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Everyday behaviour and everyday risk: An approach to study people's responses to frequently encountered food related health risks

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Food consumption constitutes behaviour that is carried out on a daily basis. The risks and benefits associated with such behaviours are often small, and the time and effort people are, consequently, willing to invest in behavioural decisions are limited. Instead, experience, in the form of an integrated evaluation of past behaviours, may serve as a predictor for future behaviour, allowing reasonable choices to be made with limited effort. This paper discusses the characteristics of daily occurring risks and suggests a model of how prior experience can accumulate and play a role in acting while exposed to daily risk. The core of the approach is a feedback loop that adjusts the current situation until a preset situation is reached. This is based on integrated past experiences and is, thus, continually updated by new experiences. To establish such a feedback mechanism, emotions are argued to play a vital role as an integrator for different types of information, such as perceptual, cognitive and physiological information. This approach may help in understanding how consumers deal with risks in daily (food-handling) practices.

Keywords: Risk perception; experiential behaviour; feedback; emotion; heuristic

Introduction

Food-borne diseases are an ancient problem. Despite long-term endeavour, food-borne diseases are still a problem, even in the Western world (Swartz 2002). To reduce this problem, a lot of effort is invested in optimizing the food chain. By reducing the hazards at every stage, from the moment of primary production to the moment of consumption (from farm to fork), the best possible guarantee for food safety can be attained. By controlling for infection of herds with human pathogens, a considerable improvement in food safety has been achieved in the primary production at the farm. Other advances have reduced risk in production and retail (Wagenaar *et al.* 2006). However, it has proven to be impossible to guarantee 100% safety of unprepared meat in retail. In principle, the consumer controls his or her own chances of falling ill from food-borne diseases. Choosing not to eat food purchased on the streets, keeping track of expiration dates, engaging in correct food handling and maintaining a clean kitchen constitute just a few examples of how chances of ill effects of food consumption can be reduced. Hence, the consumer is the

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final, crucial link in the chain from production to consumption. That food poisoning occurs nevertheless is an indication that there is room for improvement.

Food consumption risks are special in that they occur practically every day. To reduce food risks, it is necessary to realize how consumers behave in relation to daily occurring risks. This paper aims to combine insights from different approaches to behaviour regulation and risk perception into an approach to study consumer behaviour under everyday risks, taking into account its specific characteristics. Implications are discussed to open up avenues for future research into consumer behaviour and into interventions to improve public well-being.

Risks in daily life

What are the risks and benefits of participating in traffic? What is the chance of falling ill from consuming a meal? What is the estimated chance of winning the lottery? What are the risks and benefits involved in university choice? All these behaviours involve certain risks, such as being involved in a traffic accident, falling ill from bad food, losing money in a lottery or losing the capital and time invested in education. On the upside, all of the above behaviours also imply benefits, e.g. getting where you need to be, enjoying a meal, winning a prize and receiving a degree. Other examples such as the use of power tools, trekking through the mountains or gardening, represent similar behaviours that involve benefits as well as risks. These examples underscore the prevalence of risky behaviours in daily life (Wu *et al*. 2004).

The psychological and social context of perception and acceptance of risks have been part of the scientific research agenda since the late 1960s (Starr 1969). As risky behaviour is very important in many actions taken in daily life (Wu *et al*. 2004), it is not surprising that different research traditions have investigated the theme since. Economic decision sciences initially approached the issue of risky choice from a rationalistic economic perspective (e.g. Von Neumann and Morgenstern 1944). It has since become clear that human decision making is not that simple. Many studies have shown that small risks and benefits are *perceived* as being more important compared to large risks and benefits. In other words, the relation between perceived risk and benefit and the expertly assessed risk and benefit is not linear. Furthermore, risks of a certain size are usually perceived as more negative than benefits of the same magnitude are perceived as being positive. To compensate for such differences between utility and *perceived* utility, prospect theory was proposed as a tool to convert risks and benefits into perceived risks and benefits (Kahneman and Tversky 1979). Prospect theory has been supported by a series of relatively simple experiments, for instance requiring participants to choose between two medical treatments with different, known chances of success (full recovery) and different effects of failure (e.g. death versus continued symptoms; Tversky and Fox 1995). Although these are essential choices to make, the effects and probabilities are known and the comparison is made on only a few attributes. In real life, however, it has been shown repeatedly that not only probabilities and sizes of risks or benefits but also the type of risk or benefit plays a role. For instance, technological risks (e.g. introduction of genetically modified foods) or risks affecting a lot of people at once (e.g. a plane crash) are perceived as more threatening; whereas risks that are perceived as being natural (e.g. consumption of organic foods) and well known (e.g. consumption of sugar and saturated fats) are perceived as less threatening (e.g. Slovic 1987, Fife-Schaw and Rowe 2000).

