Conservatism in a 2AFC Task

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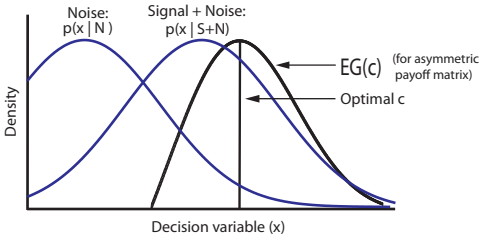
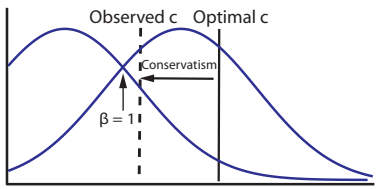
INTRODUCTION

- Optimality in detection tasks: Optimal criterion (c) maximizes expected gain (EG)



- $\beta = p(x=c \mid S+N) / p(x=c \mid N)$
- Conservatism in detection tasks with asymmetric payoffs or priors[1]: β closer to 1 than the optimal β that maximizes EG



- β is closer to optimal with asymmetric priors than with asymmetric payoffs[2].
- Does the same pattern of conservatism occur in a 2-alternative forced-choice (2AFC) task?

METHOD

- Task: Indicate which noise patch contains the Gabor.

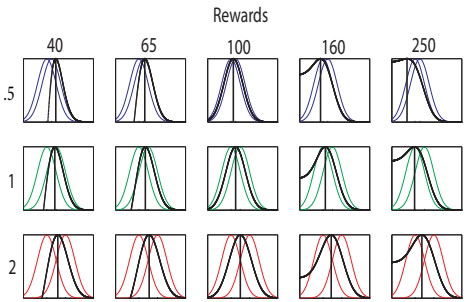
- Central fixation cross
- Trials with saccades excluded
- Stimulus duration: 200 ms
- Gabor contrast adjusted per subject to yield d' = .5, 1, 2

Asymmetric Payoffs

- 5 reward conditions, between blocks

Target pos'n	Observer response L	Observer response R
L	100	-100
R	-100	40, 65, 100, 160, 250

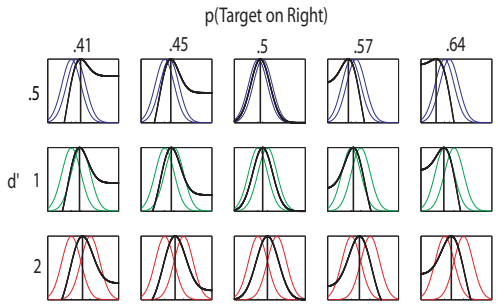
- 3 d' conditions, between blocks



- Equal priors: p(Target on Right) = .5

Asymmetric Priors

- 5 prior conditions, between blocks



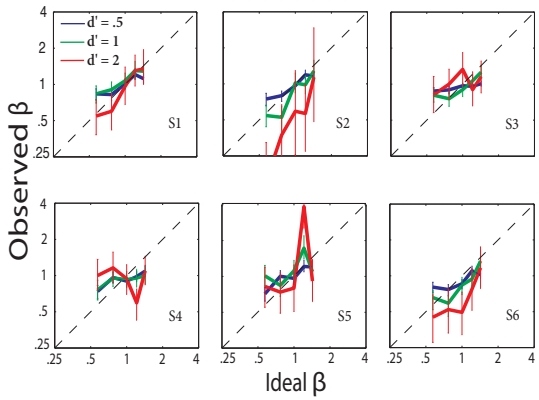
- Equal rewards:

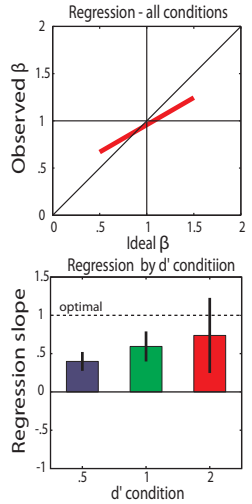
Target pos'n	Observer response L	Observer response R
L	100	-100
R	-100	100

- Asymmetric payoff and prior conditions in separate sessions. 15 blocks / session.

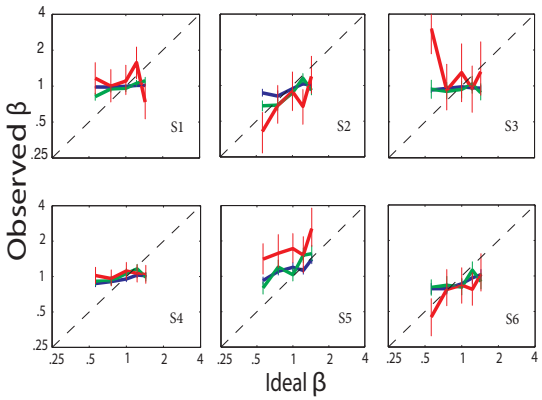
RESULTS

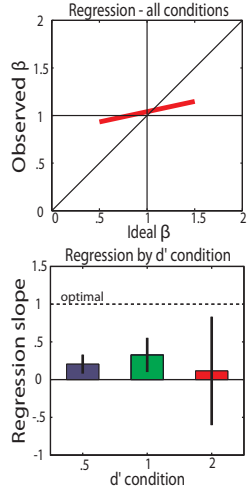
Asymmetric Payoffs





Asymmetric Priors





CONCLUSIONS

- Observers display conservatism in a 2AFC task.
- β is closer to optimal with asymmetric payoffs than with asymmetric priors contrary to typical results.

References
1. Green, D.M. & Swets, J.A. (1967). Signal detection theory and psychophysics. New York: Wiley.
2. Healy, A.F. & Kubovy, M. (1981). Probability matching and the formation of conservative decision rules in a numerical analog of signal detection. Journal of Experimental Psychology, HL&M, 7(5), 344-354.

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