Health Psychology
2008, Vol. 27, No. 1, 87–92

0278-6133/08/$12.00 DOI: 10.1037/0278-6133.27.1.87

Perceptions of Absolute Versus Relative Differences Between Personal and Comparison Health Risk

Dan Mason, A. Toby Prevost, and Stephen Sutton
University of Cambridge

Objective: To explain inconsistent results in previous attempts to determine whether, when presented with health risk information, people focus primarily on information about their own risk status or on a comparison with others. ***Design:*** A randomized between-groups experiment in which participants were presented with hypothetical cardiac risk information. We examined whether affective responses were primarily sensitive to the relative difference between personal and comparison risk, rather than the absolute difference. ***Main Outcome Measures:*** Participants' negative affective response to the risk information. ***Results:*** When relative differences were held constant, participants' responses were independently influenced by both personal risk and comparative standing, effects that were greatly attenuated when absolute differences were held constant. When maintaining constant absolute differences, personal and comparison risk information appeared to interact. ***Conclusion:*** Previous studies tended to maintain constant absolute risk differences and so may have underestimated the impact of personal risk information. Participants' responses were sensitive to the way the risk difference was constructed. Basing experimental design decisions on assumptions about the information participants will respond to can lead to misinterpretations of the basis of risk judgments.

Keywords: risk, social comparison, cardiac, relative risk, absolute risk

There is a growing acceptance that patients in primary and secondary care should be more involved in their own care (Elwyn, Edwards, & Kinnersley, 1999; Kravitz & Melnikow, 2001). One consequence of this is that it is becoming increasingly common for patients to encounter quantitative information regarding their personal risk of developing certain chronic diseases or information regarding the risks associated with different treatment options. Similarly, information about an abundance of risk factors and tools for estimating personal risk may be encountered by members of the general public on the Internet (e.g. President and Fellows of Harvard College, 2004), in health education materials and in newspapers and magazines. Tools such as CardioRisk Manager (Deanfield, Martin, & Vallance, 1999) have been developed to support the calculation and presentation of personal risk information to patients, alongside information about average risk (Hingorani & Vallance, 1999). Given these trends, it is important that we understand the way in which people interpret and respond to information about their own absolute risk presented with an absolute comparison risk.

Klein (1997) presented participants with hypothetical information about their own personal risk of having a car accident or contracting a fictitious pancreatic disease, along with information about the risk for the average person based on their age and sex. By independently manipulating the hypothetical personal and average risk levels, Klein was able to distinguish empirically between the influences of the two sources of risk information on cognitive and affective responses. He found that participants responded only to the comparison information. Those who were told they were above average were more concerned than those who were told they were below average, but their responses were not influenced by their absolute level of personal risk. This tendency was so strong that participants told their risk was 30% when the average was 10% were more concerned than participants told their risk was 60% when the average was 80% (Klein, 1997). This is striking because it implies that presenting detailed calculations of personal risk estimates to patients is unnecessary, and all that needs to be presented in order to arouse concern in the patient is whether the patient is better or worse off compared with their peers. Potentially, this has important implications for how family doctors might discuss chronic disease risk with their patients and also for how the results of screening tests or genetic testing might be presented.

There have been a number of attempts to replicate and expand on this result, but findings have been inconsistent (French, Sutton, Marteau, & Kinmonth, 2004; Harris & Smith, 2005; Harris, Sparks, & Raats, 2002; Klein, 2003). The basic approach has been to select low and high levels of personal risk (e.g. 30% and 60%) and to form independent favorable and unfavorable comparison conditions by presenting average risk at a fixed magnitude above and below personal risk (e.g. 30% vs. 10%; 30% vs. 50%; 60% vs. 40%; 60% vs. 80%). This orthogonal manipulation of personal and comparison information permits conclusions to be drawn from the main effects associated with personal and comparison factors about the independent influences of the two sources of risk information. However, the pattern of results across these studies does not give a firm indication of which source of information has the

Dan Mason, A. Toby Prevost, and Stephen Sutton, General Practice and Primary Care Research Unit, Institute of Public Health, University of Cambridge, United Kingdom.