Tversky and Kahneman (1974) noted that even in the relatively straightforward comparison between two well-defined situations, people often rely on heuristics or rules of

thumb rather than on a deliberate weighing of arguments. Heuristics are set rules to be applied in a certain situation, e.g. 'red is dangerous—keep your distance.' Acting on heuristics is often very useful as it eliminates the necessity to think through a situation. However, heuristics may also introduce biases in reasoning. When an example is personally relevant and salient, this may influence people's perception of the situation: 'my grandfather smoked heavily and lived to over 90 years of age; hence smoking cannot be that bad' (availability heuristic; Tversky and Kahneman 1974). Although heuristics can introduce biases into reasoning, a heuristic may be an optimal decision mechanism if the increasing amount of time and effort needed for extensive deliberation makes a solution less, rather than more, optimal; for example, the complexity of a problem may make it unlikely that all relevant information can be duly gathered or weighed; in such a case, the use of simple heuristics is to be preferred (Gigerenzer and Todd 1999). In addition, social-psychological research in persuasion and attitude change has identified differences in the need for (deliberate) cognition (Cacioppo and Petty 1982). People who are low in need for cognition are more likely to prefer the use of heuristics than to engage in effortful deliberation (Petty and Cacioppo 1986). These and other theories, known under the collective name of dual-process theories, distinguish between two routes to changes in behavioural attitude (for an overview, see Chaiken and Trope 1999), and have been applied to risk perception with mixed success (Frewer *et al*. 1997, Trumbo 2002). Typical heuristics in reasoning are the representativeness and availability heuristics (Tversky and Kahneman 1974, Folkes 1988), which rely heavily on prior knowledge of the person making the decision. Trust in information sources can also be used as a heuristic when a decision needs to be made in the face of uncertainty (Frewer *et al*. 1996). For instance, in the case of new, unfamiliar technologies, the best reason to accept the technology may be the perceived trustworthiness of the supporters of that technology (Siegrist 2000). However, when a technology is not completely new, some prior experience may already exist, which replaces trust in an information source as a heuristic for acceptance (Eiser *et al*. 2002, Poortinga and Pidgeon 2005). An existing feeling about a situation can also serve as a heuristic; this is known as the affect heuristic (Finucane *et al*. 2000, Slovic *et al*. 2004), or the broader 'risks as feelings' approach (Loewenstein *et al*. 2001), which includes both cognitive evaluation and feelings.

It has been found that for many lifestyle-related risks such as food-induced illness (Frewer *et al*. 1994, Miles and Scaife 2003), people tend to think they themselves are less likely to be affected than the general public (the so called 'optimistic bias'; Weinstein 1980). As a result, lifestyle-related behaviours have been found to be resistant against many interventions designed to change it (Weinstein and Klein 2002). In addition, it has also been shown that behaviour that is repeated more frequently, such as lifestyle-related behaviours, increasingly attain an automatic or habitual nature causing them to become stronger and more prominent (Aarts and Dijksterhuis 1999, Bargh and Ferguson 2000). The habitualization of more frequent behaviours allows for diminished cognitive effort, but changing such habitual behaviour requires self-regulatory control (Bandura 2004). Lifestyle-related risk taking has elements of habitual behaviour, and this may account for the apparent inability of decision models from the cognitive-based judgment and decision-making literature to explain behaviour changes in lifestyle. To overcome this issue, it is assumed a process of breaking habits is necessary to precede the decision (Prochaska *et al*. 1994).

In the light of the above account of risk behaviour, we argue that classical judgment and decision-making theories for risk taking may not be sufficiently relevant to explain food risk behaviour. In our opinion, these theories do not take due account of the specific

properties of food behaviour. As food-related behaviour occurs frequently in daily life, automatization and, thus, reduction of cognitive effort is both likely and desirable. In addition, during normal food-related behaviours the consumer encounters only small benefits (e.g. the sense of fulfilment after having a decent meal) and is fairly unlikely to suffer from the potential hazards (e.g. food poisoning).

