NYU

DEC

Assessing the role of rewards and priors on confidence judgments

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Benefits of Confidence

- Beneficial to predict the outcome of a task

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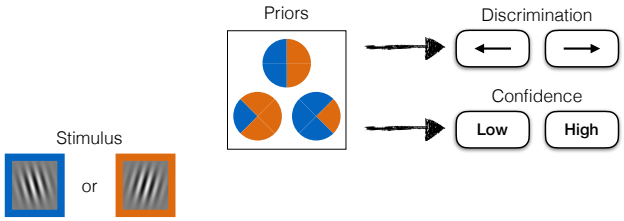
- Beneficial to predict the outcome of a task
- Confidence: estimate of probability correct
  e.g., Fleming & Dolan (2012)

How Do Priors and Payoffs Affect Decisions?



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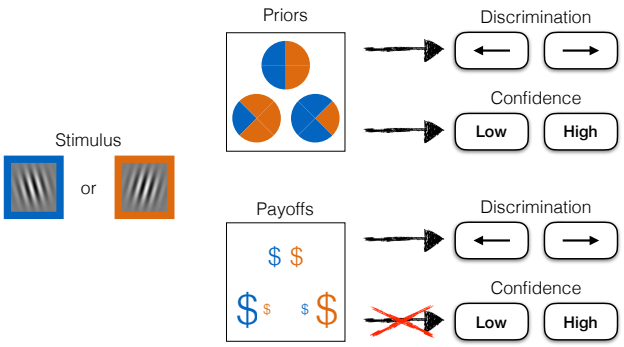
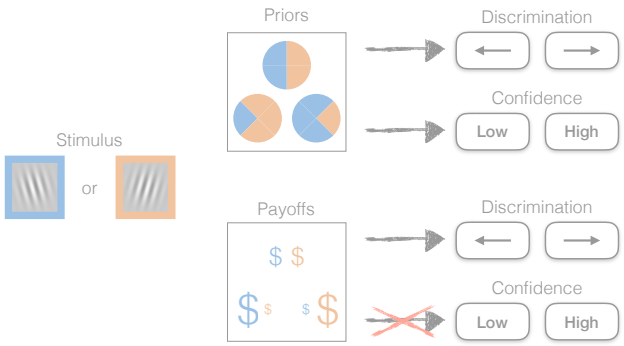
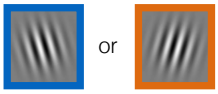


Do people adjust confidence for asymmetric priors but not for payoffs?



Task: Discrimination + Confidence Report

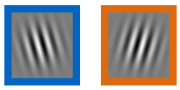
Stimuli:  or

Task: Discrimination: ← →

Confidence: Low High

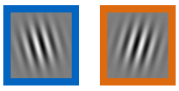
Feedback: Correct/incorrect on discrimination; reward if correct

Priors and Payoffs Manipulation



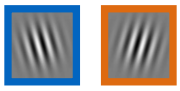
Prior \ Payoff	$ $	$ $	$ $
			
		Full Symmetry	
			

Priors and Payoffs Manipulation



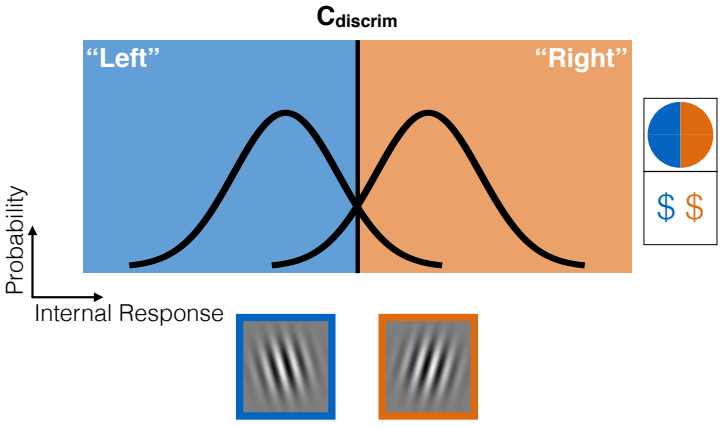
Prior \ Payoff	$ $	$ $	$ $
		Single Asymmetry	
	Single Asymmetry	Full Symmetry	Single Asymmetry
		Single Asymmetry	