Correspondence concerning this article should be addressed to Dan Mason, General Practice & Primary Care Research Unit, University of Cambridge, Institute of Public Health, Robinson Way, Cambridge CB2 0SR, UK. E-mail: dm316@medschl.cam.ac.uk

greater influence over responses. While some studies have confirmed that comparison information dominates in affective responses (Harris et al., 2002, Study 1), others have found that personal information dominates (Harris & Smith, 2005; Harris et al., 2002, Study 2a). Yet other studies have found that neither effect dominates (French et al., 2004; Harris et al., 2002, Study 2b; Klein, 2003). A further complication is the presence of interaction effects between personal and comparison information (French et al., 2004; Klein, 1997; Harris et al., 2002), which are difficult to interpret and may obscure one or both of the main effects. These studies used different sample characteristics, a variety of hypothetical scenarios, and a variety of associated risk values, which may explain some of the inconsistencies. In particular, we need more information about the profile of individuals' affective responses to this type of risk information across a range of risk levels before we can interpret these mixed findings.

This paper focuses on three possible features of the paradigm and the way it has been implemented that could lead to unreliable results and contribute to difficulties in interpretation. First, previous studies have tended to maintain constant absolute differences between personal and comparison risk. That is, average risk is commonly held at a fixed absolute distance from personal risk, rather than a fixed relative distance[1]. Various researchers have considered the effects on risk perception and decision making of presenting differences between risk levels in absolute versus relative terms (Gigerenzer & Edwards, 2003; Nexøe, Gyrd-Hansen, Kragstrup, Kristiansen, & Nielson, 2002; Skolbekken, 1998; Stone, Yates, & Parker, 1994). However, there has been no empirical research to date that has tried to establish directly whether, when faced with judging the comparative magnitude of two absolute risk levels, people focus primarily on the relative or absolute difference. Previous authors have noted that absolute or relative differences may confound when trying to distinguish the effects of personal and social comparison information, and that empirical work is needed to disentangle their influences (French et al., 2004; Harris et al., 2002; Klein, 2003). When absolute differences are constant across personal risk levels, then absolute difference and personal risk will interact to produce values of relative difference. These values of relative difference will be negatively correlated with personal risk. As such, if people respond according to relative differences, maintaining constant absolute differences could attenuate the main effect of personal risk. Likewise, when relative differences are constant across levels of personal risk, personal risk and absolute difference are positively correlated. If people focus on absolute differences, then comparison differences will be perceived as greater at higher levels of personal risk, and the main effect of personal risk might be augmented. In each case, a failure to control an aspect of the information that the participant uses in making a judgment leads to a distorted pattern of effect sizes.

Second, previous studies have tended to combine favorable and unfavorable comparisons together as a single "comparison" factor, when it is plausible that responses to favorable and unfavorable comparisons are qualitatively different and may operate according to different principles. This seems especially likely in the health domain where favorable and unfavorable comparisons could have qualitatively different and mutually exclusive implications for a person's lifestyle choices or expected quality of life. Indeed, previous studies have found evidence for qualitative differences between favorable and unfavorable comparisons (French, Hevey, Sutton, Kinmouth, & Marteau, 2006; French et al., 2004).

Third, most of the previous studies focused on single differences between personal and comparison difference. Consequently, there is a lack of information about the sensitivity of participants' responses to the magnitude of the comparison difference and how this varies across personal risk magnitudes. In other words, we do not know how participants' affective responses vary as a *function* of personal and comparison risk information. This information will be important in interpreting participants' differential responding to different sources of information and may shed light on the inconsistent pattern of results thus far observed.

In the current study, we employed a factorial design in which we manipulated level of personal risk and comparison risk difference. We focused solely on unfavorable comparisons, where the participant's personal risk is above the average risk, as these are more likely to be presented in a clinical consultation. We varied the magnitude of the comparison difference, in order to examine the profile of participants' responses to this magnitude. In so doing, we manipulated both the absolute and relative differences between personal and comparison risk as personal risk varies. We predicted that (a) participants would report higher levels of negative affect when personal risk is high than when it is low; (b) participants would report higher levels of negative affect as comparison difference increases; (c) there would be a difference in the response profile when absolute rather than relative differences are held constant, such that the interaction term would differ significantly in magnitude between each factorial. If participants focused on relative scale in judging the difference, we expected to find a larger interaction when maintaining constant absolute differences than when maintaining constant relative differences. If participants focused on absolute differences, we expected to find the reverse.