Deciding to engage in food consumption

The high frequency, relatively low likelihood of ill effects, and desired low demand on cognitive resources of food-related behaviour strongly suggests that it is regulated by heuristics, rather than by systematic processing of information (cf. Chen and Chaiken 1999). These heuristics may reflect heuristic information (e.g. bad smell indicates spoilage, hence danger) that can be used in systematic decision making (e.g. to avoid danger, we should take care not to consume foul-smelling food) and also heuristic decision strategies (e.g. when in doubt, throw it out).

Heuristic information

To understand behaviour in the context of risk, it has to be accepted that in 'real life' relevant information may not be sufficiently available. Even if all relevant information were available, it probably would not be weighed extensively because of the amount of effort this would require. Nevertheless, people are perfectly able to cope in real life, indicating that a mental mechanism allows them to make reasonable choices based on incomplete information, e.g. by accepting a conclusion from a trusted source. Heuristics do not need complete information and require only limited mental effort (Gigerenzer and Todd 1999). Heuristics like 'Do not use a cutting board for vegetables after it has been used to cut raw meat,' will be fairly effective in reducing cross-contamination between meat and vegetables. However, heuristics may not be perfect; the same heuristic may not prevent people from using the same cutting board for both raw and cooked meat (Fischer *et al*. 2007), which could cause cross-contamination as well. Basing a decision on merely a single heuristic could, therefore, prove to be risky. Adding other available information, originating from, say, one's general knowledge of food-borne pathogens, may increase safety, but may require considerable amounts of time and effort. In such cases, it would be useful to use a 'parcel' of information, consisting of valuable pieces of personal experience subsumed in a single chunk. The advice itself may be expressed in a single statement, in which all this information is duly weighed. By accepting such a recommendation, some control about the weighing of argument is given to the expert. To adopt such advice, the trustworthiness of the expert can be expected to play a role in the acceptance of the advice (Frewer *et al*. 2003). As we will argue in the remainder of this paper, the judgmental implications of personal experience may be influential as a parcel of information in a similar fashion as personalized advice. In other words, accumulated experience may be used as relevant information for future decisions.

Emotions as a heuristic decision mechanism

Heuristics effectively bypass an elaborate decision-making process that requires the different attributes to be known in detail. To combine the different types of information, a mechanism is needed that compares different types of information, while this mechanism in itself should, of course, not require too much time or effort. Emotions may provide such

a mechanism, as they are considered to act as heuristics (Oatley and Johnson-Laird 1987). In general, a positive emotion signals that the situation is satisfactory and should be continued; a negative emotion signals that something is wrong.

The idea that emotions play an important role in coping with situations in daily life was recently taken up in risk psychology. Finucane *et al*. (2000) argued that self-reported perceptions of risks and benefits are often caused by an underlying emotional judgment, which they referred to as the 'affect heuristic.' When a person has a certain feeling about a situation, the affect heuristic predicts that it is this feeling (or affect) that influences both the perception of risk and that of benefit. A positive affect would create the perception of high benefits and low risks; a negative affect would lead to the perception of low benefits and high risks (Loewenstein *et al*. 2001).

Initial research on the affect heuristic yielded promising results. Some evidence was found, for instance, that forcing people to provide perceived risk and benefit statements under time pressure, which made a deliberate weighing of pro's and con's less likely and heuristic processing more likely, resulted in higher reliance on affect in risk and benefit perceptions (Finucane *et al*. 2000). Finucane *et al*. (2000) found further evidence that providing benefit information suppressed the perception of risk (and vice versa). However, the next few years saw relatively little additional progress (see Slovic *et al*. 2004). One of the criticisms is that this approach only distinguishes between positive and negative affect (valence approach), and does not differentiate between specific basic emotions (Lerner and Keltner 2001). Specifically, negative emotions are argued to trigger differentiated responses to cope with particular situations (Oatley and Johnson-Laird 1996). Fear, for example, is an emotion aimed at removing oneself from the hazard, whereas anger is an emotion aimed at overcoming the hazard whatever the cost. Indeed, Fischhoff *et al*. (2005) showed that induced fear increased perceived risks, whereas anger actually reduced it. To combine the valence and basic emotion approaches, Frijda (1986) proposed the construct of appraisal as an evaluation mechanism. Such mechanisms are argued to transform different pieces of information into emotional experiences (Johnston 1999), which add up to a single value for the quality of a situation (Cabanac 1992). Subsequent appraisal of the situation results in a fully-fledged emotion, which informs specific changes in behaviour (Frijda 1986).

