

## Perception of Health Risks: A Selective Review of the Psychological Literature

---

*Stephen Sutton*<sup>1</sup>

*This paper discusses some of the key findings from psychological research on health risk perceptions, using smoking and sexual behaviour as examples. Research on dimensions of risk has attempted to relate perceptions of risk to characteristics such as perceived controllability and voluntariness. This approach has focused on technological risks, so application to behavioural risks is necessarily speculative. Research on accuracy of risk perceptions shows that people's estimates are subject to a number of biases. Nevertheless, recent research shows that smokers in Britain are not unrealistically optimistic about the personal health risks of smoking. By contrast, HIV/AIDS consistently evokes relatively large optimistic biases. Psychological models of the relationship between risk perception and behaviour identify a number of barriers to behaviour change. Recent evidence suggests that the most important barriers to more consistent use of condoms are low perceived risk and high perceived costs of the recommended action, in particular reduction of sexual pleasure. The main barriers to stopping smoking are low confidence of success and high perceived costs associated with unpleasant withdrawal symptoms. Although substantial progress has been made in understanding health risk perceptions, there are many important questions that remain to be answered.*

**Keywords: Risk; smoking; sexual behaviour;  
HIV/AIDS; unrealistic optimism**

### **Background and aims**

In the past 20 years, substantial progress has been made in understanding why some health risks arouse extreme aversion while others are regarded with indifference, on the media and cognitive biases that lead to distortions in risk perceptions, and on the relationship between risk perceptions and behaviour. The aim of this paper is to review some of the key findings in these areas with reference to perceptions of the health risks of smoking and sexual behaviour, behaviours that have major public health implications. The paper will focus on the British scene, but the reader should bear in mind that most of the basic research on risk perception has been conducted in the United States.

### **Dimensions of risk**

One line of research has attempted to relate people's perceptions of risk to characteristics such as familiarity, perceived control and potential for catastrophe. For example, Slovic and col-

leagues<sup>2</sup> asked subjects to consider a large number of activities and technologies that might threaten life and limb, for instance, nuclear power, mountain climbing, handguns, and power mowers. The nine themes or ‘risk characteristics’ that emerged from this and many other studies are listed below:

- *Voluntariness* — ‘Do people face this risk voluntarily?’
- *Immediacy of Effect* — ‘To what extent is the risk of death immediate — or is death likely to occur at some other time?’
- *Knowledge by Exposed* — ‘To what extent are the risks known precisely by the persons who are exposed to the risks?’
- *Knowledge by Science* — ‘To what extent are the risks known to science?’
- *Control* — ‘If you are exposed to the risk, to what extent can you, by personal skill or diligence, avoid death?’
- *Newness* — ‘Is the risk new and novel or old and familiar?’
- *Chronic-Catastrophic Character* — ‘Is this a risk that kills one at a time (chronic risk) or a risk that kills large numbers of people at once (catastrophic risk)?’
- *Common-Dread Character* — ‘Is this a risk that people have learned to live with and can think about reasonably calmly, or is it one that people have a great dread of — on the level of a gut reaction?’
- *Severity of Consequences* — ‘When the risk from the activity is realised in the form of a mishap or illness, how likely is it that the consequences will be fatal?’

The ‘risk profiles’ derived from this research showed, for example, that nuclear power was rated at or near the extreme high-risk end for most of the characteristics. Its risks were seen as involuntary, unknown to those exposed or to science, uncontrollable, unfamiliar, potentially catastrophic, severe, and dreaded. People’s strong fears about nuclear power seem logical consequences of their concerns about these considerations.

This approach has less often been applied to the risks of smoking and sexual behaviour but it is possible to make some informed guesses about how these activities would be rated on some of the risk characteristics. For example, non-smokers might regard the risks of active smoking as voluntary — smokers are choosing to expose themselves to the health risks — but the risks of passive smoking as involuntary — non-smokers are being forced to breathe air contaminated with tobacco smoke. This may partly explain why there is greater public concern about passive smoking than active smoking. Active and passive smoking also differ with respect to the length of time the risks have been known — the risks of passive smoking are still relatively novel. Smokers themselves, on the other hand, aware that they are in a real sense addicted to their habit, may regard their exposure to the health risks as involuntary.