Method

Participants

Participants were reactively recruited via links from four psychology-related web sites. These sites either maintained specific lists of online experiments or were general academic or general psychology interest resources — they are listed in the Appendix. During five months of data collection, 868 people completed the experiment. A check box was provided for participants to indicate if they were researchers or teachers, or if they were just visiting out of interest and not to take part in the experiment. Based on this criterion, 54 (6.2%) participants were excluded from the data set. In order to minimize the probability of multiple submissions from the same participant being included (Birnbaum, 2004; Reips, 2002), we excluded all participant records sharing an IP address with a previous participant who had seen the vignette, i.e. who was no longer naïve. There were 131 (15%) participants fulfilling this criterion, leaving a total of 683. Of these, 71.4% were female, with a median age of 27 years old (inter-quartile range 21 to 38 years). They tended towards being

[1] One exception is French et al. (2004) Study 2. Harris & Smith (2005) also held relative differences constant, but using natural frequency expressions of very small probabilities as opposed to the percentage expressions of quite large probabilities under consideration here.

well educated, with a median age at completion of last full-time education of 21.

Procedure

The experiment was hosted on a publicly accessible Web server and ran in the participants' own Web browser windows. Once consent had been obtained, the participants completed a short demographic questionnaire before being presented with a vignette that read, "We would like you to **IMAGINE VIVIDLY** that you are at a consultation with your GP. You undergo a lot of tests, including an assessment of your diet, blood pressure, and smoking habits. On the basis of this, your GP tells you that your risk of having a cardiac event (such as a heart attack, angina, heart failure) is ***x*% in the next 10 years.** This means that you stand an *x*% chance of having a cardiac event in the next 10 years. Your GP also tells you that on average, other people the same age and sex as you stand a *y*% chance of having a cardiac event in the next 10 years."

Participants were randomly assigned to one of ten conditions which determined the values of *x* (personal risk) and *y* (comparison risk). The possible combinations, A to J in Table 1, were selected so that by recoding the comparison difference factor *either* absolute *or* relative differences between personal and comparison risk were held constant. This was achieved by including pairs of interchangeable cells at high personal risk (cells E to J). For example, when absolute differences were held constant, cell B at low personal risk was compared with cell F at high personal risk (difference is −4 in each case); and cell D at low personal risk was compared with cell H at high personal risk (difference is −8 in each case). When relative differences were held constant, cell B at low personal risk was compared with cell H at high personal risk (difference was × 0.6 in each case); and cell D at low personal risk was compared with new cell J at high personal risk (difference was × 0.2 in each case).

Having read the vignette the participants proceeded to a page where they responded to the following items assessing negative affect and perceived severity of cardiac events: (a) If you had just been given this information in a consultation with your GP, how disturbed would you now be? (*Not at all disturbed* = 1; *Very disturbed* = 10); (b) If you had just been given this information in a consultation with your GP, how worried would you now be? (*Not at all worried* = 1; *Very worried* = 10); (c) How serious do you think it is for a person the same age and sex as you to have a cardiac event such as a heart attack, angina or heart failure? (*Not at all serious* = 1; *Very serious* = 10); (d) How common do you think cardiac events such as heart attacks, angina and heart failure are amongst people the same age and sex as you? (*Not at all common* = 1; *Very common* = 10). The 'disturbed' and 'worried' items correlated very highly ($\alpha = .93$) and were summed to create a single negative affect scale (range 2 to 20). This "negative affect" measure was based on the only measure to have been used consistently across all of the previous studies we have considered.

Analysis

We constructed two separate 2 × 4 factorials, as illustrated in Table 1, with negative affect as the dependent variable. Personal risk had two levels and comparison difference had four levels, defined in one factorial by absolute differences from personal risk, and in the other factorial by relative differences from personal risk. The relative size and sign of the two-way interaction in each factorial yield information about the profile of participants' responses with respect to personal and comparison risk information, indicating whether participants responded primarily to absolute or relative comparison differences. We tested a specific hypothesis

Table 1
Combinations of Personal and Comparison Risk Information for Maintaining Either Constant Absolute or Constant Relative Differences at Each Level of Personal Risk

