

## Motivation

- I am interested in **economic decision-making** — particularly in how individuals' *subjective assessment* of choice situations shapes their behavior.

## P1: Behavioral Time Allocation

joint with Alexander Dzionara, JGU

**Research Question:** How do people decide how much *time* to take for solving a problem? *Only poorly understood so far* (Oud et al., 2016).

- We link allocation decisions to *subjective assessment* of a decision problem (Gabaix, 2019). E.g., **Overoptimistic beliefs** in own ability leads agents to allocate less time in a given setting.
- Method: *visual search task* in **pre-registered lab experiment** ( $n = 91$ ): identify highest arabic numeral (see A in Fig. 1).

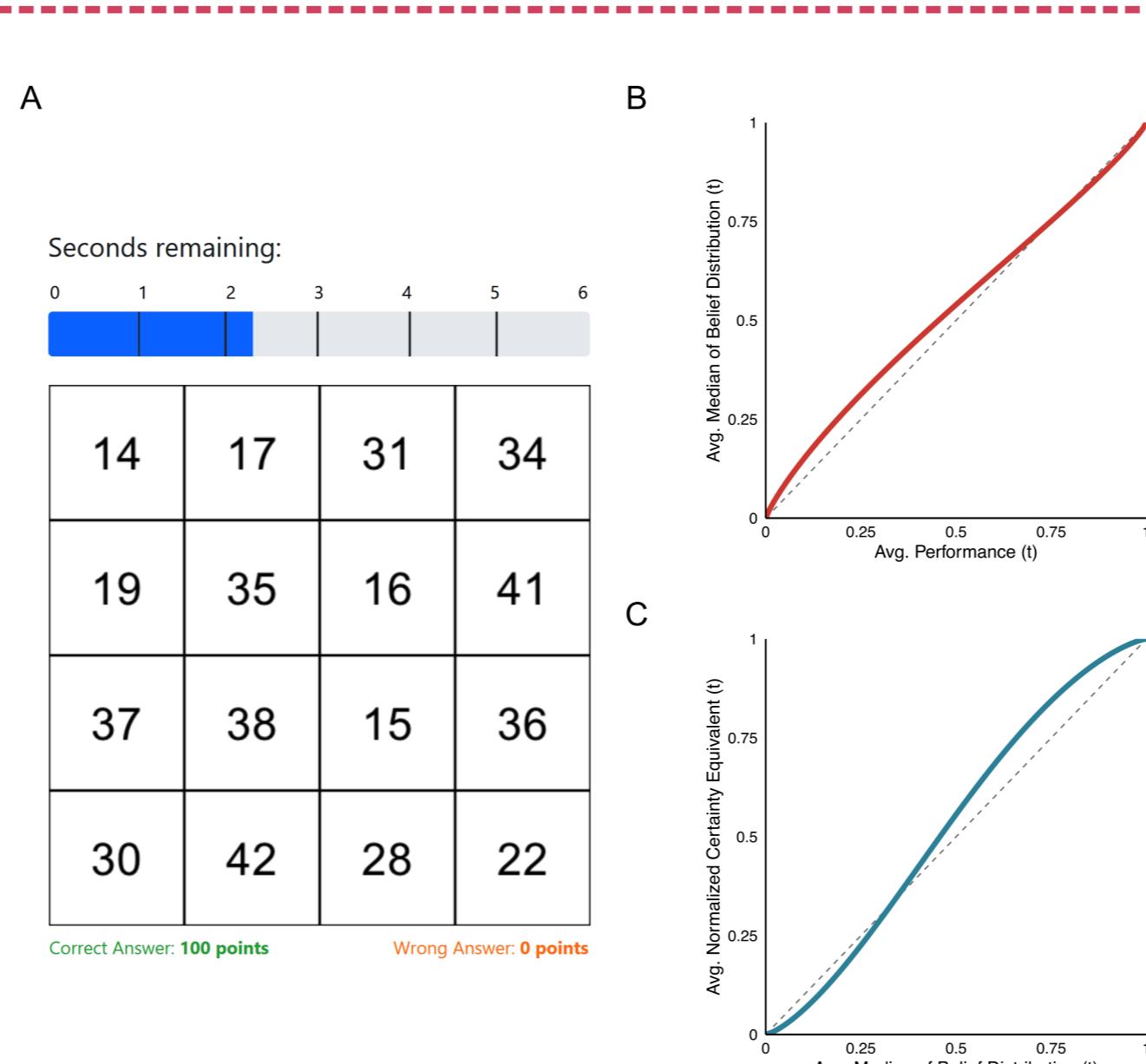


Figure 1: Visual search task and estimated average weighting functions

## P2: Cognitive Imprecision and Social Preferences

single-authored

**Research Question:** What role does the mental representation of arithmetic differences play for (measuring) *pro-social behavior*?

- Popular tool: (binary) *dictator game*. One person splits resources between herself and another (Bruhin et al., 2019; Charness & Rabin, 2002). See A in Fig. 2.
- Assumption so far: People are perfectly able to process numerical quantities, *only social preferences matter* for choices. Empirically implausible (Dehaene, 2011).

