instructions (mean score: 2.0) than consumers in the former West Germany (mean score: 2.5). Also, the levels of interest in the topic of “safety of chemical products” tend to be somewhat lower in the East (3.4) than in the West (3.7).

Awareness of safety instructions and hazard symbols correlates strongly with socio-demographic variables. Consumers with higher formal eduction, higher income and men recognize significantly more hazard symbols. Awareness of hazard symbols decreases with increasing age. The following charts depict the strong links between factual knowledge and age as well as education.

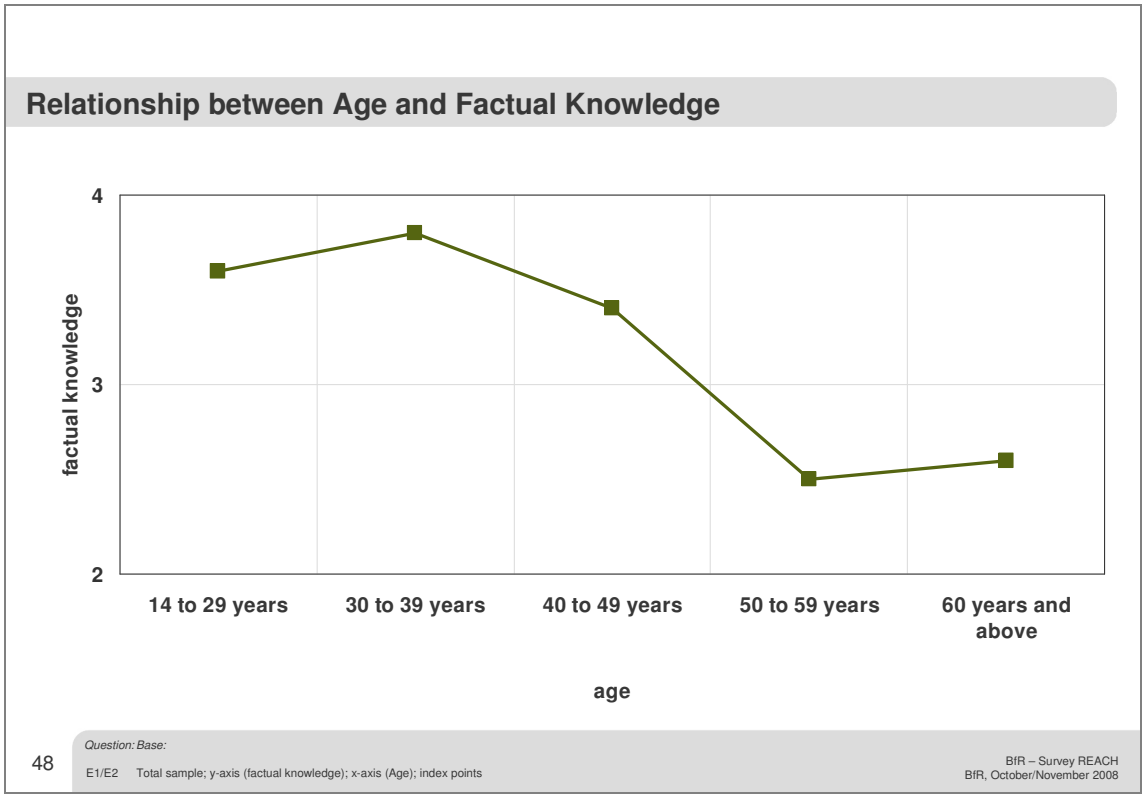

Figure 27: Relationship between Age and Factual Knowledge

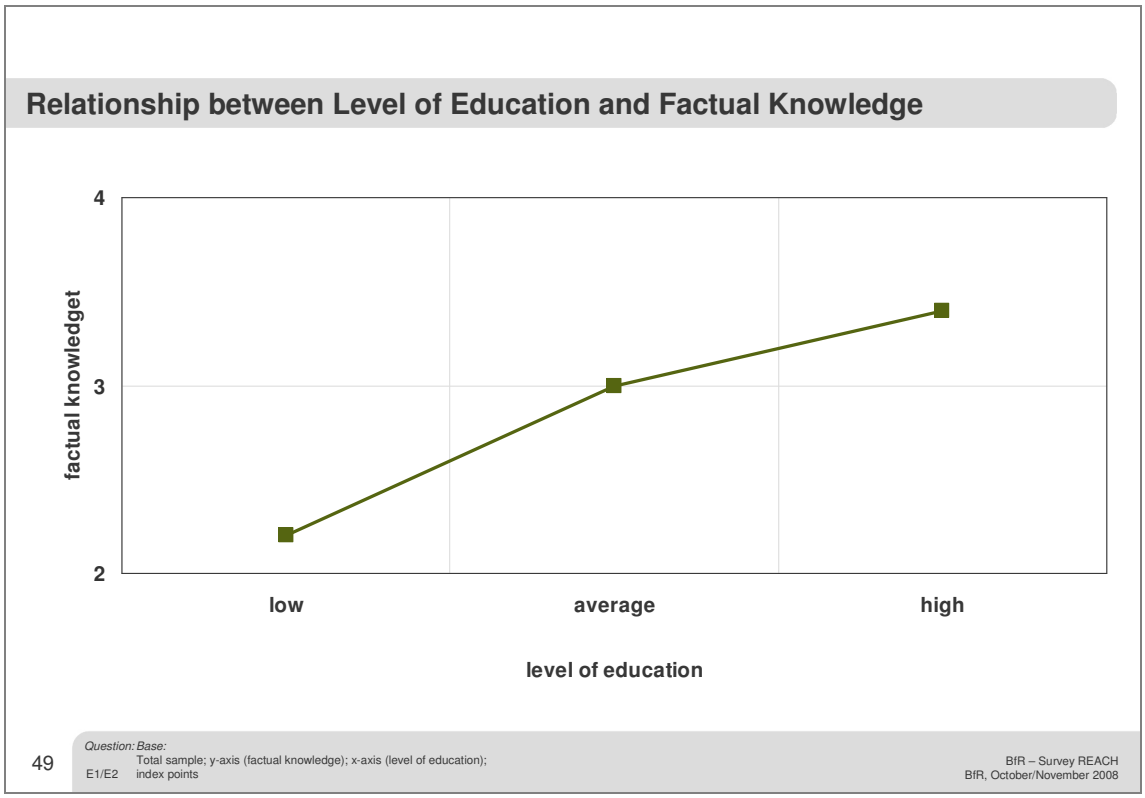

Figure 28: Relationship between Level of Education and Factual Knowledge

Furthermore, there exist some behavioural influences. Apparently, the extent and the kind of experiences made with using chemicals in daily life that shape the awareness of potential risks. One determinant factor is the presence of chemical products in the household, which increases awareness. There is a significant correlation between the number of cleaning products in the household and factual knowledge. The same obtains for the number of personally experienced adverse effects on health and factual knowledge. Both links are visualised in the following graphs.

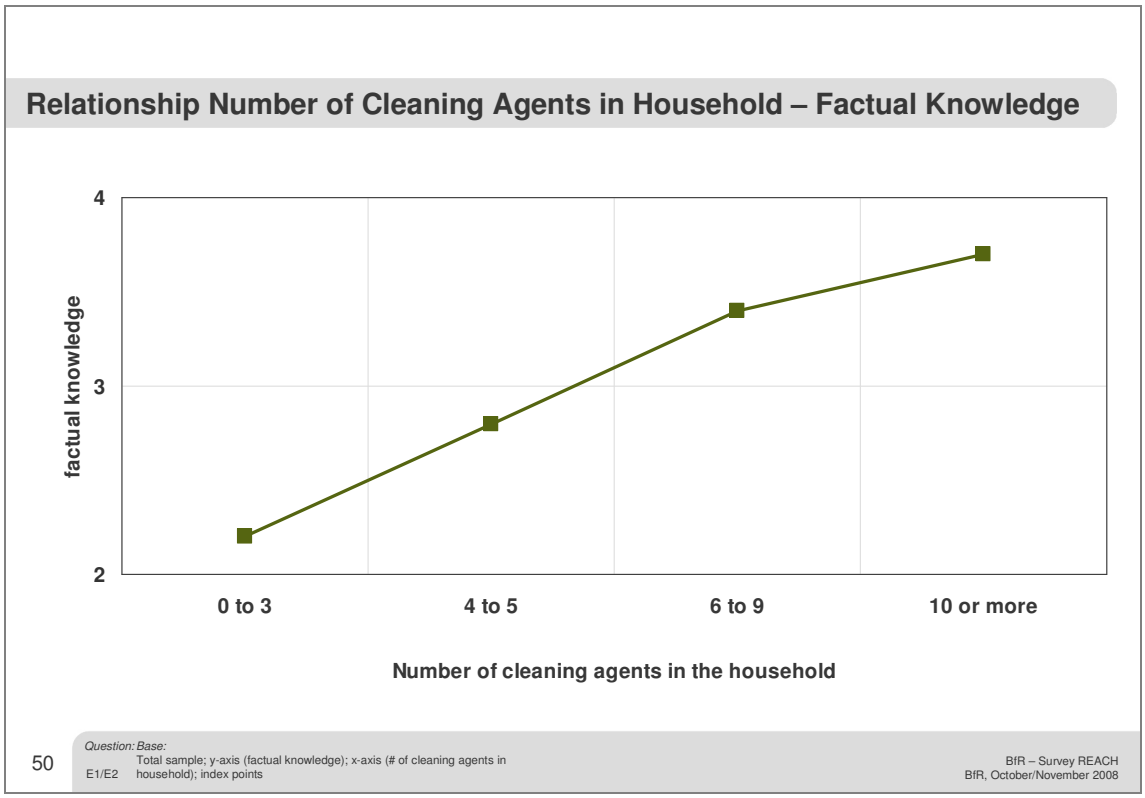

Figure 29: Relationship Number of Cleaning Agents in Household – Factual Knowledge

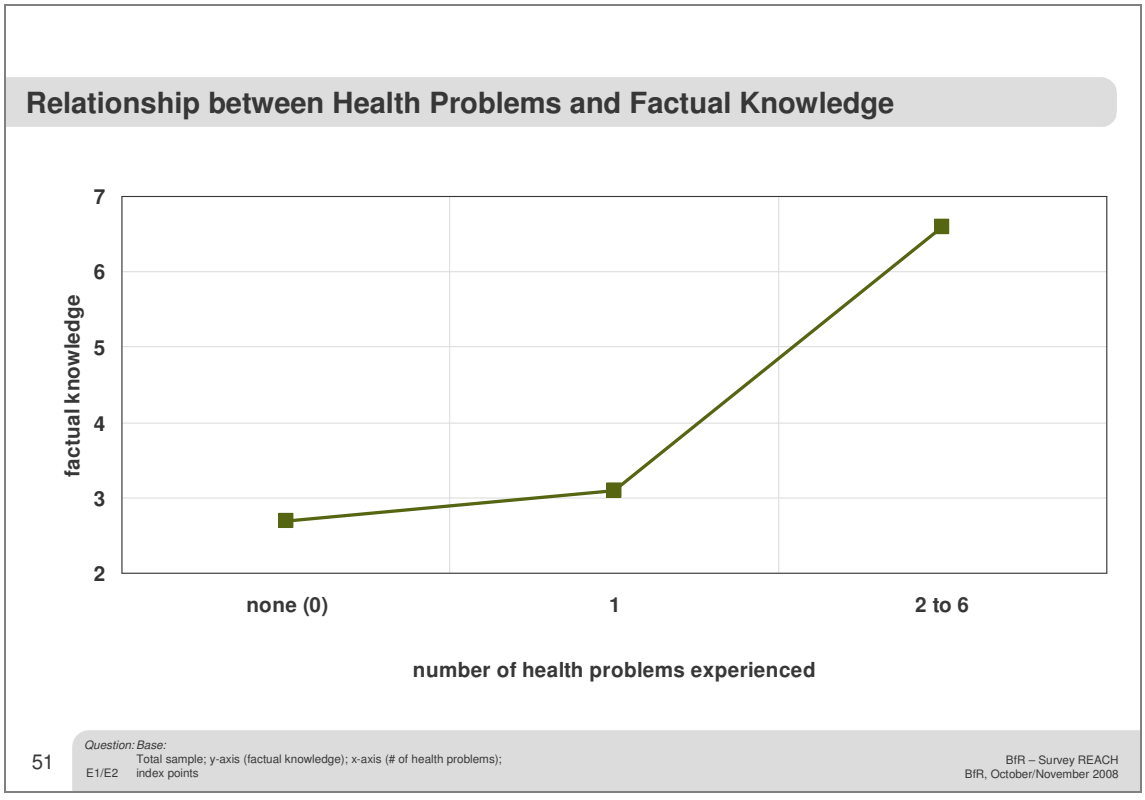

Figure 30: Relationship between Health Problems and Factual Knowledge

4.3.2 Responsibility for the safety of chemicals

Inquiring after the responsibility for the safety of chemicals was meant to shed light on who consumers expect to provide information on risks. Furthermore, how do consumers assign responsibilities to various parties tasked with ensuring product safety? Attitudes, which are involved, may be taken as indicators for knowledge about the regulation of chemicals. To a high degree, consumers delegate responsibilities. Consumers do not want to be charged with informing themselves, but prefer to be able to trust. This becomes apparent in the division of roles for institutions to cope with risks and to reduce the responsibilty of the consumer. It also emerges in the opinion that the initiative needs to be taken by institutions responsible for risk regulation. This call for third-party responsibility correlates with the desire not to accept personal responsibilty.

In a first step, those parties will be identified, which, according to consumers, are charged with the responsibilty for assuring the safety of chemical products.

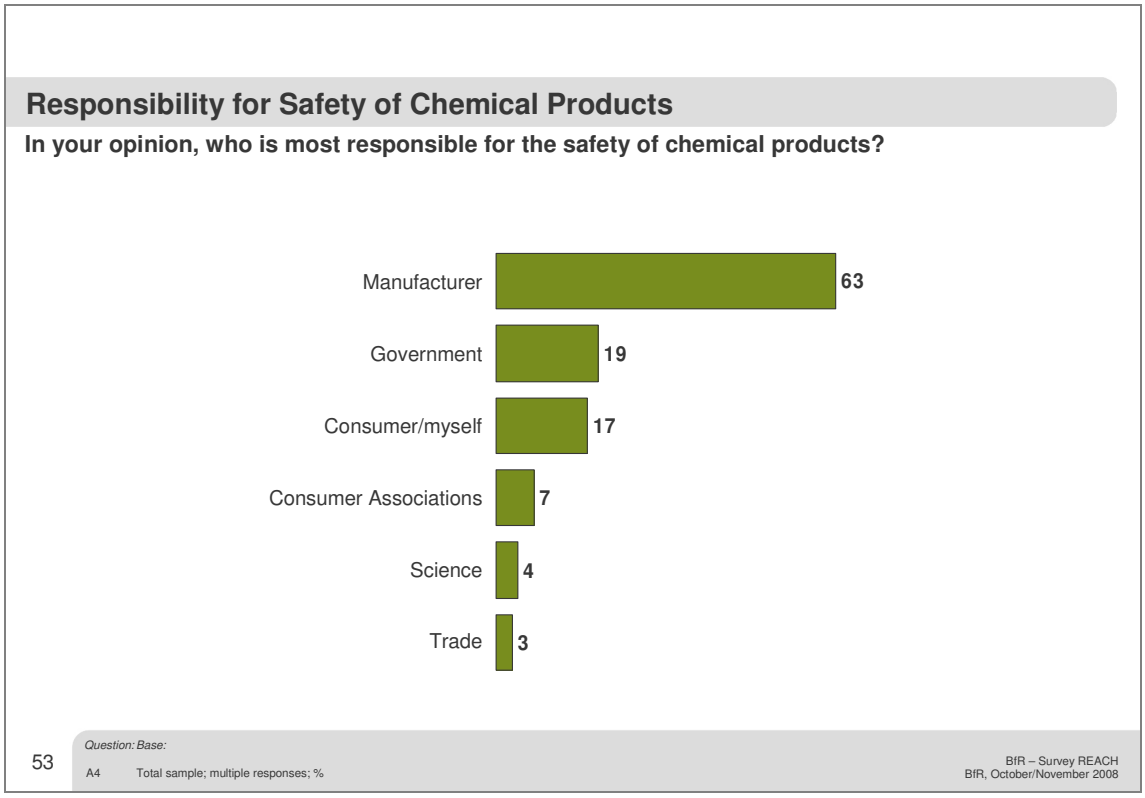

Figure 31: Responsibility for Safety of Chemical Products

The majority of consumers (63%) task manufacturers with the safety of chemical products. Government (19%) and consumers themselves (17%) followed distantly. One in ten (11%) did not volunteer an opinion; even fewer considered consumer protection associations (7%), science (4%) or trade (3%) responsible.

The following question sought to shed light on the interaction between various players responsible for product safety in the context of the regulation of chemicals. How do consumers evaluate the coordination between different players? Faced with further statements on the safety of chemical products, four out of ten consumers (39%) considered current German safety regulations sufficient. That notwithstanding, majorities supported an expansion of safety regulations. 88% called for manufacturers to provide more information on possible risks

on the package; consumer protection associations (88%) and government (84%) should to a greater extent enforce compliance with safety regulations and monitor the chemical substances contained in products. As detailed by the analysis by sub-groups in the table volume, consumers with children, due to their special responsibilities, support stricter regulation than do consumers without children.

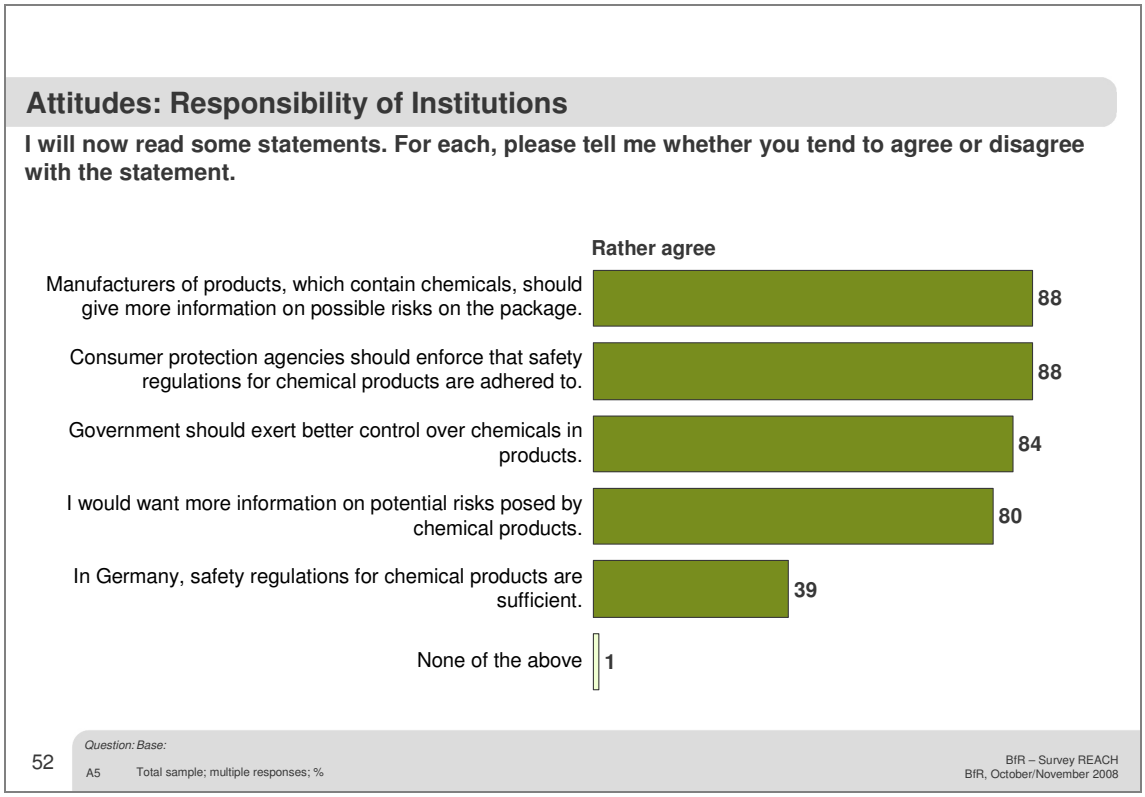

Figure 32: Attitudes: Responsibility of Institutions

Although 40% consider current regulations sufficient, 80% call for more information on potential risks. At first glance, this may appear contradictory. However, one may argue that this contradiction may be resolved by distinguishing between laid-down rules and their actual implementation. Even when established rules are sufficient, consumers are left with some concerns, since communication and transparent monitoring of these rules seem insufficient in actual practice. Against this background, the majority of consumers perceive a need for the relevant institutions to take the initiative both on the level of establishing the formal rules and of enforcing them, as 61% deem current regulations insufficient. The primary responsibility is assigned to manufacturers, as it is also in the REACH directive. From the point-of-view of consumers, companies are the main responsible for ensuring the safety of chemical products; next in line are government and consumer protection associations.

Manufacturers are also tasked with providing information. And they should take responsibility for the safety of their products. The overwhelming majority of consumers (88%) call for more product information on potential risks to be placed on the packaging; i.e. consumers demand better product labeling.

Government agencies and consumer protection are perceived as watch dogs. Both are tasked with monitoring and enforcing compliance with regulations.[15] Furthermore, consumers want government to define comprehensive rules and monitor compliance. If 61% consider current safety regulations insufficient, then government is taken to task. However, one would need to explore the reasons for considering safety regulations insufficient; only then could changes be enacted that would address those issues.

This issue demonstrates some general trends and problems. At the same time, however, it is relevant to ask whether also on this issue, there may exist specific links between knowledge and perception patterns and other variables. These links do exist. Consumers who deem current safety regulations sufficient, share a certain profile. They feel better informed on product risks and consider information on packages sufficient. – however, in actual fact, they are not better informed. Furthermore, they are less likely to have experienced health problems, they tend not to embrace "pro nature" attitudes, evaluate chemical products more positively, they are decidedly less likely to believe in adverse effects despite correct usage or that any of the four product categories may compromise health. Finally, they are less likely to take counter-measures in potentially hazardous situations.

4.3.3 Awareness of REACH

A key objective of this study was to measure consumers' awareness of the new chemical legislation; i.e. the formal knowledge of the legal framework for the usage of chemicals. Accordingly, one question was incorporated into the moderator's guide, while two questions were included in the structured questionnaire.