		Increasing comparison difference			
Low personal risk (10%)	Cell	A	B	C	D
	Personal %	10	10	10	10
	Comparison %	8	6	4	2
	C − P	*−2*	*−4*	*−6*	*−8*
	C/P	*0.8*	*0.6*	*0.4*	*0.2*
High personal risk (20%)	Cell	E	F	G	H
	Personal %	20	20	20	20
	Comparison %	18	16	14	12
	C − P held constant	*−2*	*−4*	*−6*	*−8*
	Cell	F	H	I	J
	Personal %	20	20	20	20
	Comparison %	16	12	8	4
	C/P held constant	*0.8*	*0.6*	*0.4*	*0.2*

Note. There are 10 possible combinations of risk values, A to J. For analysis, different sets of cells are selected to form two 2×4 factorials of personal risk crossed with comparison difference; with ABCD at low personal risk, and *either* EFGH (constant absolute differences) *or* FHIJ (constant relative differences) at high personal risk. Rows in italic type give absolute and relative differences between the percentage risk values.

regarding the form of the interaction in a planned contrast analysis. We predicted that the two factorials would differ in the extent to which they deviated from a parallel response of increasing negative affect to increasing comparison difference across levels of personal risk. So, we were most interested in the effect size associated with a linear interaction (or non-parallel linear response) in each factorial, where the four respective levels of comparison difference are assigned the weights −3, −1, +1, +3 at low personal risk, and + 3, +1, −1 −3 at high personal risk. We tested the statistical significance of the difference between the interaction terms from the two factorials using a bootstrap analysis performed using the *R* statistical package.

Results

The influence of level of personal risk and difference from comparison risk on negative affect was examined in a 2 × 4 between groups ANOVA, *maintaining constant relative differences* between personal risk and comparison risk (from Table 1, cells ABCD at low personal risk, and cells FHIJ at high personal risk). There was a significant main effect of level of personal risk, $F_{1,530} = 9.10$, $p < .01$, $\eta_p^2 = .017$, such that negative affect was higher at high personal risk than at low personal risk, $M = 12.87$, $SD = 4.81$; $M = 11.67$, $SD = 4.57$, respectively. There was a significant main effect of comparison difference, $F_{3,530} = 8.19$, $p < .01$, $\eta_p^2 = .044$, such that as comparison difference increased, so did negative affect (see Figure 1, upper half). The omnibus interaction was not significant, $F_{3,530} < .01$, $p = .99$, $\eta_p^2 < .001$, nor was the planned linear interaction contrast, $F_{1,530} = .01$, $p = .91$, $\eta_p^2 < .001$. The marginal means at each level of personal risk and comparison difference are illustrated in the upper half of Figure 1.

The influence of level of personal risk and difference from comparison risk on negative affect was examined in a 2 × 4 between groups ANOVA, *maintaining constant absolute differences* between personal risk and comparison risk (from Table 1, cells ABCD at low personal risk, and cells EFGH at high personal risk). There was no significant main effect of level of personal risk, $F_{1,523} = .85$, $p = .36$, $\eta_p^2 = .002$, and a significant main effect of absolute comparison difference, $F_{3,523} = 2.93$, $p < .05$, $\eta_p^2 = .017$. The omnibus interaction was non-significant, $F_{3,523} = 1.77$, $p = .15$, $\eta_p^2 = .010$, but the planned linear interaction contrast was significant, $F_{1,523} = 4.72$, $p < .05$, $\eta_p^2 = .009$. This interaction is illustrated in the lower half of Figure 1.

A bootstrap analysis using the *R* statistical package was performed to assess whether the different patterns of linear interaction seen between personal risk and each of relative difference and absolute difference were consistent with chance effects alone. For 10,000 re-samples stratified by experimental group, both linear interaction terms were re-fitted, and the *t*-statistic for the absolute differences interaction was more negative than that for the relative differences interaction with one-sided $p = .022$. The effect size associated with the absolute differences linear interaction is not consistent with chance and is significantly greater than that associated with the relative differences linear interaction ($p < .05$).