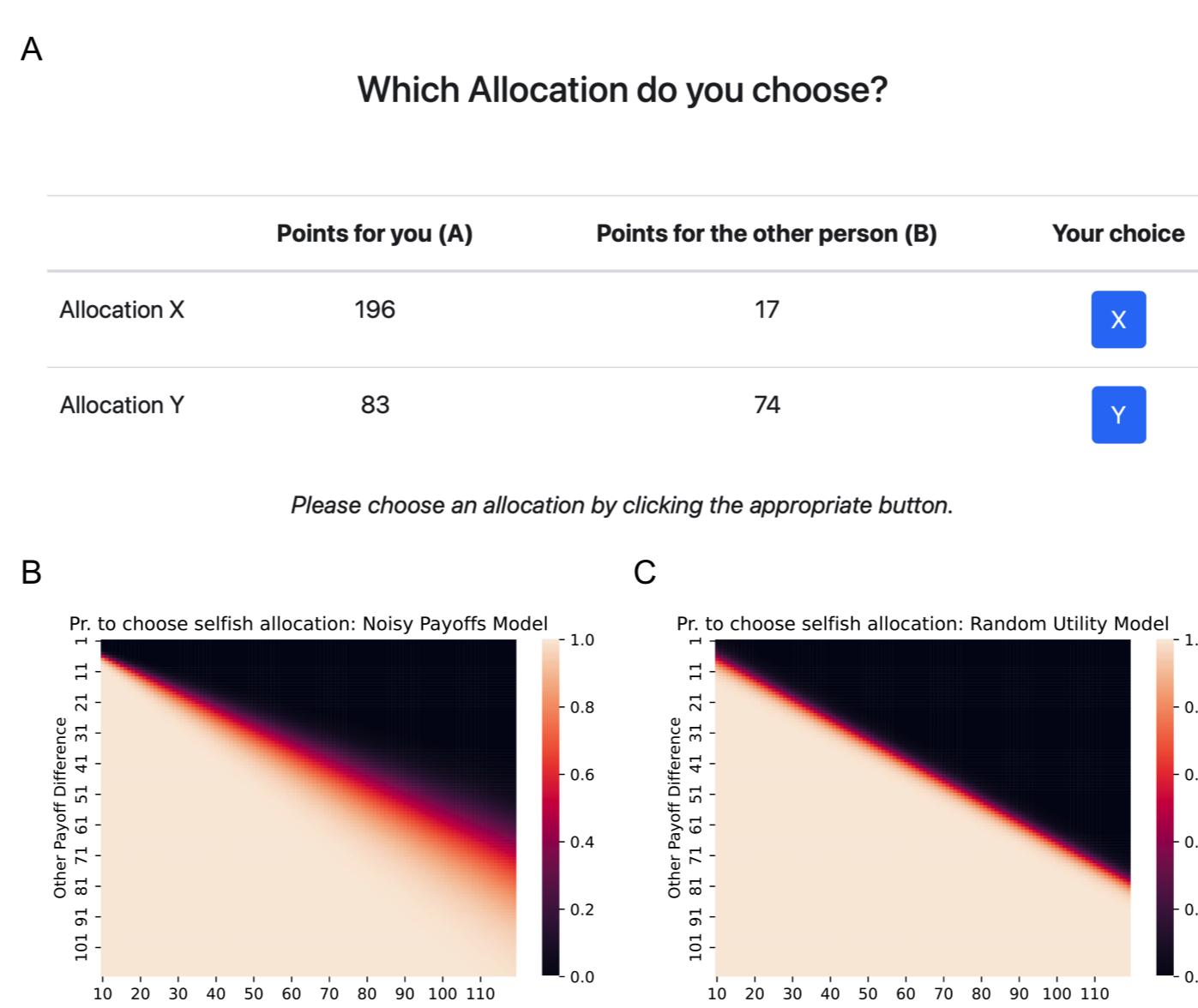


Figure 2: Binary dictator game and model simulations

## P3: Strategic Uncertainty and Time Pressure in Professional Chess

joint with Johannes Carow, JGU + MWVLW RLP

**Research Question:** How does time pressure affect choices in the presence of *strategic uncertainty*?

- We investigate this in *professional chess*, which is highly strategic + players possess great skill.
- Two innovations:**
  - We propose a source of *exogenous variation* in available thinking time of chess players (due to a specific feature of FIDE World Cups)
  - A novel measure for the *degree of strategic uncertainty* of a single chess move.

