



Risk perception and the media

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Abstract

This is a survey of research on how media influence risk perception. Media are diverse in content, and often not as biased in their (news) reporting as is commonly thought. Although many take media's influence for granted, the evidence points the other way: even for heavy media users, media are probably not a strong causal factor in (especially not personal) risk perception. Risk perception may be affected by the media via availability (more information gives a stronger effect), but the effects are lessened by impersonal impact: general risk perception is more easily changed than personal risk perception. Risk perception is often thought to cause behaviour, but this is still uncertain, and caution is necessary as to this possible connection.

1. Introduction

We live in the information age. Today a majority of all people in the world can be reached by messages from a wide array of sources, via a great many channels. Information flow has gone so far as to reach almost disturbingly high levels of quantity.

Risk is a concept that seems to be an inherent part of thinking. This is not surprising, as different behaviours must be weighted in some way to enable the most beneficial to be chosen. An efficient risk-estimating cognitive system is thus an important part of an evolutionary successful psychological setup.

Humans have probably always spent a lot of time communicating about risks. And, as every parent can testify, knowledge about risks is an important part of the cultural heritage that we transfer to the next generation. But times have changed, and we no longer get the main part of our knowledge from traditional sources (people) in traditional ways (orally). Today we receive a lot of information about various things from the media (about health for example, see Hofstetter *et al.*, 1992).

The need to understand how people in general, and in different subgroups, form their perceptions of risk is increasingly recognized as a separate field of research. It is important for example when it comes to the problem of predicting and handling the public's responses to different risks, mainly of technology. The discrepancies between, for example, model based risk estimates by experts and the public's perceptions is a well-known problem which faces politicians, industrialists and technocrats all over the world.

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Media are often believed to be very important for risk perception, but how much of the individual's risk perception is really due to the media? Which parts and what qualities? What do we really know about media influence on risk perception? To answer these questions, the present literature survey was made.

2. Aims and limitations of the review

Risk perception is an example of cognition, and we are primarily interested in looking at the similarities and differences between individuals.¹ This review will accordingly concentrate on psychological theory and empirical psychological findings. We will also take a look at risk communication via the media, as there may be differences in impact when risk information is intentional. Also, there is a difference as to the effects studied: risk perception is a mental process, but risk communicators are often more interested in behaviour, if they do not suppose that a change in attitude and/or knowledge automatically leads to a change in behaviour. This is an assumption which is not justified (van der Pligt, 1996).

The framework used for the analysis in this review is broadly along these lines: as we consider media content too diverse to be used as a starting point, we will use generally accepted psychological variables to order the available research and try to evaluate how the information we get from the media might be mediated by these psychological constructs.

3. Disposition

The review has four main parts: first there is media content, where the relation between objective reality and media information is scrutinized so that we will have an inkling as to what it is that possibly influences risk perception, and is different from what people receive from other sources.

Secondly, we examine psychological theoretical concepts and models of possible importance for media influence on risk perception, to create a frame of reference for the analysis of the specific results presented in the fourth part of the paper. The different models are evaluated as to their possible or actual use within general risk perception research.

The third part is about risk communication via the media. The reason for including this section is the suspected differences in impact between the nonintentional use of media, i.e. ordinary news and other programmes or articles, and the intentional use of media to change risk perception.

The fourth part is about the main problem: Media influence on risk perception. The central studies are evaluated within the framework of the theoretical concepts, when that is possible.

Finally, we sum up and draw some tentative conclusions.

¹When trying to piece together different findings in the area of psychology, there is one problem that creates a certain degree of uncertainty: it is whether the researchers have used the individual as their unit of analysis, or aggregated data. The latter method yields larger correlations when used on the same material (Gardner and Gould, 1989; Sjöberg, 1996). This statistical difference is not easy to take into account, as the methods used are not always clearly stated. An exact estimation would demand a recalculation of the original data, which is beyond the scope of this article. For a really fine-grained picture of media influence on risk perception we therefore recommend a closer look at this aspect. In the present article we use a somewhat broader perspective.

4. Media content

4.1. RESEARCH

What kind of risk information² do the media contain? And how is such material related to objective reality? The prevailing notion (not only among risk researchers) is that the media exaggerate some risks and ignore others (see for example Slovic, 1986), sacrificing objectivity for sensationalism, or as Johnson and Covello (1987) put it: 'Considerable evidence exists that the media engage in selective and biased reporting that emphasizes drama, wrongdoing and conflict . . .' (p. 179). Another research team says 'Media reports tend to concentrate on rare but dramatic hazards, and often fail to report more common but serious risks, such as motor vehicle accidents . . .' (Soumerai *et al.*, 1992). There are numerous other articles where the same view is presented. Many of them (for example Karpowicz-Lazreg and Mullet, 1993; Singer and Endreny, 1987) refer to an article by Combs and Slovic (1979) as proof of this bias. In that study, the authors correlated frequency of newspaper reports of deaths with actual statistics and people's estimates of how common a cause of death was. The results showed a greater correlation between reporting and estimates (about 0.70) than between reporting and actual frequency (0.13).