Harris et al. (2002) suggested that level of average risk might act as a confound on affective measures when it correlates with personal risk, as higher average (comparison) risk may lead participants to assume higher prevalence and hence lower severity

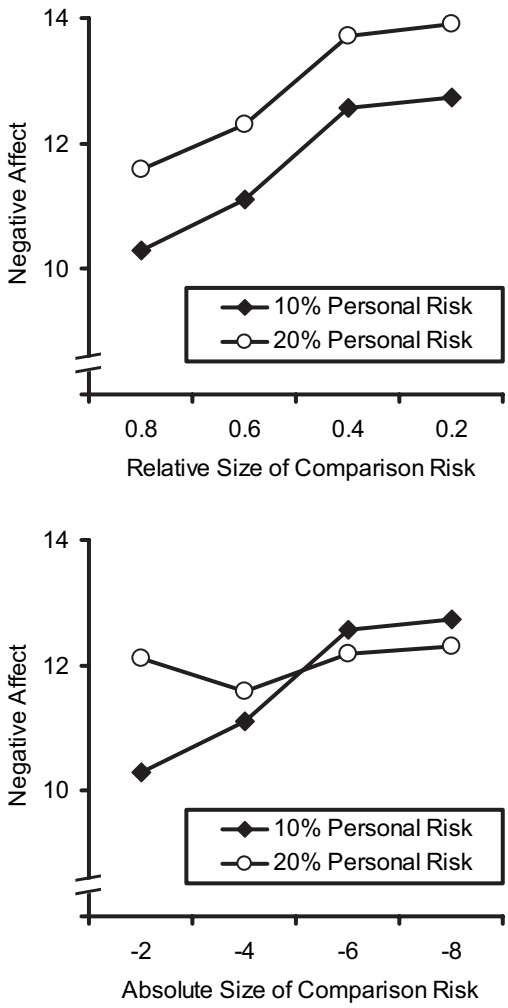

Figure 1. Negative affective response to personal and comparison (average) risk information, at low and high personal risk, with different levels of comparison risk difference; maintaining constant absolute differences (lower half) and relative differences (upper half). The standard errors across the point estimates were fairly uniform, ranging from 0.54 to 0.61.

(e.g. Jemmott, Ditto, & Croyle, 1986). However, we found no direct or interactive effects of personal risk and comparison difference on participants' judgments of the severity and prevalence of cardiac events, whether controlling for relative or absolute differences. As such, this confound cannot explain our results, and we do not report on it any further.

Discussion

When we maintained constant relative differences between personal and comparison risk, we observed significant independent responses to the varying magnitude of the two sources of risk information. First, participants responded to the magnitude of personal risk, such that high personal risk (20%) led to greater negative affect than low personal risk (10%), independently of comparison information. Second, participants responded to the magnitude of the difference between personal and comparison risk,

such that as the difference increased, so did negative affect, again independently of personal risk. Furthermore, the planned contrast showed that the increasing negative affective responses to increasing relative differences between personal and comparison risk were parallel (or were not significantly non-parallel) at low and high personal risk. While participants' affective responses to such a vignette may be influenced by many factors, the above findings permit us to conclude that among these factors were two independent, additive components of affective response: (a) a response to magnitude of personal risk; and (b) a response to relative difference between personal risk and comparison risk.

When we maintained constant absolute differences, there was an effect of comparison difference but no effect of magnitude of personal risk. The planned contrast analysis showed that negative affective responses to increasing absolute comparison difference were significantly non-parallel between low and high personal risk. Inspection of the marginal means displayed in the lower half of Figure 1 suggests that, while there was an increasing response to comparison difference at 10% personal risk, this increase was strongly attenuated at 20% personal risk. This can be accounted for by our conclusion above, that affective responses to comparison difference were sensitive to relative difference between personal and comparison risk.

When absolute differences are held constant, relative differences correlate negatively with personal risk. This could lead to a lesser role for comparison difference at higher levels of personal risk. Four of the nine previous experiments show some evidence of an interaction between personal and comparison information on negative affect. Harris et al. (2002, studies 1 and 2b) found significant interaction effects, and Klein (1997, studies 1.1 and 1.2) noted interaction-like trends. In each case, this represented an apparently lesser role for comparison difference at higher levels of personal risk. It is possible that maintaining constant absolute differences between personal and comparison risk information contributed to these effects.

