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Adapting to Information Costs: The Cost-Benefit Trade-Off in Sample-Based Decisions



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- ### The Task
- Sequential, costly sample (max = 40)
 - Decision: **Majority in population positive or negative?**
 - After decision: Feedback + payoff (gain or loss)

Block 1 of 4
 Round 1 of 25

Information Cost: 20 ECU
 Payoff: 200 / - 200 ECU

Balance: 500 ECU
 Spent this round: 220 ECU

Research Questions & Background

Information search is a crucial aspect of decision making and is always costly:

- How close to normative is people's performance across a range of parameters (that result in different optimal strategies)?
- How good and large is the adaptation to changes in cost parameters?
- What mechanism or process could underlie the adaptation?

Sequential Sampling Models or Bayesian Models often assumed:

What might influence the threshold and especially its adaptation?

Optimal strategy used as benchmark: Bayesian updating of samples generated for participants during experiment (Edwards, 1965)

Main Message

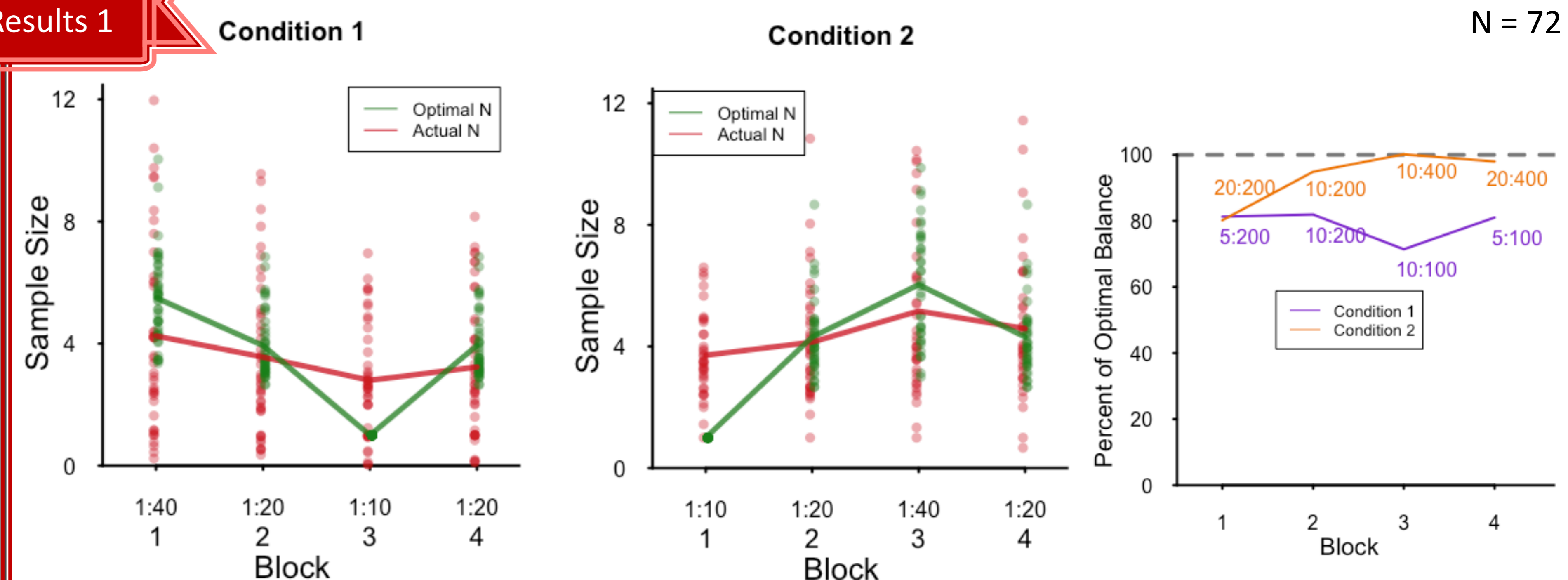
People adapt to changing information costs, but not enough to be optimal.

