What Works Best: Objective Statistics or a Personal Testimonial? 
An Assessment of the Persuasive Effects of Different Types of Message Evidence on Risk Perception

John B. F. de Wit
Utrecht University

Enny Das
Free University, Amsterdam

Raymond Vet
Utrecht University

Objective: In an experimental online study we compared the effects of different types of persuasive evidence in promoting the acceptance of a personal health risk. Design: 118 men who have sex with men (MSM) at-risk for infection with the hepatitis B virus (HBV) were recruited via a range of websites and randomly assigned to one of 4 conditions (2 experimental and 2 control): narrative evidence (i.e., a personal account), statistical evidence (i.e., abstract prevalence data), mere assertion of increased risk, and no risk information. Main Outcome Measures: Narrative evidence was expected to be more effective than statistical evidence in increasing MSM’s perceived risk of infection with HBV an intention to obtain vaccination. Results and Conclusion: As predicted, perceptions of personal risk and intention to obtain vaccination against HBV were highest after presentation of narrative evidence, and risk perception mediated the effect of type of message evidence on intention. We propose that narrative evidence effectively promotes a sense of personal risk because it is less affected by defensive message processing resulting from the threat to important self-beliefs that seems inherent in health risk communication.

Keywords: risk perception, persuasion, message evidence, narratives, hepatitis B virus

Perceiving a personal risk is a major prerequisite for behavior change, according to major psychological theories of health behavior (e.g., Schwarzer, 2001). Reviews and meta-analytic studies demonstrate the pivotal role of risk perception in promoting precautionary behavior as observed in prospective and experimental studies (Floyd, Prentice-Dunn, & Rogers; Harrison, Mullen, & Green, 1992; Janz & Becker, 1984; Milne, Sheeran, & Orbell, 2000). In health education practice, however, increasing perceptions of personal health risk is easier said than done (cf. Rothman, Kelly, Hertel, & Salovey, 2003), mostly because people have many well-documented ways of discounting unwelcome messages (Weinstein, 2003). What is less known is how awareness and acceptance of a personal risk can be promoted without eliciting defensive responses in the message receiver. The aim of the present study is to contribute to a theory-based understanding of empirically effective health messages to promote risk perceptions by drawing on a body of work in communication science that is concerned with the influence of message evidence on persuasion (for an overview, see Reynolds & Reynolds, 2002). We in particular present a comparative test of health risk messages that offer different types of evidence to support a personal health risk assertion.

The Role of Evidence in Health Risk Communication

Including some form of proof for an assertion in a message consistently increases persuasion (Reinard, 1988). Message evidence comes in different forms that can be grouped into two general types: statistical, objective evidence and anecdotal, narrative evidence (cf. Perloff, 2003). Statistical evidence refers to the use of factual assertions and abstract data, such as pertinent prevalence estimates, to persuade message receivers that they are likely to be affected by a health problem. Narrative evidence, in contrast, includes concrete, emotionally interesting information, such as a first-person account of someone who came to experience a particular condition that may also affect the message recipient. The relative efficacy of narrative versus statistical evidence may be contingent on the relation between the content of a message and the initial position of the receiver (Slater & Rouner, 1996). Specifically, statistics have been found to be particularly persuasive when a message is preference-consistent, and is congruent with the views of receivers. In contrast, narrative evidence was most effective when a message was preference-inconsistent (Slater & Rouner, 1996). Health risk messages often convey potentially threatening information that is rarely received with enthusiasm if not sub-
stallent defensiveness. Accordingly, we propose that involving narratives are more likely to increase perceptions of personal risk than abstract statistics. This superiority of narrative over statistical evidence in conveying personal health risks may be rooted in differences in the psychological processes that mediate the influence of message evidence on persuasion.

As for any type of message content, the persuasive effect of evidence to support an assertion is generally thought to depend on active cognitive processing of the presented information (Reinard, 1988). Dual-process models of persuasion, such as the Elaboration Likelihood model (e.g., Petty & Wegener, 1999), predict that consideration of message content is most likely when receivers are highly involved in an issue, and receiving personally relevant health information should thus promote active message processing. However, a health message that is inconsistent with important beliefs or positions the recipient holds is likely to elicit substantial defensive responding and strong counterarguing (Liberman & Chaiken, 1992). Even high quality statistical evidence will then have only limited persuasive impact (Slater & Rouner, 1996). The persuasive influence of narrative evidence is thought to depend less on extensive message scrutiny, and to reflect heuristic and affective processes.

