How Minds Work

The IDA Model:
a tool to think with

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Dream Amnesia

- Dreaming a conscious activity (introspection)
- Waking-type EEG patterns typically accompany REM sleep
- Yet everyone awakens from a dream only remembering a little, if any at all.
- Dream amnesia
Why Dreams?

• Both slow wave sleep and REM sleep required for offline updating of thalamocortical circuits during learning
• Updating one circuit requires activity — random auto-associations of dreaming
• Other needs the quiet of deep sleep
• (Cox & Adams 2000)
IDA on Dream Amnesia

- Dreams needed for consolidation of DM
- Imaginary contents of dreams play no useful role — are not to be learned
- During sleep episodic learning is suppressed
- No conscious contents stored in TEM
- WM contains final small portion of the dream
- Stored in TEM on awakening
- Results in dream amnesia
Unconscious Driving

• “Have you ever been driving down a highway and all of a sudden snap out of a daydream only to briefly panic as you realize you've been driving unconsciously for quite awhile?”

• “When you drive a car for long periods, you tend to slip into this bicameral state and are actually driving unconsciously.”

• “Absent-minded driving” one example of a “non-conscious experience” (Philosopher Peter Carruthers)
Unconscious Driving?

• “A case of rolling consciousness with swift memory loss” (Dennett)

• “In the case of ‘absent-minded driving’, many of the relatively mundane events one routinely encounters in everyday driving experiences … are simply not encoded by the memory processes into a readily accessible or enduring form, most likely because such events do not have any particular long-term significance. [This] can lead to the illusory retrospective impression that one has somehow been driving ‘unconsciously’” (Lyvers)
IDA on Unconscious Driving

- Sensory input during driving is (unconsciously) perceived, stored in preconscious WM, brought to consciousness, and stored in TEM
- Driving experiences stored — why not recalled?
- TEM, blurs details similar events (interference)
  - Residential (commercial) areas all similar
  - Intersections similar to one another
  - Similar events from previous drives not yet decayed
- Time sharing with radio or passenger — fewer details become conscious
- Driving done consciously but can’t be recalled
Visuospatial Sketchpad

• **Situation:** Subject is asked verbally to visualize front door and tell whether the doorknob is on the left or the right

• **Assumption:** Subject prepared to comply with instructions
IDA Analysis I

• **Input.** (CC steps 1 & 2). Input sensed, understood, and stored as a percept, in the preconscious buffer. (multiple cycles)

• **Automatic Local Associations.** (CC step 3) Using percept as a cue, local associations retrieved from autobiographical memory include a visual image of the front door

• Stored in visual sketchpad preconscious buffer.
IDA Analysis II

• **Consciousness.** (CC steps 4 & 5). Attention codelet brings visual image of front door to consciousness

• **Task Plan.** (CC steps 6&7). Behavior codelets instantiate behavior stream for searching the image and producing response (also binding variables & sending activation)
IDA Analysis III

• **Forming the Image.** (CC steps 8, 9, 1 & 2)
  – Behavior to focus on the doorknob selected
  – Underlying behavior codelets become active
  – Visual focusing on doorknob the image
  – Note its position
  – Store all this in the preconscious buffer

• **Conscious Visual Image.** (CC steps 3, 4 & 5)
  An attention codelet brings image and related information to consciousness
IDA Analysis IV

• **Resources Recruited.** (CC steps 6 & 7). Behavior codelets respond to broadcast, bind variables and send activation to behaviors in existing behavior stream

• **Overt Verbal Report.** (CC steps 8 & 9).
  – Behavior to compose response selected
  – Behavior codelets compose appropriate verbal response using phonological preconscious buffer
  – Other active behavior codelets speak the response
IDA Analysis V

• **Sensing the Response.** (CC steps 1 & 2). Verbal response sensed, understood, and stored as a percept in preconscious buffer

• **Conscious of response.** (CC steps 3, 4, 5).
  – Using percept as a cue, local associations are retrieved from episodic memories
  – Attention codelet brings the sounds and their meaning to consciousness
  – Conscious awareness of answer
Explanation and Theory

• Explanations needed for understanding
• Theories – tools for creating explanations
• Theories – tools to think with
• “There nothing more practical than a good theory.” Kurt Lewin, 1951
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