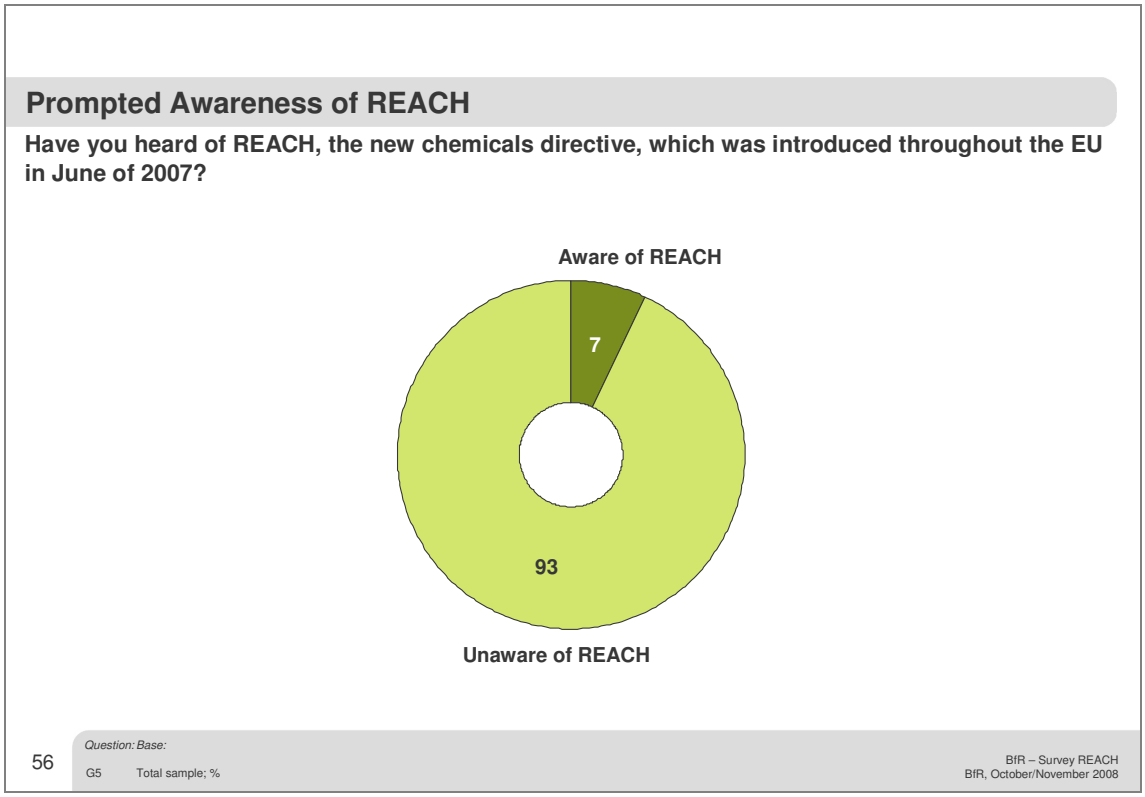

Figure 33: Prompted Awareness of REACH

7% of the population have heard of REACH, i.e. are at least aware of the name. 93% are unaware of REACH. This low level of awareness limits a breakdown by demographics of

[15] They are not, however, perceived as providers of information (see chapter 4.4 Information).

those who were aware. Nevertheless, in the following paragraphs, a few variables will provide further details. Broken down by sex, education and Internet usage, the following picture emerges.

A similar scenario was presented by the findings of the Focus Groups. Nobody had even heard of REACH, not even the professionals. Thus, findings of other, non-representative studies were confirmed (e.g. Steffensen 2008, p. 3); however, the study just cited explained the low degree of awareness by speculating about insufficient coverage by the press or the media in general. Although this is one possible explanation, one might also surmise that this represents a general attitude: a reluctance to ponder such a complicated issue. The potential increase in knowledge is hard to predict, while one already has acquired enough routine in handling such substances in daily practice.

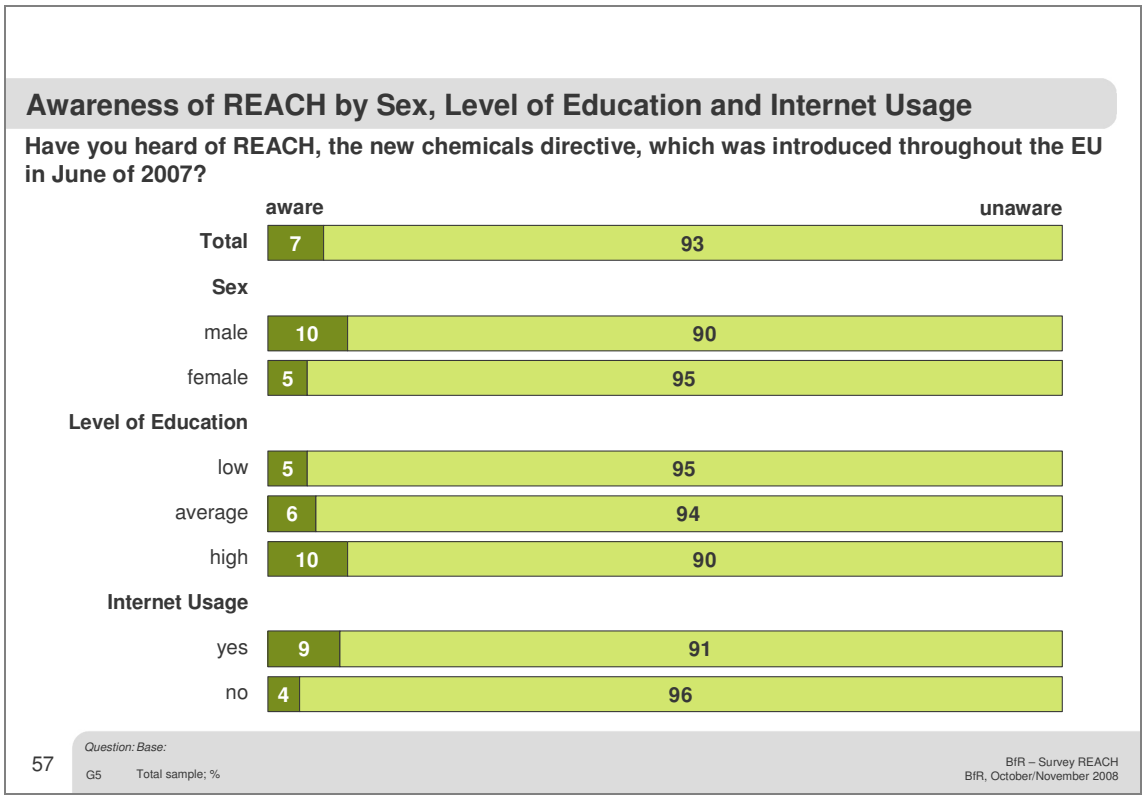

Figure 34: Awareness of REACH by Sex, Level of Education and Internet Usage

Twice as many men (10%) as women (5%) have heard of REACH. Furthermore, respondents with higher education and Internet usage are also more likely to have encountered the name. The source of awareness for REACH was asked as an open-ended question. The results are as follows:

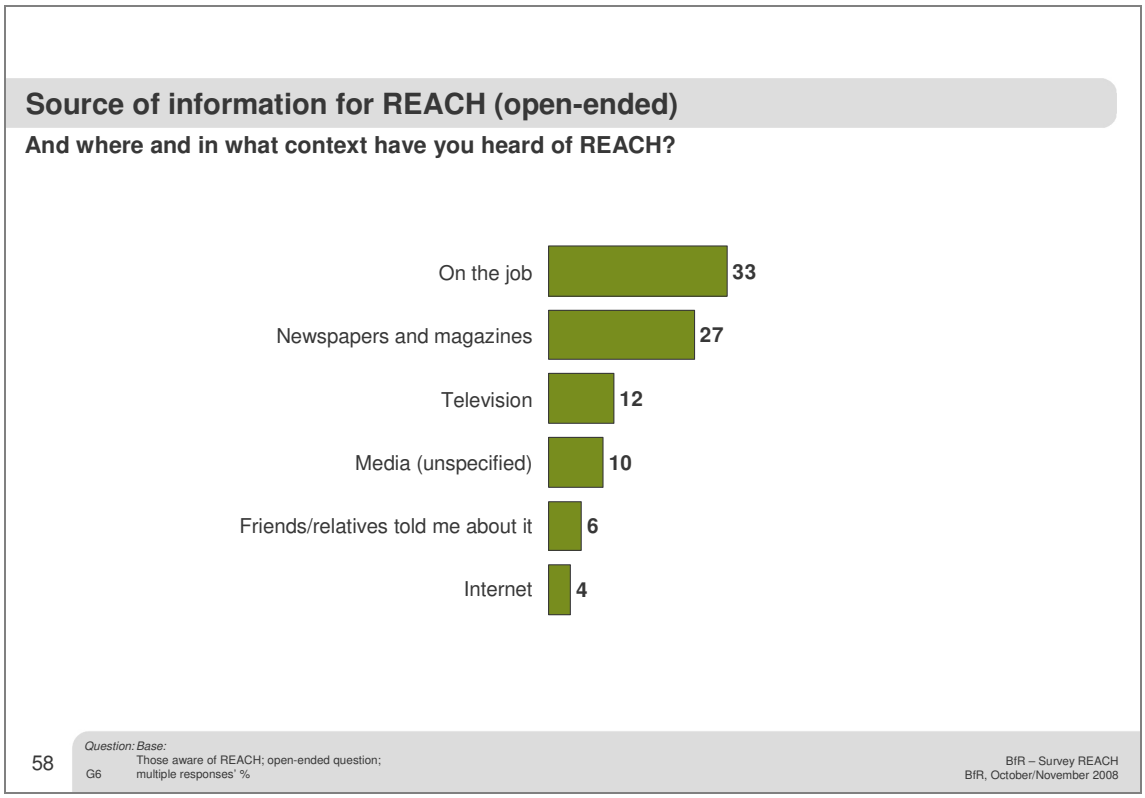

Figure 35: Source of information for REACH (open-ended)

The workplace is the most important source of awareness (33%), followed by newspapers and magazines (27%). Furthermore,correlation analysis showed that persons, who previously had sought out information on cleaning products and cosmetics (relevance of topic) are more likely to be aware of REACH than those who had not.

4.4 Behaviour in handling chemicals

It seemed necessary to add the behavioural dimension to the categories of pereptions, knowledge and information, in order to describe the situation of consumers in respect of chemicals in daily life. It may not always be easy to differentiate between these dimensions, especially since within this study behaviour could be measured only via specific behavioural attitudes. To explore this link methodically with greater precision, observational studies of actual behaviour would need to be carried out. However, the selected methodology sheds light on relevant product categories, strategies for coping with potential hazards, and some general behavioural strategies in handling chemicals.

In summary, the key findings on the behavioural dimension are as follows:

1. The use of chemical products is very common.
2. What factors determine the purchase decision depends on the product group.
3. Behaviour in handling chemical products is rather pragmatic and individualistic.
4. Hazard and safety instructions are frequently ignored. Compliance with safety instruction depends on the product group.
5. One in three consumers has already experienced health problems through the use of chemical products.

6. Personal experience of risk results in only minimal behavioural change in acute situations.
7. Risk communication has very limited effects on behaviour.

The subsequent section is structured as follows. First, frequency of usage of various product categories will be determined (4.4.1). Purchase decisions are a vital part of dealing with products. Hence, it was relevant to inquire about factors that influence purchase decisions and whether they differ from one category to the next (4.4.2). Subsequently, it would be necessary to describe risk-coping behaviours on the part of the consumer. Do they continue using risky products? Do they observe safety instructions (4.4.3)? The final section deals with the problem of general behavioural strategies in this particular field. The simple heuristics employed by consumers demonstrate to what degree the usage of chemicals has become common (4.4.4).

4.4.1 Behaviour – Usage

The representative survey focused on four different product categories. These were considered relevant because of the cognate experience of the client; but also because these emerged as especially important to consumers during the Focus Groups: numerous examples were given. The four categories were: cleaning agents, personal care products and cosmetics, building materials and children's products. Within each category, usage of specific products was measured. Thus, a detailed usage profile of consumers is obtained; and valuable insight into actual affectedness of consumers through purchase and usage of chemical products within given time frames is gained.

4.4.1.1 Cleaning agents

Nearly all consumers use chemical products of the cleaning agent category. Traditional household cleaners are more important than more aggressive, specialised cleaning products. Younger consumers tend to use considerably more cleaning products than older consumers; they also have a greater number of different cleaning products in their households.[16] While common products, such as laundry detergents, toilet cleaners and multi-purpose cleaners are used somewhat more frequently by women, men tend to be more frequent users of specialised products, such as disinfectants and automotive care products.

Usage details of the various cleaning agents is depicted below:

[16] Younger consumers tend to live in larger households

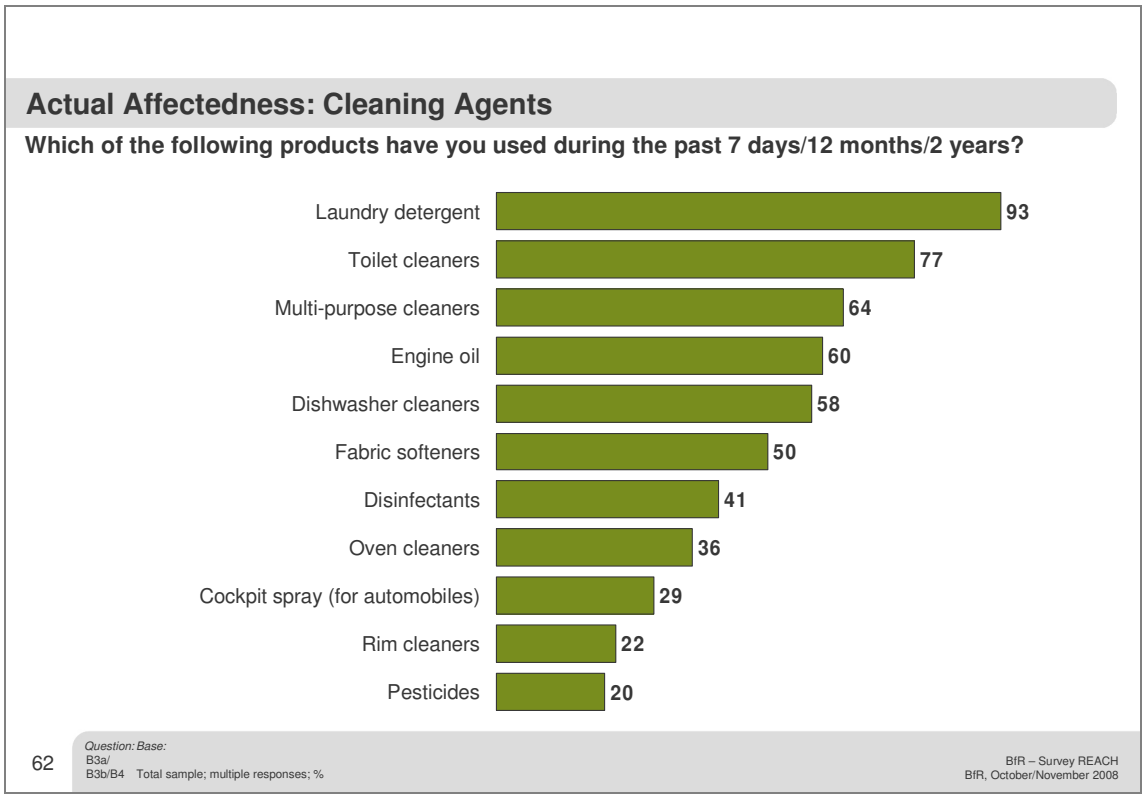

Figure 36: Actual Affectedness: Cleaning Agents

In the cleaning agents category, nearly all consumers (93%) had used laundry detergents during the past seven days; three quarters (77%) had used toilet cleaners. Two thirds (64%) had used multi-purpose cleaners, while a somewhat smaller proportion had used dishwasher cleaners (58%) and fabric softeners (50%). 3% had used none of these products.

Considerably less frequently used were disinfectants (41%), oven cleaners (36%) and pesticides (20%). 35% of consumers had used none of these products during the past 12 months.

Users of automobiles (87% of the total sample) were also asked about their usage of automotive care products. The relevant time frame was the past two years. Converted to the total population, 60% of consumers had used engine oil, 29% cockpit spray and about one in five (22%) had used rim cleaners.

Different usage patterns are easily intelligible, since they depend on the frequency of common household chores. Products for doing laundry or maintaining general cleanliness top the list. Products with specialised applications will be used less frequently, e.g. oven cleaners. These findings can be compared against the other product groups, by calculating an affectedness index for the respective products.

In analogy to subjective affectedness, an index for actual affectedness by chemical products was calculated. First, indices were calculated for each of the four product categories, ranging from 0 to 100. If all products within a category are used, the index is 100 points; if none are used, the index will be zero. The average (mean) across the four categories will form the index for actual affectedness.

In the category of cleaning agents, the average affectedness index comes in at 50 points. The greatest differences emerge by age. The younger the age of the consumers, the more cleaning products will be used. The higher index value among men is due to their higher us-

age of automotive care products and, therefore, does not reflect general usage of cleaning products.

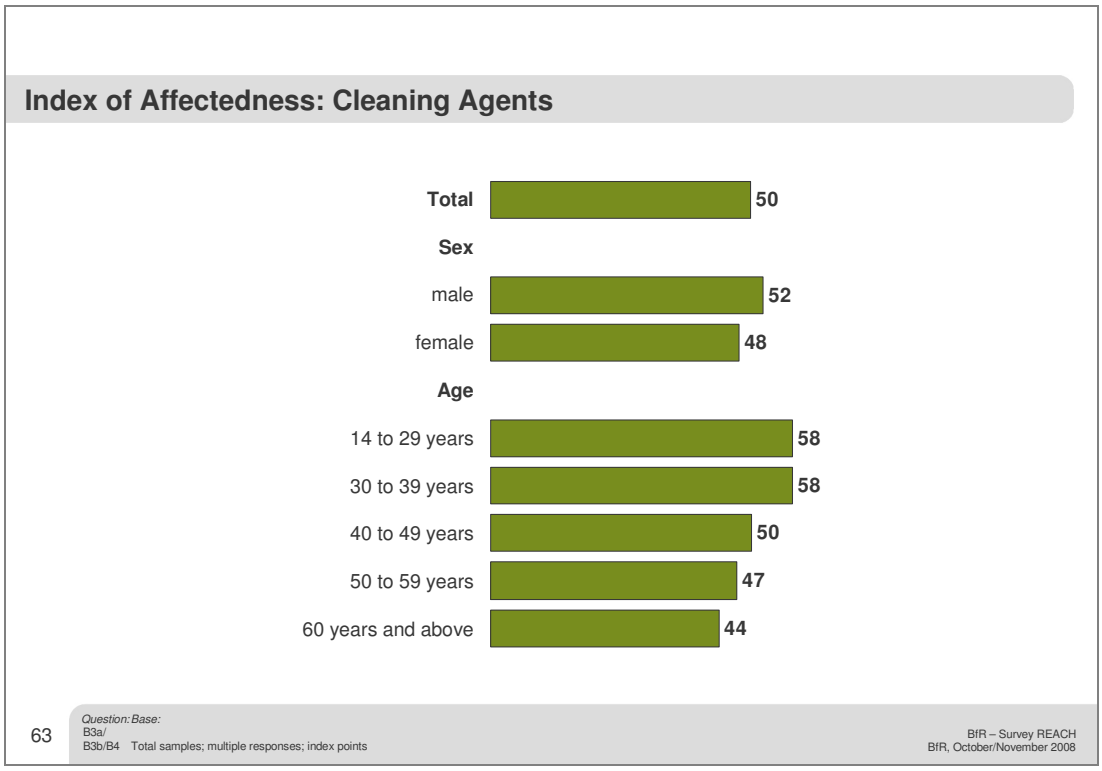

Figure 37: Index of Affectedness: Cleaning Agents

A further indicator for the affectedness by or the actual usage of products in this category is the number of cleaning products in the household. The distribution is as follows:

Figure 38: Number of Cleaning Agents in Household

By consumers' own estimate, there are an average of 7.1 different cleaning products in German households. The number of cleaning products in a household correlates strongly with demographics such as age, education and sex, but also size of household and, therefore, the number of children in the household. Looking only at single households, one finds a markedly higher number of cleaning products in male households than in female ones.

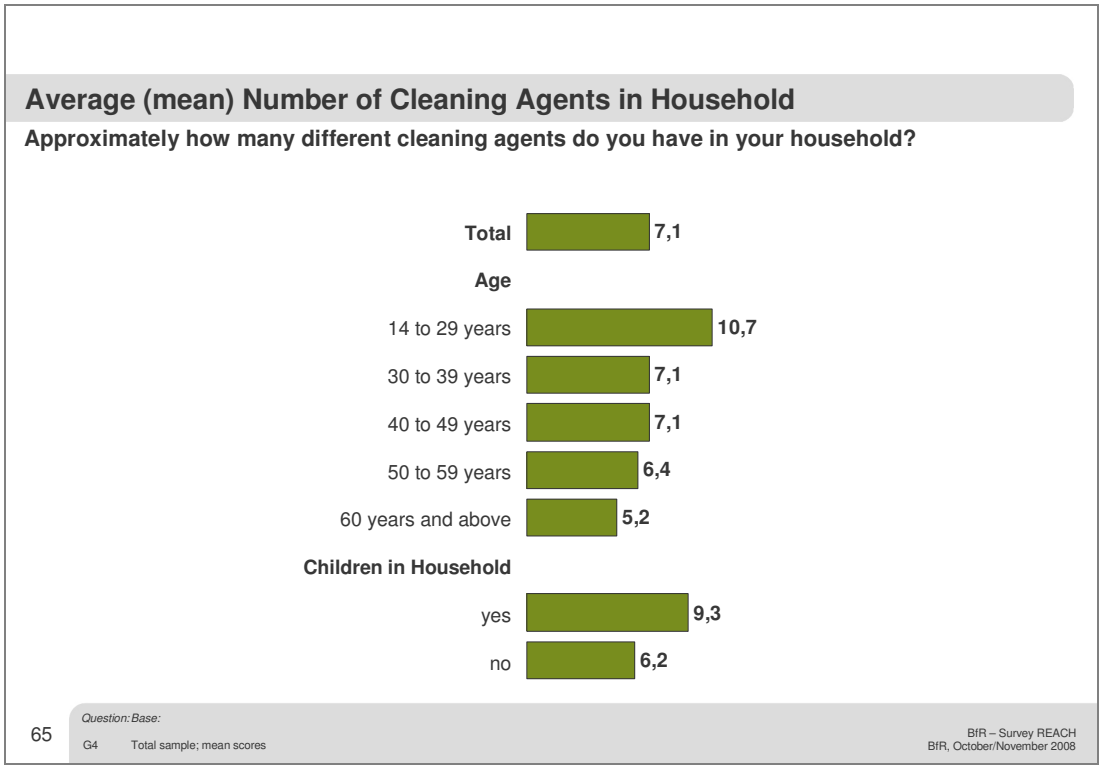

Figure 39: Average (mean) Number of Cleaning Agents in Household 1

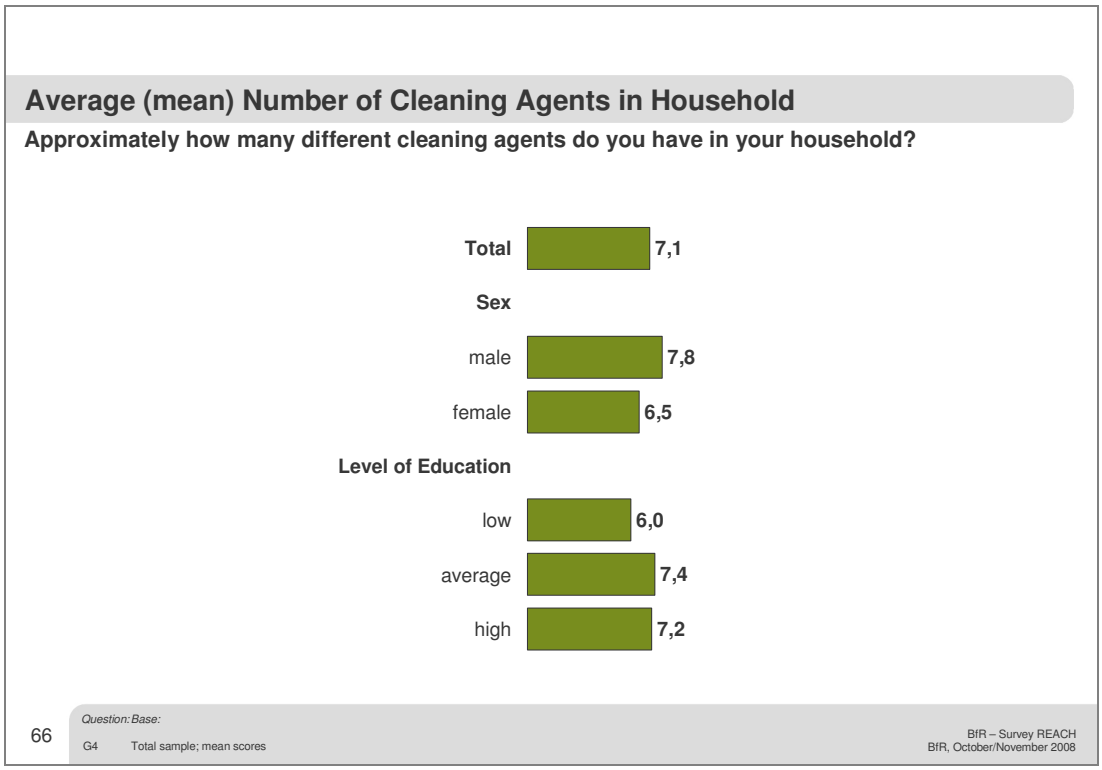

Figure 40: Average (mean) Number of Cleaning Agents in Household 2

4.4.1.2 Personal care products and cosmetics

Expectedly, virtually all consumers use products in the category of personal care products and cosmetics. Products such as deodorants and hand lotions are the most frequently used.