To appraise a situation it has to be compared to a desired or goal state (Newell 1990); in other words, this desired or goal state provides reference values for the appraisal. For instance, consider the goal of preparing a fulfilling and safe meal. Placing both salad and raw meats on the same cutting board may not be appraised as a problem in the light of preparing a fulfilling meal. However, this same situation may be appraised as highly unsatisfactory if the goal is to prepare a safe meal. A similar goal-reference relation is present in habitual behaviour, where the goal activates the appropriate habitual response and control mechanisms (Aarts and Dijksterhuis 1999).

We argue that a feedback loop (e.g. Miller *et al*. 1960) may be a mechanism that controls goal directed behaviour. Such a feedback loop unconsciously steers behaviour towards a perceived target state of the world (the goal) by moving towards the activated reference value (Powers 1973). In such a feedback loop, perceived risk would act as a reinforcer to behave more carefully, while anticipated reduction of effort might be a reinforcer to behave less carefully, as careful behaviour tends to be more resource consuming. Behaviour in risky situations would then be steered towards an acceptable 'target risk' (Wilde 1994). This target risk theory, however, offers no answer to an important criticism against feedback, which is that the complex task of reasoning through each behaviour is traded for another complex task, namely providing a reference based on

all the information from experience. Feedback models should therefore address the issue of reducing the complex calculations to arrive at an integrated experience. This can be achieved by leaving the requirement of determining *exact* parameters, but adopt more holistic criteria such as emotions instead (Vaa 2001). If we adopt the emotion appraisal ideas (Frijda *et al.* 1989), the feedback loop now appraises the different attributes of a situation as an affect, rather than a cognitive value (Johnston 1999). The reference against which the attributes are evaluated consists of previous experience (Fischer *et al.* 2005), stored in an emotional format such as a somatic marker. The somatic marker as an emotional memory links actions and emotional consequences from past behaviours. The somatic market informs decision making by generating an anticipated feeling, or bodily sensation, that is associated with the choices in a certain situation (Damasio 1994). The notions above illustrate that risk-related behaviours in mundane situations such as food preparation have specific characteristics and that a feedback loop is a likely candidate to understand how such risk taking behaviour is controlled.

Emotion-based feedback loops

In a feedback loop, four essential building blocks are distinguished (see Miller *et al.* 1960, Wilde 1982, Carver 2004). The loop perceives the current state of the world through an input function (in Figure 1a called *monitoring*). The resulting data is then transferred to a comparator for *evaluation*, which determines whether the situation in the world accomplishes the needs retrieved from a *reference value*, which in the adjusted model is a somatic marker, rather than a cognitive value (Johnston 1999, Fischer *et al.* 2005). If the current state of the world is sufficiently close to, or better than, the reference value, nothing is changed by the output function and a neutral or positive emotion is generated (content, happy). If the current situation falls below the reference, *action adjustments* are initiated. Negative emotions develop (e.g. fear, disgust) which further inform the exact change in action (cf. Frijda 1986, Oatley and Johnson-Laird 1987). With the exception of the role of emotions, this basic feedback loop seems not very different from a home thermostat, where the temperature is monitored and evaluated against a reference temperature. If the temperature is below the reference, then heating is needed; if it is higher, then climate control switches to cooling. The simplicity of this decision process illustrates the low level of cognitive resources necessary to maintain a simple process.

Humans are, obviously, far more complex than room thermostats. First, humans can cope with a range of different goals in different situations, where the thermostat only handles one. It is the reference value that determines the behaviour at the lowest (action control) level. These references values are set to achieve the goal. The goal itself can be considered part of higher-level feedback mechanism, with a different goal (Carver and Scheier 1998). By continuously 'nesting' loops, feedback systems can be built that describe complex social behaviour (Wrosch *et al.* 2003). Similar nesting has been proposed in artificial intelligence (Newell 1990) and philosophy of mind (Dennett 1995) and was applied with some success in human–computer interaction (e.g. Taylor 1988). In this paper, we will discuss the behaviour at only one level, in order not to complicate the central idea unnecessarily.