However, one has to be somewhat cautious when drawing conclusions from this study, especially if one wants to use it as an argument for the biasing influence of media on the general public, as it has been criticized for several shortcomings. What is of relevance here is that both the subject samples (Peltu, 1985) and the newspaper sample were small (two), and that there was no check on what newspapers the subjects read, or where they usually got their information about risks. In their discussion, Combs and Slovic (1979) caution that it is not possible to draw any conclusions as to causal pathways, as their study was correlational. The media might influence the public's estimations, or the other way around, or there might be mutual influence.

Replications with other populations and larger samples are needed. As far as we know there is only one: a (partial) replication using seven British newspapers found no correlation at all between number of articles on specific diseases and actual mortality statistics (Kristiansen, 1983).

On the other hand, the thesis of the biased press was challenged in a recent study by Freudenburg *et al.* (1996) who found that the only significant predictors of media content were number of casualties and level of damage. One more factor, dread, might be important, but was not significant in this study.³ The chief objective of the study was to check four (very) different mass media theories about media coverage of hazard events. These theories ranged from the Marxist perspective of the media as marionettes of capitalism (grossly understating the risks) to the above-mentioned view of media as antitechnology and sensationalistic (overstating the risks). In the end the empirically supported theory was that of a moderate protechnology attitude, stating that the media take much of their content from technological experts, and, often lacking real understanding of the issues, rely heavily on those. This is in line with the observation that

²Risk information is here defined very broadly. It contains anything of an aversive kind, from risk statistics to notes on accidents or substances (technologies, activities) which might be considered to be risky.

³ Several of psychometric variables of risk perception were tested as predictors.

the media tend 'to accept the frames provided by the dominant institutions currently active in the debate' (Singer and Endreny, 1987, p. 22).

The results of Freudenburg *et al.* (1996) are compatible with those of Renn *et al.* (1992) and Burns *et al.* (1993). These two groups found positive correlations⁴ between different measures of physical consequences of hazards and media coverage of these events, mostly about 0.3–0.4.

The reviewed research tells us that media content is influenced by the real risks as calculated by scientists but biased towards the dramatic, but there is probably also a strong element of chance (error variance). As an example of this, one could mention the now widely accepted theory about spraycans and the ozone layer. It was not immediately covered by *The New York Times* because there was too much 'doomsday reporting' going on at the moment, according to Mazur and Lee (1993).

It is also possible that the reporting on a specific hazard event is not as biased towards the dramatic aspects as is usually thought. For example, it was found that reports on the Chernobyl accident were not sensationalistic, but rather low-key. The problem was rather that not enough explanation was given on difficult technical concepts (Friedman *et al.*, 1987).

This means that the media report about different hazards without putting them in a context or perspective, and often without explaining technical terminology used. The public is left to form its own opinion about the risk based on rather scarce information, about for example cancer issues such as incidence and possible treatments (Freimuth *et al.*, 1984).

One similar problem is the personalization of media, especially news (Gorney, 1992). It is probable that much media content transmits information that is hard to handle, as it is emotionally arousing but often without enough facts to alleviate the possible fears they cause.

How culturally encompassing is the surveyed research about content? According to Dunwoody and Peters (1992), 'basic journalistic practices are quite similar across countries, perhaps even more similar than the differences among journalistic "ideologies" would suggest' (p. 202). The countries discussed by Dunwoody and Peters were only the USA and Germany. For totalitarian states, the situation is very different; hazard reporting apparently being censored, at least when domestic (Sjöberg *et al.*, 1996).

For a comprehensive survey of media content pertaining to different risks, largely in agreement with the conclusions drawn here, see Singer and Endreny (1993). For a short overview of different studies of media coverage of the Chernobyl accident, see Renn (1990). Renn's conclusion is that overall the media were factual in their coverage, although many clearly favoured one side in the conflict about nuclear energy.

In a CEC project, risk reports in print media and to some extent in television were extensively studied in France, Norway, Spain, Sweden and the UK (Nilsson *et al.*, 1997; Frewer *et al.*, 1997a; 1997b; Braxton *et al.*, 1997; Nilsson *et al.*, 1997a; Mays *et al.*, 1998; Ménard *et al.*, 1998). The data were integrated and related to risk perception survey data in Frewer *et al.* (1998). It was found, among many other things, that:

- (1) there were large differences in amount of risk reporting in Scandinavian media compared to the other countries investigated. Many more risk reports were found in Scandinavian media;

⁴See footnote no 1. These correlations are examples of analyses of aggregated data.

