



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 Responce.** (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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