Reviewer's report

**Title:** Risk Communication Formats for Low Probability Events: A study of patient preferences

**Version:** 1  **Date:** 19 October 2007

**Reviewer:** Jessica Ancker

Reviewers report:

General

This is a very interesting study that contributes to the field of visual risk communication.

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**Major Compulsory Revisions (that the author must respond to before a decision on publication can be reached)**

It is a serious limitation of the study that the authors did not screen the study sample for numeracy or health literacy. Especially in light of this limitation, the authors *must* describe the known and relevant characteristics of the study sample, especially age and educational level, as these are known to be strongly associated with graphical literacy, health numeracy, and health literacy. They must also discuss any limitations that this may introduce into the interpretation of the results; for example, if the sample was highly educated (as seems likely with a convenience sample), this limits the generalizability of the findings. The health status of the sample is also highly relevant, as stress is another relevant factor in decision making (see Slovic et al, Health Psychology, 2005 for a discussion of this topic).

The authors do acknowledge that preferred visual formats are not necessarily the most "effective" for risk communication, but this point deserves some additional discussion, as well as a clarification of the meaning of "effectiveness". For example, an egregious example of the discrepancy between preference and decision-making is Elting et al, BMJ, 1999, and others are available, including in the studies cited by the authors.

Therefore, the authors would be well-served by revising the introductory section to make other arguments about the importance of assessing patient preferences (engagement with shared decision-making, etc.).

In a related topic, on page 10, the authors claim that the study supported the hypothesis that frequency diagrams could enhance communication about low-frequency risks. This seems to be an overstatement, as (a) preferences for graphic format do not always translate into increased understanding, (b) communication processes and comprehension were not actually assessed in this study, and (c) the authors did not actually pose such a hypothesis earlier in the
paper. The actual hypothesis was that there would be differences in preferences for visual formats.

METHODS: This is an unusual application of the analytic hierarchy process. This technique is unlikely to be familiar to this audience and may deserve some more explanation (although it may be used widely, it is probably more common in organizational and environmental decision making and rarely appears in the medical literature). Why did the authors choose this method? Also, the AHP was designed to help in decisions between options that have multiple characteristics that are difficult to combine into a single preference (say, one option produces improved quality but is costly, and another is cheap but results in somewhat lower quality). However, it appears that the participants were asked only to express a preference between each pair of visuals, not to rate or examine different characteristics of the visuals. Is this correct, or have I misunderstood what the authors did? If I am correct, then this represents a modification of the AHP and deserves some discussion. (If I'm wrong, then the language needs to be clarified.)

Another point that requires explanation is the use of bar charts and pie charts to illustrate the preference ratings. In a study of preference for graphics, it seems very unusual to use a completely different set of graphics in the assessment instrument. Can the authors clarify this?

On a related point, in Figure 5, what is the meaning of the menu window in the upper left-hand corner that says "baseball vs ..." etc.?

Also in the figures, a limitation to the generalizability of this study is the use of red and green dots in the icon display, given the prevalence of red-green color-blindness among males. I assume that no subject gave evidence of color-blindness?

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Minor Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct)

Statistics: The authors should clarify that with the Bonferroni, the overall alpha was kept at 0.05, not the pairwise comparison alphas. Also, to be a stickler for accuracy, it was the alpha level that was kept at 0.05, not the p value.

Last line of page 9: The authors should clarify that this increase was an absolute increase, and should also provide the baseline risk to persuade us of their point, which is that this was a very small increase.

Authors must state what the values in the boxplots are (e.g., median, interquartile range, range, etc.), and how the outliers were defined (e.g., 3 SD above the mean, etc.). In general, more descriptive legends would be helpful.

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Discretionary Revisions (which the author can choose to ignore)
The first paragraph of the discussion is the same as the material in the introduction and is thus redundant. Use the discussion to go further!

On page 4, last sentence of second paragraph is garbled - perhaps should read "change in *risk* of disease." The same garbling occurs the next time the Gigerenzer studies are cited in the Discussion.

**What next?:** Accept after minor essential revisions

**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Needs some language corrections before being published

**Statistical review:** Yes, and I have assessed the statistics in my report.

**Declaration of competing interests:**

I declare that I have no competing interests in relation to this paper.