Cognition
from internal to external

BCS153 Week 3.2
1/31/2019
Roadmap

• Belief system
• Interaction of belief system and cognitive system
• Regulatory system and cognitive system
• Emotion and cognitive system
• Performance
• Behavior
• Development and learning
• Next step
Can you read these people’s mind through their eyes? Choose one of the four words for each emotion.
Reading the Mind in the Eye Task (RMET)  
A good test for *mind reading*?

• What factors may affect one’s interpretation of each emotion in this task?

Reading the Mind in the Eye Task (RMET)
A good test for *mind reading*?

Our *belief system* influences our choice.

What constitutes our belief system?
- Knowledge
- Cultural knowledge
- Experience

Interaction of belief system and cognitive system

"I believe that person is angry".

How do you make this inference?

- Experience
- Knowledge
- Theory of mind
Interaction of belief system and cognitive system

”I believe that person is angry”.

Memory

→ Representation vs. Function
→ “An angry face.” vs. “I can memorize things.”

External (an angry face) → Internal (memory)

• What if no external stimuli? Do we still have memory?
Interaction of belief system and cognitive system

External stimuli → Cognitive system (e.g., memory function)
← Belief system

• External stimuli
  ➢ Cultural experience
  ➢ Education
  ➢ Social interaction

• Do we have a belief system if no external stimuli?
Where does belief system fit in the pure cognitive system?
When the external stimuli are dangerous...
When the external stimuli are dangerous...

OR this model?
OK. But what if the external stimulus is NOT dangerous...
Superior status of regulatory system over cognitive system

• Evolutionary perspective
  ➢ Biological needs
  ➢ Adaptation
  ➢ Increased challenge $\rightarrow$ increased demand on RS $\rightarrow$ enhanced CS
  ➢ Account for subconscious aversion of danger
Interaction of emotion and cognitive system

• Attention and emotion
  ➔ Function vs. Mental state
  ➔ “I can attend to things.” vs. “I’m so high that I can’t pay attention.”
  ➔ Consciousness

• Memory and emotion
  ➔ Function vs. Mental state
  ➔ “I can remember things” vs. “I won’t forget the day when my mom passed away.”
  ➔ State-dependent encoding
So what does emotion do when the stimulus is dangerous...

• **Regulatory system** + Emotional System + Pure Cognitive System
When the stimulus is dangerous...
How do we actually get away from danger?

Performance

• Plan of actions
• Execution of plan
• Motor control
But performance is more than that!

• Also guided by cultural knowledge
  ➢ Production of speech
  ➢ Control of behavior
  ➢ Writing
So...what is behavior?

• Your behavior is not solely determined by the cognitive functions!

Daily behavior (instead of lab behavior) = Cognitive functions + Social norms (incl. interactions, context-specific behaviors, and observation of everyone else’s behavior) + Response to stimuli

e.g., when to cheer and when to be quiet in a ball game?
Change of behavior through development and learning

Significance of development in the study of cognition
→ Development of an animate cognitive system
→ Physiological maturation
→ Interaction
→ Adaptation
→ Culture
→ Belief systems
→ Learning
Now...what is learning?

• Accumulation or restructuring of:
  ➢ Knowledge
  ➢ Mental representations
  ➢ Experience

• Result of learning: Altering behaviors through
  ➢ Reinforcement
  ➢ Conditioning
What is skill?

• Verbal skill
• Problem-solving skill
• Arithmetic skill
• Reasoning skill
• Motor skill

How do we acquire all different types of skills?
Major difference between experts and novices?
What is skill?

- Major difference between experts and novices?
  → Timing

OK...but what influences timing?
Take home messages

• Cognition = Internal (regulatory + cognitive system) + external (stimuli, culture, social interaction)

• Mental state or process = function + event/stimulus

➢ “I remember X” won’t be valid if there’s no X.)
➢ “I’m angry at his behavior” won’t be valid if he doesn’t exist.
Take-home messages

• Mental state or process = function + event/stimulus

What if we have impaired sensory functions?

e.g. Damage to primary somatosensory cortex
  ➢ Central touch disorder → object recognition problems (source: https://goo.gl/D3PAJ5) → altered mental representation

• Paralysis

http://m.caltech.edu/news/paralyzed-patient-feels-sensation-again-81934
What’s next?

• What makes us human and how our cognitive system evolves into the current stage?

https://goo.gl/ztB7R5