- (2) while media did show a tendency to be alarming in their risk reports, they also carried reassuring messages. There was no support in these data for the assertion that media are especially concerned with low probability-high consequences risks, since a very frequently reported type of hazard was that of traffic accidents;
- (3) the Chernobyl accident was attended to extensively at the time of the 10th anniversary and around that date, with the exception of the UK where the BSE crisis was much in focus. Perhaps media have limited space to devote to risk reports and one salient hazard will hence take that space into account, for a limited time (a matter of weeks);
- (4) although the Chernobyl coverage was somewhat limited in terms of number of articles, these tended to be longer feature articles, accompanied by visuals which were depressing and 'black' (Boholm, 1998);
- (5) there was a balance between the reporting of risks, in the sense of expectations about the future, and accidents, events that had taken place;
- (6) there was a clear inclination of some media to focus on 'conspiratory theories' of risk; i.e. on blaming authorities or industry for concealing important risk information from potential victims;
- (7) TV news items were quite brief and gave very little in the way of extensive coverage that could easily be found in the print media (only newscasts were studied);
- (8) there was no social amplification of risk with regard to perceived nuclear risk due to the extensive coverage of the Chernobyl accident in four of the countries. Only improved knowledge could be noted.

4.2. CONCLUSIONS

The results in this area would seem largely to be at odds with each other, especially if one considers a study like Greenberg *et al.*'s (1989a),⁵ which tells us exactly what so many researchers have thought: that the media are biased in their reporting towards more spectacular risks like airplane crashes. But on closer inspection, maybe these contradictions are due to differing qualitative interpretations. Even if there is a strong bias, the significant predictors may still be the actual death tolls. And another plausible explanation for these differing results is differences in methods and samples. On the other hand, the media are not quite as sensationalistic and biased as is often thought.

5. Psychological theories, models and hypotheses of risk perception

There are no general theories in psychology dealing explicitly with the issue of risk perception. There are, however, some theories and models in use which are applied within the field, and some hypotheses. An often cited risk perception model is the psychometric approach. Newer, more powerful approaches are described by Sjöberg (1998a). However, none of the available risk perception models make any specific predictions about media influences.

⁵Or another version of the same article, Greenberg *et al.* (1989b).

The only really comprehensive theory used by psychological media researchers is Bandura's (1973; 1977; 1983) social learning theory. The main tenet of this theory is that man learns not only by doing, but also by watching. This means that all we experience, even 'second-hand', teaches us about the world. When it comes to television and risk perception, Bandura claims that the picture we are given by TV distorts our worldview and makes us unrealistically afraid, because the content of many programmes is highly violent, much more so than the real world. The popularity of Bandura's theory seems to have declined, mostly because other theories have managed to explain the results of many of the studies that supported social learning theory. For a review of this research, see Felson (1996).

There is, however, still (risk perception) research going on that is using social learning theory as a basis. See for example Wiegman and Gutteling (1995), whose work will be (partially) reviewed in the following.

Availability is an often used concept in the understanding of how human risk perception is formed. Many studies of media and risk perception reported here use this notion in their theoretical framework, for example Kalichman (1994), and it is in common use throughout the general field of risk perception research (see for example Goszczynska *et al.*, 1991). In experiments in the early 1970s Tversky and Kahneman (1973) formulated the concept and studied its effects. Availability is what the title of their main article says: 'A heuristic for judging frequency and probability'.

Strangely enough, another of Kahneman and Tversky's (1972) heuristics is rarely mentioned in the risk perception literature: representativeness, which means that the subjective probability of an event is partly determined by its similarity to the population of known events and the process which has generated it. This might possibly be an interesting way of looking at media impact, which so far, very few researchers seem to have been interested in.

One important contribution which explains some of the many discrepancies within the media and risk perception research field is the impersonal impact hypothesis (Tyler, 1980). It states that hazard information will have different impacts on the perceived societal and personal risk levels. This means that any one person can be influenced by (for example) the media to feel that the risk for society is larger than previously thought, but this heightened risk judgement will not greatly affect personal risk judgement. This hypothesis has been confirmed by various experiments (Tyler and Cook, 1984). On the other hand, personal and general risk ratings always have a substantial correlation (Sjöberg *et al.*, 1996).

