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Option fixation: A cognitive contributor to overconfidence

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Abstract

The ASC model of choice and confidence in general knowledge proposes that respondents first Assess the familiarity of presented options, and then use the high-familiarity option as a retrieval cue to Search memory for the purposes of Constructing an explanation about why that high-familiarity option is true. The ASC process implies that overconfidence results in part from a tendency to fixate on the high-familiarity option, to the neglect of the other option. If this implication is true, then judgment tasks requiring respondents to evaluate each option independently should result in reduced overconfidence as compared with standard judgment tasks. Two experiments tested this implication, and found that confidence and overconfidence were reduced when respondents evaluated options independently. The findings support the proposal that option fixation contributes to overconfidence, and also clarify the limitations of random error explanations of overconfidence.

Keywords: Confidence; Subjective probability; Likelihood judgment; Calibration; Confirmation bias; Explanation; Dual process; Financial knowledge

Confidence judgment is among the most debated topics in the field of judgment and decision making, and it has played a role in the broader dispute over the extent to which people should be viewed as rational decision makers (Gigerenzer, Hoffrage, & Kleinbölting, 1991; Kahneman & Tversky, 1996). The central issue of the confidence controversy is why people often are found to be overconfident. Is overconfidence due in part to systematic biases in cognitive processing? Or, is it a byproduct of more mundane causes? As an empirical phenomenon, overconfidence is most often studied in the laboratory by the use of general-knowledge test items, such as "Where was Shakespeare born? (a) Stratford-on-Avon, or (b) London." When faced with such an item, respondents first indicate which of the two alternatives is believed to be correct, and then report a probability judgment from 50% to 100% that their responses are correct. An overconfidence effect occurs to the extent that, for a test consisting of many such items, the average of these probability judgments exceeds the actual proportion of correct responses.

Aside from the broader rationality issue, overconfidence is a phenomenon of considerable practical importance. This is in part because of increasing demands to explicitly and accurately communicate probabilistic information in fields involving high uncertainty (e.g., Wilkie & Pollock, 1996). Consider, for example, the field of financial forecasting, which deals with the prediction of such quantities as currency exchange rates, earnings, or stock prices (e.g., Bolger & Önkal-Atay, 2004). Both individuals and corporations stand to make or lose a great deal of money depending on these quantities, and it is thus in their best interest to accurately forecast future financial states (Önkal, Yates, Simga-Mugan, & Oztin, 2003). Confidence judgments become crucial to gauging the certainty of these forecasts: a prediction of

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decreasing stock prices made with 95% certainty is naturally taken more seriously than a prediction made with 60% certainty. Research suggests, however, that such extreme confidence judgments are typically not warranted in the difficult, practical prediction tasks where explicit expressions of uncertainty are most needed (e.g., Thomson, Önkal-Atay, Pollock, & Macaulay, 2003).

Overconfidence is of significant practical importance, yet current explanations for the phenomenon diverge considerably. It is intuitively compelling to consider the overconfidence phenomenon as resulting, at least in part, from cognitive biases in the accumulation or evaluation of evidence. For example, Koriat, Lichtenstein, and Fischhoff (1980) were perhaps the first to propose and test the hypothesis that overconfidence stems at least in part from an inclination to rely more heavily on reasons supporting a chosen answer than on reasons contradicting it. In order to test this proposal, they had subjects in an experimental condition write reasons for and against each of a pair of alternatives given in a general knowledge test, prior to rendering judgments. Consistent with their proposal, subjects in the experimental group were less overconfident than those in a control group. Although Koriat et al.'s initial results were quite promising, there has since been difficulty in replicating them (e.g., Fischhoff & MacGregor, 1982; Yates, Lee, & Shinotsuka, 1992). Other direct evidence in support of the idea that overconfidence stems in part from confirmatory processing has been rather lacking. This is perhaps partly because the overconfidence phenomenon itself has been taken in support of the hypothesis, a notion that has recently come under intense scrutiny. For example, Juslin, Winman, and Olsson (2000) stated that, "With general knowledge items, the idea of an information-processing bias is approaching the status of a dogma, supported by naïve empiricism and selective attention to particular data sets." (p. 385).

The impetus for this statement is that in the last several years, researchers have developed alternative explanations for the overconfidence phenomenon under a general assumption that respondents are unbiased processors of statistical information. One class of explanations has to do with representative sampling of test questions (e.g., Gigerenzer et al., 1991). According to this explanation, overconfidence results from the selection of test questions that are unduly tricky. Some support for the idea that participants have prior conceptions of test trickiness comes from Arkes, Christensen, Lai, and Blumer (1987), who found reduced overconfidence after providing participants with outcome feedback on a few especially tough questions at the beginning of a test. Presumably, the initial feedback prompted respondents to anticipate more tricky questions in the remainder of the test than they would otherwise. Griffin and Tversky (1992) have shown, however, that item selection is insufficient to eliminate overconfidence effects, implying that it does not provide a complete explanation.

Another class of explanations stems from theoretical models that have been developed to explain the overconfidence phenomenon in terms of random error (Erev, Wallsten, & Budescu, 1994). Error models typically assume that a mental representation of degree of uncertainty (an "internal probability") exists and is perfectly calibrated with environmental relative frequencies ("objective probabilities"). However, reported confidence consists of the calibrated internal probability perturbed by a random error term. From within this framework, random error has clearly been shown as sufficient to produce an overconfidence effect (e.g., Juslin, Olsson, & Björkman, 1997). What the random-error models imply is that the presence of an overconfidence effect offers few constraints on the nature of the process. For example, the observation of an overconfidence effect does not necessarily entail the existence of cognitive processing biases.

The findings pertaining to item selection and random error, combined with the dearth of direct evidence for a systematic cognitive bias, have led many to question whether such systematic biases should be considered as contributors to overconfidence at all. For example, based on a fairly comprehensive analysis of existing data, Juslin et al. (2000) concluded that item selection and random error are jointly sufficient to explain observed overconfidence, and that the data do "not support the idea of a cognitive overconfidence bias that is due to, for example, confirmatory search of memory" (p. 393). In sum, overconfidence is an important and complicated phenomenon. There are several potential contributors to overconfidence, and at this point, it is not at all clear whether systematic processing biases ought to be considered among them.

The primary aim of the current study is to test the proposal that there is a systematic tendency to fixate on one option when assessing confidence in general knowledge, as well as the implication that such "option fixation" contributes to observed overconfidence. Option fixation is implicated by a process model of choice and confidence judgment in general knowledge tasks. The second aim of this research is to explore an approach for reducing overconfidence that capitalizes on this hypothesized option fixation. The remainder of this article proceeds as follows. First we will describe the Assess-Search-Construct (ASC) model of choice and confidence in general knowledge. Next, we describe key experimental manipulations, along with accounts by ASC and several alternative models. We then test the accounts in two experiments, and discuss the implications of our findings.

The Assess-Search-Construct (ASC) model

We next turn to describing a model that proposes that, when confronted with a general knowledge question, respondents first Assess the familiarity of the