PUBLIC PERCEPTIONS OF EXPERT DISAGREEMENT

Nathan Dieckmann  
Oregon Health & Science University  
Decision Research

Branden Johnson & 
Robin Gregory  
Decision Research

Marcus Mayorga &  
Paul Slovic  
Decision Research

Paul K. J. Han  
University of Oregon

Paul K. J. Han  
Maine Medical Center
Expert Disagreement

• Expert disputes are common within many scientific and forecasting domains.
  • Climate Change
  • Health
  • Economic
  • Socio-political

• Important to understand public reactions to publicized expert disputes
  • Help to design better communication strategies
Why do Experts Disagree?

- Expert consensus is a necessary feature of expertise itself (Einhorn, 1974)

- From this traditional perspective disagreement is result of:
  - Incompetence (i.e., they are not experts) or
  - Intentional or unintentional bias due to ideology, worldviews, or private interests (Hammond, 1996).
Why do Experts Disagree?

• Disagreement is part of the normal scientific process (Shanteau, 2000).

• Alternative perspective that disagreements are expected even among the most competent and unbiased experts.
  • Ill-structured, complex, dynamic, uncertain, and evolving nature of real-world problems.
  • Experts think about these problems differently (Mumpower & Stewart, 1996).
Lay Perceptions of Expert Disagreement

• Lay public have virtually no way of knowing the actual causes or magnitude of expert disagreements (Collins & Evans, 2007).

• This doesn’t mean that the public will withhold judgment when confronted with expert disputes.
### Lay Perceptions of Expert Disagreement

Possible Inferences of the Lay Public About Expert Disagreements

<table>
<thead>
<tr>
<th>Causal Inference</th>
<th>Description: Experts disagree because . . .</th>
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<tbody>
<tr>
<td>1. Too much complexity in domain</td>
<td>. . . making predictions is very difficult in</td>
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<tr>
<td></td>
<td>complex, chaotic systems with a large number</td>
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<tr>
<td></td>
<td>of diverse interrelated components.</td>
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<td>2. Too much randomness in domain</td>
<td>. . . making predictions is very difficult in</td>
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<td></td>
<td>domains where events have a lot of</td>
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<td></td>
<td>fundamental unpredictability or “randomness”.</td>
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<td>3. Experts lack knowledge</td>
<td>. . . they have not yet acquired enough scientific</td>
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<td></td>
<td>knowledge about the causes of the event.</td>
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<td>4. Experts are incompetent</td>
<td>. . . they are incompetent and are not really</td>
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<td></td>
<td>“experts” at all.</td>
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<tr>
<td>5. Experts are biased</td>
<td>. . . one or more experts are intentionally or</td>
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<td></td>
<td>unintentionally biasing their conclusions due to</td>
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<td></td>
<td>ideology, worldviews, or private interests.</td>
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<td>6. Experts are unwilling to admit</td>
<td>. . . they are not willing to admit uncertainty and</td>
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<tr>
<td>uncertainty</td>
<td>are providing simplistic overly precise forecasts.</td>
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Previous Work on Lay Perceptions

• Disagreement about environmental, health & safety risks (Johnson and Slovic, 1998; Johnson, 2003).
  • Self-interest
  • Expert incompetence
  • Lack of scientific knowledge

• Finnish interview study on disagreements about risks of food additives (Kajanne & Pirttilä-Backman, 1999).
  • Difficulty in attaining scientific information (low education group)
  • Bias or self-interest (high educated group)
  • Incompetence and knowledge differences
The present study

- We use a psychometric approach (Slovic, 1987) to examine public perceptions of expert disagreement across a diverse sample of forecasting topics.

- Examine education/cognitive ability and knowledge about the topic as possible moderators of these perceptions.

Topics

• We generated 56 different forecast topics, 8 topics for each of 7 domains.

• Within each domain we varied
  • Time horizon - Short (6 months), Medium (5 years), Long (15 years), and Very long (50 years).
  • Binary (event will happen or not) versus continuous forecast.
Example Forecast Topics

- Health
  - “Whether heart disease will still be the leading cause of death 15 years from now.”

- Politics
  - “Whether the Affordable Care Act (Obamacare) will still be law 5 years from now.”

- Terrorism
  - “Whether terrorists will succeed in downing a commercial airliner in the next 6 months.”