A classic explanation for the persuasive effect of narrative evidence is derived from the notion of the availability heuristic (Tversky & Kahneman, 1973), and holds that vividly presented information, such as a personal case history, is more likely to come to mind, and comes to mind more easily and faster when making some type of judgment (for a classic discussion of the vividness effect, see Taylor & Thompson, 1982). Evidence presented in the form of a personal narrative may also increase the ease with which message recipients can imagine an event or construct a scenario, and the simulation heuristic suggests that this ease of imagination should increase likelihood estimates (Tversky & Kahneman, 1974), in particular when involvement is low (e.g., Rothman & Schwarz, 1998). A series of recent studies suggests that subjective ease of imagination may in particular moderate the impact of negatively framed health messages (Broemer, 2004), that is, a communication that stresses potential losses or non-gains of failing to engage in a recommended course of action rather than emphasizing the gains and non-losses of adopting an action recommendation (cf. Rothman & Salovey, 1997).

Vividly presented risk information that promotes mental imagery, such as narrative evidence, may also evoke strong emotional reactions, and the risk-as-feeling hypothesis proposes that such affect experienced at the moment of decision-making (i.e., anticipatory emotions) can influence health behavior directly, independent of extensive cognitive appraisals (Loewenstein, Weber, Hsee, & Welch, 2001). In addition, a longitudinal study of influenza vaccination recently showed that anticipated emotions (i.e., emotions expected to be experienced in the future; Loewenstein et al., 2001), notably worry and regret, were stronger predictors of vaccination than perceived risk, and mediated the effect of risk perception on vaccination uptake and intention for repeated future vaccination (Chapman & Coups, 2006).

Green and Brock (2000) summarized the cognitive-affective effects of narrative messages in the concept of transportation, an immersion in a story that is characterized by a focused, integrative “melding of attention, imagery and feelings” (p. 701). Transportation is a state of engagement that does not generally involve message scrutiny, and we therefore, propose that narrative evidence should be less vulnerable to defensive reactions that may ensue from a critical consideration of health risk information. Narratives are hence expected to be superior in conveying personal health risks than statistical evidence.

The Present Study

The efficacy of different types of message evidence to support the acceptance of a health risk assertion will be evaluated in the context of attempts to promote vaccination against infection with the hepatitis B virus (HBV) among men who have sex with men (MSM). HBV-infection is one of the most common infections in the world, with about 2 billion people who have been infected, and more than 350 to 400 million individuals who are chronic carriers of the virus (Lai, Ratziu, Yuen, & Poyiadgi, 2003; Van de Laar, De Boer, Koedijk, & Op de Coul, 2005). HBV-infection is a serious condition, and unprotected sex is a major mode of transmission in low endemic regions, including Western nations, with as much as half of new acute infections seen in MSM (Van de Laar et al., 2005).

Obtaining vaccination is a safe, effective, and simple method to prevent infection, and (free) immunization programs are hence put in place. However, the uptake of vaccination in adult populations at increased risk, including MSM, has remained relatively limited (Van Steenbergen & the Working Group Vaccination High-risk Groups Hepatitis B for The Netherlands, 2002). Among MSM this may in part reflect low perceived personal risk of becoming infected with HBV (cf. Rhodes & Hergenrather, 2002). Low perceived risk in MSM has been found to reduce intentions to obtain vaccination (Das, Vet, De Wit, & Frijns, 2006), and to decrease the likelihood of actual uptake of vaccination (De Wit, Vet, Schutten, & Van Steenbergen, 2005). Increasing perceptions of personal risk for infection with HBV should hence contribute to increased vaccination rates among MSM, and the aim of the present study is to assess the efficacy of different content of persuasive communication in promoting perceptions of personal risk of contracting HBV among MSM. We expect that MSM who are exposed to narrative information, that is a personal account by a peer-group member, will estimate their personal risk for HBV infection as higher than MSM who are exposed to statistical prevalence information. The study is designed to contribute both to a theoretical understanding of health risk communication in general, and provide guidance for the design of effective health education to promote vaccination against HBV in particular.

Method

Procedure

The study was conducted via the Internet, and participants were recruited via banners placed on Websites known to attract MSM. Men were invited to participate in a study of health communication, which was explained to entail reading a short text and filling out a concise questionnaire. Participation was anonymously and voluntary. Respondents were randomly assigned to one of four conditions: two experimental conditions that included manipulations of message evidence (statistical evidence or narrative evidence), and two control conditions (brief mention of increased risk
without any supporting evidence or no risk information). To ascertain that our message evidence affected perception of risk, and not perceptions of severity, we included a measure of perceived severity of hepatitis B as control, in addition to our main measure of perceived personal risk. Furthermore, to assess the influence of risk communication on motivation to enact precautionary behavior, we also included a measure of intention to obtain vaccination.

