

include more ecologically valid contexts and tasks, we hope that this suggestion will not be interpreted as discounting the utility of future experimental laboratory work on base rate usage. Finally, we hope that future researchers will be inspired not to abandon the Bayesian norm as a standard of comparison but to take on the challenge of developing additional standards to which decisions can be compared, as researchers in social and political cognition have increasingly done (see, e.g., Tetlock 1992a). With these qualifications in mind, Koehler's framework provides an excellent starting point for a new generation of research on the base rate fallacy.

## The perils of reconstructive remembering and the value of representative design

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**Abstract:** (1) The miscitations of seminal experiments in the base rate literature adds to the existing database of systematic miscitations of well-known psychological experiments. These miscitations may be caused by a process of reconstructive remembering. (2) Representative design should be the methodological core of Koehler's call for ecologically valid research. This approach can benefit both basic and applied research.

There are two distinct facets of Koehler's target article on which I would like to comment, one pertaining to reconstructive remembering of scientific literature and the other pertaining to the value of representative design of experiments to both basic and applied research. Beginning with the former, it seems that a "myth" has developed that base rates are routinely ignored, a claim that is apparently at odds with the empirical evidence. This type of repeated, systematic miscitation of well-known psychological experiments has occurred more frequently than one might expect. Vicente and Brewer (1993) point out that there have been quite a few well-known psychological experiments that have become victims of repeated, systematic miscitation. In some cases, attribution errors (who did what) have been repeatedly committed, whereas in other cases the details of the experimental method or even the results themselves have been systematically miscited. Koehler cites the example of the Hawthorne studies, but other classic experiments have been systematically miscited, including: Moray's experiments on the cocktail party phenomenon, Watson's experiments with the infant Little Albert, and de Groot's memory recall experiment on expertise in chess. Brewer and I (1993) hypothesized that some of these miscitations may be due to a process of reconstructive remembering. The details of the cases we reviewed were consistent with this hypothesis, as were the findings of several memory recall experiments we conducted.

Curiously, the miscitations identified by Koehler seem to be very similar in nature to the miscitations of Allport and Postman's (1945) classic psychological study of, ironically enough, rumor. In those studies, a slide was projected onto a screen and someone in the audience then described the picture to a subject who could not view the slide. A second subject entered the room and stood beside the first subject who proceeded to tell the second subject everything the original subject could remember about what they had been told was in the picture. The procedure was repeated several times, with several additional subjects. The experimenters found that the subjects' reports often became increasingly distorted as the message was passed along to each successive subject. Both legal and psychological secondary sources have miscited the details of this study in such a way as to be consistent with a point they wanted to make, namely, that expectations can affect direct visual perception (and therefore eyewitness testimony). The actual study cannot support such a claim, since the subjects in that study were not eyewitnesses.

Similarly, proponents of the heuristics and biases view have a

thesis that they wish to promote vigorously – that human decision making is flawed. As a result, they may have inadvertently reconstructed the findings of seminal studies in the base rate literature in such a way as to be consistent with their thesis. In doing so, they have created yet another "virus" of miscitations of a well-known body of psychological research.

The other facet of Koehler's target article on which I would like to comment is the practical relevance of the base rate fallacy literature in particular, and the heuristics and biases literature in general. Many of these studies have been conducted with unrepresentative stimuli, unrepresentative tasks, and naive subjects. As a cognitive engineer who is concerned with designing systems to aid human performance, this causes me a great deal of concern. My goal is to generate research findings that generalize to operational settings so that safer, more productive systems can be introduced to support human work. Much of the basic research on decision making has been conducted under conditions that are not *representative* (Brunswik 1956) of those that can be found in the natural ecology in which human decision making typically takes place. This means that this body of research is very unlikely to generalize to naturalistic settings, a fact borne out by recent research in cognitive engineering (Klein et al. 1993). This means that this literature is of dubious value for the design of artifacts that enhance human performance. This lack of generalizability also has implications for basic research, for, as Gibson (1967/1982, p. 18) pointed out, "when a science does not usefully apply to practical problems there is something wrong with the theory of the science." The limited generalizability of basic research to naturalistic settings has led to a growing movement known as "naturalistic decision making" (Klein et al. 1993), which is very similar to Koehler's call for an ecologically valid research program that acknowledges and captures the rich influence of contextual influences on human behavior.

It is important to note that conducting research under representative conditions has potential benefits for *both* basic and applied research. It can lead to findings that are generalizable to natural settings and are therefore relevant to the engineering design of artifacts that lead to safer, more productive and reliable performance. It can also lead to a science of human behavior that generalizes beyond the confines of the experimental psychology laboratory. Clearly, the path defined by Koehler is well-worth following since the payoffs promise to be rich indeed.

In conclusion, I applaud Koehler's target article on two fronts. It is a humbling reminder of the serious consequences that can result when scientists succumb to the limitations of reconstructive remembering, and it provides a convincing argument for the value of representative design of experiments to both basic and applied research.

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## Base rates do not constrain nonprobability judgments

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**Abstract:** Base rates have no necessary relation to judgments that are not themselves probabilities. There is no logical imperative, for instance, that behavioral base rates must affect causal attributions or that base rate information should affect judgments of legal liability. Decision theorists should be cautious in arguing that base rates place normative constraints on judgments of anything other than posterior probabilities.

The base rate fallacy in human judgment is said to exist whenever a person ignores or underutilizes base rate information in making