Introduction:
Behavior is motivated by a desire to approach positive and avoid negative outcomes. Neuro-anatomically and functionally distinct memory and learning systems interact with these motivational influences to determine behavior. Although generally studied separately, motivation and learning are intimately connected and should be studied in concert.

Projects:
We examine the motivation-learning interface across the lifespan and in brain damaged individuals within a research framework that blends behavioral, modeling and brain imaging techniques. Active projects examine:

1) Interactions between hypothesis-testing (frontal), procedural (striatal) and perceptual representation (posterior) classification systems.

2) Classification, decision-making and choice across the lifespan.

3) Motivational influences on learning including regulatory fit, stereotype threat, choking under pressure, etc.

Classification Task-Systems:
-Human participants view hundreds of images (one at a time) and categorize each image

Two Types of Classification Tasks

Representative Findings:
1) Rule-based but not information-integration learning is impacted by working memory/attention demand.
2) Information-integration but not rule-based learning is impacted by category representation, stimulus-response compatibility and feedback timing manipulations.

Cognition across the lifespan:
1) Rule-based and information-integration learning show deficits in 8 – 12 year old children. Rule-based but not information-integration performance is correlated with working memory span.

Lifespan (cont):
2) Older adults show rule-based and information-integration deficits. Rule-based learning is mediated by a frontal component, whereas information-integration learning is mediated by a striatal component and a prefrontal component associated with the transition from verbal to implicit rules.

3) Older adults show deficits in their ability to exploit the short term optimal choice, but show an enhanced ability to explore and identify the long term optimal choice.

4) Older adults show deficits in striatally mediated prototype learning, but enhanced posterior mediated prototype learning.

Motivation-Learning Interface:
Working Hypothesis: A “fit” between regulatory focus and rewards increases cognitive flexibility.

Two Regulatory Foci:
1) Approach Focus: “Do well and earn raffle entry for $50.”
2) Avoidance Focus: “Do well and keep raffle entry for $50.”

Two States of the Environment:
1) Gains: Correct Response: 3 points; Error: 1 point
2) Losses: Correct Response: -1 point; Error: -3 points

Representative Findings:
1) Regulatory fit improves rule-based and exploratory choice, but hurts information-integration and exploitative choice.
2) Regulatory fit effects might underlie choking under pressure and stereotype threat. Negative stereotypes and pressure lead to better performance under losses than gains.

For Additional Information concerning the research conducted in our lab and for reprints visit http://homepage.psy.utexas.edu/homepage/groupmaddoxlab/ or email Todd Maddox at maddox@psy.utexas.edu.