Available online at www.sciencedirect.com
ScienceDirect
Organizational Behavior and Human Decision Processes 103 (2007) 277–290
ORGANIZATIONAL BEHAVIOR AND HUMAN DECISION PROCESSES
www.elsevier.com/locate/obhdp

The illusion of knowledge: When more information reduces accuracy and increases confidence

Crystal C. Hall, Lynn Ariss, Alexander Todorov *

Department of Psychology, Green Hall, Princeton University, Princeton, NJ 08540, USA

Received 7 December 2005
Available online 13 March 2007

Abstract

Intuition suggests that having more information can increase prediction accuracy of uncertain outcomes. In four experiments, we show that more knowledge can decrease accuracy and simultaneously increase prediction confidence. Participants were asked to predict basketball games sampled from a National Basketball Association season. All participants were provided with statistics (win record, halftime score), while half were additionally given the team names. Knowledge of names increased the confidence of basketball fans consistent with their belief that this knowledge improved their predictions. Contrary to this belief, it decreased the participants' accuracy by reducing their reliance on statistical cues. One of the factors contributing to this underweighting of statistical cues was a bias to bet on more familiar teams against the statistical odds. Finally, in a real betting experiment, fans earned less money if they knew the team names while persisting in their belief that this knowledge improved their predictions.

Keywords: Judgment under uncertainty; Accuracy; Confidence; Knowledge biases; Familiarity biases

Introduction

People generally believe that the more information they have the better their decisions will be (Schwartz, 2004), and will even pursue information that is inconsequential to their final decisions (Bastardi & Shafir, 1998). In this paper, we argue that more knowledge can reduce the accuracy of prediction of uncertain outcomes and simultaneously increase confidence in prediction. We focus on the prediction of sports outcomes for two reasons. First, these are uncertain events about which people have general knowledge. Second, it is possible to randomly sample these events. As critics of the heuristics-and-biases approach have pointed out, demonstrations that a bias leads to suboptimal performance require random sampling of events from the domain of prediction (Gigerenzer, Hoffrage, & Kleinbolting, 1991). Otherwise, suboptimal performance can be attributed to a biased sample of events.

The question of accuracy of human judgments is critical for the evaluation of the optimality of these judgments. Most research on biases has compared human judgments to normative models (Todorov, 1997). Such models satisfy coherence constraints and systematic deviations from their predictions reveal internal inconsistencies or biases in judgments. However, the question of internal consistency is conceptually independent of the question of accuracy (Hammond, 1996). The accuracy of judgments is assessed against an external criterion—the real outcome of the predicted event—and one can find task domains where inconsistent judgments are as accurate as consistent judgments derived from rational models (Gigerenzer & Goldstein, 1996; Gigerenzer et al., 1999). That is, biased judgments are not necessarily less accurate than unbiased judgments.

As noted above, a fair test of the accuracy of judgments requires random sampling of events in naturalistic environments. In all experiments, we randomly sampled

* Corresponding author. Fax: +1 609 258 1113.
E-mail address: atodorov@princeton.edu (A. Todorov).

0749-5978/$ - see front matter © 2007 Elsevier Inc. All rights reserved.
doi:10.1016/j.obhdp.2007.01.003

National Basketball Association (NBA) games. For each game, participants were provided with the same statistical information: the number of games the teams won during the season and the score at halftime. The critical manipulation was that participants were either given the team names (e.g., NY Knicks vs. NJ Nets) or not given these names (Team A vs. Team B). Intuition suggests that names should help predictions to the extent that participants have specific knowledge about the teams, because names can grant access to information that may not be available in the statistical information. However, this can be precisely the reason why knowledge of team names can reduce the accuracy of prediction. For example, after the New York Knicks reached the NBA finals in 1999 against unlikely odds, the third author started believing that they are a team that can always come back. If a person with this belief is asked to predict the outcome of a game in which the Knicks are losing at halftime, he or she is likely to predict that the Knicks would win despite evidence that trailing early in the game is highly predictive of losing the game (Cooper, DeNeve, & Mosteller, 1992).

This anecdotal failure of prediction illustrates a general case in which people can treat the predicted event as unique and not amenable to statistical generalizations (Einhorn, 1986; Kahneman & Lovallo, 1993). The lessons from studies comparing clinical and actuarial predictions are instructive. These studies have shown that simple statistical models do better in predicting patients' outcome than expert judgments of clinicians (Dawes, Faust, & Meehl, 1989). In fact, models based on the judgments of experts do better than the judgments of the experts themselves (Dawes, 1971; Goldberg, 1970). One of the reasons for the suboptimal performance of clinicians is that they treat each case as unique and import knowledge irrelevant to the prediction of the outcome. In a similar fashion, knowledge of team names can bias the predictions of the game outcome. Even when provided with statistical information, decision makers may not be completely consistent in their predictions. However, when provided with the team names, they could be even less consistent. The key question is whether this inconsistency leads to less accurate predictions when games are randomly sampled.

More-is-less versus less-is-more in predictions of uncertain outcomes

The studies on clinical and actuarial predictions, as well as studies on choice among multiple options (Iyengar & Lepper, 2000; Schwartz, 2004), have emphasized the negative effects of having knowledge on decisions—the more-is-less effect. In contrast, a number of recent studies have emphasized the positive effects of *not* having knowledge on decisions (Gigerenzer et al., 1999; Goldstein & Gigerenzer, 2002; Hertwig & Todd, 2003; Schooler & Hertwig, 2005). Specifically, lack of knowledge about an event can have a diagnostic value for the prediction and can be exploited by efficient heuristics that are optimal given the processing constraints on the cognitive system.

A perfect example of this tradition of research is the recognition heuristic (Goldstein & Gigerenzer, 1999, 2002). According to this heuristic, people exploit their lack of knowledge to arrive at an accurate judgment—the less-is-more effect. For example, in decisions comparing two outcomes, if one of the outcomes is recognized and the other is not, one should assume that the recognized entity has the higher value (but for an alternative view see Oppenheimer, 2003). In fact, consistent with the predictions of this heuristic, American participants made more accurate decisions about the relative size of German than of American cities (Goldstein & Gigerenzer, 2002). Decisions about pairs in which one of the cities is not recognized (more frequently the case for German than American cities in this case) are easier (predict the recognized city) than decisions in which both cities are recognized.

While the more-is-less and the less-is-more research traditions differ with respect to the implications of the behavioral findings for models of decision-making, they clearly show that, contrary to intuition, more knowledge does not necessarily improve decisions. In terms of descriptive models of decision-making, one question that is critical for the evaluation of these implications is whether decision-makers would like to have this additional knowledge. Although the less-is-more research provides valuable insights about how the cognitive system can exploit the informational structure of the decision environment, to the extent that people would like to have additional information and would use it in non-optimal way in their decisions, charitable interpretations of the less-is-more effect in terms of the optimality of human judgments are questionable.

The illusion of knowledge

More information often increases confidence in judgments even when the accuracy of judgments is not affected (Arkes, Dawes, & Christensen, 1986; Gill, Swann, & Silvera, 1998; Oskamp, 1965; Stewart, Heideman, Moninger, & Reagan-Cirincione, 1992). Heath and Tversky (1991) have shown that people prefer to bet on events about which they have some expertise than on random chance events or on events they feel ignorant about. Team names, by cueing specific knowledge, can increase the sense of expertise for basketball fans which, in turn, can increase their confidence.

Moreover, we argue that cueing specific knowledge of the teams would render the statistical information less