**Participants**

MSM could enroll if they had not been infected with HBV, and never obtained vaccination against HBV. In total 118 men who satisfied these inclusion criteria filled out the questionnaire and completed the study. Age of participants ranged from 19 to 63 years, with an average age of 38.3 years (SD = 10.3). Most participants were highly educated; 47% had at least some college education. Most participating MSM (86.4%) identified themselves as homosexual, while 13.6% identified themselves as bisexuals. A slight majority of participants (51.7%) was not involved in a stable relationship; 48.3% did have a stable relationship, with an average duration of 9 years. Only a few men (4.2%) reported no sex partners in the previous year; 22.9% had one sex partner in the last year, and 77.1% reported two or more sex partners. All men were native Dutch.

**Health Risk Evidence**

Two experimental persuasive messages of approximately 225 words each were developed to promote perception of personal risk, with the control message only asserting that MSM are at increased risk for infection with HBV. All messages started with an identical introductory statement: “Men who have sex with men are at high risk for infection with the HBV. The more sexual partners men have, the higher is their risk of infection. However, infection can also result from having sex with only one partner.” The statistical evidence message then presented factual epidemiological information concerning the prevalence of HBV-infections among MSM. The text in particular included data documenting high numbers of infections in MSM. In the narrative evidence message, a recognizable first-person account was presented by a member of the target group who explained that he had become infected with HBV, although he had considered himself to be at low risk. To ensure comparable length of the control message, this message included information derived from an existing leaflet that explained the health consequences of HBV-infection. All messages ended by noting “Obtaining vaccination is the only effective way to achieve long term protection against the hepatitis B virus.” Health messages were displayed on the computer screen as text only. Participants in the no information control condition received no health risk message.

**Statistical evidence.** After noting in general terms that MSM are at increased risk for infection with the HBV, the statistical evidence message explained that MSM are at higher risk than their heterosexual counterparts, and stated that infection with the HBV is the second most important sexual health problem among MSM, after HIV. To further underline the relevance of the problem, it was noted “the infectiousness of the hepatitis B virus is 10 to 100 times higher than that of HIV.” Next, it was explained that the sexual transmission of HBV infection had increased in recent years, as had the annual number of acute infections. The number of chronic infections was noted to have increased by 80%. The message then proceeded with further arguments to increased perceived relevance: “Of all infected persons, the largest affected group consists of homosexual men (30%), while approximately only 5% of males in the Netherlands have sex with men.” The message then ended with stating that vaccination is effective in providing long-term protection.

**Narrative evidence.** After stating that MSM are at high risk for HBV infection, the message proponent was introduced as a person who had become infected. Only the proponents first name (i.e., Remco), was given to allow men of different backgrounds (e.g., age, education, and social milieu), to positively relate to the fictitious person. The proponent’s first name was carefully selected and chosen because it is relatively common in The Netherlands, and is not specific to individuals with certain backgrounds. All further information related to the message character was presented as first person quotes. To further increase identification with the proponent, the character presented himself as someone living in the culturally neutral center of the country, and involved in a recent relationship with a man. Remco also mentioned a previous relationship, and having engaged in one-night stands. The image he conveyed of himself was that of a regular gay men who is sexually active, but not hypersexual. The character explained that he is not the type of person who has sex with someone very quickly, but nevertheless became infected with HBV through a one-nigh stand. Remco explained: “I had no idea that he was infected; neither did he by the way. It was something I hadn’t even thought about. Many of my friends had been vaccinated, but I never did it because I thought I wouldn’t catch the virus. I could imagine someone else getting infected, but not myself.” The character ended his account by noting: “Now I know that vaccination is the only way to protect oneself long-term against the hepatitis B virus. . .”

**Dependent Measures and Data Analysis**

**Perceived risk** was assessed by three items (Cronbach’s alpha = .91) tapping men’s perceived probability of infection, for instance: “The likelihood of me becoming infected with HBV because of my sexual behavior is substantial” (1 = totally disagree, to 7 = totally agree).

**Perceived severity** was also assessed by three items (Cronbach’s alpha = .89) that referred to the seriousness of infection with the HBV, for instance: “In your view, how severe is an infection with hepatitis B?” (1 = not severe at all, to 7 = very severe).

**Behavioral intention** to obtain vaccination against HBV-infection was equally assessed by three items (Cronbach’s alpha = .97), for instance: “Are you planning to get vaccinated against hepatitis B in the future?” (1 = certainly not, to 7 = certainly).