The Design – Exp. 1

Info cost change or payoff change from block to block (obvious change)
 Different order of ratios for conditions

		Block 1	B2	B3	B4
Condition 1	Info Cost	5	10	10	5
	Payoff	200	200	100	100
	Ratio	1:40	1:20	1:10	1:20
Condition 2	Info Cost	20	10	10	20
	Payoff	200	200	400	400
	Ratio	1:10	1:20	1:40	1:20

Results 1

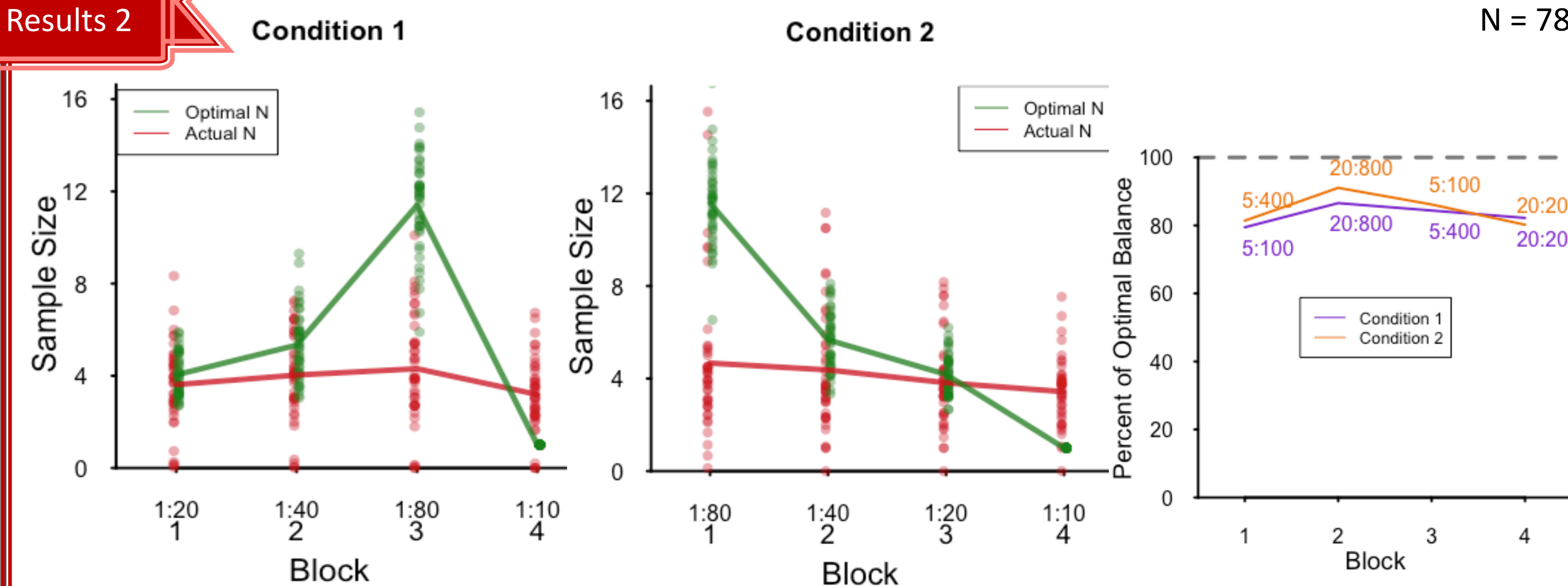


The Design – Exp. 2

Changes: New ratio of 1:80
 Info cost change and payoff change from block to block (non-obvious change)

		Block 1	B2	B3	B4
Condition 1	Info Cost	5	20	5	20
	Payoff	100	800	400	200
	Ratio	1:20	1:40	1:80	1:10
Condition 2	Info Cost	5	20	5	20
	Payoff	400	800	100	200
	Ratio	1:80	1:40	1:20	1:10

Results 2



Results Summary & Discussion

- Participants are sensitive to cost parameter changes, even when the change is not obvious (cost ratio related to sample size change, mean regression coefficients $-.23$, $t(67) = -9.92$, $p < .001$ (Exp.1); $-.089$, $t(91) = -4.41$, $p < .001$ (Exp.2))
- Adaptation is far too small to be optimal (comparison with optimal strategy, too little variance explained by cost ratio)

- Adaptation is not exclusively driven by the initial cost parameters, it is more than a "construction" relative to a default
- Further experiments required to investigate the nature of the adaptation process and influences
- Fitting of suitable descriptive model (Bayesian or alternative) required to assess threshold parameter change