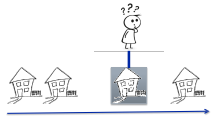


Adaptive behavior in optimal stopping search

Christiane Baumann[1,2], René Schlegelmilch[3], Bettina von Helversen[3]
[1]University of Zurich, [2] Harvard Kennedy School, [3]University of Bremen

Contact:
cbaumann@hks.harvard.edu

Optimal Stopping Problem

- Sequential decision task
- Goal: Find the **best option** out of a sequence
- **No going back** once an option is rejected
- Examples: House hunting, job search, partner search

Previous Findings

- Human choices deviate from optimal solutions
- best described by a **linear threshold strategy**
- Initial aspiration level is adjusted linearly across search

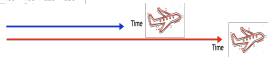
Objective

How do humans adjust search to environmental changes?

Variance:

prices ~ N(180,10)
prices ~ N(180,40)

Time Horizon:



Method

Instructions: "Imagine you plan a trip to Canada and you need to purchase a plane ticket. You will encounter a sequence of tickets and every time you have to decide to accept or reject it. Once you reject a ticket you can not go back. If you arrive at the last ticket you have to take it. The goal is to find the cheapest ticket"

Study 1: Variance

Manipulation

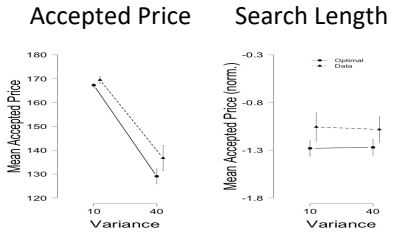
Tickets ~ N(180,10) vs ~N(180,40)

Hypotheses

A. **Normalization**: value is calculated based on relative rank

B. **Risky Decision**: Higher variance leads to higher risk aversion

Behavioral Results



Estimated thresholds

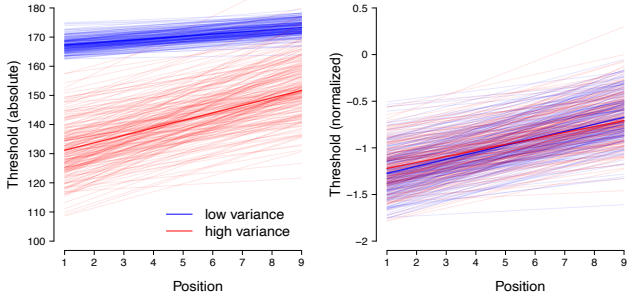


Fig 2: Threshold paramters of the linear threshold model (LTM, Baumann et al. 2020) implemented in a hierarchical-Bayesian statistical framework. Left: absolute values, right: normalized values

Conclusion Study 1

Thresholds are determined according to rank position within the sampling distribution -> **Normalization Hypothesis**

Study 2: Time Horizon

Manipulation

Time Horizon = 5, 10 and 20

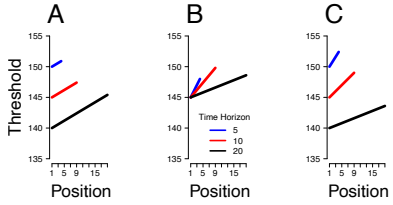
Hypotheses

Adaptation of

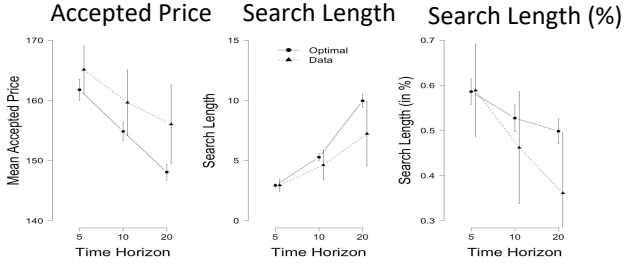
A. initial aspiration level

B. adjustment across search

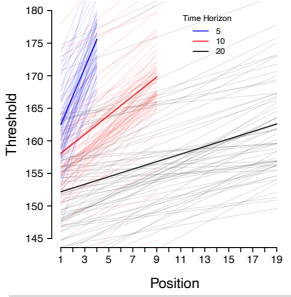
C. Both



Behavioral results



Estimated thresholds



Conclusion Study 2

- **Longer time horizon** leads to **more restrictive initial aspiration** level and **less adjustment** of the aspiration level across search
- **High stability** in first aspiration level (rho=0.6-0.8) and adjustment across search (rho=0.3-0.5) between time horizons

Conclusion

- Thresholds formulated on **percentile level**
- **Stable parameter adaptation** between time horizons
- Longer time horizon leads to increased deviation from optimality