Priors and Payoffs Manipulation

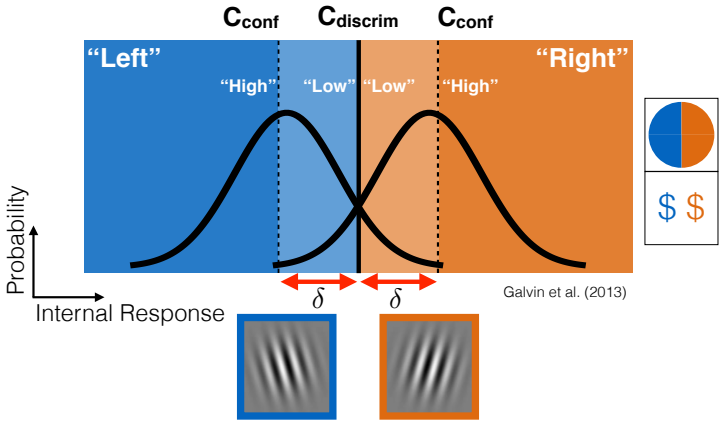


Prior \ Payoff	$ $	$ $	$ $
	Double Asymmetry	Single Asymmetry	–
	Single Asymmetry	Full Symmetry	Single Asymmetry
	–	Single Asymmetry	Double Asymmetry

SDT: Confidence



SDT: Confidence Criteria

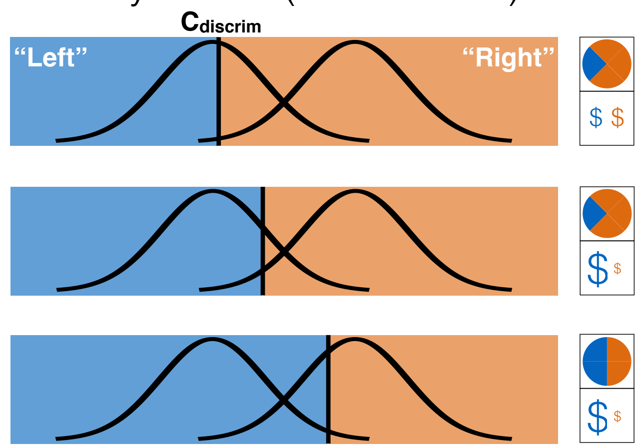


Galvin et al. (2013)

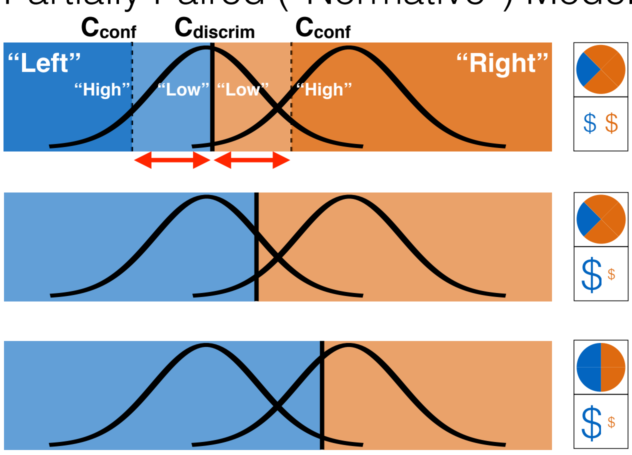
Models of Confidence

- Models differ in whether confidence criteria are affected by:
  - Model 1: Priors but not payoffs (Partially Paired)
  - Model 2: Priors and payoffs (Fully Paired)
  - Model 3: Neither priors nor payoffs (Unpaired)

