

Perceived Risk, Comparative Optimism and Behaviour

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Increased epidemiological knowledge of the possible health consequences of life style and specific behavioural practices has led to a situation in which a wide range of behaviours have been labelled risky. As a consequence, there has been a significant increase in research attempting to understand how people perceive risk, the accuracy of their perception, and the role of perceived risk as a behavioural determinant.

In this chapter we will first describe the central role of perceived risk in models of health behaviour. Prevailing models of health behaviour will be briefly summarised, followed by a brief discussion of the accuracy of people's perception of risk and some methodological considerations concerning the measurement of perceived risk. Next, we turn to comparative risk appraisal i.e., how do people see their risks as compared to others? Biases in comparative risk appraisal and their effects on behaviour will be discussed. Finally, implications of these findings for health education and intervention programs will be discussed.

Perceived Risk in Models of Health Behaviour

Risk is generally conceived as consisting of two components: the *likelihood* and the *severity* of negative outcomes or losses. Most of the prevailing models of health behaviour are based on expectancy-value approaches of human judgement and incorporate these two components of risk. Basically, these models combine *probability* judgements (e.g., the likelihood of negative (and positive) health consequences of one's behaviour) and *value* judgements (the evaluation or the expected utility of these consequences).

Based on subjective expected utility theory (Edwards, 1954), Fishbein and Ajzen (1975) formulated their *theory of reasoned action*. According to their theory, behavioural intentions are a function of attitudes and social norms. Attitudes are assumed to be based on the summed products of the likelihood of positive and negative consequences of behavioural alternatives and the evaluation of these consequences. Thus, the more positive consequences are associated with a specific behaviour and the more likely their occurrence, the more attractive the behaviour is. The theory of reasoned action has been applied to a wide variety of health-related behaviours ranging from

smoking cigarettes, dieting, alcohol consumption, wearing seatbelts and birth control measures. Overall, the model provides adequate predictions of health behaviour and has received extensive empirical support (see Sheppard, Hartwick, & Warshaw (1988) for a meta-analysis). Overall, this support tends to be stronger for behaviours that are under complete volitional control.

Ajzen (1991) argued that many behaviours are *not* under (total) volitional control. In other words, people could have positive attitudes towards certain behaviours but simply lack the resources to carry out the behaviour. For instance, one could have a positive attitude towards giving up smoking but simply fail to do so due to the limited ability to sustain this behaviour. Ajzen incorporated this in his revised model of the theory of reasoned action and termed this factor "perceived behavioural control." This factor is closely related to Bandura's (1989) concept "self-efficacy", i.e., the subjective belief of the individual to be able to carry out a specific behaviour (e.g., stopping smoking, sticking to a diet etc.) Ajzen's *theory of planned behaviour* has been applied to health behaviours such as food intake (Sparks, Hedderly, & Shepherd, 1992), quitting smoking (De Vries, Dijkstra, & Kuhlman, 1988), weight reduction (Schifter & Ajzen, 1985) and infants' sugar intake (Beale & Manstead, 1991).

The Health Belief Model (HBM) is probably the framework most widely used to explain preventive health behaviour (Janz & Becker, 1984). This model distinguishes five factors that are assumed to determine the adoption of preventive, risk-reducing behavioural practices. These are: (a) perceived susceptibility or vulnerability to developing a specific health problem, (b) perceived severity of that problem, (c) perceived benefits of behavioural action(s), (d) perceived barriers and/or possible negative consequences of the action(s), and (e) specific cues to action, such as more direct experiences with the health problem or a health education campaign (Janz & Becker, 1984). A person's tendency to take preventive action is assumed to be strongest when perceived severity, susceptibility and perceived benefits are high, while the costs of behavioural change are low.

The Health Belief Model has been found useful in understanding and predicting preventive health behaviour but is less specific about how to *measure* the various antecedents of health behaviour. Overall, empirical support has been mixed, especially with respect to the role of perceived risk or susceptibility (Ronis, 1992). The utility of the HBM has also been questioned when dealing with relatively severe health threats (Montgomery, Joseph, Becker, Ostrow, Kessler, & Kirscht, 1989).