In daily life, many tasks require simultaneous monitoring of more than one single attribute. The comparison between different attributes may be achieved by introducing a common currency of evaluation: Emotions. The emotional outcome of an evaluation can be considered the smallest building block contributing to emerging emotion or feeling and is defined as a hedonic tone. According to Johnston (1999), a hedonic tone can be either

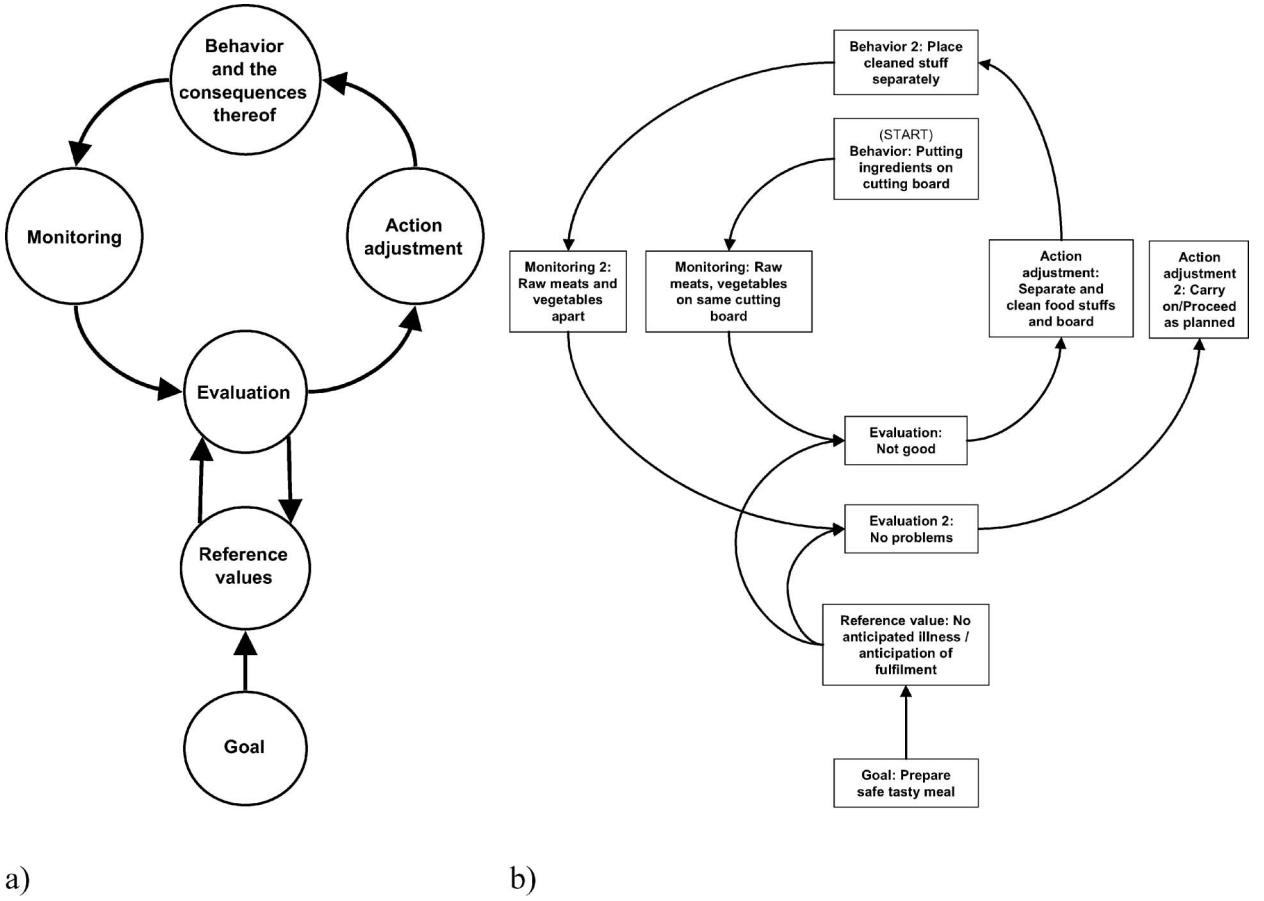

Figure 1. The proposed feedback mode, for control of daily food-related behaviour. Panel (a) displays the generic model, Panel (b) shows a specific with two possible cycles in meat preparation (updating of reference values omitted for clarity; if this were added, cycle 1 might change the reference value to reflect a 'Very unlikely anticipated illness'; while cycle 2 could reestablish the reference value to 'No anticipated illness').

positive (i.e. better than reference) or negative (worse than reference). Summation of the hedonic tones results in an overall emotional state called pleasure (Cabanac 1992), which reflects the quality of a situation. Comparison of this pleasure to a perceived emotional feeling, for instance a feeling stored in a somatic marker (Damasio 1994), determines whether the current situation is acceptable. Encountering an unpleasant situation signals that action adjustment must be initiated.