Partially Paired (“Normative”) Model



Partially Paired (“Normative”) Model



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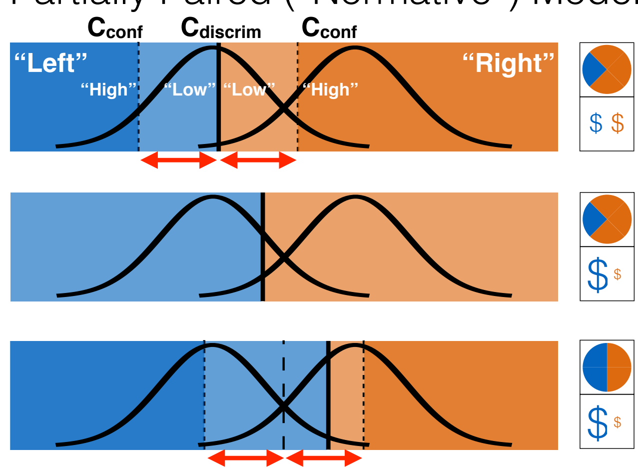
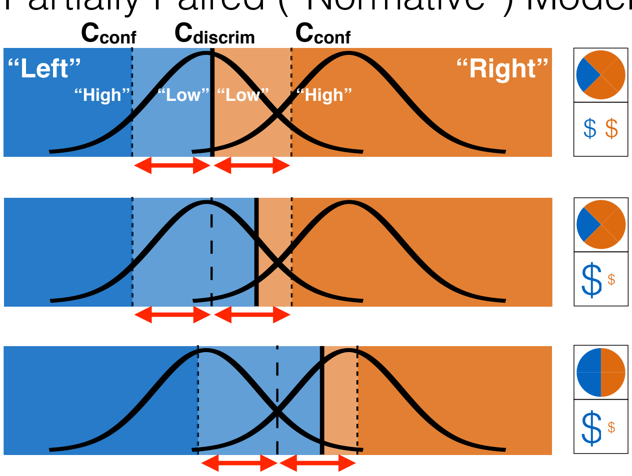
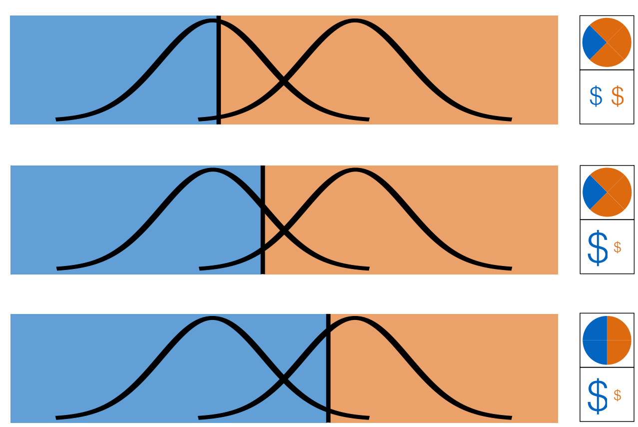