Aside from cases where people have contracted HIV from transfusions of infected blood, HIV risk would probably be rated as a voluntary risk — in general, people can choose whether to have lots of sexual partners, to have unprotected sex or to share needles. A study conducted in

the Netherlands<sup>3</sup> found that the risks of HIV infection (and STDs) were seen as highly controllable and restricted to specific groups; indeed, of the 12 health risks that were investigated in this study, these were the two that were most clearly associated with particular population groups. Compared with the risks of smoking, HIV may still be seen as a relatively new risk, and there may also be a feeling among members of the public that the scientists themselves do not fully understand the risks of HIV, a feeling that may be reinforced by the widely changing projections of the number of future HIV and AIDS cases and the stance taken by one English national newspaper in publicising scientifically controversial theories of the causes of AIDS.

### **How accurate are people's judgements of risk?**

Much work on risk perception has addressed the question of how accurate people are in their assessments of risk. For example, subjects in some of these studies were asked to give their subjective estimates of the frequency of death from a variety of causes for which objective estimates are available.<sup>4</sup> In general, the results show that people's estimates are *relatively* accurate, that is they tend to give relatively low estimates for infrequent causes of death (eg smallpox; venomous bite or sting) and relatively high estimates for common causes such as cancer and heart disease. At the same time, however, their judgements are systematically distorted. In particular, differences between the judged frequencies of the most and least frequent causes are substantially smaller than the corresponding differences in the objective, statistical estimates. In other words, *people tend to overestimate small risks (eg deaths from botulism and measles) and underestimate large risks (eg deaths from stroke and heart disease)*. In addition to this primary bias, the results of such studies also show a secondary bias: there are large differences in the estimated frequency of events with similar objective frequencies. For example, homicide is overestimated relative to suicide. The lethal events that are most *overestimated* (in terms of number of deaths) are: accidents; pregnancy, childbirth, abortion; tornado; flood; botulism; cancer; fire and flames; venomous bite or sting; and homicide. The lethal events most *underestimated* are: smallpox vaccination; diabetes; stomach cancer; lightning; stroke; tuberculosis; asthma; and emphysema. There is a striking difference between these two lists. Overestimated events tend to be dramatic, sensational events that receive heavy media coverage. Unspectacular events that take one victim at a time (the 'quiet killers') and are common in non-fatal form (eg asthma, emphysema, diabetes) tend to be underestimated. Cancer is an interesting exception to this rule. Studies show that these biases can be predicted quite well from the amount of newspaper coverage devoted to each cause and from people's personal experiences.

These findings can be explained in terms of what Tversky and Kahneman have labelled *availability bias*.<sup>5</sup> These authors argue that in making judgements and decisions, people often make use of *heuristics* — rules of thumb or short cuts that save cognitive work. When we make a judgement about the probability or frequency of some event, we often base our judgement on the ease with which we can imagine that event happening or on the ease with which we can recall past instances of that event. In general, use of availability cues (memorability, imaginability) is a good mental strategy. Instances of frequent events are usually more easily recalled than instances of infrequent events, and likely occurrences are easier to imagine than unlikely ones. Thus, availability is often an appropriate cue for judging frequency and probability. Unfortunately, availability is also affected by factors unrelated to likelihood, such as recency, vividness, and emotional salience. Reliance on availability may lead to overestimating the probability of events that are unusually memorable or imaginable. Thus, a recent air or train crash, especially if it receives wide and vivid media coverage, can have a substantial distorting effect on risk judgements.

To summarise, people are able to provide estimates of frequency of deaths from various causes if they are asked to do so, and these estimates have approximately the same rank ordering as the objective figures. However, their judgements are related to other characteristics, such as dramatic impact and biased media coverage (greater newsworthiness of uncommon, catastrophic events) which results in increased psychological availability.