Of some interest when reviewing media influence on risk perception are also the Social Amplification Theory and the Cultivation Theory of Gerbner *et al.* (1997), but these are not psychological theories,⁶ and will therefore only be described in conjunction with other research results on media influence on risk perception.

⁶Social Amplification Theory is rather sociological in its slant, while, among other things, Gerbner *et al.* do not accept common research logic in (cognitive) psychology: as some quotes may show: 'The size of an "effect" is far less critical than the direction of its steady contribution' (Gerbner *et al.*, 1980: 14.). 'But even where a relationship disappears for an entire sample, as Hirsch, Hughes and Stevens have found, it may quite clearly hold up in certain groups' (Gerbner *et al.*, 1980: 23). Gerbner *et al.* use the last quotation and similar remarks to again claim the *general* validity of their theory. Such an approach to science is for example not in line with the weak version of the falsification demand of Popper (1968) and makes the theory's value questionable (Cook *et al.*, 1983)

6. Risk communication via the media

6.1. GENERAL LAYOUT

When governmental agencies and other organizations with a social responsibility want to inform the public, and often change their attitudes and behaviour, they normally use the media to spread their message. In these campaigns there is often an element of risk perception.

It is hard to find real consensus, or even order, in the realm of risk communication research. One reason is that the field is rather new, having evolved from risk perception research (Otway and Wynne, 1989), which is also new and unorganized. However, there are claims being made that progress has been continuously made and the knowledge about how to communicate about risks is sizeable, even though the pitfalls are many (Fischhoff, 1995).

Is there a difference between the effects of risk information in the news and entertainment media compared to those of intentional information, e.g. media campaigns? We have found no study which has explicitly looked into this question. It is also hard to find research concerning risk perception changes as a result of media campaigns, mainly because the main interest of those conducting the campaigns is behaviour change (see for example Backer *et al.*, 1992). Also, the concept of risk perception does not seem to be as clearly articulated in these research areas. There is, however, a variety of articles which include variables vaguely similar to risk perception, like 'accident probability' (Sutton and Eiser, 1990), or 'perceived risk reduction' (Sutton and Hallett, 1988).

According to Sharlin (1986; 1987) there is a difference between communicating in terms of macro risks, e.g. scientific estimates of number of likely deaths in the population due to a special hazard, and telling individuals that they should avoid a certain substance (activity, technology), which is a micro perspective. The latter creates more concern among the public, as they may mainly be interested in what the figures mean, in practical terms, for them personally. The impact of the media is thus due to their use of the micro perspective, turning directly to the individual and telling him/her: 'This is dangerous – for *you!*' This view is similar to the impersonal-impact hypothesis of Tyler, and seems well worth considering for risk communicators, and it is also testable in a laboratory setting. However, Golding *et al.* (1992) found no differences in effect on demand of mitigation and testing of radon between two kinds of information: one technical and one more personal.

6.2. CONCLUSIONS

We note a lack of theoretical connections between work in the risk communication field and general risk perception research, especially so when it comes to the media. The health field workers, who do a lot of campaigning, have their own models, which sometimes incorporate risk perception, notably the Health Belief Model (see for example Falck *et al.*, 1995).

It seems that it is sometimes taken for granted in risk communication that if people's attitudes (or knowledge) change, so will their behaviour (for example, Keeney and von Winterfeldt, 1986, analyse risk communication in this somewhat simplified way). As already stated, there are good reasons to assume this is not so (Joseph *et al.*, 1987; van der Pligt, 1996).

7. Media influence on risk perception

7.1. FINDINGS, EFFECTS AND VIEWS

As mentioned above, there is a widespread belief in the risk research community that the media are very important sources for people's risk perception (see for example Bastide *et al.*, 1989; Keown, 1989). Some researchers state this very clearly: 'The findings thus argue in favour of a practically totally determinant effect of the media in risk perception' (Koné and Mullet, 1994, p. 24). Far from everyone are so bold in their statements. The results are of interest though, and point in the suggested direction: the media do influence people's risk perception. How strong this influence is and what its properties are, is another matter. Although many studies have been conducted in the general area of media and risk perception (and similar constructs), those directly addressing the question of media influence on risk perception are few. The findings are therefore not as conclusive as could be wished.

Why is it even considered probable that people are affected by the media in their risk perception, apart from the fact that people themselves state media as their chief source of risk beliefs? (Tonn *et al.*, 1990; Anderson and Larson, 1995). One possible reason is that the media express themselves in a manner that is understandable to the reader/listener/watcher. As Konheim (1988) observed, people do not understand and listen to quantitative measures, but to qualitative statements. The old controversy between experts and the public in risk estimations seems to be a variant of this problem (for a discussion of this problem and some tentative findings on how people use mass mediated information, see Fischer, 1991 and Hornig, 1993).