As the environment continuously changes, even daily routines have to adapt to differences in the environment or the person himself. Some of these changes are abrupt, either because of changes in environmental circumstances, or because a different goal is lastingly activated. At the low level where daily behaviour is regulated by feedback this can only be accounted for by changes in the goals. Gradual changes in daily routine are slower. A feedback mechanism with continuously updated reference values in emotional memory (somatic markers; Damasio 1994) facilitates such slow changes. Each new situation is integrated into this accumulated emotional experience (Fischer *et al*. 2005). This implies that achieving profit builds the expectation of more profit, and reduces the expectation of additional losses. A series of gambles that starts with losses and ends with an (accumulative) neutral score is therefore perceived satisfactory, while a series of gambles starting with gains that ends neutral is perceived dissatisfactory (Mellers *et al*. 1999). Thus by a continuously updated reference value activated by a goal, a single level of the feedback loop is specified (Figure 1).

Applicability of feedback in food safety research and practice

Food consumption is a typical example of human behaviour involving daily exposure to risks, and is used here to show the relevance of emotions in deciding, as both the benefits and risks are in the personal and emotional atmosphere of health. Since the benefits are small, as is the chance of ill effects, food handling does not warrant investing many cognitive resources and, as argued here, can be regulated through cognitive shortcuts.[1] Experience may eventually lead to mental processes such as scripts or habits (Bargh and Ferguson 2000). Such 'subconscious' procedures have come to light in cases where participants had trouble recalling practices undertaken just a few minutes earlier when preparing a meal (Fischer *et al*. 2007).

An important advantage of this feedback model is that it may help explain why consumer behaviour tends to shift towards evermore-careless practices in a time where food is safer than ever. As food preparation involves only a small chance of negative effects, low effort practices are more likely than not to result in the desired outcome, causing an accumulation of positive experiences. Eventually, this will lead to the so-called optimistic bias (Weinstein 1980) even if the actual risk is increasing. Although an ill effect may occasionally be experienced and may cause a decrease in optimism, this decrease subsequently fades as new (non-negative) experience accumulates (Parry *et al*. 2004). In other words, although it may temporarily be reduced by a negative experience, the optimistic bias never completely disappears as the bulk of previous and future positive experience is simply more influential than a single negative experience. Consumers who show optimistic bias perceive fewer risks and, consequently, see no need to gather information. Instead, they are likely to rely on personal (positive) experience. Another reason why consumers may not have enough motivation to gather information is that food pathogens are perceived as natural and familiar, reducing risk perception (Fife-Schaw and Rowe 2000). Even if people have sufficient knowledge of which behaviour to conduct and how, e.g. regarding kitchen hygiene, the heuristic rather than deliberate nature of the

decisions which prompt behaviour, in our view, yields a powerful explanation of why people do not always act accordingly and bring this knowledge into practice when they actually cook (Worsfold and Griffith 1997).

Feedback heuristic in a broader context

Although we propose that feedback accounts for many typical aspects of behaviour in *certain* risky situations, we do not propose that feedback control is the only psychological process that describes behaviour in risky situations. The various models in existence suggest many alternatives to cope with different types of risks. That these may result in seemingly unrelated or even contradictory outcomes (Slovic 1999) is not necessarily a problem, as long as each model is only applied to its tailored situation. It is the boundaries of the working areas of different models that warrant further exploration. As already indicated, there may be situations in which people have no prior experience available. In a feedback loop, starting afresh would probably require too many repetitions before a stable and satisfactory solution is reached. In such new or once-in-a-lifetime situations, behaviour controlled by feedback alone would, therefore, not be the most desirable option. It is the more repetitive and low-risk situations that make reduction of cognitive load by acting on heuristics a worthwhile strategy, and not the novel and unfamiliar. In such new or unfamiliar situations, whatever experience is present needs to be amended with non-experiential information. Once enough information is present, a deliberate action can be undertaken. In that case, the outcomes of this first, deliberate action will be the initial experience, after which the feedback loop can continue. For such an initial starting point, attitude and intention formation may provide the needed settings (e.g. TPB; Ajzen 1991). Alternatively, adequate behaviour may be started through imitation of others or through performing mental simulations (Dennett 1995). Thus, there are several theories that account for the initiation of new behaviours. After accumulating first-hand experience, we argue that the indirect information used initially to choose behaviour may increasingly be replaced with experiential information. According to this line of reasoning, several systems for risk perception might co-exist, each for a specific situation.