The models proposed by Fishbein and Ajzen and the Health Belief Model reveal considerable overlap. HBM's perceived susceptibility, perceived severity, and the perceived benefits and costs of behavioural change are all part of the subjective risk-benefit analysis underlying individual attitudes in the models proposed by Fishbein and Ajzen. Perceived barriers are closely related to Ajzen's concept "perceived behavioural control."

The approaches discussed thus far pay only limited attention to motivational aspects. Rogers (1975) introduced protection motivation theory to account for differences in individual reactions to information about health risks. This because of the finding that although people are quite aware of the *relative* risk of specific activities

or behaviours, things tend to change rather dramatically when this knowledge is applied to their own behaviour. For instance, many smokers accept the association between smoking cigarettes and disease, but do not believe themselves to be personally at risk (Pechacek & Danaher, 1979). Motivational explanations of perceived invulnerability tend to focus on the need to reduce feelings of fear and anxiety. Support for the role of these mechanisms is provided by research showing more biased risk estimates in situations of increased threat. For instance, Bauman and Siegel (1987) showed that men with a risky life style who deny or underestimate their risk of an HIV-infection, experienced lower anxiety. According to protection motivation theory, information about health risks initiates two appraisal processes: *threat appraisal* and *coping appraisal*. The theory distinguishes maladaptive and adaptive responses, and a number of factors facilitating or inhibiting the likelihood of these responses. Threat-appraisal focuses on the perceived severity of the consequences of a specific behaviour and one's vulnerability to these consequences. The coping-appraisal process refers to the ability to cope with and avert the negative consequences. Defensive denial of the risks associated with specific behavioural practices would be a maladaptive response. The perceived efficacy of the behavioural response (beliefs that the recommended behaviour reduces the likelihood of the consequences) and one's ability to carry out the recommended behaviour successfully (self-efficacy) are expected to increase the likelihood of the adaptive response. Response costs such as abstaining from behaviour that provides pleasure decrease the probability of occurrence of the adaptive (preventive) response.

The approaches described in this section illustrate that most models of preventive health behaviour incorporate the recognition of one's own risk-status or vulnerability as an important condition for adopting behaviours that reduce these risks. One assumption of these models is that people are able to adequately assess the risks associated with their behaviour. In the next section we turn to this issue.

Biases in Risk Perception

A number of conclusions can be drawn from research on risk perception. Perceptions of risk vary considerably among people and often show little correspondence to epidemiological findings or accident statistics; moreover quantitative risk judgements are prone to a number of biases. First, small probabilities are overestimated, and large probabilities are underestimated. Second, risks that are more "available" due to e.g., personal experience or media coverage tend to be overestimated. The "availability" heuristic (Tversky & Kahneman, 1974) refers to the tendency for an event to be judged more probable to the extent that it is more easily pictured or recalled. Thus, estimates of the likelihood of "sensational" risks such as the risk of contracting AIDS or being involved in an air crash tend to be too high, while estimates tend to be too low for more common and/or less sensational risks such as heart disease or being involved in a cycling accident. Generally, however, people have a reasonable idea of

the *relative* risks of various activities and behaviours. Major errors seem to occur primarily in estimates of the *magnitude* of the risks. This relative accuracy of perceived risk supports the central role of this concept in models of health behaviour. It seems essential, however, to also assess whether these perceptions are related to actual behaviour.