What researchers usually do not mention when referring to the Combs and Slovic (1979) article discussed earlier is that the correlation between people's estimates and actual frequencies of causes was high (0.94 for ranked data). So, even though the media may be biased in their reporting, the public did not seem to be strongly influenced by this. Also, Lichtenstein *et al.* (1978) found high⁷ accuracy of people's rank estimates of different causes of death, but identified two kinds of bias: overestimation of low frequencies and sensational causes, and underestimation of high frequencies and 'quiet killers'. However, both these studies used aggregated data (geometric means), a method which exaggerates correlations (see footnote no. 1).

One thing that makes it hard to predict people's risk perceptions from media content is that people do not always use the available information in forming their opinions. For example, in a study by Baird (1986) it was found that knowledge of certain central items in the discussion of the possible dangers from a smelter was low, but this did not stop people from having an opinion on the issue. Baird's conclusion was that even though people have a right to get the facts about risks, one should not expect these to affect their opinions strongly.

In another study of risk perception it was found that actual and perceived amount of technical detail did not correlate (Sandman *et al.*, 1993). An even more clear-cut example is the finding by Vallone *et al.* (1985) that when there were clear fractions to an issue, both sides found the mass media coverage to be biased against them (see also Gunther, 1992). This shows that our perceptions of information draw heavily upon our already existing views.

⁷Lichtenstein *et al.* themselves judged the results somewhat differently: Per cent correctly ranked causes of death, which ranged between 56% and 89% was considered as proof that 'few individuals showed any appreciable ability to perform the ratio-estimation task' (1978: 559).

An instance when media style has an effect is the negative impact of dramatic news sequences on cognitive complexity and recall of central facts. If dramatic parts are edited out, people's recall of news becomes more accurate (Milburn and McGrail, 1992). If this tendency also affects people's risk perception has (to our knowledge) not yet been investigated, but it seems probable that a highly dramatic news story could have stronger effects on risk perception, as it appeals to a more emotional response, which is not as strongly attached to the real facts as a more 'low-key' story. This hypothesis might be supported by the results of an experiment made with news stories with either a social political or a scientific-technological slant: the first led to higher perceived risk (Hornig, 1988). Maybe the scientific style led people into thinking in terms of knowledge and safety due to control, while the social articles evoked thoughts about the impact on society and its safety. Anyway, this is another example of the importance of the content and style of the message for its impact. For an overview of media effects in general, see Roberts and Bachen (1981), who give many examples of the diversity of impacts.

How authorities (and their actions) are depicted in the media seems to be of importance, regardless of the actual content of their conduct. In a simulation study of media exposure, Sandman *et al.* (1993) found that perceptions of risk could be manipulated by altering descriptions of trustworthiness and secretiveness on behalf of a state agency in faked newsclips with identical factual risk information. Most important was how the reactions of average people were described, though. An allegedly enraged public heightened people's risk perception significantly. The manipulation also had effects on different emotions, for example fear: the per cent of frightened subjects rose from 1.2% to 39.7%. This is an interesting finding, as the media often go for the individual opinion about different hazards, and also seem to favour the more extreme reactions among those concerned.

A variable with a possible, not so well researched, connection to risk perception is anxiety.⁸ Sjöberg *et al.* (1996) in a survey asked about respondents' anxiety as well as perceptions of different risks, and showed that anxiety probably is a variable in its own right: in one national sample the correlations with risk perception were about 0.5 (Bulgaria), but in another close to zero (Romania). In two Swedish samples weak positive linear relationships were found between risk perception and anxiety (Sjöberg, 1998b). This relationship was probably mediated by the variable 'possibility of protection'. Drottz-Sjöberg and Sjöberg (1990) have also used anxiety items in scales of sensitivity in their predictions of risk perception with good results, although the variance explained by these questions has been very low.

Finally, in a sample of nuclear power plant employees, a U-shaped relationship was found between anxiety and risk perception, with high and low anxiety leading to lower risk estimates (Sjöberg and Drottz-Sjöberg, 1991). Whether anxiety is caused by media exposure is uncertain. That it is not a predictor of behaviour related to the anxiety-object is, on the contrary, rather certain (Brown *et al.*, 1992).

⁸Which can be specified as 'Apprehension, tension, or uneasiness that stems from the anticipation of danger, which may be internal or external. Some definitions of anxiety distinguish it from fear by limiting it to anticipation of a danger whose source is largely unknown, whereas fear is the response to a consciously recognized and usually external threat or danger' (American Psychiatric Association, 1987: 392).