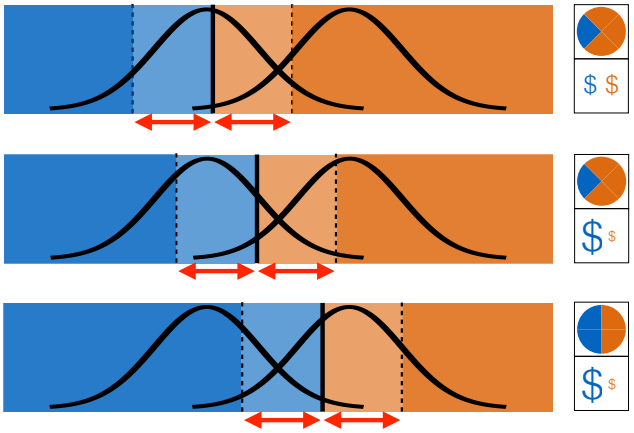
Partially Paired (“Normative”) Model



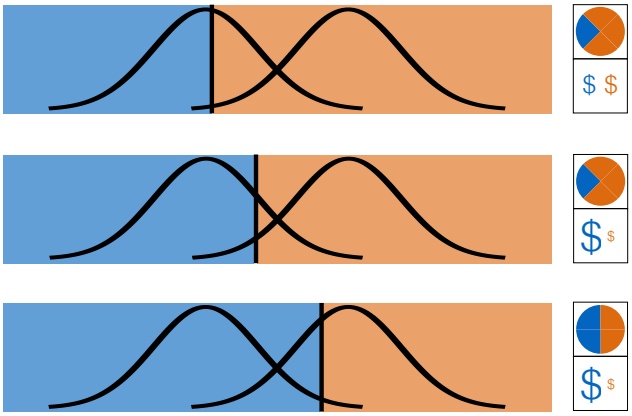
Fully Paired Model



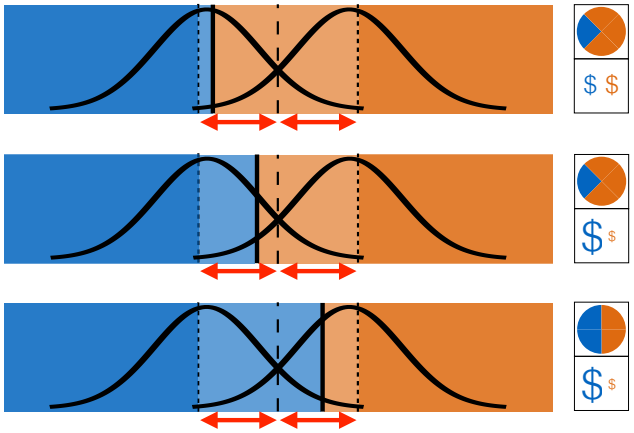
Fully Paired Model



Unpaired Model



Unpaired Model



Best-Fitting Models of Confidence

Calculated model evidence by marginalizing parameter grid

Best-Fitting Models of Confidence

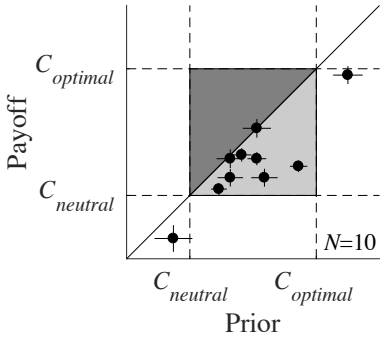
Model	Frequency of Best Fit
Partially Paired	0
Fully Paired	6
Unpaired	4

Calculated model evidence by marginalizing parameter grid

Criterion Assumptions

1. Assumed optimal criterion shifts
   - But people show conservatism: Incomplete criterion shift from neutral to optimal
     e.g., Healy & Kubovy (1981), Ackermann & Landy (2015)

Discrimination Criteria

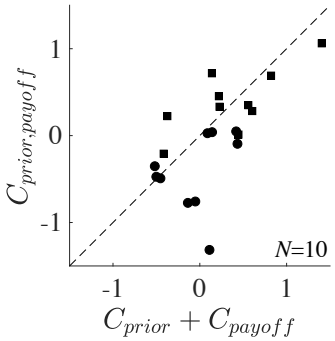


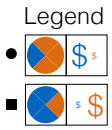
- People show conservatism
- More conservative for asymmetric payoffs (closer to optimal for asymmetric priors)

Criterion Assumptions

1. Assumed optimal criterion shifts
   - But people show conservatism: Incomplete criterion shift from neutral to optimal
2. Assumed shifts in single-asymmetry conditions sum