Perceived Risk and Behaviour

As argued above, much effort has been directed to understand the factors that shape beliefs about perceived risk or susceptibility, and to unravel the relationship between perceived risk and precautionary behaviour (Weinstein, 1988). Perceptions of risk are often found to be positively related to preventive health behaviour (Cummings, Jette, Brock, & Haefner, 1979; McCusker, Stoddard, Zapka, Zorn, & Mayer, 1989). However, in some instances, measures of perceived risk are found to be negatively related to preventive behaviour or behavioural intentions (Joseph, Montgomey, Emmons, Kirscht, Kessler, Ostrow, Wortman, O'Brien, Eller, & Eshleman, 1987; Rogers & Mewborn, 1976), or not at all (Temoshok, Sweet, & Zich, 1987). Research on the HBM also indicates that the relationship between perceived risk and behaviour can be opposite to the predicted direction (Becker, Nathanson, Drachman, & Kirscht, 1977; Langlie, 1977). Several findings suggest that an increased sense of risk - combined with low expectations of success in dealing with the risk - may provoke a helplessness reaction, and hence, decrease intentions to behave adaptively (Beck & Frankel, 1981). This is supported by Rogers and Mewborn's (1976) findings showing a negative relation between perceived risk and behavioural intentions *only* when recommendations for preventive behaviour are presented as relatively ineffective. Similar results were obtained in a study on cigarette smoking (Maddux & Rogers, 1983).

Most studies in the area of risk perception focus on the relation between perceived risk and behaviour but do *not* control for previous behaviour. Weinstein (1984) argues that people acknowledge the effects of their own (past) risk behaviour on their risk status only to a limited extent. He concluded that people seem able and willing to incorporate knowledge about their family history, personality, and physical or physiological attributes into their perceptions of risk or vulnerability, but they seem much poorer at recognising the relationships between their own actions and their risk of harm. Contrary to Weinstein's (1984) findings, Whitley and Hern's (1991) results support the expected relation between past behaviour and risk appraisal. Women who had protected themselves more against pregnancy in the prior six months gave lower likelihood estimates of getting pregnant in the next year. In accordance with these findings and the assumption that people behave rationally when assessing their risk, Otten and Van der Pligt (1992) also expected that risky behaviour in the past leads to higher risk appraisals for future negative events. Their findings show a clear relationship between past behaviour and risk appraisal, and between past behaviour and future behaviour. Their results also show that risk appraisal is related to future behav-

our, but in some cases this was in the opposite direction (higher perceived risk was associated with increased levels of risk in future behaviour). When predicting future behaviour on the basis of *both* risk appraisals and previous behaviour the effect of risk appraisal on future behaviour disappeared, while past behaviour remained a strong predictor of future behaviour. Overall, their results suggest a *modest* role of risk appraisal as a determinant of future behaviour. Their finding that perceived risk tends to be higher for people who expect to behave more risky in the future confirms the mixed findings about the relationship between perceived risk and behaviour reported earlier in this chapter. This could be related to the way perceived risk is measured, as we will see in the next section.

Conditional versus Unconditional Risk

An important distinction is that between *unconditional* and *conditional* risk estimates. *Unconditional* risk estimates refer to the subjective probability that an event will occur, based on whatever sets of factors individuals take into account (e.g., perceptions of control, the perceived efficacy of preventive behaviours). *Conditional* risk refers to the probability of an event if no preventive action is taken, or the probability of an event if a specific (preventive) action is taken. A conditional risk estimate thus requires respondents to indicate their risk given their present behavioural practices, or changes in these practices.

Although most models of health behaviour refer to *conditional* risk estimates, many operationalisations are phrased in terms of an *unconditional* risk estimate (e.g., "How likely is it that you will get ...", followed by the health risk(s) under study). The major drawback of such an unconditional risk estimate is that it is unclear what set of factors respondents take into account when answering this general question.

Recently, Ronis (1992) stressed the necessity to measure health risks in ways that are clearly conditional on action, and argued that preventive behaviour and attitudes towards this behaviour would be more accurately predicted from conditional than from unconditional measures of health risks. He found support for his prediction in a study of judgements about a hypothetical disease and a study on dental flossing behaviour.