- Climate Change
  - “The average sea level rise along U.S. coasts 15 years from now.”
Example Forecasts

• Economics
  • “Whether the value of the Dow Jones stock market index will be above 20,000 5 years from now.”

• Crime
  • “The violent crime rate (per 1000 citizens) in the U.S. 50 years from now.”

• Environment
  • “Whether laws protecting endangered species in the United States will be significantly weakened by Congress within the next 6 months.”
Sample & Procedure

- Participants (N=342) were recruited from an online subject panel.
  - 57% Female
  - Median age 45 yrs/old (range 22-76)
  - 26% high school of less, 31% some college or vocational school, 27% college, and 16% advanced degrees

- Each participant was presented with 7 randomly selected forecast topics, one from each domain.
Ratings

- **Outcome**
  - Perceived expert disagreement (3 items)

- **Predictors**
  - Irreducible complexity (1 item)
  - Irreducible randomness (1 item)
  - Expert knowledge (2 items)
  - Expert bias from ideology, worldviews, or private interests (2 items)
  - Expert competence (2 items)
  - Expert willingness of admit uncertainty (2 items)

- **Other measures**
  - Numeracy and IQ measures.
  - Self-reported knowledge of each forecast topic rated.
Analytic Approach

• Regression Modeling
  • Calculate mean on each measure for each forecast topic and did analysis at forecast level.
  • Primary outcome was perceived expert disagreement

• Model selection
  • Used information criteria (BIC) to determine best fitting regression models
  • glmulti package for the R statistical computing environment (Calgano & Mazancourt, 2010)
Variability in Perceived Disagreement

- Average expected disagreement ratings varied greatly across forecast topics.
  - Variance not explained by time horizon.
  - Domain not a strong predictor although forecasts in the health domain tended to elicit lower ratings of expected disagreement.

- Most interpretable regression models were those stratified by education and self-reported knowledge.
Predictors of Disagreement

Lower Cognitive Ability

Credcomp
Biased
Randomness
Complexity
Admitunc
Expknow

* Predictor included in best fitting model
Predictors of Disagreement

Lower Self-Reported Knowledge

- Credcomp
- Expknow
- Randomness
- Complexity
- Admitunc
- Biased

* Predictor included in best fitting model
Predictors of Disagreement

Higher Cognitive Ability

- Complexity
- Randomness
- Biased
- Expknow
- Admitunc
- Credcomp

* Predictor included in best fitting model
Predictors of Disagreement

Higher Self-Reported Knowledge

- Biased
- Randomness
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* Predictor included in best fitting model
Conclusions

• People lower in education and self-reported knowledge appear to most strongly attribute expert disputes to expert incompetence.

• This may relate to a more simple view of science as objective and certain, where any disagreement must be an indication of faulty experts.
Conclusions

- People with the highest self-reported knowledge about a forecast topic appeared to overwhelmingly attribute disputes to bias.

- This implies a more sophisticated view of science as being socially constructed and thus (for better or worse) subject to influence from financial or ideological interests.
Conclusions

• The natural causes (complexity/uncertainty) strongly predicted levels of disagreement for only the most educated, cognitively able participants, outweighing even their co-attrition of expert bias.

• This suggests a view of science integrating inherent complexity and randomness and the socially constructed nature of scientific claims.
Open Questions

• When/how do people perceive disagreement at the individual issue level?
  • Issue of conflict
  • Multiplicity
  • Evidence heterogeneity
  • Temporal inconsistency

Open Questions

- How does perceived cause (e.g., incompetence) of disagreement affect judgment and decision making?
  - Ignore information or seek more information (Elstad, et al., 2012)
  - Weight information less or only use information that confirms prior beliefs (Tversky et al., 1988; Han et al., 2013)
  - Decision paralysis (Samuelson, et al., 1988)
  - Lower behavioral intentions (Nagler, 2014)
  - Increase anxiety and heighten risk perceptions (Pollack, et al., 2004; Han et al., 2006)
Open Questions

• How can we “nudge” people to be more accepting of disagreement as a natural part of science?
  • Perhaps embed simple epistemological education within communications to reinforce concepts like randomness, complexity and limitations in our ability to know.
  • May also suggest a need for audience segmentation—i.e., use of different interventions for different segments of lay society.
Thank you!

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