General discussion

Modelling feedback as a way of dealing with daily risk has some interesting properties. First, feedback allows for behaviour with a low demand on mental resources, which is the likely level of resource allocation for mundane behaviour. Feedback mechanisms reduce the amount of processing required. Additionally, specifying emotions as the core construct means that low demands on memory are placed since all relevant evaluations are stored in the emotional memory. Feedback mechanisms, furthermore, are sufficiently flexible, in that they follow real world changes, and constantly update experience. By focusing on such a mechanism, we could understand mundane behaviour in relation to other research traditions in risk perception.

There is, however, also an important drawback to this approach. As the feedback model assigns a major role to existing experience in determining future behaviour, researchers need an extensive account of the individual history of each of the participants in a study. This is often not realistic, limiting predictive power of the approach. As a descriptive rather than a predictive model, a feedback loop is probably a fair rendering of the underlying mechanism. An emotion-driven feedback approach can be used to understand what people do, how optimistic biases develop and how behaviour follows

from experience and accounts for the psychometric evaluation of 'newness,' as well as the possible applicability for planned behaviour for first time actions.

To investigate the role of prior experience we need to be able to account for this. Therefore, we argue we should get outside the laboratory environment, as experiences formed experimentally are likely fairly shallow when compared to real-life experiences (Gigerenzer and Todd 1999, Fischer *et al.* 2005). Alternatively, we recommend introducing assumed differences in experience with real life situation as a condition in controlled experiments; for example by changing the focus from well known to exotic products (e.g. Fischer and Frewer 2007). Another option would be the use of longitudinal studies, where the introduction of a new product or technology is followed from unknown to familiar, or by meta-analyses of existing research spanning such a process of familiarization. It would also be useful to investigate how existing experience is affected by a crisis. Food practices are particularly suited for these analyses since they (1) are likely to be governed by experiential processes due to these being highly frequent, and low in level of anticipated risk, (2) have been related to a number of clear, well documented, crises, and (3) have frequent introduction of new products and technologies aimed at becoming part of daily life.

From a practical point of view, feedback processes provide an explanation why consumers may not take information into account when they are acting on experience. If the hazardous behaviour is simply the result of not putting in enough effort, for example through unrealistic optimism, we may motivate people to try harder. Emotions such as shock or fear may be used for this aim, although the emotion may have a different effect at the action or the goal setting level (Sloman 2001). Targeted intervention aiming at the most relevant information and likelihood of adoption thus seems essential (Frewer and Fischer 2005, Fischer *et al.* 2006). Alternatively, interventions can be aimed at changing the experience itself. This requires, for example, individualized training programs, which by its repetition will change experience and the associated references towards the desired state. For all interventions, it is likely that the effect will wear off as additional experience accumulates. Therefore, repeated exposure to the intervention is probably required.

Conclusions

This paper combines insights from different research fields on risk perception and daily occurring behaviours subject to risks to arrive at an integrated approach towards risk behaviour in a daily context. Risk perceptions accompanying highly repetitive behaviours such as handling or preparing food and other daily behaviours are probably the result of the application of heuristics. New risks may be evaluated more deliberately, involving causal rather than experiential processes. Once an action based on deliberate information has been completed, the experience with its consequences may be the starting values of further, heuristic familiarization. Once behaviour becomes repetitive or even part of one's lifestyle, a self-regulatory feedback model, in which emotions are integrated in the evaluation process, shows promise to describe the process of behaviour when at daily risk. By considering the psychological shifts in information processing that occur over the process of familiarization, and later habitualization, the different approaches that describe how people deal with risks and benefits in daily life, which until now have seemed to be isolated or even contradictory, can be brought together. While this paper provides a theoretical overview, future empirical research, careful checking of boundaries and studies looking into either gradual or discrete shifts in processing style are needed to reveal the full

potential of this approach. If such results confirm this model, different findings from different psychological domains can be combined to help health practitioners to determine what information, or what practices, may be most successful in reducing health risk behaviour.

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Note

1. Food safety practices are often communicated as heuristics, such as 'wash your hands when you come to the table,' or 'clean, separate, cook, chill' in the recent US food safety campaign (http://www.fightbac.org/).

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