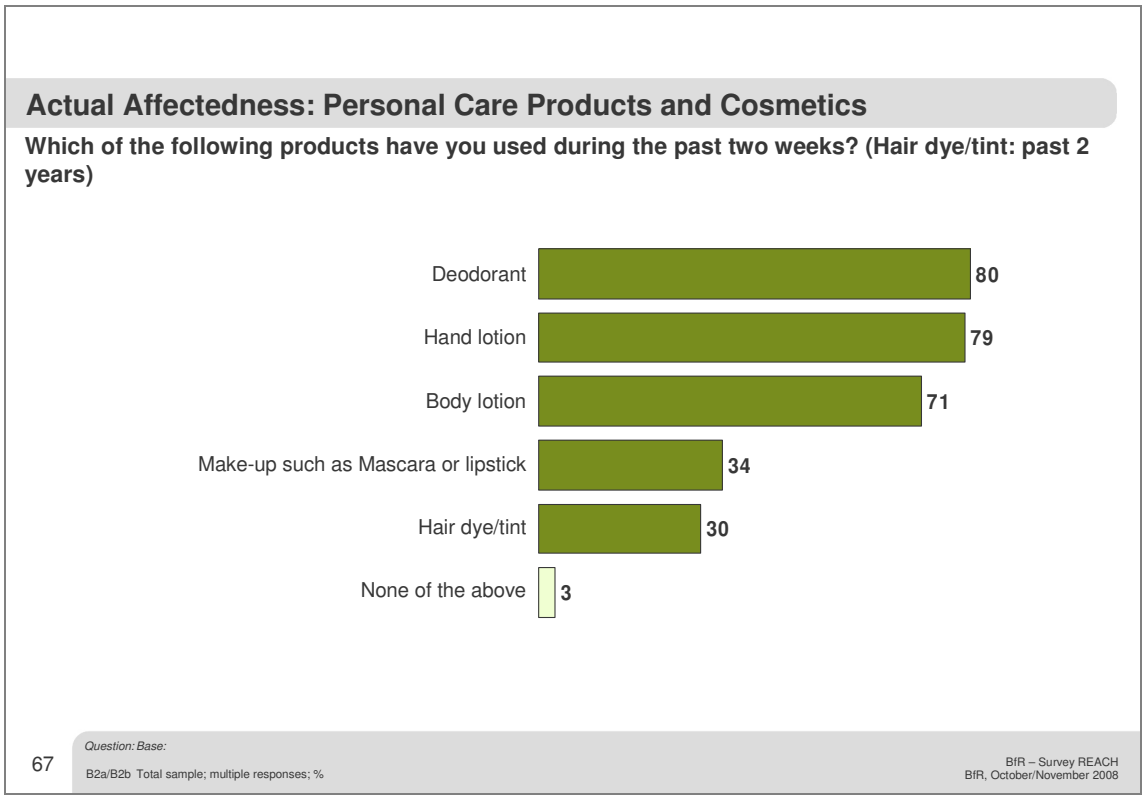

Figure 41: Actual Affectedness: Personal Care Products and Cosmetics

In this category, deodorants (80%), hand lotions (79%) and body lotions (71%) are the most commonly used products. Make-up products and hair dyes/tints are used by about a third of consumers (34% and 30%, respectively), whereas most of their users are women (59% and 50%, respectively). Just 3% of consumers claimed to use none of these products.

In this category as well, an affectedness index was calculated, which, with 59 points, is higher even than the one obtained for cleaning agents. Again, there exist distinct correlations: women use personal care products and cosmetics to a far greater extent than men (women: 71; Men: 46). Usage continuously declines with rising age (64 among 14 to 29 year olds and 56 among those above the age of 60)

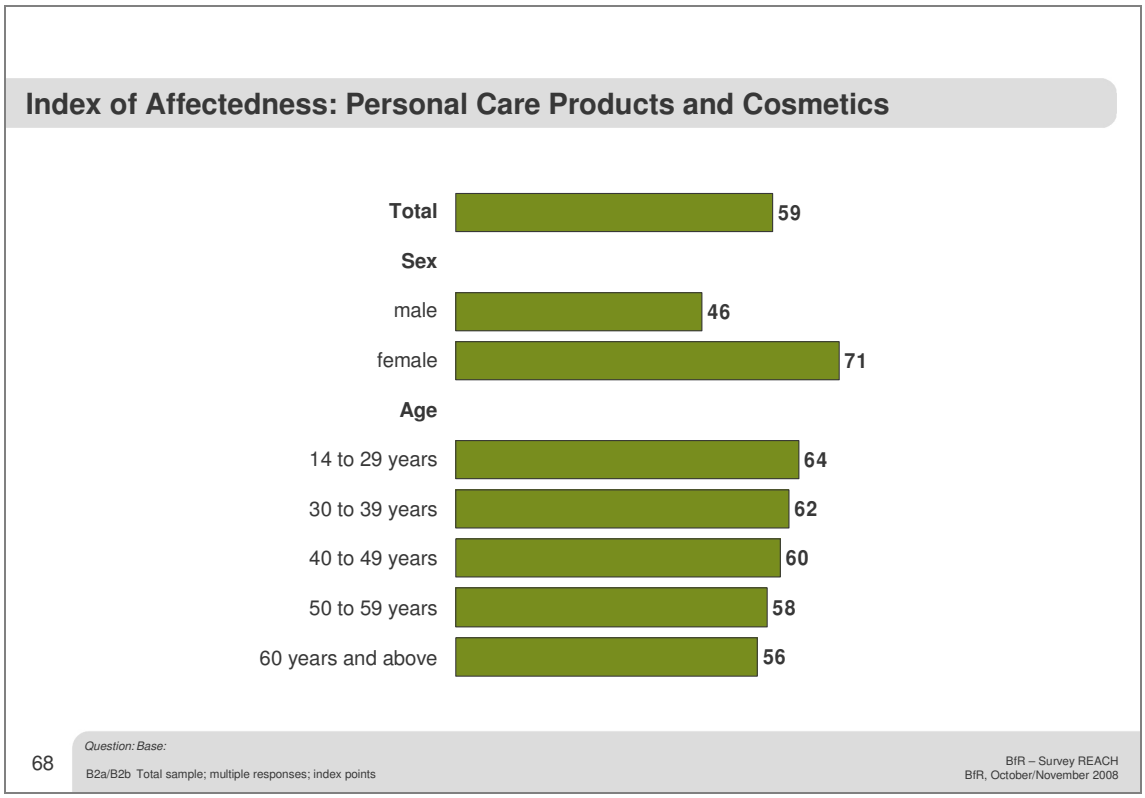

Figure 42: Index of Affectedness: Personal Care Products and Cosmetics

4.4.1.3 Building materials

Compared to common product categories like cleaning agents and personal care products, consumers do not often come into contact with building materials. The most commonly used product is wall paint. Specialised products, such as solvents, are used by only a small proportion of the population.

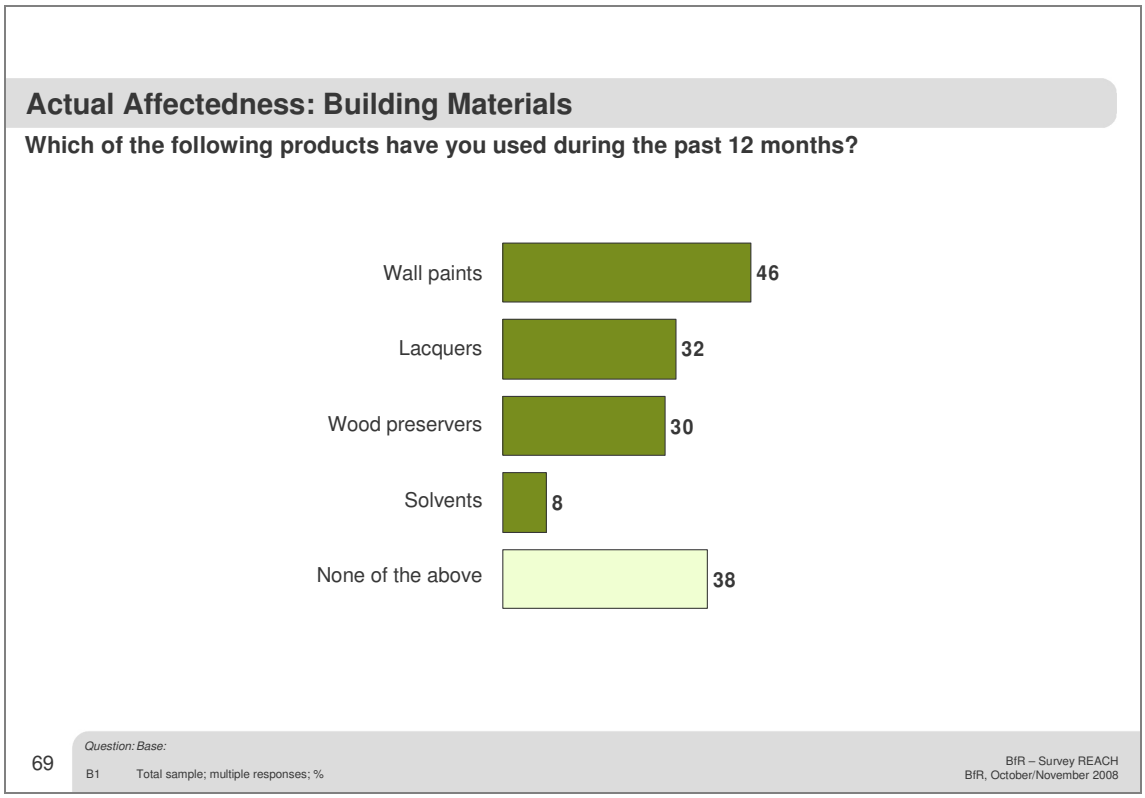

Figure 43: Actual Affectedness: Building Materials

In this product category, roughly every other consumer (46%) had used wall paints during the last twelve months; about a third had used lacquers (32%) and wood preservers (30%). In contrast, just 8% had used solvents. Four out of ten consumers (38%) claimed to have used none of these building materials. With 29 points, the affectedness index is the lowest among all four product categories. Again, there are considerable differences by sex (men: 36; women: 22) and by age (14 to 29 year olds: 36; 60 years and above: 24).

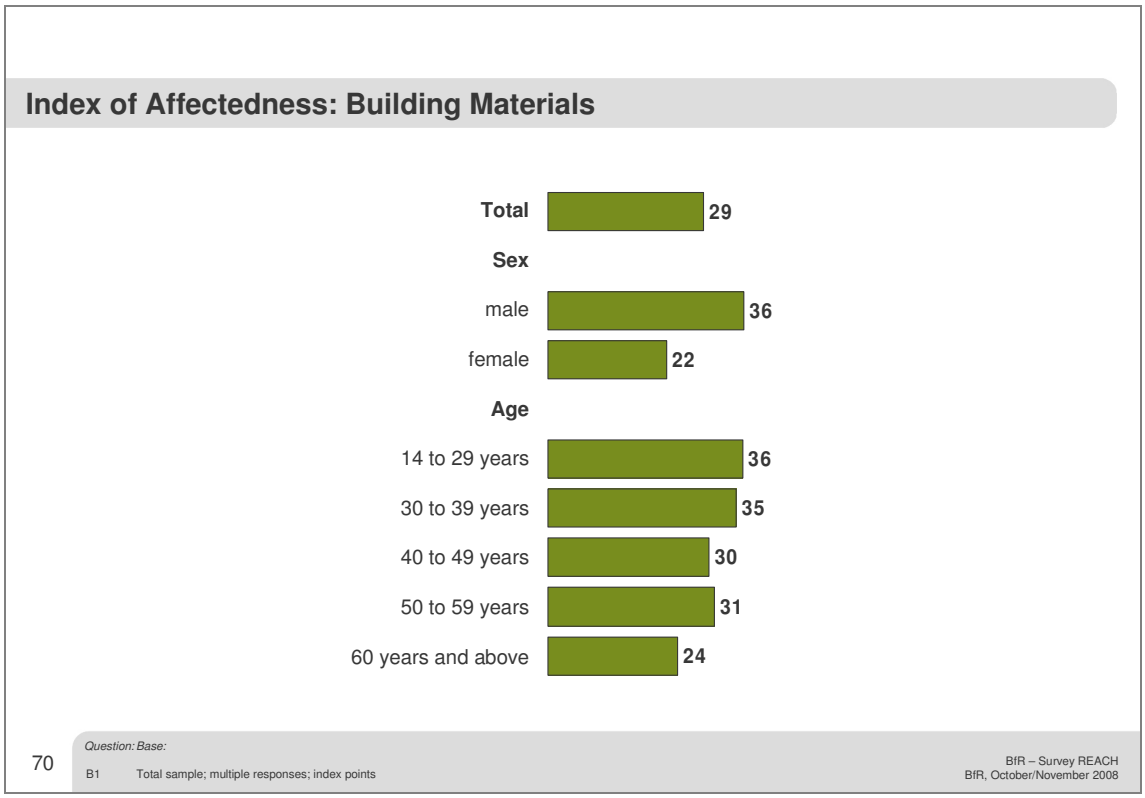

Figure 44: Index of Affectedness: Building Materials

4.4.1.4 Children's products

72% of consumers in households with children had bought childrens' products, such as children's clothing, toys, nursery furniture or diapers during the past one year. This category is especially relevant among the 30 to 39 year olds, as these would frequently be raising families.

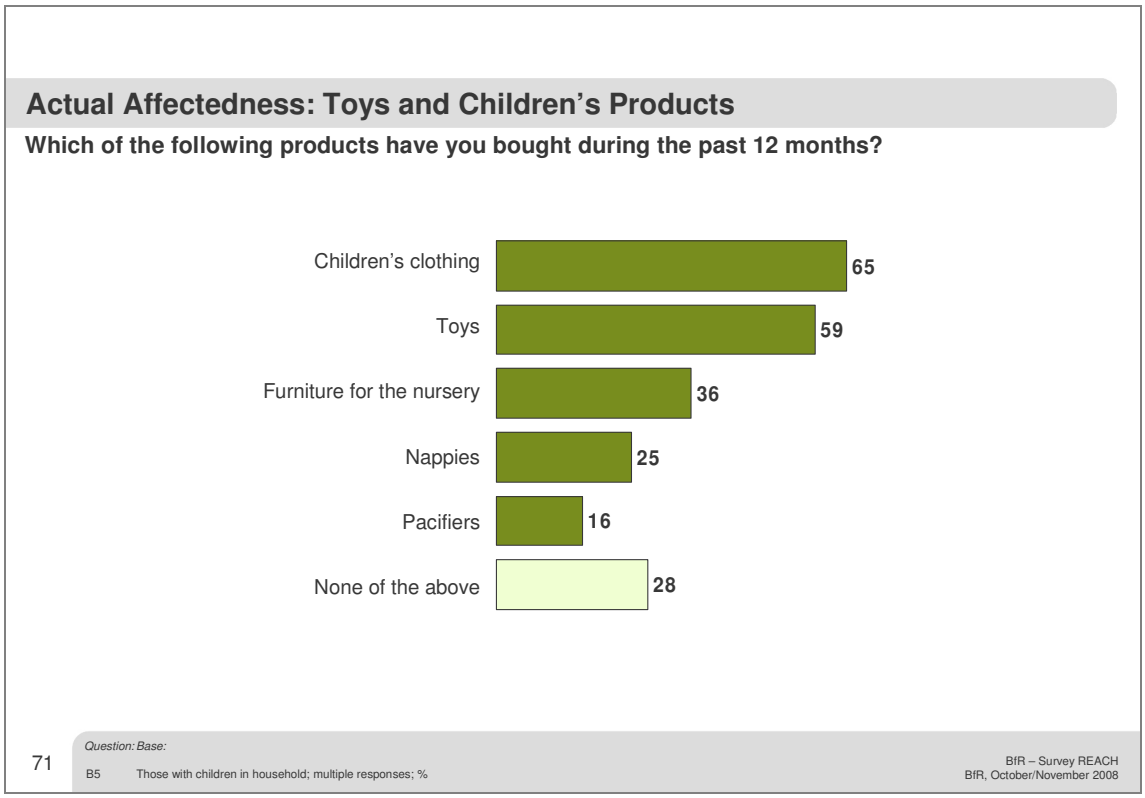

Figure 45: Actual Affectedness: Toys and Children's Products

65% of consumers in households with children have purchased children's clothing during the past twelve months; 59% have bought toys. Products for infants such as nappies (25%) and pacifiers (16%) came in at the bottom of the list. A third claimed not to have purchased any of these items during that period; these tended to be adolescents and older household members above the age of fifty. Nevertheless, the affectedness index, with 40 points, still exceeds that for building materials, but is lower than that of cleaning agents and personal care products. There is a strong correlation with age.

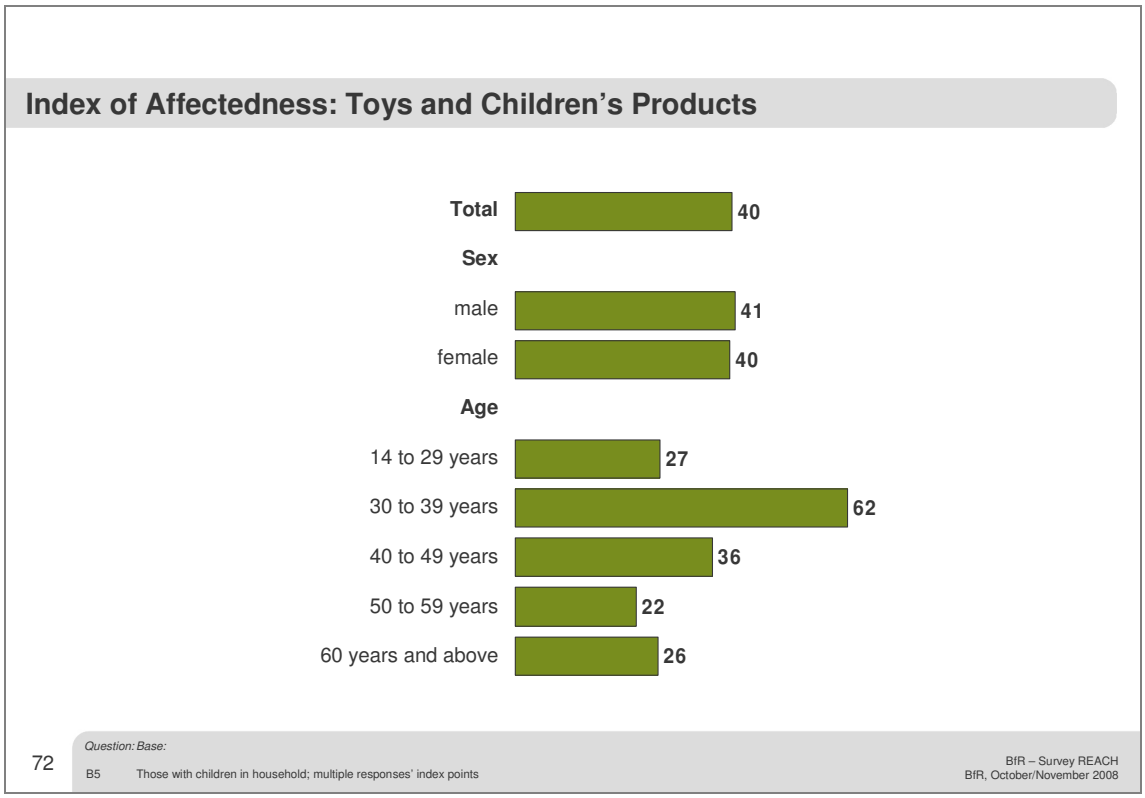

Figure 46: Index of Affectedness: Toys and Children's Products

4.4.1.5 All product categories

If an affectedness index is calculated across all product categories, it comes in at 37 points; there are no differences by sex, but a strong correlation with age. It is mainly the age group of 30 to 39 year olds, which uses chemicals of the various categories and also keeps them at hand in the household. The affectedness decreases noticeably with increasing age.

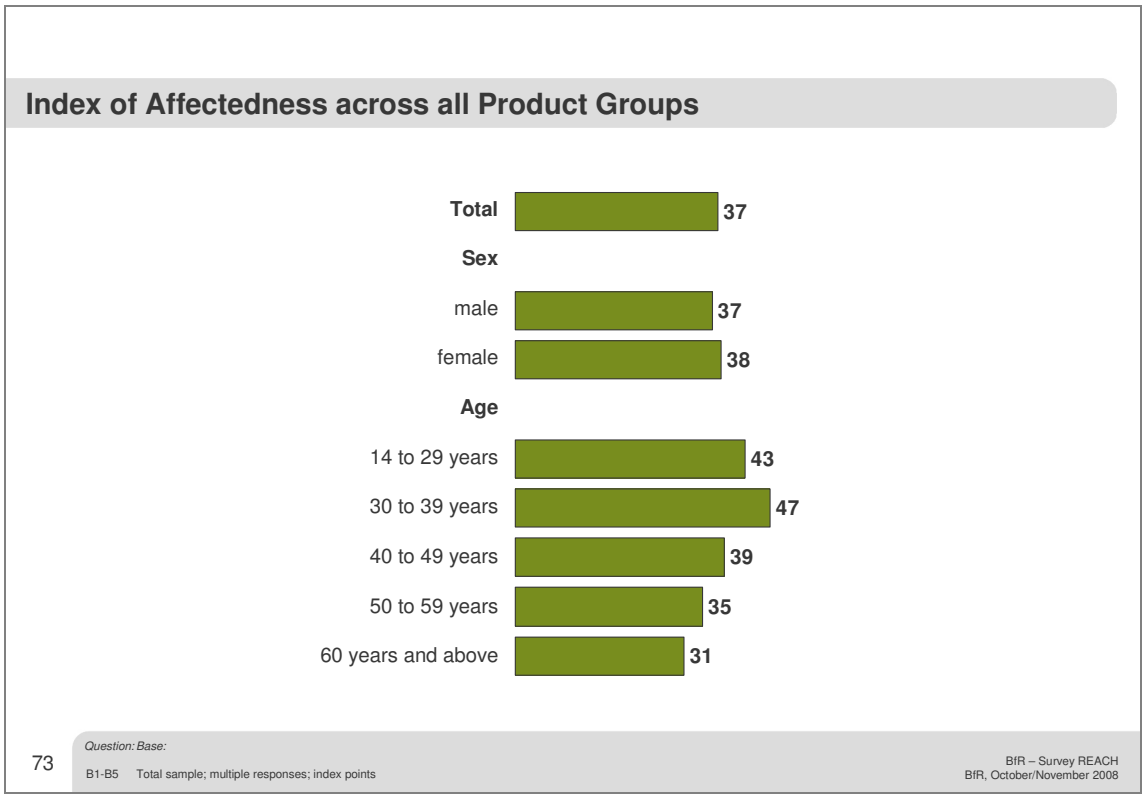

Figure 47: Index of Affectedness across all Product Categories

Differences by sex within product categories emerge mainly among building materials (Men: 36; Women: 22) and personal care products and cosmetics (Men: 46; Women: 71). There exist no significant difference in the category of cleaning agents (Men: 52; Women: 48) and children's products (Men: 40; Women: 41). Therefore, across all categories, no correlation exists between affectedness and sex.