Smoking and the diseases it causes clearly falls into the 'quiet killer' category. Although smoking is frequently in the news for one reason or another, the sheer magnitude of the death toll from smoking is rarely emphasised. If an air crash occurred in the UK leading to the loss of 300 lives, it would without doubt receive massive media coverage. But the 300 deaths *per day* from smoking receive a disproportionately small amount of news coverage. Surveys conducted in Britain 20 years ago found consistently that people, and especially smokers, tended to underestimate the number of deaths due to smoking relative to the number of deaths from road accidents.<sup>6</sup> The situation appears to have changed since then. In a recent National Opinion Poll (NOP) survey, 44 per cent of respondents (and 40 per cent of current cigarette smokers) identified smoking from a list of eight possible factors as causing the most premature deaths in the U.K. each year;<sup>7</sup> 33 per cent picked road accidents. There is evidence from telephone surveys conducted in the United States that people now tend to *overestimate* the risks of smoking. When asked the question 'Among 100 cigarette smokers, how many of them do you think will die from lung cancer because they smoke?', respondents estimated (or guessed) that, on average, about 40 out of 100 smokers will suffer this fate; current smokers gave only slightly lower estimates.<sup>8</sup> According to Viscusi, anti-smoking campaigns, strongly worded health warnings on cigarette packets ('SMOKING CAUSES LUNG CANCER'), and increasingly severe restrictions on smoking, have led to a situation in which people now hold biased perceptions of the health risks of smoking. In his view, if the aim of health promotion is to enable people to make informed choices, overestimating the risks is as bad as underestimating them.

In summary, in spite of its 'quiet killer' status and in spite of the fact that smoking-related deaths rarely hit the headlines, there appears to have been a shift over the years in the general public's perceptions of the health risks of smoking such that it is now acknowledged even by smokers themselves as a major cause of premature death. This may reflect the cumulative 'drip, drip' effect of repeated publicity about the harmful effects of smoking over the last 30 years. One important feature of this repeated publicity has been the consistency and simplicity of the message: that smoking is bad for you and that you should therefore give it up. Many millions have stopped smoking, of course. Prevalence of current smoking in the UK is currently about 27 per cent and still falling, albeit rather slowly. One possible consequence of the increasing recognition by the general public and by smokers themselves that smoking is a major cause of premature death is that prevalence will continue to decline. Another is that those who continue to smoke will increasingly show signs of anxiety and distress associated with worry about the health risks.

### **The distinction between general risk and personal risk**

All the studies described above examined people's estimates of the frequency of lethal events or the risk to population groups, in other words measures of their perceptions of *general risk*. None of them assessed people's estimates of their *own personal risk* of dying from various causes or experiencing other kinds of negative outcomes. This is a crucial distinction which has important implications. To give an illustration, a person may believe that, in general, unprotected sex with a series of partners is risky but at the same time believe that his own

behaviour, although it also involves unprotected sex with a series of partners, is not risky. He may believe this, for example, because he is confident that he can tell from a person's appearance whether or not they are HIV-positive. In a similar way, a smoker may accept that smokers are more likely than non-smokers to get lung cancer but regard themselves as an exception to this general rule — perhaps because they smoke less than other smokers or because they smoke very low tar cigarettes. A considerable body of research has supported the importance of this distinction between generalised and personalised beliefs, and the theoretical models that have been developed by psychologists and others to explain how people respond to health threats or make decisions about their health emphasise the role of *perceived susceptibility*.<sup>9</sup> Before a person will respond to a potential health threat by changing their behaviour, they have to feel personally at risk.

### **Unrealistic optimism**

Related to the above distinction, research on risk perception has identified a tendency for people to estimate their personal risk of experiencing a given hazard or health problem as being lower than that of the average person or other people.<sup>10</sup> This phenomenon has been labelled *optimistic bias* or *unrealistic optimism* — unrealistic because not everyone can be below average risk. This phenomenon seems to be one instance of a much more general tendency for people to believe that they are somewhat superior to or more fortunate than others in a variety of different ways. For example, people tend to believe that they are above average in driving ability.

In research on unrealistic optimism, different hazards are found to evoke different degrees of optimistic bias.<sup>11</sup> HIV/AIDS, and sexually transmitted diseases in general, consistently produce quite large optimistic biases whereas other hazards (eg cancer) seem to evoke rather small or zero biases. In other words, people tend to see a much bigger difference between their own risk and others' risk for HIV/AIDS than for cancer. Optimistic bias seems to be related to perceived controllability.<sup>12</sup> Risks that people feel that they can successfully avoid or do something about elicit relatively large optimistic biases.

Optimistic biases are thought to be good for one's mental health but potentially bad for one's physical health. Believing that you can achieve what you want to achieve, that your future outcomes are likely to be favourable, that you are little more intelligent and a little more skilful than your peers helps to maintain self-esteem as well as motivation and persistence in pursuit of life goals. In this sense, optimistic biases are thought to be beneficial to mental health. Furthermore, it is argued that depressed people in fact hold more *realistic* beliefs about themselves and the future than non-depressed people.<sup>13</sup> At the same time, however, unrealistic optimism may reduce the likelihood of adopting recommended health-protective actions. If you think that your risk of HIV infection is much lower than other people's, you may be less likely to practise safe sex.