Variables were logarithmically transformed (lg10) to correct for non-normal distributions. Transformed variables were used in statistical tests, but untransformed average scores are reported for descriptive purposes. The effect of type of message evidence was assessed with unifactor analyses of variance (ANOVA).

**Results**

**Effects of Type of Message Evidence**

A first ANOVA revealed that the type of evidence to support a health risk message had a significant effect on perceived risk of
infection with HBV, \( F(3, 114) = 3.23, p < .05, \eta^2 = .08 \). As expected, perceived risk was highest among men who received a communication including narrative message evidence (see Table 1). Post-hoc comparisons with Bonferroni correction showed that the effect of narrative evidence differed significantly from that of the mere assertion of increased risk, whereas the effect of statistical evidence did not differ from this control message. Descriptively, only risk perceptions of men who had received narrative message evidence were higher than those of men in the no information control condition, although this difference was not statistically significant. The effect of health risk message type on perceived severity was, as expected, not significant, \( F(3, 114) = .70, ns, \eta^2 = .02 \).

A further ANOVA revealed that the effect of health risk message type on intention to obtain vaccination was marginally significant, \( F(3, 111) = 2.19, p = .094, \eta^2 = .06 \). Inspection of mean intention scores over conditions illustrated that these paralleled effects observed for perceived risk for infection with HBV. As expected, participants in the narrative evidence condition on average had the highest intention to obtain vaccination against HBV.

In additional two-way ANOVA analyses we tested whether the effects of message type on risk perception and intention to obtain vaccination were contingent on level of education or relationship status. No such interaction effects were found, however, nor were there any significant main effects of education or relationship status.

**Mediation of Effect on Intention**

To assess whether the effect on risk perception mediated the effect of health risk message type on intention, we used an approach that conforms to the procedures outlined by Baron and Kenny (1986). Three dummy variables were computed to represent the four health risk message condition (no information vs. other; statistical evidence vs. other; narrative evidence vs. other). We then first regressed intention to obtain vaccination (i.e., the dependent variable) on the three dummy variables representing the independent variable, and observed a significant effect of the dummy variable coding the narrative evidence condition versus the other three conditions (\( \beta = .23, p < .05 \)), lending further support to the expected superiority of narrative evidence in promoting HBV-vaccination. Next, we regressed risk perception (i.e., the proposed mediator) on the three dummy variables coding the independent variable, and equally obtained a significant effect of the dummy variable coding the effect of narrative evidence against the other conditions (\( \beta = -.31, p < .01 \)). In a third regression analyses, the effect of risk perception on intention to obtain vaccination also proved significant (\( \beta = -.32, p < .001 \)). Finally, we regressed intention onto the dummy variables representing health message conditions as well as on risk perception. In this analysis, the previously significant effect of the dummy variable that coded narrative evidence versus all other message conditions failed to achieve conventional levels of statistical significance (\( \beta = .15, ns \)), while the effect of risk perception retained its significance (\( \beta = -.29, p < .01 \)). A subsequent Sobel-test of mediation (Aroian version, \( z = \frac{a*b}{\sqrt{a^2*b^2 + a^2*sb^2 + b^2*a^2}} \); Baron & Kenny, 1986) proved significant (\( Z = 2.20, p < .05 \)). Thus, the effect of health-risk message type on intention was indeed mediated by message-induced differences in risk perception.

**Discussion**

Over the past decades, theorists have proposed, and research has shown, that the perception of some personal risk is a critical determinant of the initiation of any health behavior change (see De Wit, Das, & De Hoog, 2006). In the practice of ‘real life’, however, it has proven difficult to convey health risks and influence individuals’ risk perceptions (Rotman et al., 2003). Receivers of health risk information tend to consider themselves relatively invulnerable to (health) threats (e.g., Weinstein, 1982, 1984), discount the seriousness of their personal health risk (e.g., Ditto & Croyle, 1995), extensively counterargue health risk information (e.g., Liberman & Chaiken, 1992), and better remember information that is consistent with the idea that they are healthy (Kiviniemi & Rothman, 2006). To the best of our knowledge, the findings we present in this paper are the first to suggest that providing message recipients with narrative evidence supporting a health risk assertion can be an effective strategy to increase individuals’ perception of their personal health risk, and promote at-risk individuals’ motivation to engage in protective health behavior, as illustrated by our study of vaccination against infection with HBV among MSM.