4.4.1.6 Professional affectedness

A special sub-group was formed by those consumers, who handle chemicals at their work place. Actual affectedness could be influenced by professional contact with the four product categories; hence, this was explicitly captured in the questionnaire. 64% of employed consumers, i.e. the majority, had no professional dealings with any of these categories. The balance 36%, however, do; most of them with cleaning products (64%) and building materials (40%); a few also with personal care products and cosmetics (29%) and children's products (17%). 45% of affected professionals were white collar workers, 28% workmen and machine operators and 22% health care workers.

Professional affectedness results in increased private affectedness, especially in the case of building materials and cleaning agents. Not unexpectedly, workmen come into contact with building materials much more frequently, both at work and in private, but less with cosmetics. On the other hand, service providers in the health sector display a higher private affectedness by cosmetics.

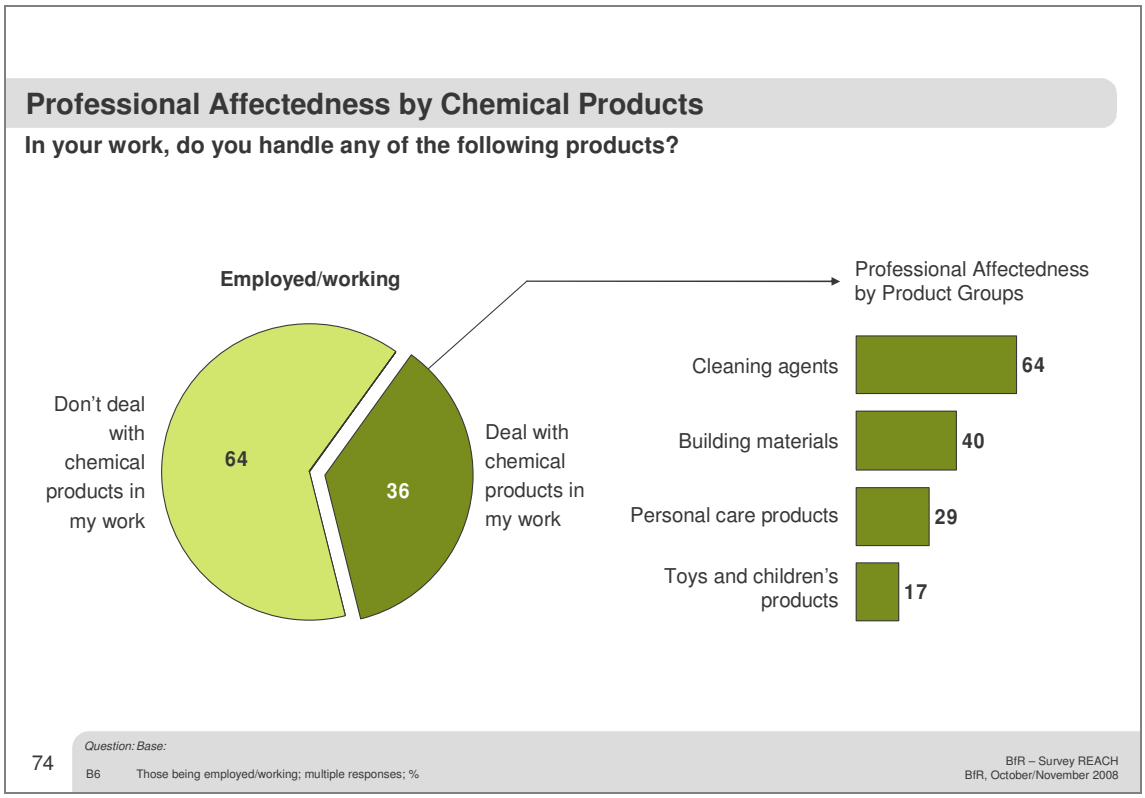

Figure 48: Professional Affectedness by Chemical Products

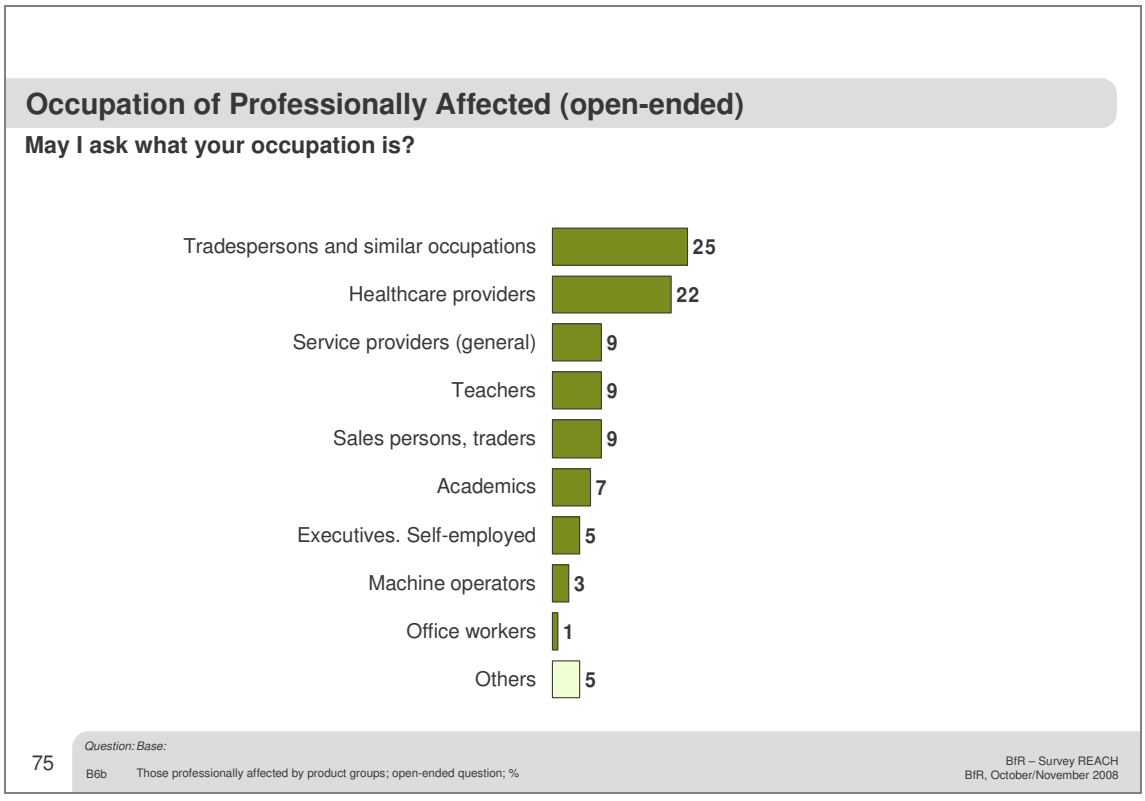

Figure 49: Occupation of Professionally Affected (open-ended)

4.4.2 Purchase decisions

Purchase decisions are an important indicator for the evaluation of consumer behaviour. This already emerged during the Focus Groups and could be further substantiated by the representative survey. It is worth taking note that factors impacting on the purchase decision vary from one category to the next. Although the price is an important factor, it does not have an equal impact on purchase decisions across categories. Depending on the category, consumers apply different criteria, in order to balance intended product performance and uncertainty about the respective products. The following graphic visualises these differences by category.

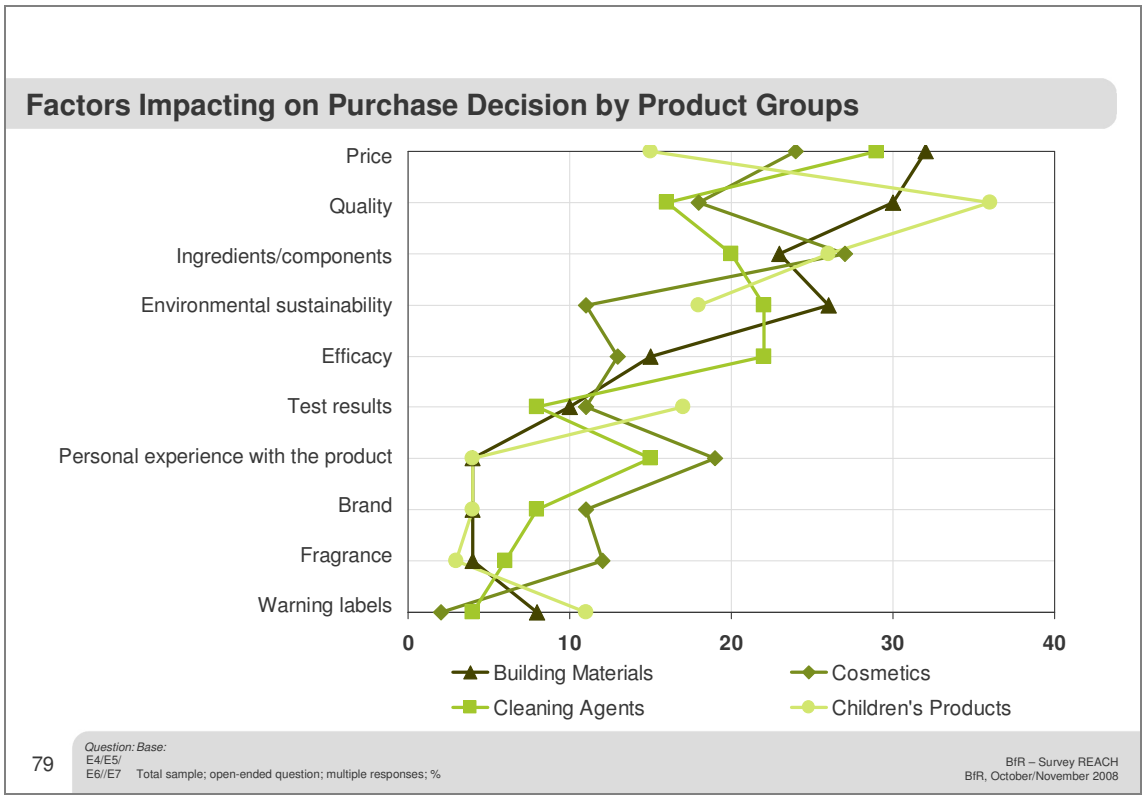

Figure 50: Factors Impacting on Purchase Decision by Product Groups

Which are the factors influencing purchase decisions? In the case of cleaning agents and building materials, price is the most important factor in the purchase decision. Ingredients/components and environmental sustainability are secondary factors. A different scenario obtains for personal care products and cosmetics: ingredients are more important than the price; also, prior experience with the product is especially important. In children's products, consumers are mindful of product quality: ingredients/components, environmental sustainability and test results are more important selection criteria than the price. Warning labels do not play a significant role in any of the categories.

Other studies, focusing on textiles, emphasised price as an important criterion, followed by product quality. In third place, design or appearance were mentioned. Type of material and country of origin were less important. Considerable differences emerged by gender (Steffensen 2008, p. 16).

Apart from the differences between categories and specific purchase criteria, there were differences by socio-demographics. The following correlations emerged by product category:

- **Building materials:** Men and respondents with higher education mentioned more factors that influence purchase decisions.
- **Household cleaners:** respondents with higher education and higher incomes applied a higher number of criteria to purchase decisions.
- **Children's products:** respondents with higher education cited a higher number of criteria, especially environmental sustainability and test results.
- **Personal care products:** no differences obtained in this category.

Considerable differences in purchase criteria were also observed in the Focus Groups. The qualitative methodology captured a wide spectrum of factors, without, however, being able to quantify them. Repeatedly, price was mentioned in the Focus Groups as a key criterion in purchase decisions. This criterion was mentioned most frequently in the context of choosing between alternative products. Of similar importance was the expected benefit of chemicals; the desired effectiveness was an important incentive in making a purchase. Ingredients as another important criterion were tested in both research phases. Seals of approval, which emerged prominently in the Focus Groups, played a secondary role in the representative survey. A key finding of the Focus Groups was that seals of approval increase trust, especially seals like "Ökotest". This finding could not be verified to the same extent in the quantitative survey; the same applied to brand consciousness. Brands and certain manufacturers were associated with trust by participants of the groups. However, it cannot be precluded that the eminent factor "quality" represents a bundle of value judgements, which includes brand, seal of approval and prior personal experience. A further topis, which was debated in the Focus Groups, but did not gain prominence in the survey, was the country of origin. According to Focus Group participants, certain products should be manufactured in places, where production conditions meet ecological and humanitarian standards (e.g. children's clothing). To what extent this demand impacts on purchase decisions cannot be determined by this study.

4.4.3 Behaviour dealing with risk

The dimension of handling risks was measured by a number of items. This was to ensure that this multi-faceted issue was well covered. The following topics were taken as indicators or determinants for behaviours relating to risks:

- Compliance with safety instructions
- Personally experienced health problems due to usage of chemicals
- Behaviour during an acute hazardous situation
- Dealing with communicated potential hazards

4.4.3.1 Handling of chemicals in daily life: safety instructions

Compliance with safety instructions can be interpreted as conscious handling of chemicals.

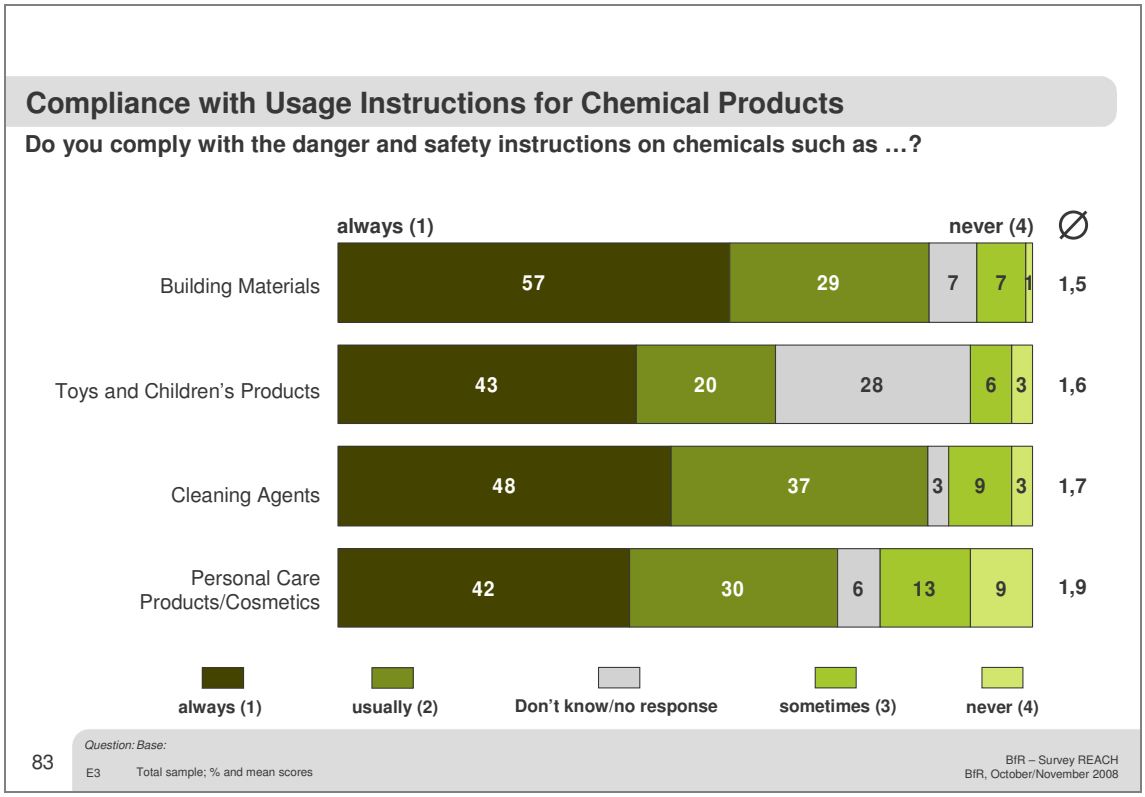

Figure 51: Compliance with Usage Instructions for Chemical Products

According to their own estimation, hazard and safety instructions are always complied with by about half of consumers. For instance, 48% claim to always stick to instructions for cleaning agents; a further 37% claim to usually stick to instructions (combined 85%). 12% of consumers rarely or never comply with instructions. A similar picture emerges across the other product categories.

Compliance with safety instructions is most likely in the category of building materials. This is the category, which is the least used in daily life, as demonstrated by the affectedness index. This implies that precautionary measures tend to be taken whenever familiarity with the product is low. The lower the familiarity, the more likely conscious and cautious handling of the product will become. The high proportion of non-responses in the children's products category is explained by the fact that adolescents and older household members have little contact with children's products. Thus, key findings are the large proportion of consumers, who always or almost always adhere to safety instructions; and the differences by product category. This result conforms to the high degree of pragmatic acceptance of chemicals, as described above.

In regard to the links between adherence to safety instructions and certain socio-demographic variables, the following observations can be made: the higher the level of formal education of consumers, the likelier it wil be that they comply with hazard and safety instructions. Men are less conscientious than women in following instructions. Consumers who are immigrants or whose parents are immigrants are below average in complying with hazard and safety instructions.

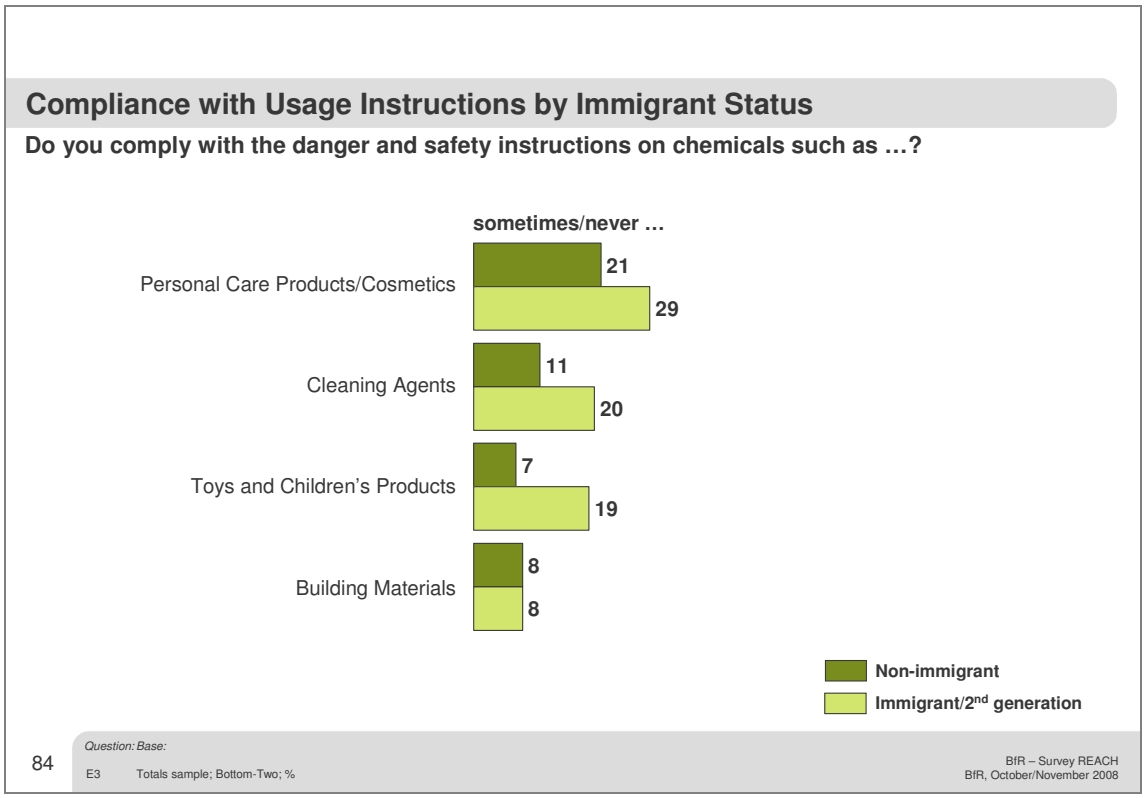

Figure 52: Compliance with Usage Instructions by Immigrant Status

4.4.3.2 Personally experienced health problems through chemical products

Compromised health through the use of chemicals constitutes an important element in consumer experience, since it shapes behaviour to a high degree. Experienced health problems lead to increased caution and motivate avoidance.The collected data show that the majority of consumers (61%) have so far not (consciously) experienced health problems caused by chemical products; if at all, the problems were limited to skin irritations (15%) or allergies (10%). Among the product categories, cleaning agents and personal care products are especially important.

