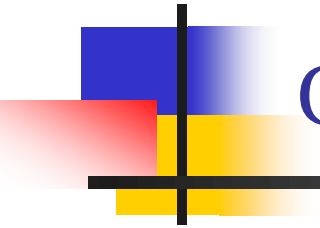
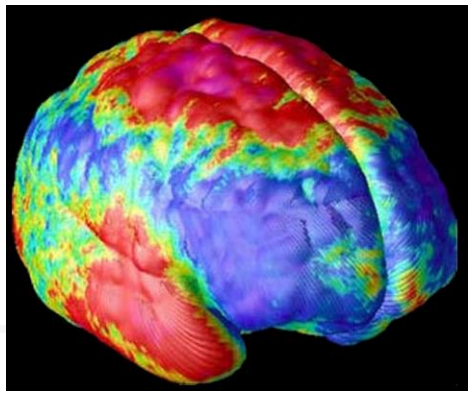


Creativity and Expertise (Part 2)

Expertise

- Intelligence is not enough
- Creative people have considerable training, knowledge, and experience in their field of expertise
- Experts solve problems quicker and more creatively than novices

Expertise



Colzato et al., 2013

- Neuro-imaging research
  - Frontal lobe active during idea generation, while temporal lobe specializes in idea ‘editing’
    - *f*MRI and PET studies show depression, stress, and anxiety reduce this type of brain activity

COMPARISON OF NOVICE AND EXPERT PROBLEM SOLVERS

Characteristic	Novices	Experts
Memory	Small pieces Few items	"Chunks" or pattern ~ 50,000 items
Attitude	Try once and then give up Anxious	Can-do if persist Confident
Categorize	Superficial details	Fundamentals
Problem statement	Difficulty redescribing Slow and inaccurate Jump to conclusion	Many techniques to redescribe Fast and accurate Take time defining tentative problem May redefine several times
Simple problems	Slow Work backward	~ 4 times faster Work forwards with known procedures
Strategy	Trial and error	Use a strategy
Information	Don't know what is relevant Cannot draw inferences from incomplete data	Recognize relevant information Can draw inferences
Sketching	Often not done	Abstract principles Explore

Expertise (Pros)

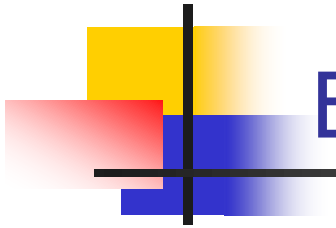
- Being an expert involves:
  - Schemas/heuristics
  - Selective attention
  - Automaticity
  - Top-down processing

Expertise (Cons)

- Being an expert involves:
  - Reliance on established pathways of thinking
  - Bias
  - Tunnel vision, or ignoring otherwise important/relevant information

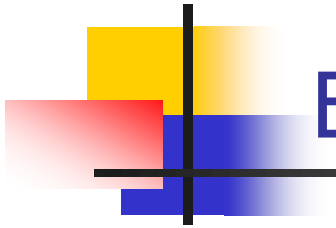
Expertise

- **Matthews (2015) – "Too Good to Care"**
  - Trait personality not a robust enough predictor of player experience
  - Higher skill is positively correlated with in-game flow
  - Player skill is negatively correlated to frustration
  - *Game content affects non-expert (low and mid-skill) player groups similarly*



Expertise

- Creative heuristics
  - **- Means-end analysis**
    - Compare current state with goal state
    - Breaking problem down into smaller tasks
  - **- Generate and test**
    - Trial-and-error strategy
    - Creating many possibilities and testing them



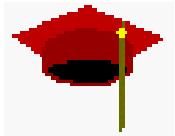
Expertise

- Creative heuristics
  - **Working forward**
    - Begin with initial state and move forward (PEMDAS)
  - **Working backward**
    - Determine last step needed to accomplish goal, then next-to-last-step, and so on

The 6 Thinking Hats

White hat

- Focus on the available information and data
- Analyze past trends and extrapolate



Red hat

- Examine problems through emotion
- Using intuition, gut reactions, or likely (emotional) response of others

The 6 Thinking Hats

Black hat

- Focus on the “bad” side of the problem or decision to be made
- Analyze why it may not work, highlight the weak points (to eliminate)

Yellow hat

- Focus on the “good” side, and all of the benefits that go along with it
- Extremely useful to think about the value of something in difficult times

The 6 Thinking Hats

Green hat

- Developing creative solutions, “free-flowing” idea generation
- Low self-imposed criticism, anything goes

Blue hat

- Process control, very “high level” approach to thinking
- Creating action items