Most of the research on unrealistic optimism has been conducted on American college students.<sup>14</sup> The results may therefore not be representative of the wider population. Asking healthy young adults about possible distant health outcomes may be conducive to finding optimistic biases. In a project funded by the UK Economic and Social Research Council under its Risk and Human Behaviour Research Programme, I have been studying cigarette smokers' perceptions of the personal health risks of smoking from the standpoint of research on optimism bias using nationally representative samples.<sup>15</sup> Smokers were asked to compare their own chances of getting lung cancer (or heart disease) at some time in their life with the average cigarette

smoker in this country. The findings were particularly interesting. Lung cancer showed no optimism bias. On average, smokers perceived their own lifetime risk of getting lung cancer to be about the same as the average smoker. Heart disease showed a small but significant *pessimism* bias. Smokers tended to rate their lifetime risk of getting heart disease to be somewhat higher than the average smoker. This effect was stronger for women than for men. Lighter smokers were more optimistic than heavier smokers with respect to both lung cancer and heart disease, and older smokers tended to be more optimistic than younger smokers. Older smokers may feel that they have escaped or are immune to the health consequences or that they have a stronger constitution than other smokers. Their optimism may not be entirely unfounded, of course. Another relevant factor may be that the older smokers would have been smoking for many years before the scientific evidence of the harmful effects of smoking was first published in the early 1950s.

In summary, the findings from this study suggest that smokers in Britain today are not unrealistically optimistic about the personal health risks of smoking. When invited to compare themselves with the average smoker, they did not take advantage of the opportunity to exempt themselves from the health risks or to place themselves in a favourable light relative to other smokers.

Smokers in this study were also asked to compare themselves with the average non-smoker. On average, they rated their risk of lung cancer and heart disease to be 'a bit higher'. Thus smokers acknowledge that they are at increased risk compared with non-smokers. However, they may not fully appreciate how much their risk is increased. Current smokers are about ten times more likely to develop lung cancer than those who have never smoked regularly.<sup>16</sup>

Smokers were also asked to give numerical estimates of their lifetime risk in terms of chances out of a hundred. On average, they estimated their personal risk of getting lung cancer to be 41 per cent and their personal risk of getting heart disease to be 47 per cent. It is difficult to judge the accuracy of these estimates in a precise way because the epidemiological evidence is rarely presented in this form. However, it has been estimated from Canadian data that one in six male current smokers and one in nine female current smokers will eventually develop lung cancer.<sup>17</sup> On these figures, it would seem that, although smokers (correctly) rate heart disease as more likely than lung cancer, they tend to overestimate their lifetime risk of lung cancer to a substantial degree. This most probably reflects the effects of 30 years' sustained publicity on the link between smoking and lung cancer.

These findings are broadly consistent with previous studies of smoking in suggesting that smokers give rather high estimates of lifetime risk. For example, in a national survey of smoking habits and attitudes conducted in the UK in the early 1980s, 32 per cent of smokers said that they were 'fairly likely' or 'very likely' to get lung cancer if they carried on smoking; the corresponding figure for 'get a bad heart' was 39 per cent.<sup>18</sup>

### **Risk and behaviour**

Theoretical models developed by psychologists to understand risky behaviours typically regard perceived susceptibility (high perceived personal risk) as *necessary but not sufficient* for behaviour change.<sup>19</sup> Thus a person may feel that their behaviour carries a high risk of some future outcome (eg lung cancer, HIV infection) but they continue to behave in a risky way. Why? Models of health behaviour suggest five main reasons:

