Tracing cognitive processes underlying advice taking: An eye-tracking approach

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Abstract

This research explores the cognitive processes underlying advice taking applying an eye-tracking approach on situations with multiple advisors. Participants increased their general extent and depth of visual information search when confronted with advice with increasing distance to participants' estimates and when their initial accuracy was low. Increasing distance and decreasing accuracy were associated with greater shifts in opinion. However, there was no indication of mediation through depth of information search. Follow-up analyses on attention focus indicate that people process advice adaptively: (1) Aiming to process high quality advice first, (2) stopping the information search early when it validates their initial opinion which is (3) associated with more frequent decisions not to revise the initial opinion.

Introduction

- Taking advice is a powerful means to increase the quality of judgments (Rader, Larrick, & Soll, 2017)
- People are generally sensitive to the quality of advice when deciding how much to heed it, but have a strong tendency to discount advice with detrimental effects on judgment accuracy (Yaniv & Kleinberger, 2000)
- Previous research focused on a purely behavioral approach, cognitive processes underlying the decision to take or to ignore advice are yet poorly understood
- We explore whether complementing behavioral research on advice taking with eye-tracking can yield new insights into which cognitive processes play a role in advice taking

Method

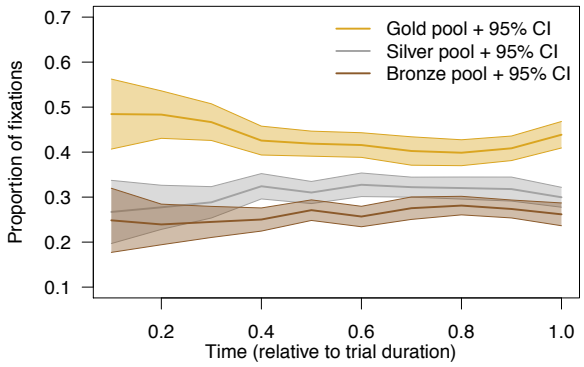
- *N* = 87 participants (41 male, 40 female, 6 no report) estimated airline distances between European capitals over 40 trials in the lab
- Procedure (adapt. *judge-advisor system*, Sniezek & Buckley, 1995):
  1. Initial (pre-advice) estimate + confidence rating
  2. Fixation cross (500 ms)
  3. Advice screen (3 estimates from previous participants; eye-tracking)
  4. Final (post-advice) estimate (incentivized)
- Three pieces of advice varied on average in quality (made transparent in instructions)
  - One of each was sampled from the best, second best, and third best quarter of previous participants working on the same tasks
  - Referred to as the “gold”, “silver” and “bronze pool”, respectively
- Presentation order of advice (position in a triangle) was counterbalanced between subjects
- Other measures
  - Opinion shift: Absolute movement from initial to final judgements relative to initial judgments
  - Initial percentage absolute error (as an inverted measure accuracy)
  - Average Euclidean distance to all three pieces of advice (as an inverted measure of general advice proximity)

Results I - Extend and depth of in formation search

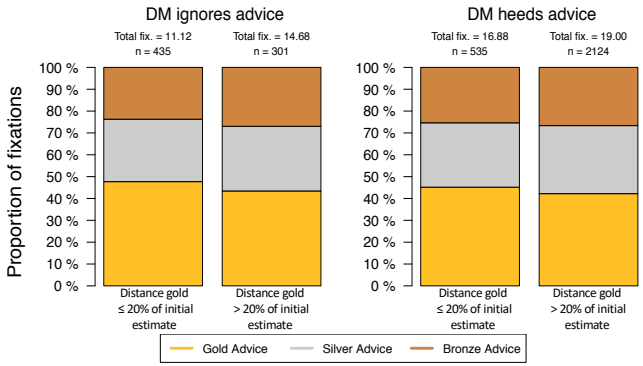
	Total fixations	Opinion Shift	
		I	II
Fixed effects			
Intercept	2.68***	0.48***	0.33***
Initial confidence	0.001	-0.21*	-0.27
Euclidian Distance	0.11***	0.30***	0.24***
Initial perc. error	0.03*	0.42***	0.32**
Total fixations			-0.02
Observations	3086	3394	3086
-2 × log likelihood	30745.96	15893.97	11735.39

All predictor variables are *z*-standardized. Total fixations are modelled with a poisson error structure and using the logarithm as a link function. All models include all possible random intercepts and slopes. *$p < .05$. **$p < .01$. ***$p < .001$.

Results II – Attention focus by time



Results III – Attention focus by decision to heed advice



Results IV – Attention focus by first fixations

First fixation on gold

	M total fix.	% heed advice	% no fixation on silver	% no fixation on bronze
Gold close	13.30	53%	11%	21%
Gold distant	17.64	87%	6%	11%

First fixation on silver

	M total fix.	% heed advice	% no fixation on gold	% no fixation on bronze
Silver close	17.68	67%	5%	17%
Silver distant	18.39	86%	6%	13%

First fixation on bronze

	M total fix.	% heed advice	% no fixation on gold	% no fixation on silver
Bronze close	18.74	76%	4%	10%
Bronze distant	19.18	82%	2%	10%

“Close”: Rel. distance ≤ 20% of initial estimate. “Distant”: Rel. distance > 20% of initial estimate.

Discussion

- Analyses on extent and depth of information search as well as on attention focus show an adaptive advice search process
  1. Reduced extend of information search when initial accuracy is high and advisors are close to initial opinion
  2. More attention to high quality advice
  3. Early stop of search process when high quality advice validates the initial opinion (see also Hütter & Ache, 2016)
- Results support a two-process model of advice taking:
  1. DM decides whether to revise initial opinion or not
  2. If DM decides to revise opinion, DM starts a more thorough information search weighting different pieces of advice to revise opinion
- Early stop of information search can result in insufficient attention to helpful advice

References.

Hütter, M., & Ache, F. (2016). Seeking advice: A sampling approach to advice taking. *Judgment and Decision Making*, *11*, 401–415.

Rader, C. A., Larrick, R. P., & Soll, J. B. (2017). Advice as a form of social influence: Informational motives and the consequences for accuracy. *Social and Personality Psychology Compass*, *11*, e12329.

Sniezek, J. A., & Buckley, T. (1995). Cueing and Cognitive Conflict in Judge-Advisor Decision Making. *Organizational Behavior and Human Decision Processes*, *62*, 159–174.

Yaniv, I., I., & Kleinberger, E. (2000). Advice Taking in Decision Making: Egocentric Discounting and Reputation Formation. *Organizational Behavior and Human Decision Processes*, *83*, 260–281.

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