

DIGEST OF EMPIRICAL WORK ON THE EFFECTS OF DIFFERENT WAYS OF PRESENTING INFORMATION

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1. ABSTRACT

This article is a literature review of experiments that try to measure the effects of manipulating the presentation of information for humans. The main themes to be drawn out are (1) **TASK**: what task does the participant carry out? (2) **MEASURES**: what aspect of the participant's behaviour or performance is measured? (i.e., what are the dependent variables?) (3) **MANIPULATIONS**: what is manipulated? (usually called 'format' or 'presentation type', this is the independent variable, the manipulation that will induce varying performance in the subject).

2. PAPERS

2.1. Bisantz, Marsiglio, & Munch, 2005: Displaying uncertainty: Investigating the effects of display format and specificity

- **Task** Simulated stock purchase task, online, over 3 days. Betting on stock that was either profitable or unprofitable. Participants were supplied with updating probabilities that the stock would be profitable, presented in different formats.
- **Measures** Total profit; when the participants made decision to purchase; others...
- **Manipulations** Format of information about probabilities: degraded and not degraded symbols, specific numbers and less specific numbers, where greater specificity was achieved by a greater number of classifications, i.e., a greater (versus smaller) number of bins for the range 0% to 100%.

2.2. Dieckmann, Slovic, & Peters, 2009: The Use of Narrative Evidence and Explicit Likelihood by Decisionmakers Varying in Numeracy

- **Task** Read a simulated terrorism risk forecast. Decide whether, or not, to redeploy local police – acknowledging the attendant risk (not varied) of episodes of violent crime. Rate the risk. Rate the usefulness of the report. Rate the analyst that wrote the report. Rate trust in the analyst. All ratings 0–10.
- **Measures** Choice (redploy / don't redeploy); rating of perceived risk. Choice analysed with logistic regression. Ratings analysed with ANOVA
- **Manipulations** Presence / absence of narrative evidence to accompany statement of risk (i.e, explicit likelihood assessments) (between subjects); high / low numeracy participants (between subjects); degree of stated risk (5% vs 20%); format of stated risk (verbal, percentage, frequency; highly unlikely, 5%, 5 out of 100; fairly unlikely, 20%, 20 out of 100). Second study: The four levels of stated likelihood were: no stated likelihood, 1%, 5%, and 10%. Likelihood format 2 levels The probability that this event will occur is x%... vs We are x% sure that this event will occur...

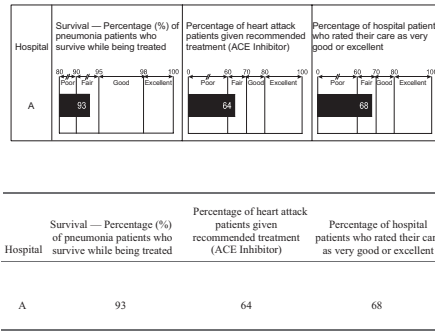


Figure 1. Study 1: Hospital information is provided in an evaluative-categories format (top) or with numbers only (bottom).

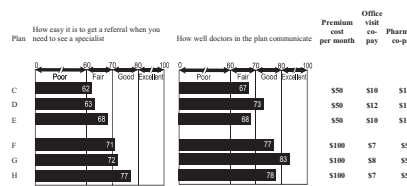


Figure 3. Studies 2 and 4: The evaluative-categories condition in an elaborated choice.

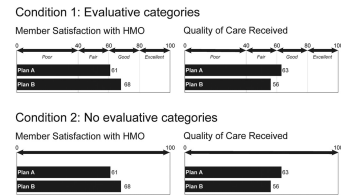


Figure 4. Study 3: The evaluative-categories manipulation. HMO = Health Maintenance Organization.

FIGURE 1. Evaluative format manipulations across several experiments

2.3. Peters et al., 2009: Bringing Meaning to Numbers: The Impact of Evaluative Categories on Decisions

- **Task** Judgement; recall of information contributing to judgement
- **Measures** Amount of use of numeric quality-of-care information; amount of reliance on an irrelevant affective state among the less numerate; depth of processing; RT
- **Manipulations** ‘evaluative meaning’: the extent to which an attribute can be mapped onto a good/bad scale. Accomplished through the addition of visual boundary lines and evaluative linguistic labels to a graphical format.
- **Other comments** Get ratings of mood before experiment in a presumed unrelated task. Between subjects manipulation on format with 2 formats (Fig. 1): with / without evaluative categories. Stimuli contain 3 sources on information (indicators). Regression to get proportion of variance explained (R^2) by each of the three indicators. Numeracy assessed by a scale from Peters, Dieckmann, et al. (2007) yielding numeracy 0 to 15, normally distributed after root transform. Assess significance of effects of indicator and interactions with numeracy (in regression model).

2.4. Waters, Weinstein, Colditz, & Emmons, 2006: Formats for Improving Risk Communication in Medical Tradeoff Decisions

- **Task** Hypothetical medical trade-off where a treatment would decrease one risk but increase another.
- **Measures** Accuracy, in terms of whether the participant correctly determined whether the treatment would increase or decrease the *total* risk.
- **Manipulations** 1. Amount of cognitive effort required to evaluate tradeoff; 2. display type for the probability information (graphical / text only); 3. percentages / frequencies, where a frequency is n in 100.
- **Other comments** Very large N (2,601) due to being internet-based.

2.5. Peters et al., 2006: Numeracy and decision making

- **Task**
- **Measures**
- **Manipulations**
- **Other comments** 4 studies, one of which is the gambiling task where people are more willing to gamble if a slight loss is involved than if no loss is involved.

2.6. Peters, Dieckmann, Dixon, Hibbard, & Mertz, 2007: Less is more in presenting quality information to consumers

- **Task**
- **Measures**
- **Manipulations**
- **Other comments** Contains a useful simple questionnaire for measuring a person's numeracy.

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