1. Even if an outcome is seen as likely to occur, it may not be regarded as serious. For example, gonorrhoea ('clap') may not be regarded as serious because it can be treated with antibiotics. Distant outcomes may be discounted as being less serious than imminent threats, particularly if advances in medical science appear to offer the possibility of an effective cure. Death from a heart attack, if quick and timely, may not be feared to the same extent as a slow, painful death from cancer.
2. The risks may be more than compensated for by the benefits the behaviour brings. For some smokers, the psychological benefits of smoking (eg the apparent calming effect) may outweigh the health risks. The hazards of speeding may be offset by the thrill of driving fast and the instrumental benefit of arriving at your destination sooner.
3. Even if the outcome is seen as likely to occur, the recommended action (eg stop smoking; always use a condom) may not be seen as an effective way of reducing the risk. This could be the case, for instance, if the person believes that the damage has already been done — that he already has lung disease or is already infected with HIV. Again, if a person believes that condoms are unreliable and have a tendency to split or fall off during intercourse, they may seem to offer little protection against HIV infection and may be disregarded for that reason. Other, non-recommended, actions may be seen as providing a more effective way of reducing risk. For example, some people believe that one can tell from a person's appearance whether or not they are HIV-positive. If this were true, choosing one's sexual partners on this basis might indeed be regarded as an effective risk-reduction strategy; unfortunately, it isn't.
4. The recommended action may have costs or disadvantages. For example, condoms are regarded as reducing sensitivity and sexual pleasure for both partners.
5. The individual may feel unable to carry out or maintain the recommended action. For example, he/she may believe that they lack the social and verbal skills to raise the issue of condom use with a new sexual partner. Many smokers lack confidence in their ability to quit smoking.

So, the main barriers to behaviour change are: low perceived risk; low perceived severity; high perceived benefits of current behaviour; low perceived efficacy of the recommended action; high perceived costs of the recommended action; low confidence or self-efficacy for successfully carrying out the recommended action. It is important to appreciate that a behaviour that seems foolhardy or irrational to the observer (eg continuing to smoke or to have unprotected sex) may appear quite reasonable from the individual's viewpoint, that is, it may be *subjectively* rational. Whereas the health consequences may seem salient to an observer — especially a health professional or health educator — to the individual concerned other considerations may be just as important.

Recent data<sup>20</sup> suggest that the most important barriers to more consistent use of condoms are low perceived risk and high perceived costs of the recommended action. Many people who are sexually active do not regard themselves as being at risk of infection by HIV or other sexually transmitted diseases. In the majority of cases their beliefs are probably accurate: they are at objectively low risk. This emphasises the need for health education messages to be properly targeted to high-risk groups and for information about which groups are at risk — and by how much — to be included in health educational materials for more general consumption. The biggest cost associated with condom use is loss of sexual pleasure. Changing this belief is a challenging task. Beliefs based on personal experience, in contrast to those acquired through

information from outside sources such as television programmes, are likely to be highly resistant to change. Health educators would be helped enormously in their task if the manufacturers developed a condom that as well as being safe and inexpensive actually increased sexual pleasure for both partners.

Low perceived risk is probably not as important a barrier to smoking cessation as it was 20 years ago. Most of the evidence outlined in this paper points to the conclusion that smokers in Britain have 'got the message', at least with respect to lung cancer. Nevertheless, it is important that smoking education campaigns continue to present accurate information about the health risks of smoking. This should include information about the less well-known health effects of smoking (eg smoking as a risk factor for osteoporosis and bladder cancer) as well as the widely-cited ones (heart disease, lung cancer, and bronchitis). However, other barriers to stopping smoking remain important, particularly low confidence of success and fear of suffering unpleasant withdrawal symptoms. Nicotine replacement (by gum, skin patches, or nasal spray) offers one way of addressing both of these barriers.

### Conclusion

Research on risk perception has discovered a number of important cognitive biases that influence the way that people judge health risks, and the main barriers to behaviour change have been identified. Those who are charged with making or advising on health policy and with planning public information campaigns need to be aware of these findings. However, although we have made substantial progress, basic research is needed to further our understanding of how individuals make decisions involving risk. There are many important questions that remain to be studied. For example, what are the effects of regular exposure to information about different risks and hazards from a variety of different sources? In the context of this high rate of exposure, do people respond to new health scares by becoming anxious and depressed ('one more thing to worry about') or are they becoming immune to risk information and increasingly sceptical about the scientific truth of each new story? Is the general public suffering from 'information overload' with regard to information about risks? How do people choose which risks they should worry about and which they can disregard? It is hoped that the next decade of research on risk perception will provide answers to at least some of these questions.