As argued by van der Velde, van der Pligt, and Hooijkaas (in press), using a *conditional* measure of perceived risk instead of an *unconditional* measure has several advantages. First of all, a conditional measure more closely resembles the original construct as developed by Rogers (1975) and Becker (1974). People are inclined to take preventive action if they believe that inaction significantly increases their risk as compared to taking preventive action. Thus, they should perceive a high susceptibility to the disease given inaction. Similarly they would be less inclined to take action if they think they are likely to get the disease even if they would take action. In the latter case perceived risk is not associated with preventive behaviour. General, unconditional risk measures do not provide the possibility to disentangle those alter-

natives, hence the need for a conditional measure of risk. Another drawback of an unconditional measure of risk concerns the direction of causality between unconditional risk estimates and behavioural intentions. This direction is unclear because respondents may use their behavioural intentions to anticipate future levels of risk. Finally - and most importantly - a conditional risk estimate seems to be less dependent upon differences in actual risk status, and is therefore more likely to be related to behavioural intentions in a consistent and interpretable manner.

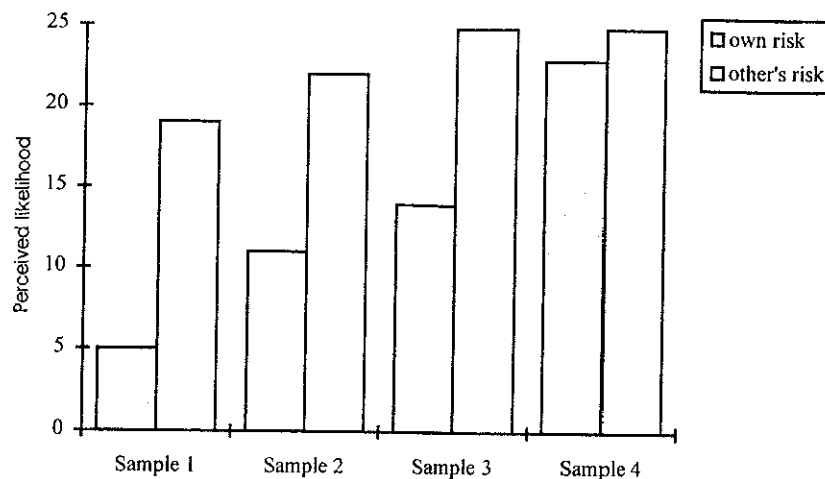
Summarising, perceived risk is generally assumed to be an important determinant of (preventive) behaviour. A number of biases affect the accuracy of perceived risk. Cognitive biases (such as the availability heuristic) have an effect on the perceived magnitude of risk but generally people have a fairly accurate view on their relative risk, hence the inclusion of this factor in most models of health behaviour. More attention should be paid to motivational factors influencing the perception of risk, such as the tendency to deny threatening information. Generally, research findings concerning the impact of perceived risk on behaviour are mixed. These mixed findings could be due to variations in the measurement of perceived risk. We would like to recommend a more precise, conditional measure of perceived risk. All in all it seems premature to conclude that perceived risk is not important as a predictor of health behaviour. Perceived risk seems a necessary but not a sufficient condition for behavioural change. This view coincides with Weinstein's (1988) "precaution adoption process." His approach assumes a logical process preceding the adoption of preventive action to reduce the threat of negative outcomes for one's health. First, people have to realise that a specific hazard exists. Second, they have to realise that the hazard is significant and can affect people. Third, they have to realise that they are vulnerable to the hazard. After these necessary requirements, behavioural change will be a function of the perceived severity of the consequences for one's health and the efficacy and costs of preventive behaviour. Another reason for this lack of correspondence between perceived risk and behaviour could be that people not only focus on their absolute level of risk but also rely on comparative risk appraisal. To that issue we turn next.