If our interpretation that participants were responding to relative differences is correct, then the negative correlation between relative difference and personal risk could have attenuated the main effect of personal risk when absolute differences were held constant. When relative differences were held constant and there was no interaction between personal and comparison information, the effect sizes associated with personal and comparison information were $\eta_p^2 = .017$ and $\eta_p^2 = .044$, respectively. When absolute differences were held constant, so that relative differences were negatively correlated with personal risk and there was an interaction between personal and comparison information, the effect sizes reduced to $\eta_p^2 = .002$ and $\eta_p^2 = .017$, respectively. Five of the nine previous experiments make no mention of interaction effects on negative affect (French et al., 2004, studies 1 and 2; Harris & Smith, 2005; Harris et al., 2002, study 2a; Klein, 2003, study 5) and all report significant main effects of personal risk. None of the experiments in which interaction effects or trends were reported found main effects of personal risk. This is consistent with our argument that the negative correlation between relative difference and personal risk, when absolute differences are held constant, attenuates the main effect of personal risk.

Participants' affective responses to being told their risk was above average varied according to the relative size of the comparison difference. This conflicts with Klein (2003) who found in Study 5 that varying the magnitude of difference between personal risk and comparison risk had no influence on affective responding. Klein found that the important aspect of the information was whether or not the participant was told they were above or below average risk. It is possible that in Klein's (2003) Study 5, any component of affective response that was due to the distance of personal risk from the comparison risk was dwarfed by the effect of being given a favorable rather than an unfavorable comparison, a factor that was deliberately omitted from the design of the current study for simplicity. Furthermore, there may have been attenuation of comparative effects due to absolute differences being held constant at different levels of personal risk, as we have reported here—although note that the current study does not inform us of patterns of responding when comparisons are favorable for the participant.

We note that further empirical work would also be required to draw conclusions about response patterns at very low risks (e.g. $<1\%$) or across a wider range of personal risk values and comparison differences. Aside from the limits of the risk values chosen for investigation, however, the current study is mainly limited by the recruitment strategy. Previous authors have considered whether the use of student samples and comparisons across the literature between US and UK samples may account for some of the inconsistencies between studies (French et al., 2004; Harris & Smith, 2005; Harris et al., 2002; Klein, 2003). Recruiting reactively from other websites meant we obtained a sample that was US-dominated, but generally of mixed nationality (58% US, 15% UK, 27% elsewhere or not identified). We also found that around one third of respondents were students. The median age of 27 years may not have been the most appropriate for the topic under consideration (c.f. French et al., 2004), and our findings require replication with more specifically targeted populations to whom the subject matter is more pertinent. Nevertheless, the study makes an important methodological point and has implications for the interpretation of previous and future studies.

The measures used in the current study were appropriate as they were the only measures used consistently throughout the previous studies we set out to explain. We are, however, aware that there are possibly more sensitive measures of affective reaction than those used here (e.g. Iyengar, Wells, & Schwartz, 2006) and that even physiological measures might be useful in this context (Slovic, Peters, Finucane, & MacGregor, 2005)[2]. Future studies should pay close attention to the sensitivity and validity of measures of affective reaction.

Whether to maintain constant absolute or relative differences between risk levels may seem an arbitrary decision at the planning stage of an experiment, but in this case either choice would have led to very different conclusions. It is important to be aware that the features of the information we seek to control may well not be the features of the information that govern participants' responding. In the current study, participants were not prompted to focus on the relative difference between personal and comparison risk and were simply presented with two absolute risk levels; yet they appear to have responded to relative information. One might speculate that participants were simply extracting the information

[2] We would like to thank an anonymous reviewer for the suggestion that this work could be extended using alternative measures.

they wanted in order to help them interpret the scenario. Another possibility, based on ideas put forward by Slovic et al. (2005), is that the detailed numerical information only holds meaning for the participants to the extent that it elicits an affective reaction. Our data could indicate that it is the relative difference that drives this affective reaction more than the absolute difference and, as such, holds the key to the meaning extracted by the participants. However, it is difficult to infer universal mechanisms and, hence, make specific practical recommendations from any single study in this paradigm, as participants may be responding to systematic numerical artifacts that were not apparent to the investigators when designing the experiment.