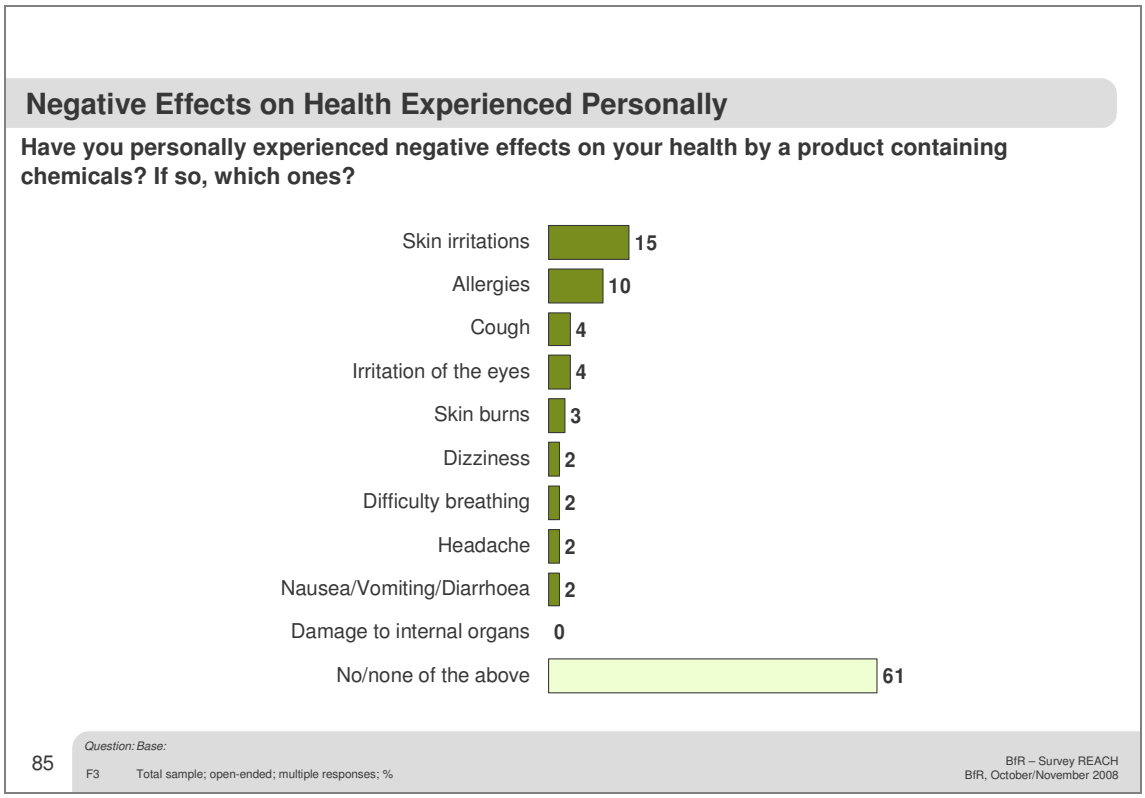

Figure 53: Negative Effects on Health Experienced Personally

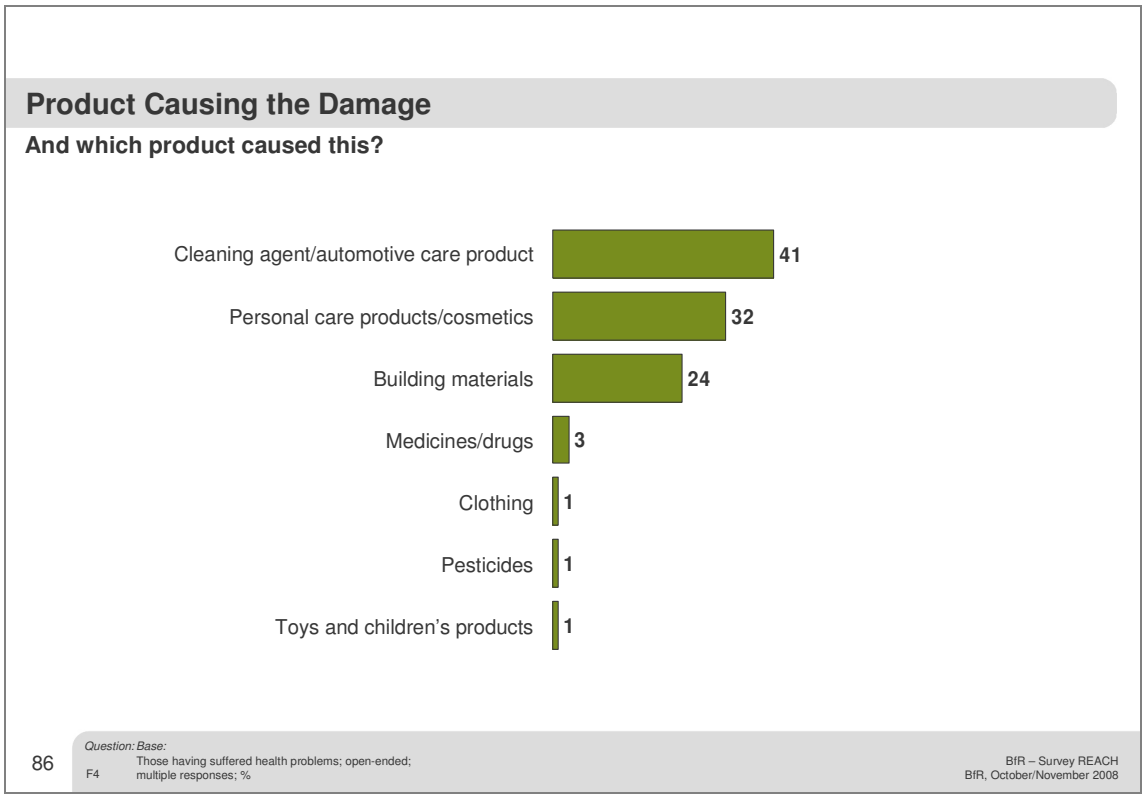

Figure 54: Product Causing the Damage

4.4.3.3 Chemicals in daily life: hypothetical risk scenarios

It has already been discussed that a survey of this nature cannot capture actual behaviour, but, at best, recalled past behaviour and claimed intended behaviour. That notwithstanding, to a certain extent, the issue can be addressed by assessing hypothetical scenarios. The following scenario was presented:

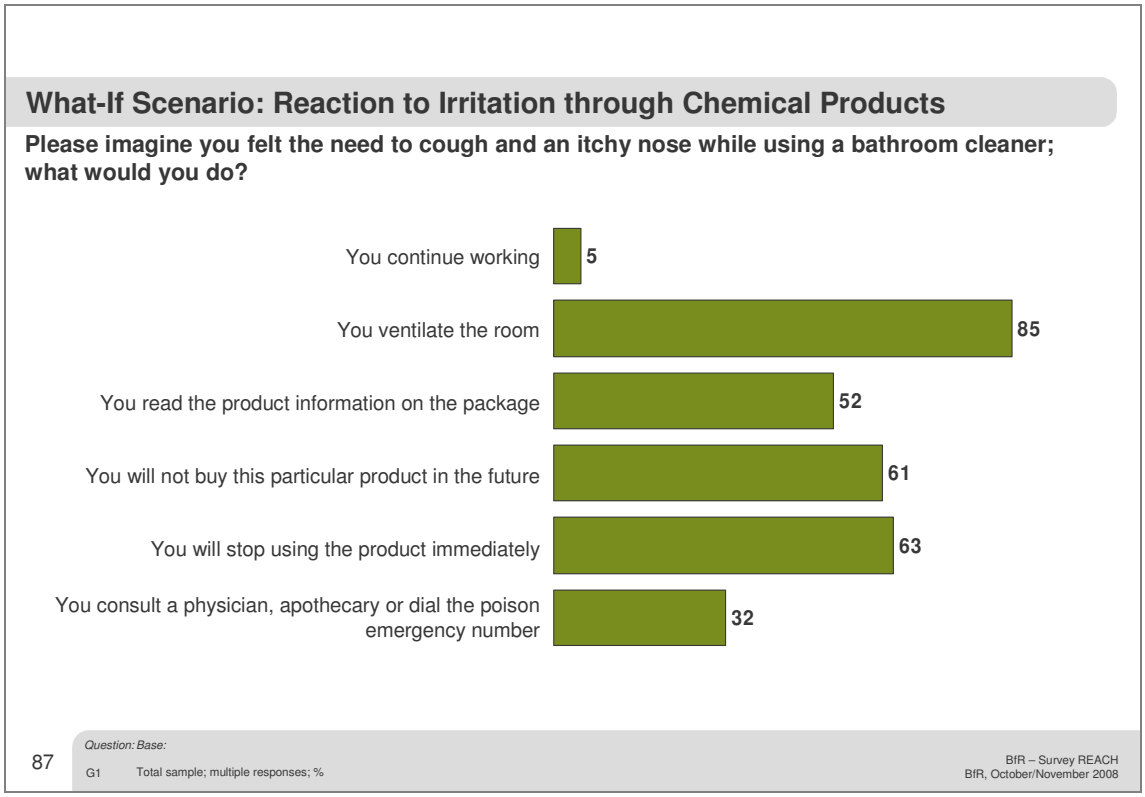

Figure 55: What-If Scenario: Reaction to Irritation through Chemical Products

If consumers notice physical problems (scenario: cough/itchy nose), they would almost always modify their behaviour: 85% would at least ventilate the room, 52% would read the product information on the package, 61% would not buy the product again and 63% would discard the bathroom cleaner and not use it again. Just 5% of consumers would continue their work and take no action. A third would consult a physician or apothecary or dial the poison emergency number. Nevertheless, it is to be expected that at least minimal behaviour modifications would occur depending on the situation. Thus, one may assume that ventilation of the room would be the first step, with next steps being taken depending on whether risk perception increases or decreases. This is also suggested by the findings of the Focus Groups.

The evaluation of a hazardous situation correlates with age: younger consumers show fewer reactions; 8% of the 14 to 29 year olds claim to just keep on working; just 3% of consumers aged 50 and above would do the same. Furthermore, it is evident that high subjective affectedness and behavioural change go hand in hand: persons who show a high degree of perceived affectedness (see chapter on perception) display definite differences in their reaction to hazard: they tend to avoid such products in future.

4.4.3.4 Chemicals in daily life: Communication on risk

There is a difference between personally experiencing risk or just to hear it discussed. Therefore, respondents were confronted with a second hypothetical scenario:

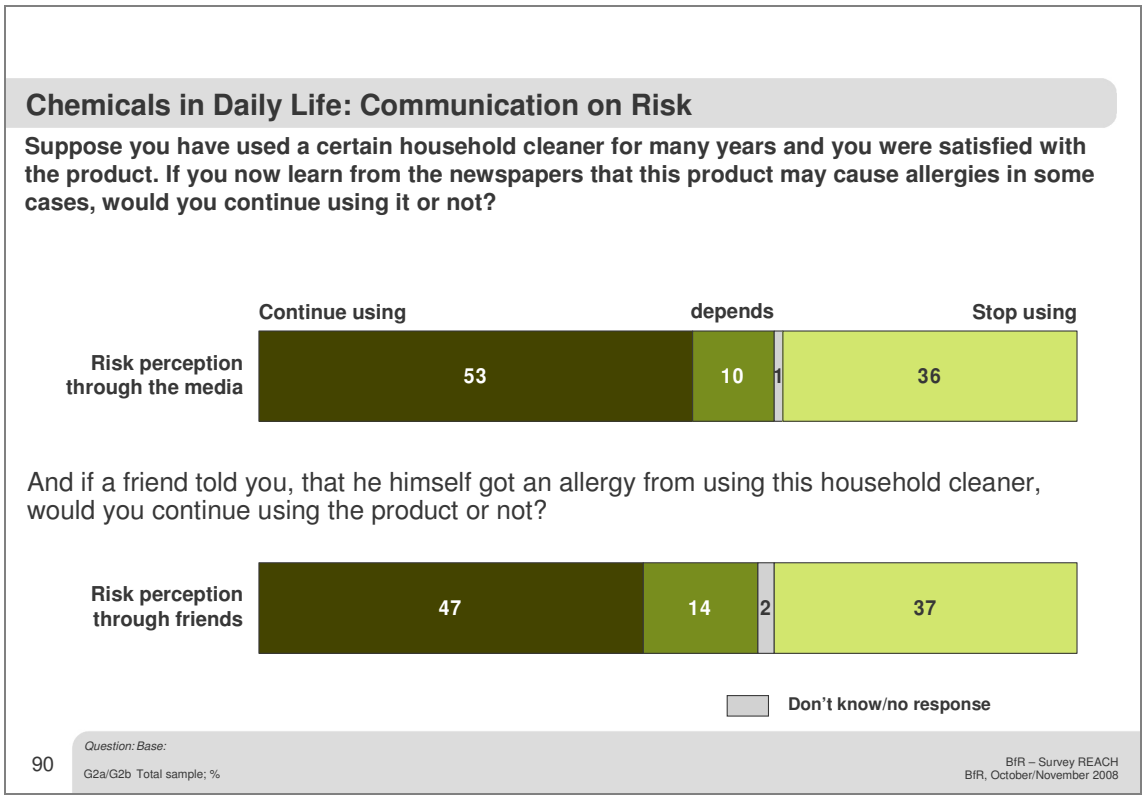

Figure 56: Chemicals in Daily Life: Communication on Risk

The results are clear: few would modify their behaviour immediately; rather, they would keep following routines. The similarity of responses is surprising; it makes little difference whether the information is provided by the media or one's friends.

When it comes to information on the hazards of chemical products, the media are as credible as word-of-mouth. If consumers were to learn from a newspaper that a tried and true household cleaner may, in some cases, cause allergies, half of them would continue using it; a third would no longer use it. If they had learned about undesirable side-effects not through a newspaper, but a friend, they would react likewise. This attests to a pragmatic and individualistic attitude toward potential risks of chemical products: many consumers will stop using a product only after they have personally experienced problems. Effects and side-effects are evaluated through the lense of personal experience.

4.4.4 Heuristics – general behavioural strategies

Heuristics allow for the simple classification of complex situations. They encompass guidelines on how to interpret acute situations and how best to respond. It is for this reason that this topic has been widely discussed in risk perception research. In the debate on why assessments by experts and laypersons are at odds, the standing argument is that laypersons misinterpret risks because of cognitive pitfalls, distorted judgements and faulty heuristics (compare B. Gilovich et al. 2002; Jungermann et al. 2005). The argument especially revolves around the assessment of the frequency of risks, which, unsurprisingly, is often not correctly estimated by laypersons. “How do real people – that is, people constrained by limited time, limited memory, and limited computational capacities – judge the frequency of risks in their environment, and how well do they do it?” (Hertwig et al. 2005, p. 622). An example would be availability heuristics, which posits that the more readily such and similar events are recalled, the higher the frequency of such events will be estimated. Availability heuristic is useful in daily life, but may lead to misjudgements in the case of rare events; or those, which were communicated by the media. Another example would be affect heuristics (Kunreuther/Slovic 2002), according to which it is not only knowledge that is important in evaluating risks, but also positive or negative emotions, which are relevant in connexion the issue to be evaluated (Slovic et al. 2004).

These claims are reflected in the results presented in this report. However, there is another connotation to heuristics. First and foremost, heuristics are the productive achievements of individuals, devised to better cope with complex situations. Heuristics facilitate problem solutions in uncertain and complex situations. They are perceptual and behavioural patterns, which can be interpreted as “mechanisms, which arise in response to situations and help respond to newly arising situations” (Schulze 2005, S. 18). In time, actual experiences and ever more stable attitudes form a repertoire of heuristics, which is deployed more or less intuitively in specific situations. The efficiency of simple heuristics is based on their ecological rationality; i.e. rational to the extent that it utilises the structures of the environment (compare Todd/Gigerenzer 2007; Brighton/Todd 2009). Thus, it is necessary to investigate the importance and scope of such heuristics as they are being acted upon in actual situations, in order to better address them through risk communication. This is not to say that misinterpretations are not also guided by heuristics. But it seems necessary to first examine the capacity of such heuristics to aid in problem solving, in order to then estimate which misinterpretations are caused by their reductive characteristics.

It is worth taking note of the fact that the usage of chemical products has become normalised to a high degree; i.e. despite all the uncertainties and in view of the omnipresence of chemicals in daily life, a plethora of behavioural strategies have been developed to cope with this problem. In a first step, some heuristics were extracted from the analysis of the Focus Groups:

a) *Stick to known products:* Consumers rely on continuity when handling chemical products. This is a key heuristic to economise the decision-making process among a multitude of substances.

b) *Be experimental:* One’s own experience in handling chemicals is very important. An alert by the media or even one’s social circle will not be a reason for not using a product; rather, it serves as reason to re-examine the product as to whether it poses risks. Continuity prevails, unless personal experience argues against it. In this study, no indications emerged to support “resigned risk handling” (Steffensen 2008, S. 4). Consumers handle chemicals and potential risks with self-confidence.

c) *Be generous when classifying risks:* Rather than finding out with hindsight that a risk category has been defined too narrowly, consumers opt for a broad approach. This forming of overly-comprehensive categories corresponds to the logic of giving – or withdrawing – trust. If a manufacturer has introduced a noxious product into the market, other products

will also be viewed with suspicion, because one generally does not trust this manufacturer anymore. In the case of cleaning products: “avoid eye contact, not on open wounds; otherwise, not harmful.”

d) *Establish hierarchies of trust:* This is a social mechanism to assist in making safe choices. Confusion can only be overcome to the extent that one can rely on the expertise of people, who are credited with having the requisite knowledge. This would also explain why consumers bond with manufacturers.

e) *Minimise the use of chemical products:* This implies that chemicals should not be used unnecessarily; should their use become necessary, the correct dosage is important.

What do we learn about general behaviour patterns from the findings of the representative survey? Again, learning from experience is an important mechanism. One indiction is the correlation of actual affectedness and awareness of and compliance with safety instructions. Whoever has much contact with chemicals not only has better knowledge, but is also more open to complying with behavioural rules, which s/he has been informed about. This segment, however, also tends toward another behavioural strategy, which is based on experience as well: these heavy users tend toward maintaining their current behaviour even if new risks become known about a cleaning product.

Correlating these findings with socio-demographic variables, the following relationships emerge: men tend to have many different cleaning agents in the household. Also, the number of cleaning products rises with increasing level of education. Furthermore, level of formal education correlates with better awareness of safety instructions and hazard symbols, Nevertheless, these heavy users frequently tend to disregard safety instructions. This corresponds to heavy users tending to take decidedly fewer counter-measures in hazard situations than consumers, who own fewer cleaning agents. Thus, familiarity with usage of a product diminishes potential restraints of a more experimental stance.

To summarise: with a view toward the behavioural dimension, it is evident that the disconnect between “message space” and “behavioural space” (compare Chapter 2.2) is of great importance. In functional contexts it emerges that behavioural relevance follows a self-evident logic and, therefore, abstractions are understood without major difficulties. That is not the case in open contexts, as obtains for the utilisation of chemicals by consumers. Behavioural instructions need to be made tangible, their relevance for behaviour needs to be made evident. And that is best achieved through the use of symbols. Communication through symbols would constitute the most accessible formal knowledge, because it also contains behavioural relevance. “Code language” (e.g. R & S instructions) is not well understood.

4.5 Information on chemicals

The final aspect to be examined in this study pertains to the expectations in information as well as the behaviour of German consumer as regards information, and also their level of feeling informed. Thus, how and where do consumers seek information on the properties of certain substances and products (sources of information)? How well-informed do consumers feel about potential risks of chemicals and consumer goods? And what are their expectations and what is their level of interest in information on chemical products and their regulation? What role do consumer centres play in consumer information? To develop concepts for adequate risk communication, it is vital to answer these questions.

The following statements summarise key findings of the study in respect of information-seeking and demands for information by German consumers on chemical products:

1. There is a high level of interest in information on potential risks and dangers of chemical products.
2. Just one in five consumers feels well-informed.
3. Product packaging is the most important source of information; however, the information provided is deemed insufficient.
4. Consumers demand information on risks and dangers, which should be easily comprehensible.
5. On the Internet, consumers utilise manufacturers' sites as well as those by consumer protection agencies and private forums. Government pages are of little importance.
6. Personal consultation in a consumer protection centre occurs rarely.

The following chapter is divided into five sub-chapters. At first, levels of interest and the need for information on product risks will be discussed (4.5.1). Then we will examine how well-informed consumers perceive themselves (4.5.2). The next sub-chapter will extensively discuss sources of information, both those already used by consumers and those they demand (4.5.3); subsequently, we will describe consumers' strategies for identifying allegedly hazardous products (4.5.4). The final sub-chapter (4.5.5) will examine the quality and level of usage of consultation offered by consumer centres.

4.5.1 Interest in information on product risks

In order to adequately communicate on risks of chemical products it is necessary to determine consumers' level of interest in information on such products. Using a scale from 1 ("not interested") to 5 ("very interested"), more than half of respondents (55%) claimed to be "very interested" or "interested" in information on risks and dangers of chemical products. The average (mean score) came in at 3.7. Just about one in ten claimed to be "not interested" or "less interested" (a total of 14% opted for values 1 or 2 on the scale). Women are significantly more interested in information on product risks than men. Younger consumers (14 to 29 year olds) are noticeably less interested in such information than consumers aged 60 and above (mean scores 3.2 and 3,9, respectively); and there is a tendency toward higher interest with increasing age. This seems plausible as factual knowledge declines with rising age (compare Chapter 4.3.1).

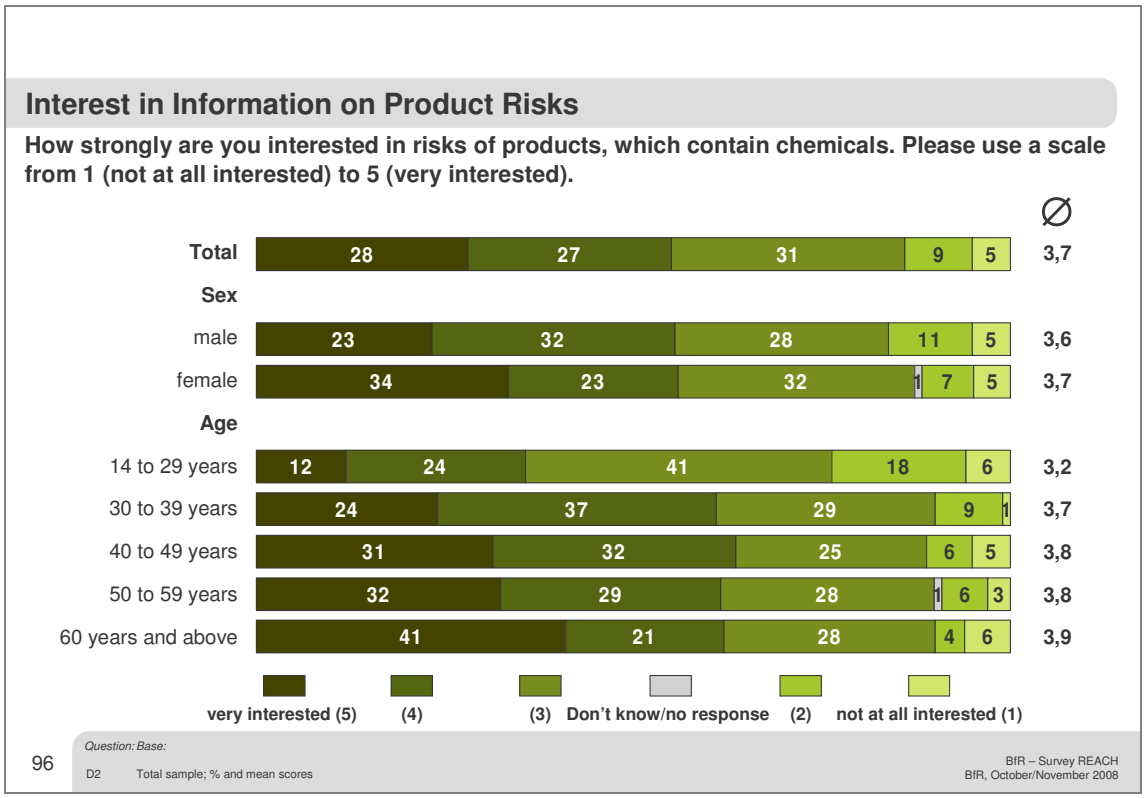

Figure 57: Interest in Information on Product Risks

There are no differences in levels of interest in product information by other variables such as level of education or employment status.

4.5.2 Perceived extent of being informed

This question sought to explore how consumers evaluate their own levels of information:

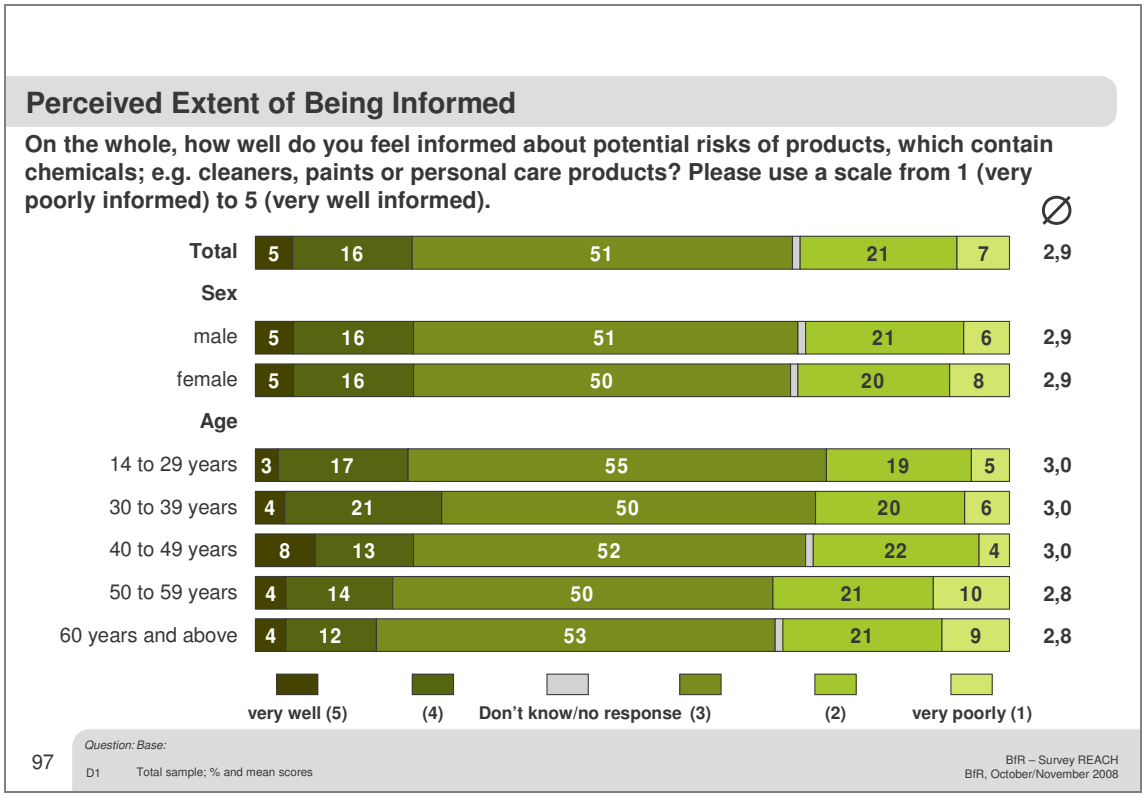

Figure 58: Perceived Extent of Being Informed

Just one in five consumers feel “very well informed” or “well informed” on potential risks of chemical products (using a scale from 1 = “very poorly” to 5 = “very well”). The mean score stands at 2.9. A slight majority of consumers (51%) apparently feels moderately infomed; a further 28% even worse informed; i.e. 79% of consumers feel moderately or poorly informed on risks and dangers of chemical products. There were no differences by sex (both men and women achieved mean scores of 2.9) and only slight differences by age. Consumers with higher education and higher incomes perceive themselves as better informed.