### Notes

- 1 Senior Scientist and Reader in Social/Health Psychology, Health Behaviour Unit, University College London, Brook House, 2-16 Torrington Place, London WC1E 6BT. Email: s.sutton@ucl.ac.uk
- 2 Slovic, P., Fischhoff, B. and Lichtenstein, S. (1985) Characterizing Perceived Risk. In Kates, R. (ed.) *Perilous Progress: Managing the Hazards of Technology*. Boulder, CO: Westview Press.
- 3 Reported in van der Pligt, J., Otten, W., Richard, R. and van der Velde, F. (1993) Perceived Risk of AIDS: Unrealistic Optimism and Self-Protective Action. In Pryor, J. B. and Reeder, G. D. (eds) *The Social Psychology of HIV Infection*. Hillsdale, NJ: Erlbaum.
- 4 For example, see Lichtenstein, S., Slovic, P., Fischhoff, B., Layman, M. and Combs, B. (1978) Judged Frequency of Lethal Events. *Journal of Experimental Psychology: Human Learning and Memory*. Vol. 4, pp 551-578.
- 5 Tversky, A. and Kahneman, D. (1974) Judgment Under Uncertainty: Heuristics and Biases. *Science*. Vol. 185, pp 1124-1131.



- 6 For example, see Eiser, J. R., Sutton, S. R. and Wober, M. (1979) Smoking, Seat-Belts, and Beliefs about Health. *Addictive Behaviors*. Vol. 4, pp 331-338.
- 7 NOP Consumer Market Research (1994) *Report on Research Carried Out for Department of Health on Smoking Habits, November 1994*. Department of Health internal report. NOP/43331.
- 8 Viscusi, W. K. (1992) *Smoking: Making the Risky Decision*. New York: Oxford University Press; see also Sutton, S. R. (1993) Smoking: Making the Risky Decision [Book Review]. *British Medical Journal*. Vol. 307, p 573.
- 9 Conner, M. and Norman, P. (1996) *Predicting Health Behaviour*. Buckingham: Open University Press; van der Pligt, J. (1998) Perceived Risk and Vulnerability as Predictors of Precautionary Behaviour. *British Journal of Health Psychology*. Vol. 3, pp 1-14.
- 10 Weinstein, N. D. (1980) Unrealistic Optimism About Future Life Events. *Journal of Personality and Social Psychology*. Vol. 39, pp 806-20; Klein, W. M. and Weinstein, N. D. (1997) Social Comparison and Unrealistic Optimism about Personal Risk. In Buunk, B. P. and Gibbons, F. X. (eds) *Health, Coping, and Well-Being*. Mahwah, NJ: Erlbaum.
- 11 Ibid.
- 12 Ibid.
- 13 Taylor, S. E. and Brown, J. D. (1988) Illusion and Well-Being: A Social-Psychological Perspective on Mental Health. *Psychological Bulletin*. Vol. 103, pp 193-210; Colvin, C. R. and Block, J. (1994) Do Positive Illusions Foster Mental Health? An Examination of the Taylor and Brown Formulation. *Psychological Bulletin*. Vol. 116, pp 3-20; Taylor, S. E. and Brown, J. D. (1994) Positive Illusions and Well-Being Revisited: Separating Fact From Fiction. *Psychological Bulletin*. Vol. 116, pp 21-27; Block, J. and Colvin, C. R. (1994) Positive Illusions and Well-Being Revisited: Separating Fiction From Fact. *Psychological Bulletin*. Vol. 116, p 28.
- 14 Weinstein, op cit; Klein and Weinstein op cit.
- 15 Sutton, S. R. (1998) Are Smokers Unrealistically Optimistic About the Health Risks? Findings From Two National Surveys. Paper submitted for publication.
- 16 Villeneuve, P. J. and Mao, Y. (1994) Lifetime Probability of Developing Lung Cancer, By Smoking Status, Canada. *Canadian Journal of Public Health*. Vol. 85, pp 385-8.
- 17 Ibid.
- 18 Marsh, A. and Matheson, J. (1983) *Smoking Attitudes and Behaviour*. London: HMSO; Sutton, S. R., Marsh, A. and Matheson, J. (1990) Microanalysis of Smokers' Beliefs About the Consequences of Quitting: Results From a Large Population Sample. *Journal of Applied Social Psychology*. Vol. 20, pp 1847-62.
- 19 Conner and Norman, op cit; van der Pligt, op cit.
- 20 For example, from the English Health Education Authority's 1993 Health and Lifestyle Survey: Sutton, S. R., McVey, D. and Glanz, A. (1998) A Comparative Test of the Theory of Reasoned Action and the Theory of Planned Behavior in the Prediction of Condom Use in a National Sample of English Young People. *Health Psychology*, in press.