Our data illustrate two important points. First of all, it appears that the way in which the psychological variables "personal risk" and "comparison risk difference" are conceptualized and implemented by the experimenter can have a profound effect on the observed response profiles and hence on conclusions that are drawn. Second, participants' affective responses were sensitive to the magnitudes of both personal risk and comparison risk difference, and these effects differed in clarity depending on how the psychological variables were conceptualized. We have seen that by focusing their designs on absolute differences, previous studies may have underestimated the independent influence of the participants' own personal status. Important questions remain, such as whether the findings are robust across different outcomes and risk levels with better targeted populations, whether similar processes apply to favorable comparisons, and whether there are aspects of the communication that can influence the extent to which people differentially focus on personal and comparison information.

References

Birnbaum, M. H. (2004). Human research and data collection via the Internet. *Annual Review of Psychology, 55,* 803–832.

Deanfield, J., Martin, J., & Vallance, P. (1999). *CardioRisk Manager: A program for the prevention of heart disease and stroke.* London: British Medical Journal Books.

Elwyn, G., Edwards, A., & Kinnersley, P. (1999). Shared decision-making in primary care: The neglected second half of the consultation. *British Journal of General Practice, 49,* 477–482.

French, D. P., Hevey, D., Sutton, S., Kinmonth, A. L., & Marteau, T. M. (2006). Personal and social comparison information about health risk: Reaction to information and information search. *Journal of Health Psychology, 11,* 497–510.

French, D. P., Sutton, S. R., Marteau, T. M., & Kinmonth, A. L. (2004). The impact of personal and social comparison information about health risk. *British Journal of Health Psychology, 9,* 187–200.

Gigerenzer, G., & Edwards, A. (2003). Simple tools for understanding risks: From innumeracy to insight. *British Medical Journal, 327,* 741–744.

Harris, P., & Smith, V. (2005). When the risks are low: The impact of absolute and comparative information on disturbance and understanding in US and UK samples. *Psychology and Health, 7,* 319–330.

Harris, P., Sparks, P., & Raats, M. (2002). Theoretical and applied issues in the provision of absolute and comparative risk information. *Risk, Decision and Policy, 7,* 153–163.

Hingorani, A. D., & Vallance, P. (1999). A simple computer program for guiding management of cardiovascular risk factors and prescribing. *British Medical Journal, 318,* 101–105.

Iyengar, S. S., Wells, R. E., & Schwartz, B. (2006). Doing better but feeling worse: Looking for the "best" job undermines satisfaction. *Psychological Science, 17,* 143–150.

Jemmot, III, J. B., Ditto, P. H., & Croyle, R. T. (1986). Judging health status: Effects of perceived prevalence and personal relevance. *Journal of Personality and Social Psychology, 50,* 899–905.

Klein, W. M. P. (1997). Objective standards are not enough: Affective, self-evaluative and behavioral responses to social comparison information. *Journal of Personality and Social Psychology, 72,* 763–774.

Klein, W. M. P. (2003). Self-prescriptive, perceived and actual attention to comparative risk information. *Psychology and Health, 18,* 625–643.

Kravitz, R. L., & Melnikow, J. (2001). Engaging patients in medical decision making. Editorial. *British Medical Journal, 323,* 584–585.

Nexøe, J., Gyrd-Hansen, D., Kragstrup, J., Kristiansen, I. S., & Nielsen, J. B. (2002). Danish GPs' perception of disease risk and benefit of prevention. *Family Practice, 19,* 3–6.

President and Fellows of Harvard College (2004). *Your disease risk.* Received June 23, 2005, from Harvard University, School of Public Health Web site: http://www.yourdiseaserisk.harvard.edu/

Reips, U.D. (2002). Standards for Internet-based experimenting. *Experimental Psychology, 49,* 243–256.

Skolbekken, J.A. (1998). Communicating the risk reduction achieved by cholesterol reducing drugs. *British Medical Journal, 316,* 1956–1958.

Slovic, P., Peters, E., Finucane, M. L., & MacGregor, D. G. (2005). Affect, risk and decision making. *Health Psychology, 24,* S35–S40.

Stone, E. R., Yates, J. F., & Parker, A. M. (1994). Risk communication: Absolute versus relative expressions of low-probability risks. *Organizational Behavior and Human Decision Processes, 60,* 387–408.

Appendix

Participants were recruited via the following Web sites:

1. http://www.psychnet-uk.org
2. http://psych.hanover.edu/research/exponnet.html
3. http://www.socialpsychology.org
4. http://www.genpsy.unizh.ch/Ulf/Lab/WebExpPsyLab.html