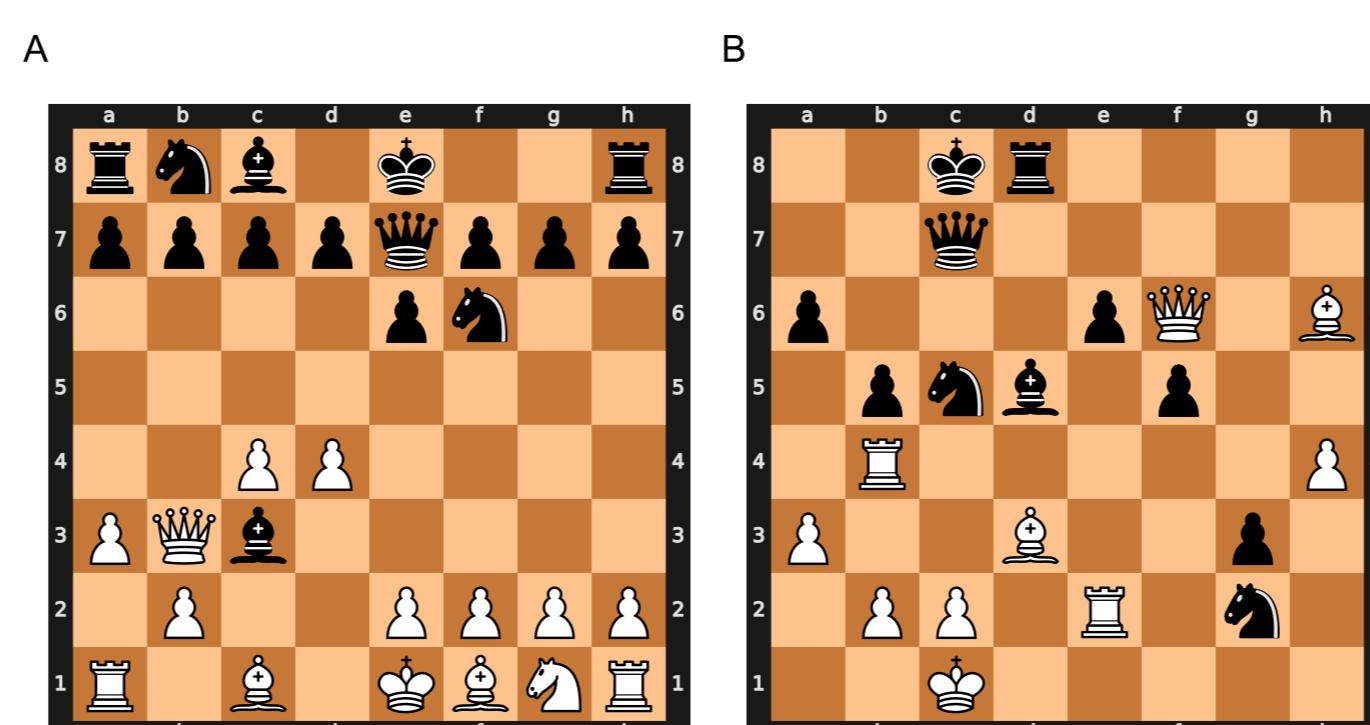


Figure 3: Predicted difficulty for White: low and high example

- Key in (human) chess is the (strategic interaction with the) *difficulty* of a position.
- Think difficulty as  $Q = f(p)$ , i.e., the quality of a move  $Q$  being (partly) dependent on piece positions  $p$ .

## References

- Bruhin, A., Fehr, E., & Schunk, D. (2019). The many Faces of Human Sociality: Uncovering the Distribution and Stability of Social Preferences. *Journal of the European Economic Association*, 17(4), 1025–1069.
- Charness, G., & Rabin, M. (2002). Understanding Social Preferences with Simple Tests. *The Quarterly Journal of Economics*, 117(3), 817–869.
- Dean, M., Wu, S.-W., & Maloney, L. T. (2007). Trading off speed and accuracy in rapid, goal-directed movements. *Journal of Vision*, 7(5), 10.
- Dehaene, S. (2011). *The Number Sense: How the Mind Creates Mathematics*, Revised and Updated Edition (Updated Edition). New York: Oxford University Press, USA.
- Enke, B., & Graeber, T. (2020). Cognitive Uncertainty. *NBER Working Paper*.
- Frydman, C., & Jin, L. J. (2022). Efficient Coding and Risky Choice. *The Quarterly Journal of Economics*, 137(1), 161–213.
