

# Neuroeconomics: Summary and review

Neuroeconomics Seminar  
Spring 2006

# Behavioral Economics Topics

- Decision under risk
  - Risk-as-feelings
  - Prospect theory & 4.5-fold pattern of risk attitudes
  - Concave value function, inverse-S weighting function
- Decision under uncertainty
  - Ambiguity aversion
  - Interaction of beliefs & preferences
- Reward & Value
  - Decision Utility vs. Experience utility
  - Constructed preferences

# Behavioral Economics Topics

- Game theory
  - Fairness & ultimatum games
  - Trust games
  - Other issues: levels of thinking, learning, equilibrium
- Intertemporal choice
  - Time preferences & dynamic inconsistencies
  - Savoring & dread

# Neuroscience Methods

- Single cell recording
- ERP, GSR
- Brain imaging: PET, fMRI, hyperscanning
- Lesion patients
- Reversible lesions: rTMS
- Pharmacological (e.g., oxytocin, propranol)

# Some issues

- Consistency
- Integrating results across experimental methods
- Conceptualizing neural systems
- Common problems with neuroeconomics experiments
  - Task design and analysis
  - Interpretation
- Integrating theory and experiments
- The future of the field

# Consistency

- How consistent are results across studies?

# Integrating results across methods

- How well do results match up across methods?
- What are the benefits or drawbacks of different methods?
- How should methods be integrated?

# Translation across species

- To what degree can studies of nonhuman animals tell us about human decision making?
  - Do we really believe that humans are that different?

# How should we conceptualize neural systems?

- 2 approaches:
  - Gloss the complexity for the sake of explanatory simplicity
    - “Limbic” vs. “Prefrontal” stories
  - Revel in the complexity
    - Animal models of reward learning
- Functional specialization vs. integration
  - Are processes always localized?

# Common problems: Design and analysis

- Task confounds
  - E.g., Knutson's MID task
- Lack of robustness
  - E.g., correlations driven by outliers
- Lack of statistical rigor
  - E.g., no rigorous correction for multiple comparisons
- “Methodological standards relax to accommodate ideological commitments” (D. Dulany)

# Common problems: Interpretation

- Over/misinterpretation of fMRI data
  - What does “activation” mean?
  - FMRI does not demonstrate necessity
- Overuse of reverse inference
  - selectivity of mind-brain relationships

# Integrating theory and experiments

- Did any of the studies discussed here really integrate behavioral economics and neuroscience?
  - How could such an integration work?

# Future of the field: Beyond the low-hanging fruit

- Where are the opportunities for conceptual advances?
- What kinds of approaches will be most fruitful?
- What aspects of current work should we abandon?