Comparative Risk Appraisal

A substantial body of research on the perception of health risks focused on *comparative* risks i.e., one's own risk as compared to others. When asked to compare their risk to the "average" person or to comparable others, people tend to estimate their risk of experiencing a negative event as below average. This illusion of (relative) invulnerability has been obtained for a wide variety of health risks, ranging from "catching a cold" to more serious risks such as heart disease, cancers and AIDS (Weinstein, 1982). Weinstein introduced the term *unrealistic optimism* to refer to this effect. Unrealistic optimism has been obtained for both low and high-risk groups. For instance van der Velde, van der Pligt, & Hooijkaas (1994) investigated the perception of

AIDS-related risks for four different samples. These samples differed in their risk status and included a high-risk sample of gay men (with a risky life style) and a heterosexual high-risk sample of visitors of a STD clinic. Results showed that the groups were aware of their relative risk-status: high-risk groups gave higher ratings of their own risk. However, all groups also showed an optimistic bias and thought that their risks were lower than that of an average person of their sex and age (see Figure 1).

Figure 1. Perceived Risk for Self and Others as a Function of Own Risk Status



Unrealistic optimism and the illusion of (relative) invulnerability could hinder the adoption and maintenance of preventive behaviours; if health risks apply more to others than to oneself, there is no reason to take preventive action. It seems crucial therefore to better understand the possible causes of this positive illusion and investigate the behavioural consequences. Six possible causes have been mentioned in the literature on unrealistic optimism (see van der Pligt, Otten, Richard, & van der Velde, 1993, for an overview). The first, is *perceived control*; when rating one's own risk status as compared to others, optimism tends to be greater for those risks judged to be under personal control. Research findings also indicate that those who rate the controllability of a specific risk higher are also more optimistic about that risk. This relation between perceived controllability and optimism is confirmed by research on a wide variety of health-related behaviours. Some even argue (McKenna, 1993) that unrealistic optimism is simply another manifestation of the illusion of control i.e., the tendency to overestimate one's ability to control life's outcomes. McKenna found that only controllable events resulted in optimism. Harris and Middleton (1994), however, found optimism to be unrelated to ratings of the capacity to control outcomes.

A second factor that is often related to optimism is the so-called *egocentric bias*. When people are asked to assess their risks and those of others, they are bound to

have more knowledge about their own protective actions than those of others. It seems that people tend to focus on their own risk-reducing practices and are less aware of personal actions or circumstances that increase their risks. Moreover, one's own actions are more available than those of others i.e., people do not always realise that most other people also take protective action. This bias is also related to the availability heuristic discussed earlier in this chapter.

Third, *personal experience* with a specific risk tends to decrease unrealistic optimism. Personal experience tends to be relatively vivid as compared to statistical information about risks, and enhances both availability and recall.

A fourth factor that could produce unrealistic optimism is related to *stereotypical or prototypical judgement*. People might have a relatively extreme image of high risk groups or those suffering from specific diseases. This extreme prototype is unlikely to fit one's self-image, hence it is concluded that the risk does not apply to oneself but primarily to others.

A fifth factor is *self-esteem maintenance* or enhancement. Generally, people seem to think that their own actions, lifestyle, and personality are more advantageous than those of their peers. This mechanism would explain the fact that people are generally not optimistic about hereditary and environmental health-risks; the latter do not constitute a threat to one's self-esteem. In contrast, a high-risk lifestyle could be seen to imply that we are ignorant of what we ought to do or are simply unable to exercise self-control. Both these factors concern one's ability to cope effectively with life, and have clear links to self-esteem.

The sixth and final factor is related to *coping strategies*. Under conditions of high stress or threat, denial is a response often used to protect against anxiety or worry. Denial can reduce emotional distress but can also reduce the likelihood of direct behavioural actions, which may be necessary to reduce one's risks. Unrealistic optimism is an illusion that can help the individual to adapt to threatening events.

As argued by van der Pligt et al. (1993), most research in this area relies on correlational analyses and further research is needed to assess the precise causal role of the antecedents of unrealistic optimism. Moreover the effects of optimistic bias on preventive health *behaviour* need to be assessed more carefully. One of the basic rationales for this research is that comparative optimism could undermine the effectiveness of health education campaigns.