- Gabaix, X. (2019). Behavioral inattention. In *Handbook of Behavioral Economics: Applications and Foundations 1* (Vol. 2, pp. 261–343). Elsevier.
- Gonzalez, R., & Wu, G. (1999). On the Shape of the Probability Weighting Function. *Cognitive Psychology*, 38(1), 129–166.
- Khaw, M. W., Li, Z., & Woodford, M. (2021). Cognitive Imprecision and Small-Stakes Risk Aversion. *The Review of Economic Studies*, 88(4), 1979–2013.
- McIlroy-Young, R., Sen, S., Kleinberg, J., & Anderson, A. (2020). Aligning Superhuman AI with Human Behavior: Chess as a Model System. *Proceedings of the 26th International Conference on Knowledge Discovery & Data Mining*, 1677–1687.
- Oud, B., Krajbich, I., Miller, K., Cheong, J. H., Botvinick, M., & Fehr, E. (2016). Irrational time allocation in decision-making. *Proceedings of the Royal Society B: Biological Sciences*, 283(1822), 20151439.
- Tversky, A., & Kahneman, D. (1992). Advances in prospect theory: Cumulative representation of uncertainty. *Journal of Risk and Uncertainty*, 5(5), 297–323.
- Woodford, M. (2020). Modeling Imprecision in Perception, Valuation, and Choice. *Annual Review of Economics*, 12(1), 579–601.