Persons who generally feel well informed also feel better informed by product information on the package. They feel less uncertain and they also are aware of a greater number of safety instructions; they have experienced fewer health problems and tend toward “pro chemicals” attitudes. They expect fewer dangers, even if the product is not used correctly; their risk perception is less pronounced because of subjective characteristics.

Persons who feel poorly informed are characterised by generally strong doubts about chemical products.

The findings of the Focus Groups pointed at the importance of the product packaging in product information. The quantitative study confirmed this: 92% of consumers want all necessary information on health risks printed on the package or a pack insert (see below: 4.5.3). If levels of general interest are high, yet perceived levels of information are low, how are product packages rated as sources of information?

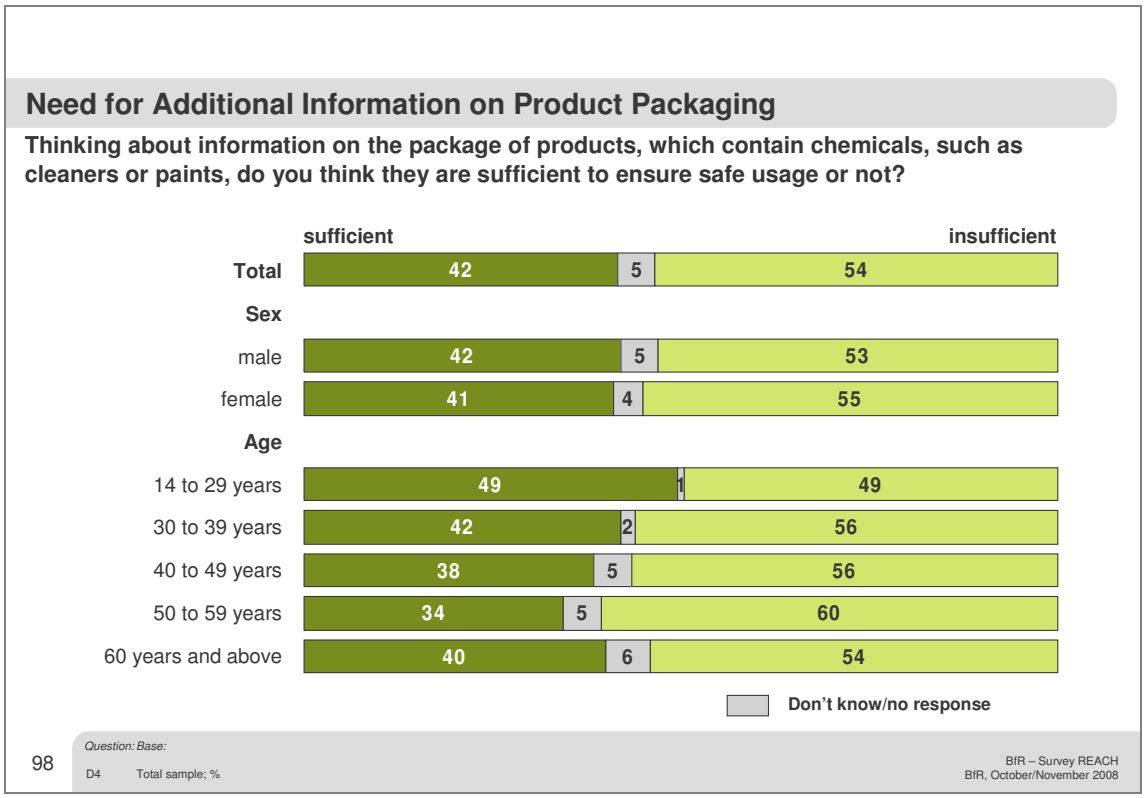

Figure 59: Need for Additional Information on Product Packaging

The current study reveals that the majority of consumers (54%) do not consider information on the packages to be sufficient to guarantee safe usage of chemical products. There is no difference by sex. The younger the consumers, the more likely it was that pack information was considered sufficient (among 14 to 29 year olds: 49%; among 50 to 59 year olds: 34%), since younger consumers tend to actually be better informed. Among consumers above the age of 59, the proportion of those, who consider information to be sufficient, rises again to 40%.

Those consumers, who complained that package information was insufficient were also asked what type of information was missing on the packages:

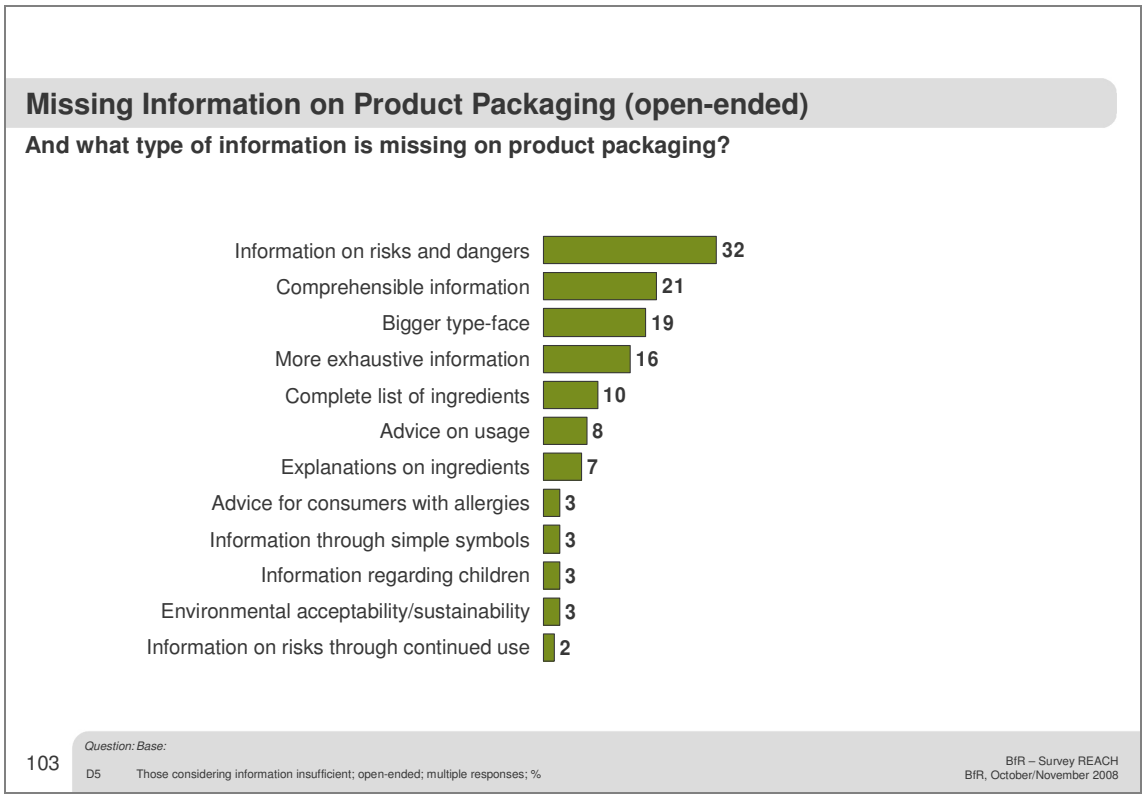

Figure 60: Missing Information on Product Packaging (open-ended)

According to consumers, information on product risks and dangers of chemical products (32%) is the most important missing element, followed by easily comprehensible information (21%) or more detailed information (16%). A fifth of consumers (19%) criticised the small type face. 10% call for a comprehensive list of ingredients and an almost equal proportion miss information on usage (8%) and explanations of ingredients (7%). All other specific suggestions, ranging from allergy advice to simpler symbols or information on environmental acceptability, were of marginal importance.

4.5.3 Utilised and preferred sources of information on risks of chemical products

Awareness of actually used, but also of preferred sources of information on risks of chemical products is of great interest to risk communication:

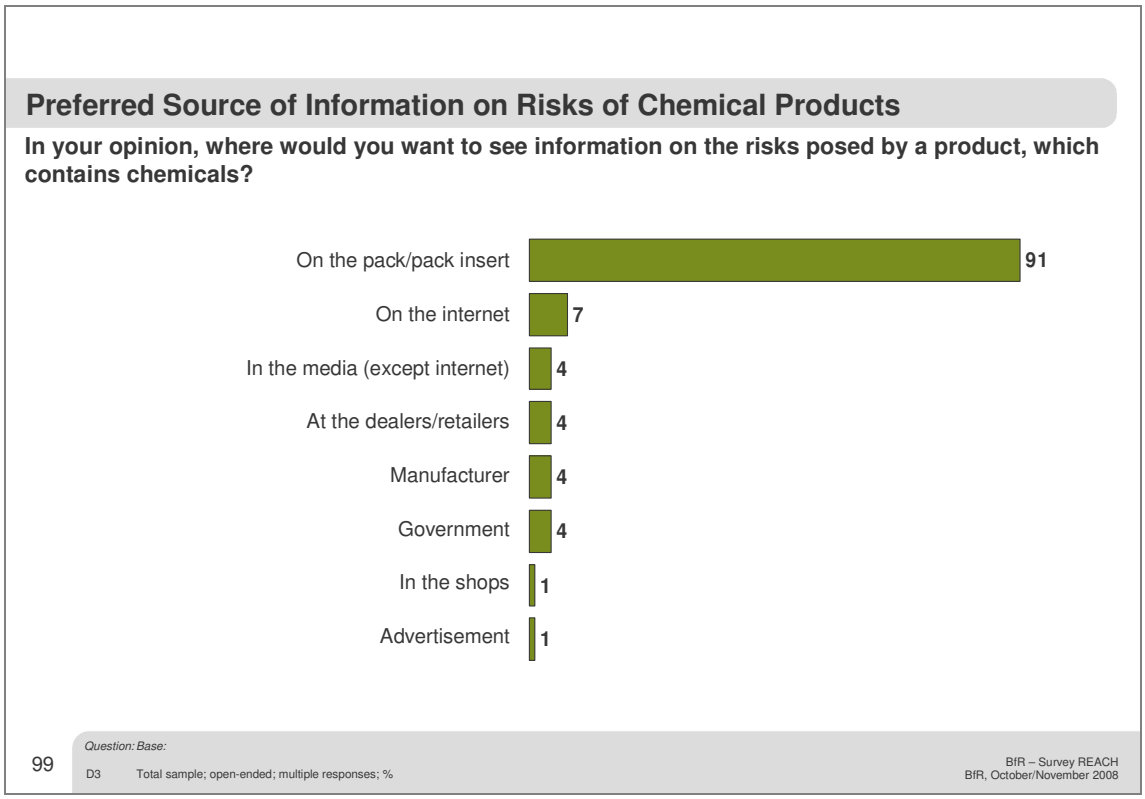

Figure 61: Preferred Source of Information on Risks of Chemical Products

As regards preferred sources of information, there is a clear vote for information on the packagee or pack insert (91%). Other sources of information, such as the Internet, conventional mass media, but also sales persons at point of sale are of marginal importance.

Having obtained an unexpectedly unanimous vote on the question after preferred sources of information, consumers were asked after sources of information they actually used.

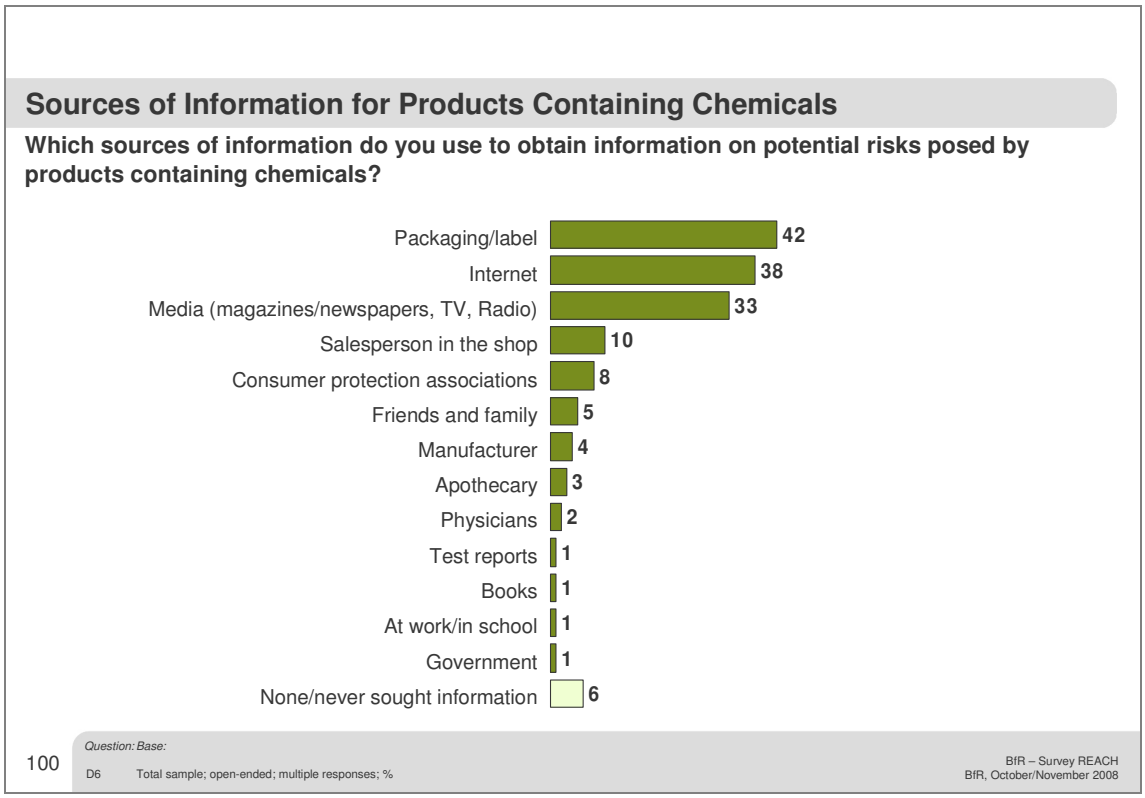

Figure 62: Sources of Information for Products Containing Chemicals

The open-ended question after actually used sources of information revealed that consumers indeed sought out information on the package. 42% spontaneously mentioned the package as their main source of information, which therefore takes top position. In second place, the Internet was mentioned by 38% of consumers, followed by conventional mass media (33%). Just 10% sought information from sales persons in the store. Consumer protection associations (8%) and friends and relatives (5%) were of far lesser importance, as were other sources of information such as physicians, manufacturers or government agencies.

It is surprising that “friends as source of information”, contrary to finding of the Focus Group, were mentioned at such a low level. In the groups, friends and family were frequently mentioned as a reliable source of information.

The spectrum of potential sources of information is also reflected in information-seeking behaviour in regard to products. The more sources of information for chemical products in general are utilised, the more detailed will be the information behaviour on specific products.

Utilised sources of information and behaviour correlate positively: the higher the number of accessed sources, the more likely it will be that safety instructions will be observed and that counter-measures will be taken in hazardous situations. Consumers who access more information on children’s products also use fewer cleaning agents in the household.

Those, who access many sources of information, feel significantly worse informed by information on the packaging. Across categories (the exception being children’s products), they seek out more information; they can recall a considerably larger number of safety instructions, they are more familiar with the orange-coloured hazard symbols, and they comply with safety instructions more frequently.

Those consumers, who mentioned the Internet as a utilised source of information, were asked to specify the type of sites they access for information on chemical products.

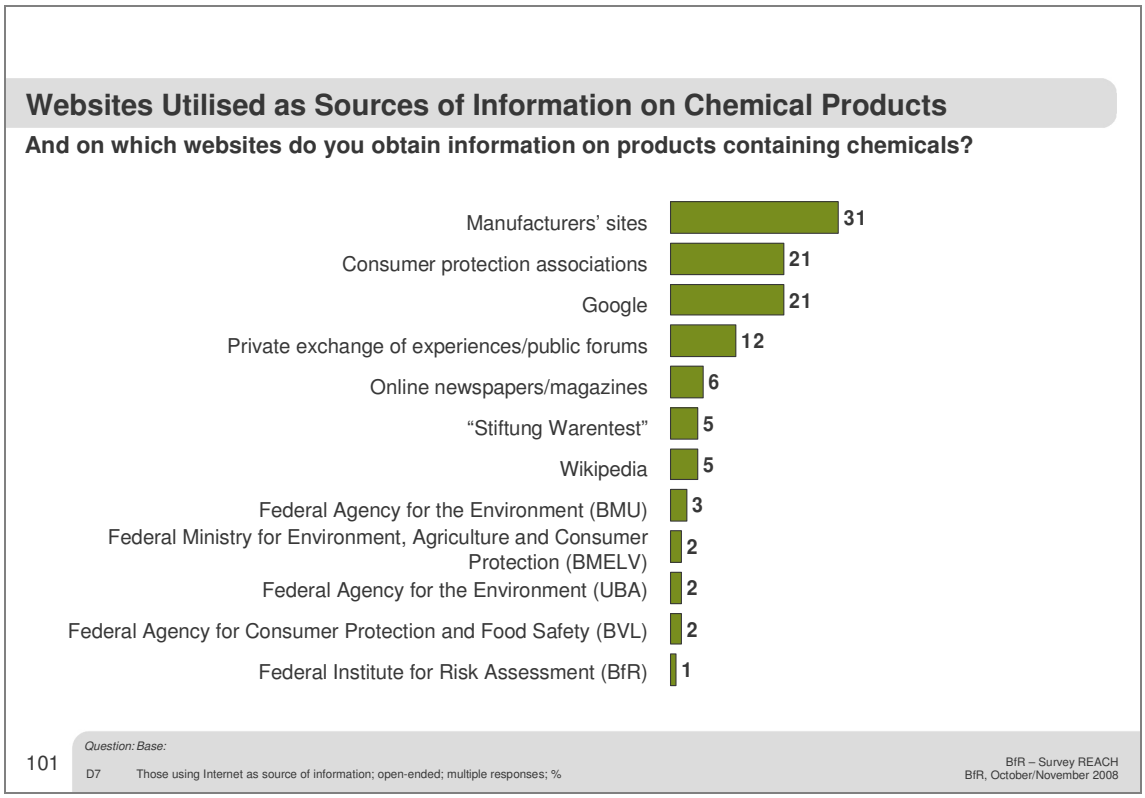

Figure 63: Websites Utilised as Sources of Information on Chemical Products

Consumers who claimed to use the Internet for accessing information on chemical products (38%), target manufacturers' pages (31%), followed at some distance by consumer protection associations and Google searches (21% each). About one in ten (12%) specifically search for private accounts of experiences or Internet forums, access information at online print media (6%), at Stiftung Warentest or Wikipedia (5% each). Other websites, including those of government agencies, do not play a major role.

As was the case for other variables, information accessing behaviour was broken down by product category. In Module B, actual affectedness was captured; at this point, consumers were asked how they kept informed on these categories.

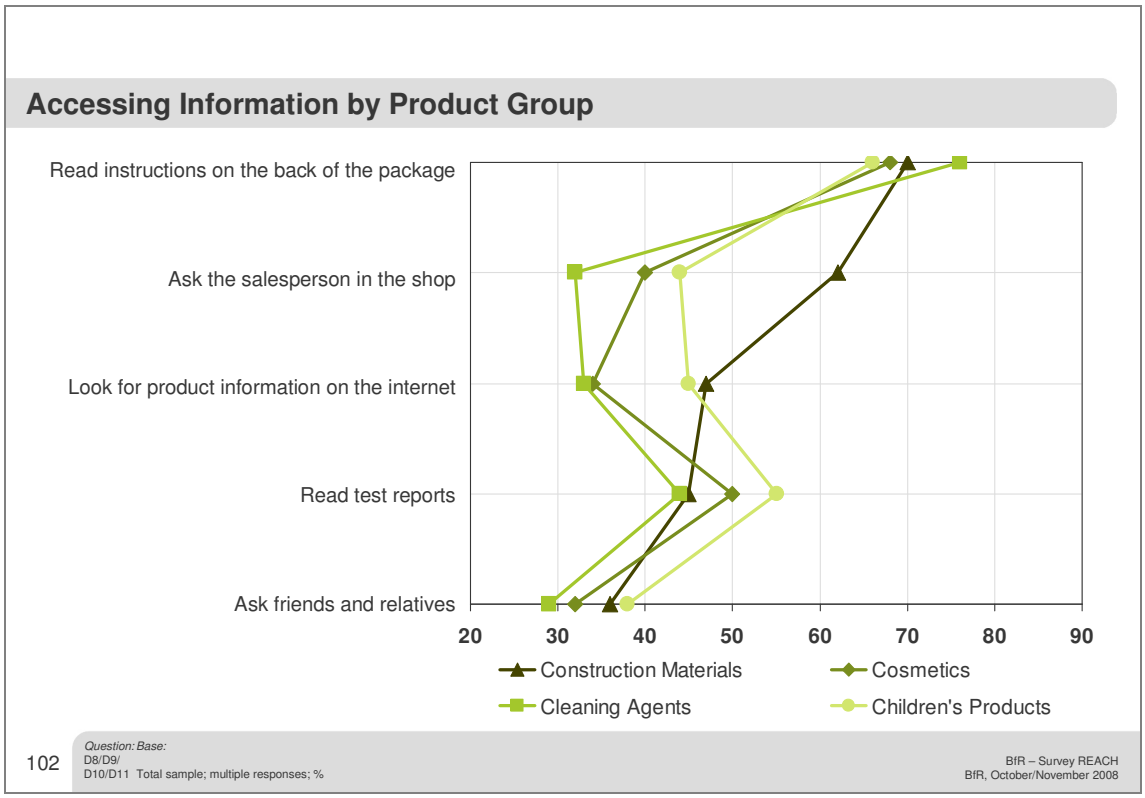

Figure 64: Accessing Information by Product Group

The importance of the package instructions is confirmed again across each of the four categories; regardless of whether cleaning agents, building materials, cosmetics or children's products, in all cases the instructions on the back of the package are always used most frequently (ranging from 66% to 76%), if consumers want to learn about specific product risks. By product category, reading of test reports (ranging from 44% to 55%) is important for cleaning products, children's products and cosmetics; while in the category of building materials, there is a much higher likelihood of asking the sales person in the store (62%), as these products often require explanation of usage. A third of consumers would search on the Internet for information on cleaning agents and cosmetics; while a decidedly larger proportion would do so for building materials and children's products (47% and 45%, respectively). Finally, 29% to 39% of consumers would also ask their friends and relatives for information on risks of chemical products. However, some consumers (ranging from 3% for building materials and 9% for cosmetics) admitted to using none of these sources of information.

On balance, there is evidence of a discrepancy between information demands and information offers: consumers are agreed that packages are of vital importance in providing information on the risks of chemical products, but more than half consider these packages insufficient. And, indeed, consumers also access other media to meet their information requirements. On the Internet, manufacturers' pages are preferred; hence, manufacturers are charged with special responsibility as information provided by them is the most searched for and accessed.