Overall, the predictive power of comparative risk appraisal seems rather modest. Research incorporating both own risks and comparative risk (i.e., level of optimism) shows that the former is modestly related to behavioural intentions and actual behaviour (Otten & Van der Pligt, 1992). Comparative risk appraisal does not seem to add much to the prediction of behaviour over and above perceived (own) risk. It could be that comparative risk appraisal primarily triggers social comparison processes and is not a prime determinant of preventive health behaviour.

Changing Risky Practices

Changing risky practices is often difficult and providing risk information is generally not sufficient to foster behavioural change. As argued before, other factors such as the efficacy and costs of preventive behaviour as well as perceived self-efficacy play a major role in helping people to change their behaviour.

A first requirement however, is that programs aiming to increase preventive behaviour convince people of the possible negative consequences of certain practices. It needs to be added that providing threatening, fear inducing information about the possible risks of behaviour can be counter-productive. This obviously poses a problem for health education. A direct confrontational approach could have potentially adverse consequences for those who perceive themselves to be at greater risk. The complicated dual aim of health education programs is to create and maintain a level of anxiety which is sufficient to motivate risk reducing behaviours, while at the same time these levels of anxiety should not be too high. One way to resolve this problem is to focus on immediate affective consequences of specific behavioural practices. A strategy that emphasises the more immediate affective consequences of risky behavioural practices seems most appropriate when there is a discrepancy between the feelings associated with the behaviour, and the possible consequences of that behaviour. This was tested in research on risky sexual practices by Richard, van der Pligt, and de Vries (1995). They expected that inducing people to think about their feelings after having had unprotected sex with a new or casual partner should affect preventive behaviour. Results showed that stressing the immediate risks such as worries, anxiety and regret that could be experienced after unprotected sex, result in an increase in protective action. It thus seems that such an intervention leads to some anxiety but not enough to lead to defensive reactions and/or denial of the risks associated with the behaviour, and increases the likelihood of preventive behaviour. Richard et al. (in press) found that anticipated affective reactions are also related to other health behaviours such as dieting and drug and alcohol use.

Conclusion

Most models of (health) behaviour incorporate perceived risk as an important determinant of behaviour. Generally, these models decompose risk into a probability component and a value component (i.e., the likelihood of negative consequences and the evaluation of these consequences). In this chapter we focused on the probability component of risk perception. A number of biases affect both absolute and comparative risk appraisal. These could hinder behavioural change. Generally, the perception of personal vulnerability to health risks seems a necessary requirement for people to consider behavioural change, but it is not sufficient to actually induce people to change risky practices. When tested in the context of other behavioural determinants, perceived risk is a modest predictor of preventive health behaviour. This also applies

to comparative risk appraisal i.e., the tendency of people to be optimistic about health risks. Comparative risk appraisal serves a number of functions but does not seem to be a prime determinant of behaviour. It seems premature to conclude that optimism in comparative risk appraisal has a detrimental effect on preventive behaviour.

More research is needed to assess the *precise* role of perceived risk as a necessary factor to induce behavioural change. This research should preferably be *prospective*; too many studies assess perceived risk and behavioural intentions at the same time, which makes it difficult to investigate the predictive power of perceived risk. Second, more attention should be paid to the *measurement* of perceived risk. The many different ways in which perceived risk and vulnerability are measured make it difficult to compare research outcomes. Most models require a *conditional* probability assessment; most research, however, relies on a more general measure of *unconditional* risk.

When confronted with risks that pose a severe threat, motivational factors could result in substantial biases in risk perception. This obviously poses important problems for health education. A direct confrontational approach could have adverse consequences for those who perceive themselves to be at risk. The complicated dual aim of health education programs is to inform, and create and maintain a level of anxiety which is sufficient to motivate risk reducing behaviours while at the same time these levels of anxiety should not be too high. For these reasons it is essential that health education programs also stress *how* to change behaviour and take preventive action i.e., increase self-efficacy and provide examples and role models of how to effectively change one's behaviour. The tendency to deny more severe risks requires an approach that also focuses on the more immediate affective consequences of risky behavioural practices such as regret and worry.

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