7.2. AVAILABILITY

One opinion in the mass media researcher camp says that it is not the content that influences people's opinions, but the sheer amount of coverage (Mazur and Lee, 1993). This notion seems intuitively plausible and has the added advantage of being easily testable. Also, one interesting facet of this proposal is that even positive media coverage should influence public opinion negatively. And, as Mazur and Lee observed, it is in agreement with the availability heuristic of Kahneman and Tversky (1972). The prediction is for example borne out by an experiment by Morgan *et al.* (1985), in which subjects grew more worried of certain possible dangers when receiving more information about them.

There is also an effect over time of the media reports: as they wax and wane, so does public risk perception regardless of if the coverage is negative or positive (Mazur, 1981; 1990). We must not only receive information on risks, we must be reminded of them from time to time, otherwise we tend to forget and lower our risk estimates. Wiegman *et al.* (1989) have done work which lends some support to this theory, but see also Vitelli and Endler (1993) for a study on (amongst other things) the relation between media crime information and fear of crime. Unfortunately, this study is somewhat hard to interpret, as some key points of interest in their methodology are not fully described.

7.3. THE CULTIVATION THEORY

If we follow the simple path of amount of exposure to media, there is an interesting conflict to be reviewed. In the 1970s Gerbner and associates proposed their 'cultivation theory' which said, among other things, that people would grow more fearful (experience more subjective risk) with a heightened amount of TV viewing, as they would see the world more as it was on the screen than it was in reality (Gerbner and Gross, 1974; 1976). Many articles were written, presenting data from national surveys as support for the theory. It all seemed pretty commonsense; if you watch a lot of TV, you lose your grip of reality and use the available information (about crime, for example) to form your opinions. This interpretation was challenged and mostly discredited, however, when data from some articles (Gerbner *et al.*, 1977; 1979) were reanalysed in a more stringent manner: all effects disappeared (Hirsch, 1980). Another re-analysis by Hughes (1980) using controls not used by Gerbner *et al.* yielded the same results: no effects of TV-viewing on various measures (among them perceptions of risk of crime) were discernible. The logic of the cultivation approach was also criticized as incoherent. All this criticism has led to some modifications of cultivation theory, but its main tenets still remain, although not claimed to be as encompassing as when they started out. This version, called mainstreaming (Gerbner *et al.*, 1980), claims that the main cultural values are disseminated through television, resulting in a strengthening of those values. With this theoretical ground, Gerbner *et al.* are still doing their research (Gerbner *et al.*, 1994), in spite of the devastating critique by Hirsch (1981a, 1981b). For a more detailed summary of the controversy to date, see Gunter (1994), and for a discussion of Gerbner *et al.*'s theory and related research, see Cook *et al.* (1983).

The studies by Gerbner *et al.* that found correlations between television viewing and personal fear of victimization have one rather simple explanation: people do not get

more fearful of crime because they watch TV, they both watch more TV *and* get more fearful because they live in areas with high crime rates. There is thus no causal relationship between TV-viewing and fearfulness (Doob and Macdonald, 1979). It was this kind of influence that Gerbner *et al.* did not adequately control for, but Hirsch did. Another finding is that the relationship television viewing–fearfulness disappears when influence of the personality variable internal–external control is partialled out (Wober and Gunter, 1982). Also, evidence has been found that more apprehensive persons probably enjoy crime shows more (at least those with the typical happy ending) (Wakshlag *et al.*, 1983).

7.4. THE IMPERSONAL IMPACT HYPOTHESIS

The findings of Hirsch and Doob and Macdonald are consistent with the impersonal impact hypothesis described earlier (Tyler and Cook, 1984). People's general risk perception may be heightened through heavy media use, but their personal risk judgments are not (Tyler, 1980; Coleman, 1993). Most people think that they and their relatives and friends are less at risk from a great many things than is 'the average person' (for different examples, see Perloff and Fetzer, 1986). Even dispositional pessimists believe this (Fontaine, 1994). For a review of research on fear of victimization and media crime information, see Tyler (1984), who draws the conclusion that fear of crime is not generated by the media, but by personal experiences and those of friends. Whether the variable 'fear of crime' is the same as perceived personal risk is another matter.

Another finding that is compatible with the impersonal impact hypothesis is that people who have direct experience with a certain hazard tend to ignore mass media information about it, as they often find such information inaccurate (Wiegman and Gutteling, 1995). Also, differences have been found in impact on crime-related beliefs between personal, interpersonal and mediated experience/information. These differences in sources, however, also interact with each other in complicated ways, making it hard to predict beliefs. But principally, personal experience is the strongest, with other people's experience told by themselves as second, and all other (at least third-hand) information last in line (Weaver and Wakshlag, 1986). This means, as Wiegman and Gutteling (1995) found, that lower-order experience will be suppressed (or ignored) if some higher-order information is present.

