# Does Providing a Belief Distribution *Truly* Reduce Overconfidence?

**Beidi Hu, Joseph Simmons**
The Wharton School,
University of Pennsylvania

**Pre-registrations, data, and materials available at:** https://researchbox.org/314&PEER_REVIEW_passcode=IUVUQY

## Summary

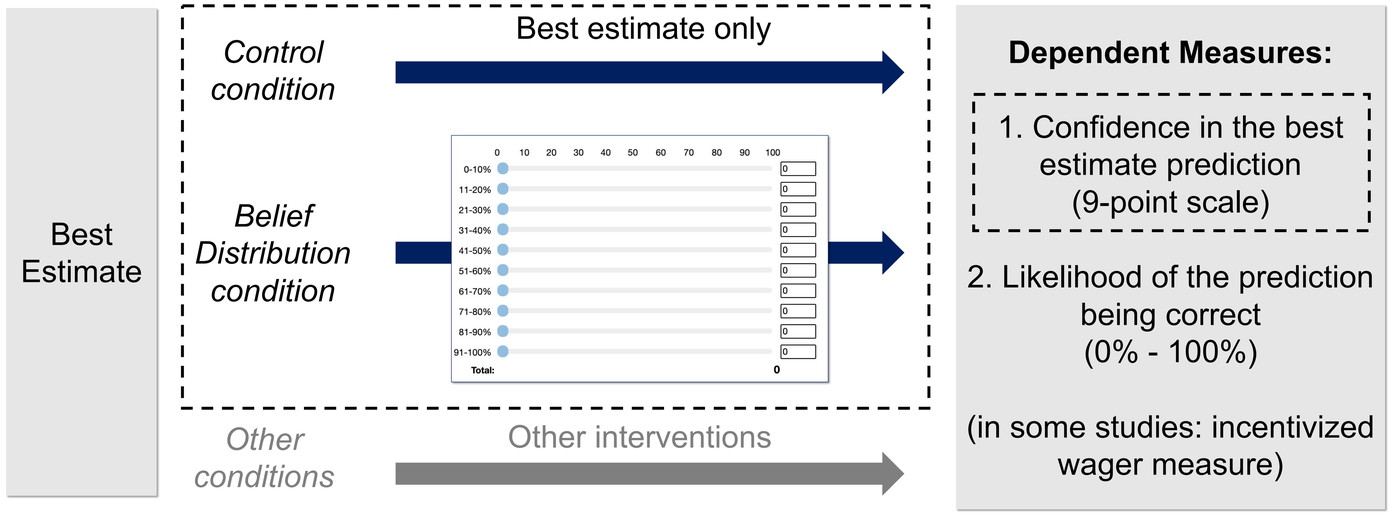

- People are often too confident in the accuracy of their beliefs.
- Past research suggests that this form of overconfidence can be reduced by asking people to provide a belief distribution over all possible outcomes, as doing so forces them to confront the fact that many different outcomes could materialize (Haran, Moore, & Morewedge, 2010; Moore, 2020).
- In 10 pre-registered experiments ($N$ = 11,157), we manipulated whether participants were asked to provide a belief distribution before indicating their confidence in their judgments.
- Across different domains and different measures of confidence, we were surprised to find that providing a belief distribution usually ***increases*** (over)confidence, as people's distributions often serve to reinforce their existing beliefs.


**Poster session:**
Friday Feb. 11, 9:30-10:30am ET

**Zoom:**
https://upenn.zoom.us/j/97996487507

## Study Procedure

Participants make predictions about upcoming sports games or other participants' responses to preference/behavior questions.



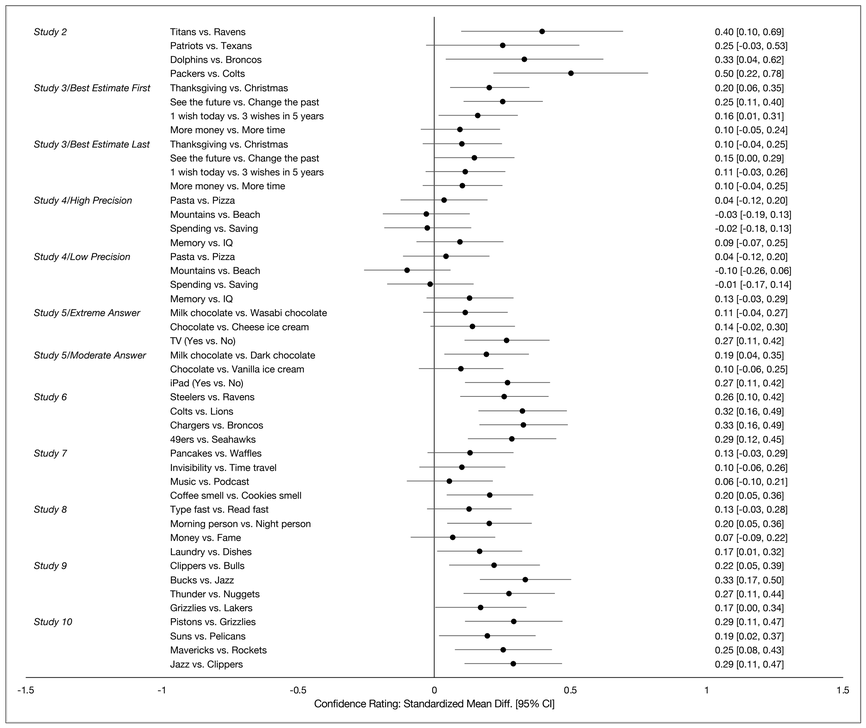

**Dependent Measures:**

1. Confidence in the best estimate prediction (9-point scale)
2. Likelihood of the prediction being correct (0% - 100%)

(in some studies: incentivized wager measure)

## Results (Confidence Rating)

***The results of other measures show the same pattern**




*Belief Distribution condition increases confidence compared to the Control condition*

Surprisingly (to us at least), giving a belief distribution usually exerts a small but ***positive*** effect on overconfidence (directionally in 42 of 46 comparisons, and significantly so in 25 comparisons).

### Results are robust to:

- ✓ Different prediction domains
- ✓ Eliciting distribution before or after giving the best estimate prediction (Study 3)
- ✓ Whether the prediction took the form of a point estimate or a range (Study 4)
- ✓ Whether the answer to the prediction question was extreme or moderate (Study 5)
- ✓ Different measures

***Note.*** Cohen's *d*s between the Belief Distribution condition and the Control condition (Belief Distribution condition minus Control condition) on the *confidence rating* question. A **positive** sign reflects that the Belief Distribution condition **increases** confidence compared to the Control condition; a **negative** sign reflects that the Belief Distribution condition **reduces** confidence compared to the Control condition.

## Additional Results

**Participants in our studies were *over*confident.**

- We compared how likely participants said their predictions were to be accurate to how accurate those predictions actually were.
- Their likelihood estimates were overconfident in every condition of every study.
- Thus, for all studies, whenever an intervention increased confidence, it also increased *over*confidence.

## Mechanism

This effect seems to occur because people build belief distributions that reinforce their initial beliefs.

This effect does not emerge
(1) When people are asked to merely consider all possible outcomes (Studies 8-10), or
(2) When they are asked how surprised they would be if each outcome were to arise (Study 8).

**For feedback or to request a copy of the paper, please email Beidi Hu at beidihu@wharton.upenn.edu.**

**Acknowledgments:** We thank the Wharton Behavioral Lab, the Wharton Dean's Research Fund, and the Wharton Risk Center Russel Ackoff Doctoral Student Fellowship for support of this research.