4.5.4 Identifyers of products that are classified as hazardous

Information on potential risks of a product are not only communicated via text, but also gainsaid by secondary identifiers such as smell, position in the store, type of package or the colour of a product. As these identifiers were mentioned on several occasions during the Focus Groups, this topic was also addressed in the survey.

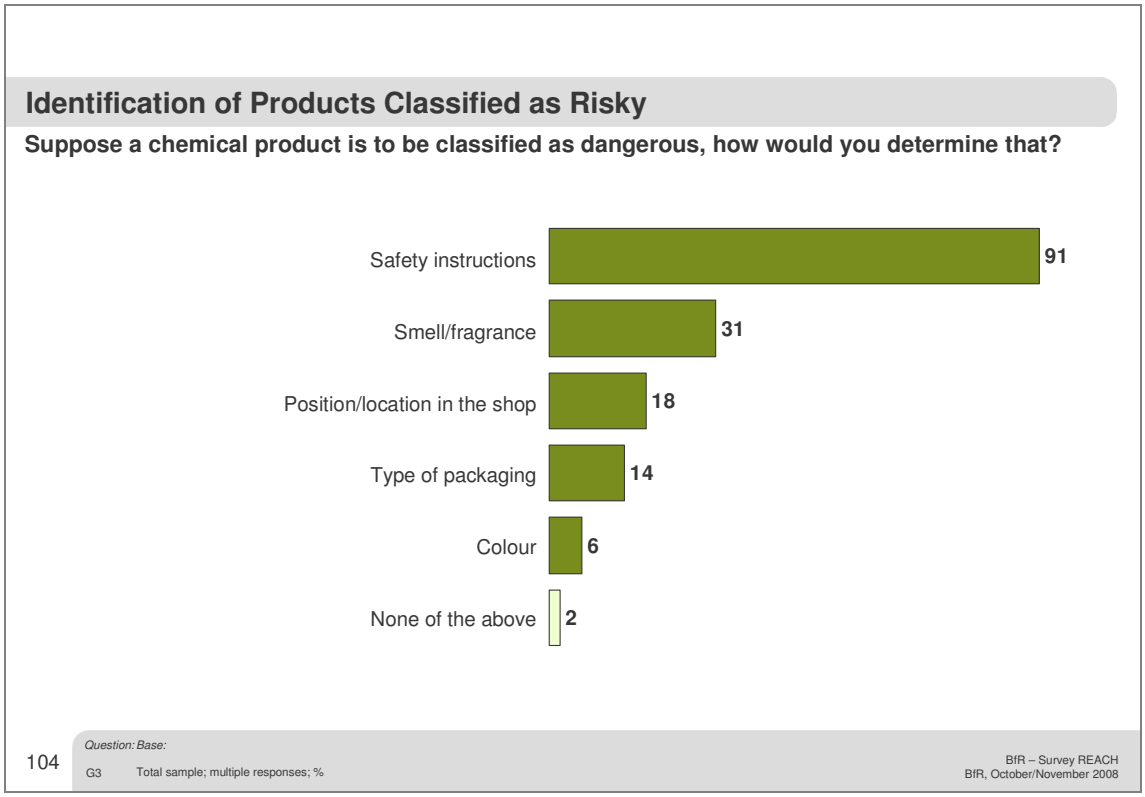

Figure 65: Identification of Products Classified as Risky

Half of consumers (49%) believe they can detect product risks by perceived product characteristics such as smell, colour, type of package and position in the shop.

Against the background that although most consumers (91%) believe they can detect risks by reading safety instructions, but that these very instructions are considered insufficient by a majority, the importance of these secondary criteria is made evident.

4.5.5 Consultation at consumer centres

One issue, which always arises in discussions on health-related consumer protection, is the role played by consumer centres. To answer the question after the role played by consumer centres in the area of chemical products and consumer goods is especially important in regard of the risk communication to be developed on REACH: consumer protection associations, according to all studies on the topic, are credited with considerable trustworthiness by consumers – a fact that might be of benefit to risk communication on REACH.

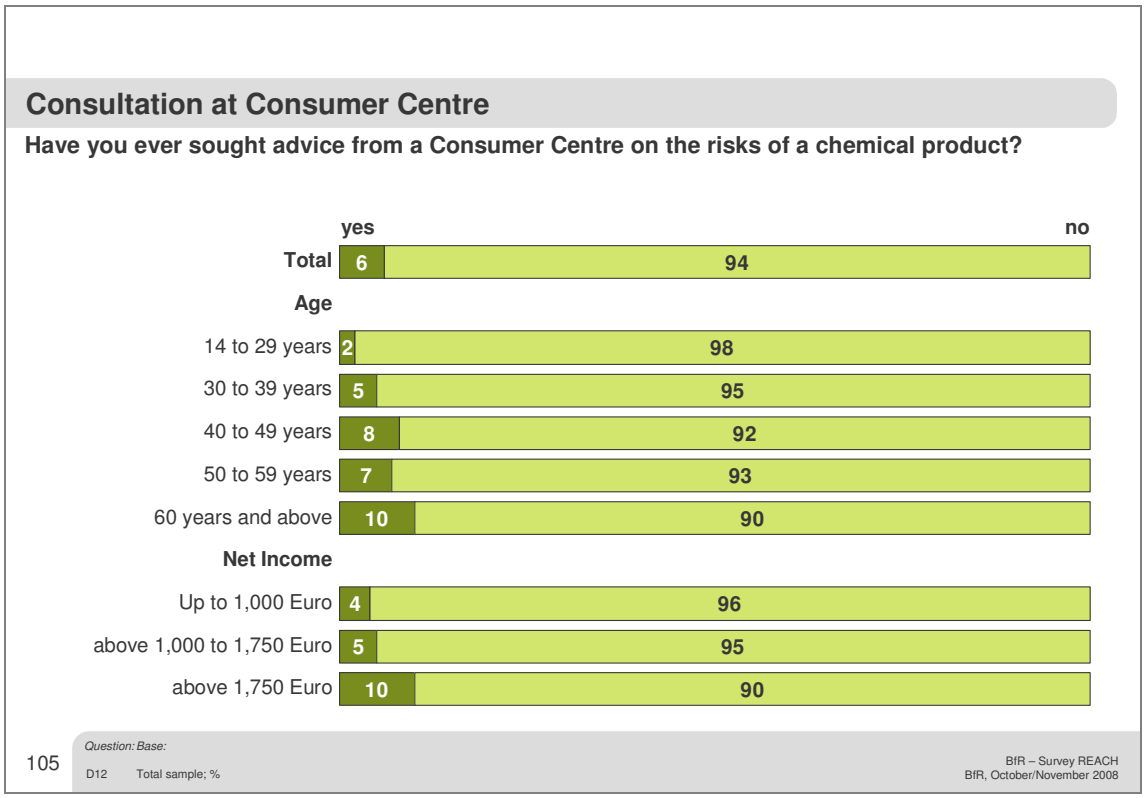

Figure 66: Consultation at Consumer Centre

Just a very low proportion (6%) of the German population has sought information on risks and dangers of chemicals products at a consumer centre. The vast majority (94%) admitted to not having consulted with a consumer centre in regard to chemical products. The younger the consumers, the less likely it is that they make use of this service: just 2% of the 14 to 29 year olds have done so. The likelihood of making use of the information offer increases with rising age: 10% among consumers aged 60 years and above indicated that they have consulted a consumer centre on chemical products. It is also revealing to break down results by income categories: the higher the net equivalent income, the likelier consultations by a consumer centre become. While just 4% of consumers in the lowest bracket (up to €1,000) have made use of the offer, 10% in the highest bracket (above €1,750) have done so.

Those, who have sought consultation, were asked on which product they had been consulted. This was done by an open-ended question.

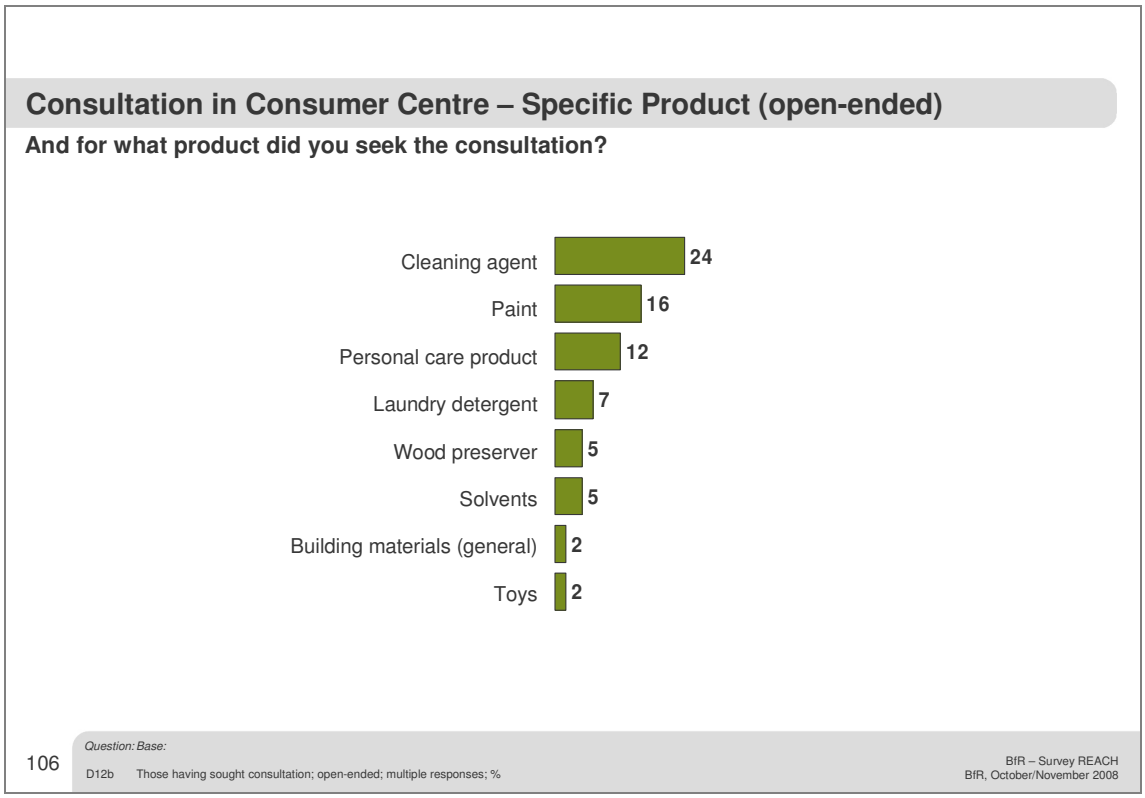

Figure 67: Consultation in Consumer Centre – Specific Product (open-ended)

A quarter (24%) of consumers who had sought consultation at a consumer centre did so on cleaning agents, followed by paints (16%) and personal care products (12%). All other products, such as laundry detergents, wood preservers, solvents, general building materials and also toys remained in the single digit percentage range.

4.5.6 Summary

To summarise, the following issues need to be emphasised. There exists a great demand for information on potential risks of chemical products; roughly half of consumers show interest. However, just one in five feels well informed on chemical products and consumer goods. Product packages are the most important source of information. According to consumers, information on risks and dangers of chemical products should be placed directly on the product or its packaging. More than 91% of consumers claim to be able to identify risks by reading the safety instructions on the package. However, 54% consider existing information on packages insufficient. Ease of comprehension is the most important consideration. Provided information should be easily comprehensible, printed in large font or be presented by way of symbols. The relevance of information needs to be transported directly; otherwise, consumers will not or cannot take note.

Missing package information is partially compensated by using other sources of information, especially by consumers with higher education. Although package information is the most important channel, consumers use other sources of information to a considerable extent.

5 Opportunities for Risk Communication

This discussion will highlight several essential consequences of this study for the future direction of risk communication by the BfR in the area of the regulation of chemicals. First, the findings on the ten central objectives will be summarised (5.1); subsequently, possible consequences for risk communication and future research into risk communication will be discussed (5.2).

5.1 The ten central objectives

The ten central objectives (compare Chapter 1 of this report) will be presented in somewhat different order to emphasise the systematic and content-related connexions.

(1) What do German consumers know about REACH and the regulation of chemical products?

Consumers do not have cognate knowledge; they also are not interested in formal knowledge on legal procedures. Thus, risk communication cannot be effective on this issue without first creating the conditions for such risk communication by implementing certain measures; e.g. targeted educational campaigns in schools or other educational institutions (compare results of Project STARC[17]). At any rate, it is a safe assumption that interest will be limited, as this knowledge has few implications for consumer behaviour. Thus, a minimalistic approach is recommended; efforts should be concentrated on such elements, which pertain to the labelling of products with symbols.

(2) To what extent does their knowledge of chemicals and regulation of chemicals influence risk perception?

The regulation of chemicals play no role, but knowledge of chemicals and chemical products does. Knowledge about risk and personal knowledge about the multiple uses go hand in hand. Chemicals are associated with a negative image, which, in case of doubt, results in avoidance, e.g. strategies to keep usage to a minimum. Image is a perceptual category; but it reinforces other aspects, such as health problems that were personally experienced. Consumers who are informed to a greater extent will be more cautious in handling chemicals.

(3) Do the people in Germany emphasise the risk or benefit aspects of chemical products?

Both aspects are acknowledged. The efficiency of chemicals as well as their price put potential negative effects into context. In the Focus Groups as well, opportunities and benefits of chemicals were acknowledged. Thus, the population is very much conscience of ambivalence.

(4) How do consumers evaluate the safety of consumer products?

Chemical products are not per se considered dangerous; they are assumed safe. Consumers assume that only sufficiently tested products will be available in the market. Nevertheless, a certain unease remains towards chemicals. There are differences from one category to the next, which correlate with the frequency and the characteristics of their usage. For instance, building materials are considered more dangerous than personal care products.

[17] In a Hungarian case study on chemical waste, the respondent emphasised that the field of chemicals and the handling of chemicals were far too important to society to neglect education on the issues. Consequently, the topic is firmly embedded in school curricula (compare Dien et al. 2006).

Especially the manufacturers are tasked with ensuring the safety of their products. At the same time, however, consumers also demand more and more detailed information on product risks.

(5) Did recalls of contaminated consumer products influence risk perception among consumers?

Product recalls exacerbate acute risk perception and pose a problem for affected manufactuerers, at least for a certain period. If a certain product is recalled, other products by the same manufacturer are also boycotted, according to participants in the Focus Groups. However, this does not imply a permanent effect on perception. Things return to normal rather quickly. Once an event is no longer acute in consciousness, it usually ceases to have effects on behaviour within a short period of time. This is confirmed by other risk-related topics. For instance, during the BSE crisis, after German BSE cases became public, consumer purchases drastically declined, but returned to previous levels within a few months. (compare ZMP 2002).

(6) In what way, and where, do consumers seek information on the properties of certain substances and products?

Consumers seek information mainly on the product itself. The information should be as simple and as accessible as possible. Since the product is seen as the most important source, but this source is also deemed insufficient, some consumers will continue their search and usually access manufacturers' pages on the Internet. The Internet is increasingly becoming important as a source of information. Consumer centres and government agencies, on the other hand, do not play a significant role.

(7) Within the context of REACH, there is a strong link between the regulation of chemicals and the safety of consumer products. Do consumers even perceive this connexion?

The answer is a decided no. Consumers expect manufacturers to assure the safety of consumer goods. Government is at best perceived as watch dog, a function that is taken for granted.

(8) What direction will public opinion take in regard to REACH and the safety of consumer products?

Public opinion on REACH does not exist; but there is a high pragmatic acceptance of chemicals in products. This means: while compromises need to be made, they are not too difficult to make. As such, in the absence of major scandals, no great shifts are to be expected.

(9) Does the survey provide indications on which factors influence risk perception among consumers?

A distinction was made between specific and general factors:

Specific factors: The more frequently a product is used, the less risky it will appear. Sensory evaluation (colour, smell, position in the store) strongly influences risk perception. Risk perception is held in check by personal feelings of competence.

General factors: A targeted increase in the volume of information reduces safety concerns; i.e. consumers feel better informed and are able to balance risk perception. It is important to note that chemicals are always perceived as ambiguous. Interestingly, risk perception is not influenced by level of education.

This has the following implications for risk communication: the perception of chemicals as ambiguous should be considered as a benefit for risk communication; it functions as a safety device, because consumers act cautiously. Chemical products are perceived as risky and dangerous; nevertheless, they are needed and appreciated. Hence, risk perception is part of the solution and not the problem.

(10) What do consumers expect in regard of information on chemical products and their regulation?

A distinction is being made between expectations in regard to the placement of information and expectations in regard to type of information.

Placement of information: The information needs to be on the product. It should also be accessible on manufacturers' websites.

Type of information: Easy accessibility and comprehensibility of the information in terms of language and content are crucial. Symbolic and sensually perceivable risk identifiers need to be communicated, as a large proportion of consumers rely on subjective risk perception (colour, smell, position, etc.). Furthermore, among a large proportion of consumers, information is translated into behaviour through the perception of (hazard) symbols,

This has the following implication for risk communication: the correct mix of information strategies (by type and placement) is essential, since patterns of risk perception and their implementation in behaviour are not uniform. A maximum number of consumers will be reached through a mix of strategies (again, by type and placement).

5.2 Implications for risk communication

The implications of this study for risk communication can be discussed under two different aspects. For one, from the findings of this study, a number of recommendations for the further development of risk communication in the area of chemical products can be extracted (5.2.1). But also, the results point toward future necessary research in order to adequately circumscribe this complex topic (5.2.2).

5.2.1 General findings

What is the significance of survey findings in addressing the needs of BfR's risk communication?

(1) Abstract information is not perceived as information by the general public. Information is abstract, if they are communicated through professional jargon and cannot directly be translated into behavioural guidelines. R&S instructions or the identification of substances by their scientifically correct names would be abstract information – hazard symbols, on the other hand, are not. This is an issue due to the high degree of complexity of our topic; on the other hand, there are more than enough studies which identify low levels of scientific expertise among average consumers and thereby demonstrate that the framework has not (yet) been established to use such information without difficulty. In this context, it is worth noting that while many experts, by their expertise, may perform better in categorising, but are not necessarily in a better position to come to unanimous conclusions (compare Kraus et al. 1992) or even arrive at successful definitions (Hoffmann 1990). Chemicals are an area of inherent complexity, which is difficult to penetrate even for many experts.

(2) Information needs to be directly relevant to behaviour. Thus, the discussion on product labelling, which has been going on for a number of years, needs to be further pursued and brought to a conclusion (compare Hertel 2005; Lahl 2005; Fleischer 2005). Lahl is justified in arguing that product labelling is not a genuine objective of REACH; rather, REACH promotes the creation of a register of products, which "primarily serves in data collection and substance assessment" (Lahl 2005, p. 95). Nevertheless, one may argue that the number of risk-related innovations may not just pass by the consumers (see Hertel 2005; Fleischer 2005). For this reason, the discussion on the "informed consumer" should be pursued forcefully; a preliminary definition of such informed consumers should also be arrived at. The findings of the current study suggest that an "informed consumer" is first and foremost a consumer, who has received sufficient behaviourally relevant information. It is from this perspective that this topic needs to be addressed.

(3) Risk communication should build on the high pragmatic acceptance of chemicals. Consumers acknowledge both benefits and risks and, therefore, tend to be cautious, without rejecting chemicals as a matter of principle. Furthermore, new products are used with more caution than traditional, well-known products. Contrary to the opinion that adequate risk perception needs to be created through communication via the mass media (e.g. Below 2008), such measures would be counter-productive, since mass media campaigns would unnecessarily draw attention to risk. To a large extent, consumers are already sufficiently conscious of risks. But they are also aware of the benefits, they know about side-effects, at least intuitively. Creating risk awareness might shift the balance to the detriment of the potential usage benefits and would bias attention.

(4) Risk communication is expected from the manufacturer. It is the companies, which consumers see at the very centre of activities in risk communication. They are held responsible for product safety and, therefore, consumers expect to receive competent information, if one searches their web sites. This clear tasking companies with responsibility for risk communication does not imply that such communication should not also be carried out by government agencies. It would be worth considering whether official risk communication should be re-oriented; one might consider submitting specific offers to companies and to issue directives for the implementation of risk communication on the part of private industry. Thus, official risk communication could also occur by exerting pressure on manufacturers to provide and communicate risk information.

(5) The transmission of basic information requires basic locales for learning them. If education on the regulation of chemicals is to be the objective of risk communication, then schools and educational institutions would be more appropriate than the mass media. If not, consumers will not be reached. The task would be to identify potential locales for the relaying of information on chemical hazards. Below (2008) emphasises point of sale (PoS) and Point of Use (PuS) as suitable locales. While there is nothing wrong with these suggestions, one would need to consider further differentiating and classifying such locales. It is certain that awareness of hazard symbols and similar issues would only be communicable through schools or institutions of adult education.

(6) Government (and its agencies) is seen in the role of watch dog. Government is perceived as the guarantor for compliance with the rules. This may also imply that the mere existence of rules could be made a topic of risk communication. The message that government works toward the safety of chemical products through various programmes would certainly be a message that reaches consumers. However, such communication also implies an obligation. Emphasise activities for improving safety, and be measured by them. Consequently, such communication would need to be supported by actual measures; otherwise, a paradoxical situation may arise, namely that despite improved framework conditions, failed communication might increase the level of safety concerns. For this reason, risk communication aiming

at creating trust should be coordinated with players of the industry, the general public (consumer protection) and the government (agencies).

5.2.2 Further research

The following discussion points, without claims to being exhaustive, will present some possible approaches to further research on risk communication; these points were derived from the findings of this survey but also discussions held at the BfR.

(1) Target group profiles. In this study, it was not possible to arrive at typologies (target group segmentation). Regression and factor analyses were carried out, but did not result in a significant and plausible model of risk perception. This may be connected to the not yet thoroughly understood complexity of the issue. That notwithstanding, it is still profitable to identify preliminary target group profiles, using demographic characteristics. Thus, based on the findings of this study, target groups would be: a)men/women; b) age groups; c) immigrant status (1st/2nd generation); d) level of formal education; e) income brackets; f) “old” versus “new” states.

(2) Culturalist risk perception research: In a summary article, Taylor-Gooby and Zinn (2006) propose a risk research that goes beyond the traditional confines of psychology and sociology. Two important dimensions, they argue, are formed by emotions and cultural conditions. In the current study, there are numerous indications that both aspects are highly important in the exploration of the complex topic of risk perception. Thus, detailed insights on risk perception are required. Heuristics would be one viable option. Heuristics are habitually reinforced behavioural patterns. They integrate individual and collective preference, perceptual patterns and behavioural strategies. Another option would be to explore “social groups”. These could be conceptualised in various ways, either via risk cultures or via lifestyles or social milieu research. An important hypothesis might be that ideologies, membership of a certain milieu or a general feeling of uncertainty may shape expressed risk perception and, therefore, may be able to shed light on some surprising findings (e.g. that risk awareness should be independent of formal education).

(3) Integrated research into risk perception. If the preceding research approach is taken seriously, it will have consequences for the structure of the entire spectrum of risk management in the area of chemicals. This is already suggested by findings of this study: consumers want risk communication to be simple, brief, comprehensible, product-related; these demands come into conflict with legal regulations of entrepreneurial responsibility; these, by necessity, insist on justiciable completeness. It will be a similar scenario in the case of governmental activities geared at improving the regulation of risk, if they as well are to become the object of successful risk communication. Finally, one would need to consider an integrated risk communication research, which would analyse institutionalised restrictions and various options of risk analysis, risk management and risk communication.