Predicting Criterion Shift



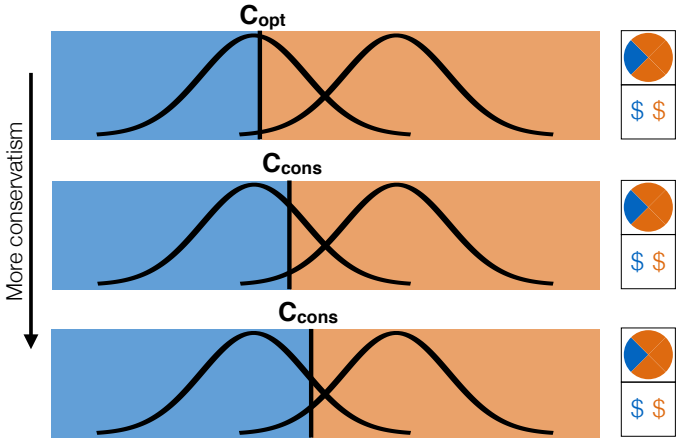


Criterion shifts for payoffs and priors sum when both are asymmetric

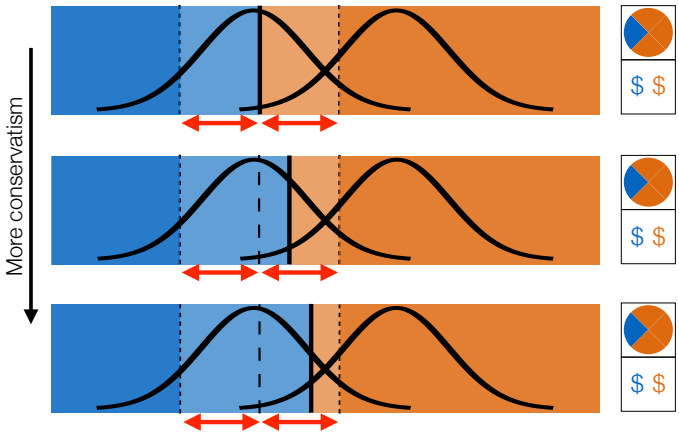
Conservatism in Confidence

Does conservatism carry over to confidence?

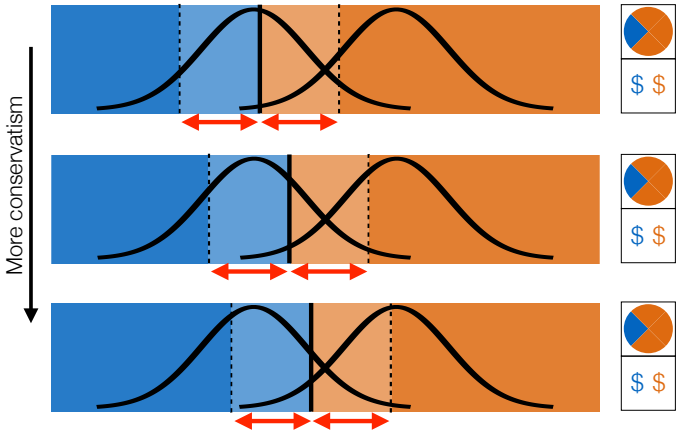
Conservatism in Confidence



Conservatism in Confidence



Conservatism in Confidence



Best-Fitting Models of Confidence

Model	Frequency of Best Fit
Partially Paired	(prev: 0)
Fully Paired	(prev: 6)
Unpaired	(prev: 4)

Best-Fitting Models of Confidence

	Discrimination:	Optimal		
	Confidence:	Optimal		
Model	Partially Paired	(prev: 0)		
	Fully Paired	(prev: 6)		
	Unpaired	(prev: 4)		

Frequency of Best Fit

Best-Fitting Models of Confidence

	Discrimination:	Optimal	Conservative	Conservative
	Confidence:	Optimal	Optimal	Conservative
Model	Partially Paired	(prev: 0)		
	Fully Paired	(prev: 6)		
	Unpaired	(prev: 4)		

Frequency of Best Fit

Best-Fitting Models of Confidence

	Discrimination:	Optimal	Conservative	Conservative
	Confidence:	Optimal	Optimal	Conservative
Model	Partially Paired	0 (prev: 0)	0	0
	Fully Paired	0 (prev: 6)	0	6
	Unpaired	0 (prev: 4)	4	

Frequency of Best Fit

Conclusions

Discrimination:

- Criterion shifts for payoffs and priors sum

Confidence:

- Conservatism carries over into confidence decision
- Not normative: respond to both priors and payoffs or neither