Finally, research on the so-called 'third-person' effect has found that people tend to believe that others are more influenced by the media than themselves. This effect, however, is altered by specific issue, type of media and amount of exposure, and possibly by conservatism (Innes and Zeitz, 1988).

7.5. SOCIAL AMPLIFICATION THEORY AND RESEARCH

The only large-scale framework so far for understanding risk perception was proposed by Kaspersen *et al.* (1988). It has generated some interesting research (see Renn *et al.*, 1992, who investigated variables central to the theory) but is still in its early stages and it is uncertain if it will survive the scrutiny of the scientific community. Its strength seems at the same time to be its major weakness: it is loose enough to encompass the whole field, but maybe too loose to be really useful.

The main tenet of social amplification theory is that the consequences⁹ of a risk are determined by different amplifier stations, which can be persons, groups or organizations, who transform and disseminate the information about the hazard. In this way the information and its effects 'ripple' through society in some hypothesized key steps, shaped by different societal mechanisms (Kasperson *et al.*, 1989). The framework explicitly assumes that the media have an important role in the shaping of people's risk perception as it is the major part of the information source called 'professional information brokers' (Kasperson and Kasperson, 1996, p. 97). In one study a correlation of 0.43 between risk perception and media coverage was found (Kasperson *et al.*, 1989), and in another 0.46 (Renn *et al.*, 1992). The findings on the social amplification of risk are tentative, and in need of replications.

7.6. SOME EXAMPLES

One example of a transmission of risk information by the media which had an effect on behaviour comes from a study by Soumerai *et al.* (1992). They found that when the mass media (newspapers and magazines) had a peak in their number of articles about the possible connection between aspirin and Reye's syndrome,¹⁰ the incidence of the disease went down to almost zero, and remained that way while the interest of mass media faded. What happened was presumably that people reacted to the risk and changed their behaviour, e.g. they no longer gave aspirin to youngsters with a viral disease, the 'at-risk' group. The main risk communicator in this instance must have been the media, as warning labels did not appear on aspirin bottles until after the change, and there were no other mass communication channels at work.

Some quasi-experimental studies in this area concern the question whether the disclosure of a famous athlete being HIV-positive had any effect on people's risk perception and behaviour. The results were not very encouraging: although interest in AIDS and related topics increased sharply as measured for example by calls to AIDS hotlines which in some cases remained above baseline for several weeks, factual knowledge and personal risk perception remained virtually unchanged. The only people who after the announcement made significant changes in behaviour and thought were members of high-risk groups who identified with the sports star because of similarity (Kalichman *et al.*, 1993; Kalichman, 1994).

For a review of research on the effects of television on aggression and risk perception, see Rule and Ferguson (1986). For a discussion about media effects on risk perception in somewhat different terms than here, see Dunwoody and Peters (1992). These last two authors use a mass media research perspective, while the main concern in the present article is individual psychology. Despite this difference in emphasis, on mostly macro versus microlevel, the results of our respective reviews are compatible.

7.7. SOME CONFOUNDING FACTORS

One factor which is ordinarily not taken into account in media studies is that the actual content of an article. It may not be the overriding factor, but the mood it induces in

⁹Exactly what these consequences are or can be has not been exhaustively defined.

¹⁰A serious, but very unusual disease.

us. Johnson and Tversky (1983) found that all kinds of (general) risks were rated as higher when people had read a story about sudden death, which induced a sad mood. Contrary to expectations, the effects were not only on perception of the specific risk that was being described, or on similar risks. The effect was global: all changes in perceptions of different risks were equally large (a crime story was most effective, increasing estimates with 133%); but see also Cantor and Omdahl (1991) for results that are far less clear-cut, and Easterling and Leventhal (1989) about specific elicitors of personal risk perception and worry. The Johnson–Tversky study, frequently cited, needs to be replicated. The study suggests that ‘we tend to make judgments that are compatible with our current mood, even when the subject matter is unrelated to the cause of that mood’ (Johnson and Tversky, 1983, p. 30). This may mean that our perceptions are far from stable, and that the media may, very temporarily, have strong global effects on risk perception. Exactly how long these effects last is uncertain.

Also, Tyler and Rasinski (1984) found that the influence of information and affect related to crime were correlated in their effects on perceived future crime risk. This finding is consistent with the results of Johnson and Tversky in that it is not possible to segregate the two variables, as they mutually influence each other. Findings of this sort have wide scientific and methodological importance: much research into media effects (like Bandura’s classical studies on TV-induced aggressiveness) has found effects that might be very temporary, caused by the induced (passing) mood. Yet, all too often the results have been interpreted (if not by the researchers themselves, by someone else) as proof of more long-term changes.