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7 Appendix

7.1 Appendix 1: Questionnaire (representative survey)

Questionnaire

Project:	**BfR – Chemicals in Daily Life**
Project Number:	**170**
Methodology:	**CATI**
Respondents:	**persons 14 years and above; nationally representative**
Sample size:	**1,004**
Length of Interview:	**approx. 25 minutes**
Fieldwork:	**1st of October to 17th of November 2008**
Version:	**26th September 2008**

Content:

Module I – Screener

Module A – Attitudes toward chemicals

Module B – Actual affectedness

Module C – Perceived affectedness

Module D – Accessing and processing information

Module E – Handling of product information

Module F – Supposed potential hazards

Module G – Handling of chemicals

Module S – Socio-demographics

Module I – Screener

Question I1
Hello, my name is…. And I am calling from Hopp & Partner in Berlin. We are currently conducting a survey on consumer protection on behalf of a public sector client. Your telephone number was selected at random. May I please talk to that person in your household, who is at least 14 years old and was the last to have had his/her birthday?

Interviewer: IF CONTACT PERSON SEEMS RELUCTANT:
Your household was selected by a statistical random methodology. To ensure that results accurately reflect the opinions of the public, it is very important that many people participate in this survey.

Of course, you will remain anonymous and your responses will be analysed according to privacy regulations.

We conduct this survey on behalf of a public sector client (Federal Institute for Risk Assessment, BfR).

1	Selected respondent on phone	➔ continue with Question I2
2	Selected respondent not on phone	➔ ask to speak with respondent, go to QI3
3	Respondent not available	➔ make appointment, then terminate
4	Contact refuses	➔ terminate

Question I2
This survey will take just 20 to 25 minutes. May I start the interview?

1	Yes	➔ start interview
2	No, but at a later time	➔ make appointment, then terminate
3	No, refuses interview	➔ terminate

Question I3
This survey will take just 20 to 25 minutes. May I start the interview?

1	Yes	➔ start interview
2	No, but at a later time	➔ make appointment, then terminate
3	No, refuses interview	➔ terminate

Module A – Attitudes toward Chemicals

Programmer: Please bring to the front demographic variables, which are required for filtering: household ownership of vehicle/children/employment status

Question A1 – Image profile of products containing chemicals
I will now read to you several properties. For each, please tell me whether they apply more to products with chemical ingredients or rather to products containing natural ingredients.
Interviewer: Read out.
Programmer: Randomise.

a) … effective
b) … useful
c) … pleasant
d) … fragrant
e) … modern
f) … healthy
g) … dangerous
h) … expensive

1 applies more to products containing chemicals
2 applies more to products containing natural ingredients
3 applies to both product groups equally
99 don't know/no response

Question A2: Attitudes: Perception of presence of chemicals in daily life
I will now read some statements. For each, please tell me whether you tend to agree or disagree with the statement.
Interviewer: Read out; Select applicable responses
Programmer: Randomise.

1 … Life without chemicals is unimaginable
2 … In my household, we use almost no chemicals
3 … In daily life, I try to avoid using chemicals as much as possible
4 … Chemicals make daily life so much easier
96 None of the above
99 Don't know/no response

Question A3 – Attitudes: Chemical vs. natural products
Please tell me, which of the following statements you agree with and which you disagree with
Interviewer: Read out; Select applicable responses
Programmer: Randomise.

1 … Products made from natural substances are usually more expensive than those made from chemicals
2 … I prefer a product with natural ingredients to one with chemicals, even if it is expensive
3 … Household cleaners with chemicals in them are usually more effective than those with natural substances
96 None of the above
99 Don't know/no response

Question A4 – Responsibility for safety
In your opinion, who is most responsible for the safety of chemical products?
Interviewer: Do not read, multiple responses.

1 Manufacturer
2 Government
3 Trade
4 Science
5 Consumers
6 Consumer associations
98 Others (specify)
99 Don't know/no response

Question A5 – Attitudes: Responsibility of institutions
I will now read some statements. For each, please tell me whether you tend to agree or disagree with the statement.
Interviewer: Read out; Select applicable responses
Programmer: Randomise.

1 … Government should exert better control over chemicals in products
2 … Manufacturers of products, which contain chemicals, should give more information on possible risks on the package
3 … Consumer protection agencies should enforce that safety regulations for chemical products are adhered to
4 … In Germany, safety regulations for chemical products are sufficient
5 … I would want more information on potential risks posed by chemical products
96 None of the above
99 Don't know/no response

Module B – Actual Affectedness

Question B1 – Actual affectedness (building materials)
First, I would like to know which of the following products you have used during the past three years.
Interviewer: Read out.
Programmer: Randomise.

1 … Wall paint
2 … Lacquers
3 … Solvents
4 … Wood preservers
96 None of the above
99 Don't know/no response

Question B2a – Actual affectedness (personal care products and cosmetics)
Which of the following products have you used during the past two weeks?
Interviewer: Read out.
Programmer: Randomise.

1 … Hand lotion
2 … Deodorant
3 … Body lotion
4 … Make-up such as mascara or lipstick
96 None of the above
99 don't know/no response

Question B2b
During the past two years, have you used hair tints or hair dye?

1 Yes
2 No
99 Don't know/no response

Question B3a – Actual affectedness (household cleaners)
Which of the following products have you used during the past 4 weeks?
Interviewer: Read out.
Programmer: Randomise.

1 … Detergents
2 … Fabric softeners
3 … Multi-purpose cleaners
4 … Toilet cleaners
5 … Dishwasher cleaners
96 None of the above
99 Don't know/no response

Question B3b
Which of the following products have you used during the past 12 months?
Interviewer: Read out.
Programmer: Randomise.

1 … Oven cleaner
2 … Disinfectant
3 … Pesticides
96 None of the above
99 Don't know/no response

Filter: Household owning car
Question B4 – Actual affectedness (automotive cleaners)
Which of the following products have you used during the past two years?
Interviewer: Read out.
Programmer: Randomise.

1 … Rim cleaners
2 … Cockpit spray
3 … Engine oil
96 None of the above
99 Don't know/no response

Filter: Household with children
Question B5 – Actual affectedness (toys and children's products)
Which of the following products have you bought during the past 12 months?
Interviewer: Read out.
Programmer: Randomise.

1 … Children's toys
2 … Children's clothing
3 … Pacifiers
4 … Nappies
5 … Furniture for the nursery
96 None of the above
99 Don't know/no response

Filter: Only ask those employed
Question B6 – Professional affectedness
In your work, do you handle any of the following products
Interviewer: Read out; multiple responses.

1 … Building supplies, e.g. paints or lacquers
2 … Personal care products
3 … Cleaning agents
4 … Toys or children's products
96 None of the above
99 Don't know/no response

Module C – Perceived Affectedness

Question C1 – Health concerns (product categories)
Are you concerned about health issues when using the following products? Please use a scale from 1 (“not concerned”) to 5 (“very concerned”).
Interviewer: Read out; refusals are not acceptable
Programmer: Randomise.

a) … Building supplies, e.g. paints or lacquers
b) … Personal care products
c) … Cleaning agents
d) … Toys or children’s products

1 1 – not concerned
2 2
3 3
4 4
5 5 – very concerned
99 Don’t know/no response

Programmer: Randomise questions C2–C5

Question C2 – Safety concerns (building materials)
I will now mention some building materials. For each, please tell me if you consider them safe for your health or unsafe.
Interviewer: Read out.
Programmer: Randomise.

a) … Wall paints
b) … Lacquers
c) … Solvents
d) … Wood preservers
e) … Fillers, such as silicone or acrylics

1 Rather safe
2 Rather unsafe
99 Don’t know/no response

Question C3 – Safety concerns (personal care products)
I will now mention some personal care products. For each, please tell me if you consider them safe for your health or unsafe.
Interviewer: Read out.
Programmer: Randomise.

a) … Hand lotions
b) … Antiperspirants/deodorants
c) … Hair dye/tint
d) … Body lotion
e) … Make-up such as lipsticks, mascara or foundation

1 Rather safe
2 Rather unsafe
99 Don’t know/no response

Question C4 – Safety concerns (cleaning agents)
I will now mention some household cleaning products. For each, please tell me if you consider them safe for your health or unsafe.
Interviewer: Read out.
Programmer: Randomise.

a) … Laundry detergent
b) … Dishwashing liquid
c) … Multi-purpose cleaners
d) … Toilet cleaners
e) … Oven cleaners
f) … Disinfectants

1 Rather safe
2 Rather unsafe
99 Don't know/no response

Filter: Household with children
Question C5 – Safety concerns (toys and children's products)
I will now mention some products for children. For each, please tell me if you consider them safe for your health or unsafe.
Interviewer: Read out.
Programmer: Randomise.

a) … Children's toys
b) … Children's clothing
c) … Baby bottles and pacifiers
d) … Nappies
e) … Furniture for the nursery

1 Rather safe
2 Rather unsafe
99 Don't know/no response

Module D – Accessing and Processing Information

Question D1 – Perceived extent of being informed
On the whole, how well do you feel informed about potential risks of products, which contain chemicals; e.g. cleaners, paints or personal care products? Please use a scale from 1 ("very poorly informed") to 5 ("very well informed").

1 1 – very poorly
2 2
3 3
4 4
5 5 – very well
99 Don't know/no response

Question D2 – Interest in information
How strongly are you interested in risks of products, which contain chemicals. Please use a scale from 1 ("not at all interested") to 5 ("very interested").

1 1 – not at all interested
2 2
3 3
4 4
5 5 – very interested
99 Don't know/no response

Question D3 – Source of information
In your opinion, where would you want to see information on the risks posed by a product, which contains chemicals?
Interviewer: Do not read; multiple responses.

1 Package/pack insert
2 Dealer/retailer
3 Manufacturer
4 Government
5 Internet
98 Other (specify) _____
99 Don't know/no response

Question D4 – Information on the package
Thinking about information on the package of products, which contain chemicals, such as cleaners or paints, do you think they are sufficient to ensure safe usage or not?

1 Sufficient
2 Insufficient
99 Don't know/no response

Filter: if insufficient information in Question D4, code 2
Question D5 – Missing information on the package
What information would you expect to see on the package?

_____

Question D6 – Source of information for products containing chemicals
Which sources of information do you use to obtain information on potential risks posed by products containing chemicals?
Interviewer: Do not read; multiple responses.

1 Sales person in the shop
2 Friends and relatives
3 Physicians
4 Apothecary
5 Internet
6 Media (magazines/newspapers, TV, radio)
7 Consumer protection agencies
8 Government
9 Manufacturers
96 None/never sought information
98 Others (specify)
99 Don't know/no response

Filter: If Internet mentioned in Question D6, code 5
Question D7 – Websites utilized
And on which websites do you obtain information on products containing chemicals?
Interviewer: Do not read; if Google/search engine mentioned, ask: On which specific website do you then find the desired information?

1 Manufacturers' websites
2 Private reports or forums
3 Online newspapers/magazines
4 Consumer protection agencies
5 Federal Ministry of the Environment (BMU)
6 Federal Institute for Risk Assessment (BfR)
7 Federal Agency of the Environment (UBA)
8 Federal Ministry for Consumers (BMELV)
9 Federal Agency for Consumer Protection and Food Safety (BVL)
98 Other (specify) _____
99 Don't know/no response

Programmer: Randomise questions D8–D11

Filter: If building materials used in Question B1 (minimum: 1 product)
Question D8 – Source of information for building materials
Which of the following options do you use if you want to find out more about the risks of building materials, such as **paints and lacquers**?
Interviewer: Read out; multiple responses.
Programmer: Randomise.

1 … Read the instructions on the back of the package
2 … Ask the sales person in the shop
3 … Ask friends or relatives
4 … Search for product information on the Internet
5 … Read test reports
96 None of the above
99 Don't know/no response

Filter: if personal care products used in Question B2a/b (minimum 2 products)
Question D9 – Source of information for personal care products
Which of the following options do you use if you want to find out more about the risks of **personal care products or cosmetics**?
Interviewer: Read out; multiple responses.
Programmer: Randomise.

1 … Read the instructions on the back of the package
2 … Ask the sales person in the shop
3 … Ask friends or relatives
4 … Search for product information on the Internet
5 … Read test reports
96 None of the above
99 Don't know/no response

Filter: If cleaning product used in Question B3a/b (minimum 2 products)
Question D10 – Sources of information on cleaning products
Which of the following options do you use if you want to find out more about the risks of **cleaning products**?
Interviewer: Read out; multiple responses.
Programmer: Randomise.

1 Read the instructions on the back of the package
2 Ask the sales person in the shop
3 Ask friends or relatives
4 Search for product information on the Internet
5 Read test reports
96 None of the above
99 Don't know/no response

Filter: If toys bought in Question B5 (minimum 1 product)

Question D11 – Sources of information on children's products

Which of the following options do you use if you want to find out more about the risks of **toys and children's products**?

Interviewer: Read out; multiple responses.
Programmer: Randomise.

1 … Read the instructions on the back of the package
2 … Ask the sales person in the shop
3 … Ask friends or relatives
4 … Search for product information on the Internet
5 … Read test reports
96 None of the above
99 Don't know/no response

Question D12 – Advice from consumer Centre

Have you ever sought advice from a Consumer Centre on the risks of a chemical product?

1 Yes
2 No
99 Don't know/no response

Module E – Handling of Product Information

Question E1 – Perception of safety instructions
Frequently, products with chemicals, such as household cleaners or paints, come with safety instructions. Are you aware of these instructions? Which ones?
Interviewer: Do not read; multiple responses.
Probe: Which others?

1 Only use outdoors or in well-ventilated areas
2 After use, ventilate room
3 Do not inhale
4 Do not swallow. In case of accidental swallowing, consult your physician
5 Avoid skin contact
6 Wear gloves
7 Avoid eye contact. In case of accidental eye contact, rinse immediately with water
8 Wash hands thoroughly after use
9 No smoking/avoid sparks
10 Do not mix with cleaners
11 Keep out of reach of children
12 Not suitable for children below the age of 3
13 Irritating
14 Caustic
15 Flammable
16 Poisonous/toxic
17 Explosive
18 Oxidising
19 Hazardous to environment
20 Orange-coloured hazard symbols
96 None
98 Others (specify) _____
99 Don't know/no response

Question E2 – Awareness of hazard symbols
Are you aware of the orange-coloured hazard symbols, which sometimes are printed on the package of products containing chemicals?

1 Yes
2 No
99 Don't know/no response

Question E3 – Compliance with instruction for usage
Do you comply with the danger and safety instructions on chemicals such as…
Interviewer: Read out. For each item ask: Dou you always comply, or most of the times, sometimes or never?
Programmer: Randomise.

a) Paints and lacquers
b) Cosmetics
c) Cleaning products
d) Toys and children's products

1 Always
2 Most of the times
3 Sometimes
4 Never
99 Don't know/no response

Programmer: Randomise questions E4–E7

Filter: If building materials used in Question B1 (minimum 1 product)
Question E4 – Criteria for purchasing building materials
Which of the following attributes are especially important to you in your purchase decision when you buy paints or lacquers at your home improvement centre?
Interviewer: Do not read; multiple responses.

1 Personal experience with the product
2 Fragrance
3 Efficacy
4 Price
5 Packaging
6 Brand
7 Ingredients
8 Warning labels
9 Seal of approval
10 Recommendations by friends/acquaintances
11 Advertising
12 Test reports (e.g. Stiftung Warentest, Ökotest)
13 Salesperson's recommendation
98 Other (specify) _____
99 Don't know/no response

Filter: If personal care products used in Question B2a/b (minimum 2 products)

Question E5 – Criteria for purchasing personal care products

Which of the following attributes are especially important to you in your purchase decision when you buy personal care products or make-up?

Interviewer: Do not read; multiple responses.

1 Personal experience with the product
2 Fragrance
3 Efficacy
4 Price
5 Packaging
6 Brand
7 Ingredients
8 Warning labels
9 Seal of approval
10 Recommendations by friends/acquaintances
11 Advertising
12 Test reports (e.g. Stiftung Warentest, Ökotest)
13 Doctor's advice
14 Salesperson's recommendation
98 Other (specify) _____
99 Don't know/no response

Filter: If cleaning products used in Question B3a/b (minimum 2 products)

Question E6 – Criteria for purchasing household cleaners

Which of the following attributes are especially important to you in your purchase decision when you buy household cleaners or detergents?

Interviewer: Do not read; multiple responses.

1 Personal experience with the product
2 Fragrance
3 Efficacy
4 Price
5 Packaging
6 Brand
7 Ingredients
8 Warning labels
9 Seal of approval
10 Recommendations by friends/acquaintances
11 Advertising
12 Test reports (e.g. Stiftung Warentest, Ökotest)
13 Salesperson's recommendation
98 Other (specify)
99 Don't know/no response

Filter: If children's products bought in Question B5 (minimum 1 product)

Question E7 – Criteria for purchasing children's products

Which of the following attributes are especially important to you in your purchase decision when you buy toys or children's products?

Interviewer: Do not read; multiple responses.

1 Personal experience with the product
2 Fragrance
3 Efficacy
4 Price
5 Packaging
6 Brand
7 Ingredients
8 Warning labels
9 Seal of approval
10 Recommendations by friends/acquaintances
11 Advertising
12 Test reports (e.g. Stiftung Warentest, Ökotest)
13 advice by educators, teachers, doctors etc.
14 Salesperson's recommendation
98 Other (specify) _____
99 Don't know/no response

Module F – Supposed Potential Hazards

Question F1 – Health hazards of usage
In your opinion, can chemical products affect your health, even if used **correctly**?

1 Yes
2 No
99 Don't know/no response

Filter: If Yes (Code 1) in Question F1
Question F2 – Type of effects on health
What kind of damage?
Interviewer: Do not read; multiple responses.

1 None, not worried about effects
2 Nausea, vomiting, diarrhoea
3 Dizziness
4 Headache
5 Irritated skin
6 Skin burns
7 Allergies
8 Irritation of the eyes
9 Blindness
10 Cancer
11 Damage to internal organs
12 Death/dying
13 Poisoning
14 Cough
98 Others (specify) _____
99 Don't know/no response

Question F3 – Negative effects on health experienced personally
Have you personally experienced negative effects on your health by a product containing chemicals? If so, which ones?
Interviewer: Do not read; multiple responses.

1 Nausea, vomiting, diarrhoea
2 Dizziness
3 Headache
4 Irritated skin
5 Allergies
6 Skin burns
7 Irritation of the eyes
8 Blindness
9 Cancer
10 Damage to internal organs
11 Poisoning
12 Cough
96 None
98 Others (specify) _____
99 Don't know/no response

Filter: If suffered negative effects in Question F3 (minimum 1 effect)

Question F4 – Product causing the damage

And which product caused it?

Interviewer: Do not read; categorise; multiple responses.

1 Building materials (paints, lacquers etc.)
2 Personal care products and cosmetics
3 Cleaning products automotive care products
4 Toys and children's products
98 Others (specify) _____
98 Don't know/no response

Module G – Handling of Chemicals

Question G1 – Reaction to irritation
Please imagine you felt the need to cough and an itchy nose while using a bathroom cleaner; what would you do?
Interviewer: Read out; multiple responses.

1 … You continue working
2 … You ventilate the room
3 … You read the product information on the package
4 … You will not buy this particular product in the future
5 … You stop using the product immediately
6 … You ask your physician or apothecary or call the poison emergency number
96 None of the above
99 Don't know/no response

Question G2a – Reaction to risk perception by the media
Suppose you have used a certain household cleaner for many years and you were satisfied with the product. If you now learn from the newspapers that this product may cause allergies in some cases, would you continue using it or not?

1 Continue using the product
2 Stop using the product
3 (Spontaneously): That depends/will observe/ask others
99 Don't know/no response

Question G2b – Reaction to risk perception by friends
And if a friend told you, that he himself got an allergy from using this household cleaner, would you continue using the product or not?

1 Continue using the product
2 Stop using the product
3 (Spontaneously): That depends/will observe/ask others
99 Don't know/no response

Question G3 – Identification of risk
Suppose a chemical product is to be classified as dangerous, how would you determine that?
Interviewer: Read out.
Programmer: *Randomise.*

1 … By smell
2 … By the colour
3 … By the packaging
4 … By the safety instructions
5 … On location, in the shop
96 None of the above
99 Don't know/no response

Question G4 – Number of cleaning products in the household
How many different cleaning products do you have in your household?
Programmer: Numerical entry, 0–99

1 Quantity: I__I I__I Cleaning Products
99 Don't know/no response

Question G5 – Awareness of REACH
Have you heard of REACH, the new chemicals directive, which was introduced throughout the EU in June of 2007?

1 Yes
2 No
99 Don't know/no response

Filter: If aware of REACH in Question G5 (code 1)
Question G6 – Source of information for REACH
And where and in what context have you heard of REACH?

_____

Module S – Socio-demographics

Question S1 – Age
Finally, a few demographic questions, which we require for analysis. What is your year of birth?

1 19 I__I I__I
99 Don't know/no response

Question S2 – Level of formal education
What level of schooling have you attained?
Interviewer: Do not read

1 Primary (8th grade)
2 Some secondary (10th grade), polytechnic
3 Completed secondary
4 University
5 Others
6 Still in school
99 Don't know/no response

Question S3 – Marital status
Are you …
Interviewer: Read out.

1 … Single/living alone
2 … Married/living together
3 … Divorced, widowed
99 Don't know/no response

Question S4 – Number of persons in household
How many persons, including children, are living in your household?
Interviewer: Do not read

1 1 person/living alone
2 2 persons
3 3 persons
4 4 persons
5 5 persons
6 6 persons
7 7 persons
8 8 persons and above
99 Don't know/no response

Filter: If more than one person in household in Question S4 (not code 1)
Question S5 – Number of children in household
And how many children below the age of 18 are living in your household?
Interviewer: Do not read

1 None
2 1 child
3 2 children
4 3 children
5 4 children
6 5 children
7 6 children
8 7 and more children
99 Don't know/no response

Question S6 – Employment status
Are you working/employed?

1 Yes
2 No
99 Don't know/no response

Filter: If not working in Question S6 (code 2)
Question S7: Category
Are you …
Interviewer: Read out.

1 … Pupil/student
2 … University student
3 … Retired
4 … Unemployed
5 … Housewife/houseman
6 … Military/alternative service
97 Other
99 Don't know/no response

Filter: If working/employed in Question S6 (code 1)
Question S8 – Type of employment
Are you a …
Interviewer: Read out.

1 … White collar worker
2 … Blue collar worker
3 … Professional, farmer, freelancer
4 … Civil servant
5 … Apprentice
6 … Working in family business
97 Other
99 Don't know/no response

Question S9a – Migrant status – Country of birth
In which country were you born?
Interviewer: Do not read

1 Germany
2 Other country
99 Don't know/no response

Question S9b – Migrant status – parents' country of birth
Was one of your parents born abroad?
Interviewer: Do not read

1 Both parents born in Germany
2 One or both parents born abroad
99 Don't know/no response

Question S10 – Household ownership of car
Does your household own a car?

1 Yes
2 No
99 Don't know/no response

Question S11 – Usage of Internet
Do you access the Internet regularly?

1 Yes
2 No
99 Don't know/no response

Question S12 – Net household income
What is the monthly net income of your household? Your answer will be treated confidentially – just as all the other answers in this interview. It would be of great help to us if you could indicate the approximate income bracket of your household.
Interviewer: Read out if required.
The net household income includes wages, pensions, public assistance, housing assistance, child benefits and other income, after deduction of taxes and social security contributions.
Read out categories if required

1 Below 500 Euro
2 500 Euro to less than 1,000 Euro
3 1,000 Euro to less than 2,000 Euro
4 2,000 Euro to less than 3,000 Euro
5 3,000 Euro and above
99 Don't know/no response

Question S13 – Sex of respondent
Interviewer observation:

1 Male
2 Female

Question S14 – Postal code
Programmer: Insert postal code from telephone sample

This concludes our interview.
Thank you very much for participating.

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