Effective health risk communication may need to circumvent defensive responses (also see Kiviniemi & Rothman, 2006), which may serve the down-regulation of negative affect that can be elicited by threatening health information, such as worry, fear, dread or anxiety (see De Wit, Das, & de Hoog, 2007). We tentatively propose that presenting individuals with narrative evidence is effective in persuading message recipients because this type of message content is less subject to defensive responding than statistical evidence is. The present study is an initial investigation that did not directly test this reduced defensiveness account, and future research is hence needed to assess potentially mediating cognitive-affective processes. Notably, a message containing a

---

**Table 1**

**Mean Scores (SD) Regarding Risk Perception, Perceived Severity, and Intention to Obtain Hepatitis B Vaccination by Type of Message Evidence Included in a Health Risk Communication**

<table>
<thead>
<tr>
<th>Type of Evidence</th>
<th>No evidence control( N = 38 )</th>
<th>Mere risk assertion( N = 30 )</th>
<th>Statistical evidence( N = 26 )</th>
<th>Narrative evidence( N = 24 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk perception</td>
<td>3.05 (.24)( a,b )</td>
<td>2.23 (.27)( a )</td>
<td>2.89 (.29)( a,b )</td>
<td>3.45 (.30)( b )</td>
</tr>
<tr>
<td>Severity</td>
<td>6.18 (.18)</td>
<td>5.99 (.21)</td>
<td>6.17 (.22)</td>
<td>5.78 (.23)</td>
</tr>
<tr>
<td>Intention</td>
<td>5.00 (.33)</td>
<td>4.14 (.38)</td>
<td>4.40 (.40)</td>
<td>5.31 (.41)</td>
</tr>
</tbody>
</table>

Note. Values with different subscripts differ significantly (\( p < .05 \)).
personal account provided by a similar other, such as a peer group member, may be more difficult to discount than prevalence data because its influence depends less on cognitive elaboration of message content (Green & Brock, 2000). While the influence of statistical evidence is thought to be mostly contingent on reflective reasoning processes (Slater & Rouner, 1996), narratives are assumed to also influence persuasion through implicit, impulsive processes that rely on associative links, and motivational orientations (cf. Strack & Deutsch, 2004). At this implicit processing level, it may be much harder, if not impossible, to discount personally relevant risk information.

Limitations and Future Directions

The present study focused on the promotion of intentions to obtain vaccination by increasing perceptions of personal risk concerning infection with HBV among MSM. This focus was motivated by the observation that perceived personal risk is a pivotal determinant of precautionary intentions in this domain (De Wit et al., 2005). Of course, risk perceptions are not the sole determinant of MSMs intention to obtain vaccination against HBV. Notably, previous studies have also found that limited health care provider communication about stigmatized behavior negatively influences vaccination uptake (Rhodes & Hergenrather, 2002), as does potential social stigma (i.e., the fear that one may be considered promiscuous; De Wit et al., 2005). Future research may want to examine the separate and joint effects of health messages that target personal risk perceptions and fear of stigmatization and other perceived (social) barriers in increasing vaccination intentions. In addition, while intentions are important theoretical predictors of behavior, their empirical association with action is far from perfect (for an overview, see Sheeran, 2002). To enable more stringent testing of the persuasive effect of narrative message evidence, subsequent research should include assessments of actual health behavior.

The presented data were obtained in a convenience sample of MSM who were recruited via the Internet. This method of data collection generates more varied samples of MSM than more traditional survey methods (e.g., Ross, Tikkanen, & Månnsson, 2000), such as recruitment through the written media (gay magazines) or outreach activities on sex-on-premises venues (sex clubs and the public space). Nevertheless, considering the specific characteristics of the target audience, the present findings can only tentatively be extrapolated to other populations, including different strata of MSM. For instance, previous work in intravenous drug users has shown that the social norm they perceive (i.e., what significant others think of vaccination) is an important factor promoting vaccination against HBV (Schutten, De Wit, & Van Steenbergen, 2002). Furthermore, the presented findings cannot be translated to other types of health behaviors that may be predicted by different factors.

Conclusions

Health educators often face the difficult task of conveying an unwelcome message to an audience. In the present study, we assessed the effectiveness of different types of message content in persuading MSM of their personal health risk regarding infection with HBV. We found that narrative evidence in the form of the personal account of a member of the target audience’s peer group was more effective in persuading individuals’ of their health risk than was statistical evidence that focused on objective facts and figures. Whereas statistics may reveal the objective reality of all members of a target audience, narratives may do a better job of approaching the reality of each individual receiver. Thus, narrative health risk messages have the potential to contribute to the promotion of a broad range of health behaviors.

References