Another problem in this area is that different kinds of mass media seem to have different impacts. Snyder and Rouse (1995) found that distinguishing between news and entertainment was one way of heightening the correlations between media exposure and personal risk assessments, with entertainment having the greatest positive (enhancing) effect. There was even a slight (inconclusive) tendency for news to have a negative impact. This again leads us to the conclusion that it is erroneous to talk about ‘mass media’ and their effects in general. Within this sprawling area there are a lot of differences, both in content and effects. Even within a subarea such as news there may very well be important variations (see Sjöberg *et al.*, 1996 for differences between countries).

Finally, the big problem in the realm of risk perception and media coverage is to ascertain the causal pathways. There seem to be correlations in this area, even though they are unlikely to exceed 0.50, so there is a relationship between these two variables. But of what kind? Does the media content affect people’s perceptions, or are the journalists just writing about what they know people already feel are risky activities (substances, technologies)? Or is there an interplay?

8. Discussion and conclusions

There appears to be many blind spots in the research concerning risk perception and media. This is not surprising in view of the fact that risk perception research is a relatively new field where many subquestions are still not only unanswered, but unasked. What is surprising is that many risk perception researchers take the media effects for granted. This is at least premature, as we have seen.

If one would try to summarize this summary of findings, the following points are the better researched and important ones:

- (1) Media content: The content of the media is far from objective when it comes to risks, but it is also far from being as biased as has often been thought, both in frequency of reporting about and in presentation of hazards. One of the certain shortcomings of media is that they often present facts outside their contexts, and leave to the public to evaluate them.
- (2) Media influence: Yes, the media do influence (some of) our risk perceptions, but they are only one factor among many.
- (3) Availability: Media's most fundamental way of altering people's risk perception is possibly by number and vividness of articles/features. As risk almost always carries some notion of probability and people use availability to estimate this probability, this notion is central to the effect of media on risk perception.
- (4) General and personal risk: Media can have an influence on general risk perception, but personal risk judgements appear to be very resistant to change from this source. Direct information from people about their experiences is a much stronger factor, as is personal experience.

When it comes to risk communication, it is uncertain whether intentional information and media campaigns have an impact on risk perception that differs from that of the unintentional risk information that news and entertainment supply us with. Also, it is uncertain how long the effects of the media last. It is possible that the media affect risk perception mainly in the short term. Whether this is so does not seem to have been studied longitudinally to see the effects change over time.

If one looks at the quantity and content of the risk perception-and-media-research in the past two or three decades, it gives the impression of having had a hey-day in the 1970s, before risk research as such was an established field, whereupon there was a decline in interest. In the 1990s, the questions seem to gain prominence again, as risk perception researchers explore their field more thoroughly. But we are still in the beginning of this interest, as can be seen for example in a recent book on media effects (Bryant and Zillman, 1994). There is no chapter on risk perception, though there is one on the related topic of fear, and one on the cultivation perspective by Gerbner *et al.* The concept of risk also surfaces in a chapter on violence.

As we have seen, it is often taken for granted by researchers (and people in general) that the perception of risk almost automatically influences behaviour. This is wrong. Just as personality and attitudes are low-value predictors, but often thought to cause behaviour, risk perception has no strong and clear relationship to behaviour (Joseph *et al.*, 1987). For an attempt to disentangle the intricate web of interactions between perception and behaviour over time, see Weinstein and Nicolich (1993).

The question of biased media coverage is a controversy that will probably continue to rage for a long time. In the end it is very much a question of belief in certain ways of measuring such a thing as media coverage that determines what is accepted as valid results. And the interpretation of these possible results is also influenced by one's prior view of whether the media's goal should be to present a realistic picture of reality or not. For a discussion of these and related questions, see Wilkins and Patterson (1987).

One of the problems with earlier research is that the risk perception concept seldom was used as a variable or clearly defined. It is therefore not always easy to draw conclusions about risk perception as we understand it today, with obvious consequences for a summary like the present one. This means that we need to re-visit the old controversies and use the fresh knowledge of risk research to really be able to disentangle the web of possible influences from different kinds of media on people's risk perception. We also need to ask new questions, for example about differences between traditional and digital information. There are some theories and many opinions about these things, in different fields of research, but few seem to have been empirically tested, which means that facts are sparse. Not even the widely accepted 'fact' that the media are responsible for a great deal of people's risk perception is really well researched, not to speak of the many other, less central, questions. Maybe a cross-discipline approach with empirical psychological testing of the hypotheses and theories of mass media research could be fruitful.

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