

# Chapter 15

## Unconscious Processing

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### Definition of Consciousness

- "A state of awareness of sensations or ideas such the we can reflect on those sensations and ideas, know what it 'feels like' to experience the sensations and ideas and can, in many cases, report to others that we are aware of the sensations and ideas." (Reisberg, p. 479.)
- We can also describe the feelings to others.

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### Cognitive Unconscious

- Not as Freud saw it
- Activity that makes possible our interactions with the world but of which we are completely unaware
- Cognitive processes vs. products
- Hypothesis: aware of products, not of processes
  - Products: perceptions, ideas, beliefs, memories

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## The Cognitive Unconscious

- No awareness of processes involved in producing the products
- E.g. memory search. Aware only of word or image recalled.
  - Retrieval hypothesized in 60s – computer retrieval processes
- No awareness of spreading activation, inferences in word identification, reconstruction in memory etc.

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## The Cognitive Unconscious - 2

- Unable to distinguish between real & false memories
- Understanding influenced by schematic knowledge, expectations, context, inferences etc.
  - No awareness of processes by which this happens
- Aware of products of unconscious processes – understanding (or not) of a text passage

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## Unconscious Attributions

- Implicit memory: people influenced by something they can't recall
  - No awareness of influence of prior event
- Attribute feeling of familiarity to famousness of person, or having seen them at a crime
  - Source confusion
- We are not aware of making these attributions

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### Unconscious Attributions - 2

- Nisbett & Schacter: Ss experienced electric shock. Some Ss given placebo pill & told it would decrease pain.
- Pill would also cause hands to shake, butterflies in stomach, irregular breathing, etc.
  - Symptoms are actually result of shock
- Ss given placebo accepted much higher levels of shock

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### Unconscious Attributions - 3

- Ss in no-pill condition concluded that symptoms were due to shock → anxious, wanted shock to stop
- Ss given pill unconsciously attributed symptoms of shock to pill; didn't make inference that shock was "too strong"
- Ss not aware that information about pill affected their reactions to shock
  - Didn't mention the pill

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### Unconscious Attributions - 4

- Ss engaged in sophisticated reasoning
  - Observing 'symptoms', producing hypotheses to explain their feelings, drawing conclusions on basis of available evidence etc.
- Ss not aware of this unconscious thought
- Ss believed that pill had nothing to do with their willingness to continue receiving the shocks
  - This belief was wrong – People do not always know their reasons even though they think they do.

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## Mistaken Introspections

- Ss read passage from novel & described emotional impact
- Also asked which part of passage, which images, had greatest effect
  - 86% selected bit about messy baby's crib
- 2<sup>nd</sup> group read passage without crib passage → still reported same emotional response
- → introspections wrong. Ss had no insight into their emotional reaction

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- Ss engaged in reconstruction of their reasoning based on schematic knowledge
- Introspection often incorrect – S can't distinguish between reconstruction or inference from "memory" of what they thought

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## Unconscious Guides to Conscious Thinking

- Conscious thought – internal 'conversation' with oneself, manipulation of visual image (e.g. rotation)
- Elaborate unconscious support involved
  - E.g. mental set or Einstellung : unconscious assumptions, e.g. problem about rt-angled triangle in circle
  - Frame in decision making. Positive frame → risk averse
    - Wording of custody scenario: Award vs deny custody. Wording biases Ss to seek confirmatory support

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## Unconscious Guides - 2

- Elaborate unconscious support
    - Perceptual reference frame in visual imagery (e.g. which part is top or front)
    - Ambiguous sentences – not ambiguous at the time
      - E.g. sentences on students' assignments
  - Priming effect
    - Present *nurse*, then *doctor*. Response to *doctor* faster than if unrelated word or random letters presented
    - We are not aware of spreading activation.
- Unconscious frame prevents ambiguity & shapes content of thought

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## Blind Sight & Amnesia

- Korsakoff patients – no conscious recollection, but show normal retention on implicit tasks
- Blind sight: Striate cortex damage → blindness, no response to light.
  - Ss forced to guess what stimuli were, guessed correctly or pointed to objects.
  - Patients not conscious of perception
- Person who can't taste, but doesn't like some foods.

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## Nature of Unconscious Processing

- Behaviour involves well-established routines
  - Well practiced or 'innate'
- Modules are highly specialized
  - E.g. memory search, pattern recognition, attribution of causality, judgements of frequency
- Unaware of processes involved
- Usually the best response
  - Inferring frequency from availability
  - Reaching for an object

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## Nature of Unconscious Processing - 2

- Involve familiar ordinary responses – automatic
  - Behaviour guided by habit or by environment
    - inflexible behaviour, e.g. set, action slips
  - Need conscious effort to modify or inhibit the behaviour
  - Must concentrate to avoid making usual response (e.g turn into MUN instead of proceeding straight) to go to Avalon Mall

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## Advantage of Unconscious Performance

- Highly practices tasks run quickly & don't require attention
- Launch routine (sequence of responses) rather than having to think about each response
- Reallocate cog. resources
  - When speaking or writing, don't need to think about word retrieval, processing syntax, how to spell words, punctuation etc.

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## Advantage of Unconscious Performance - 2

- Can focus on higher-order ideas, global strategies, long-term goals
- Invisibility of mental processes → not distracting → allow attention to focus on task at hand

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## Cognitive Neuroscience

### Neuronal workspace hypothesis

- Different areas of the brain highly specialized
- Need to integrate work done in specialized areas.
  - Need to keep specialized processing going long enough to become integrated
- Attention amplifies & prolongs neural activity & links different modules
  - E.g. movement, colour, shape etc. linked together → perception of moving red arrow

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## Cognitive Neuroscience - 2

- Workspace neurons – connect different areas of the brain & selectively promote specialized processing of attended item
- Hypothesis: Integrated activity of workspace neurons = glue that binds features → unified experience

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## Function of Neuronal Workspace

- Workplace neurons + attention → unitary experience, maintain mental representation
- Stimuli become conscious when linked to one another in coherent representation in workspace (i.e. when attended)
- We can choose what we focus on → keep mental representation in mind.

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## Function of Neuronal Workspace - 2

- Neuronal workspace = Baddeley's working memory
- Central executive (frontal lobes)
  - Enables creativity, novel responses, suppression of habitual responses (Stroop task), problem solving (set) etc.
  - Controls direction of attention
- Sleep – not conscious
  - No communication between different parts of brain, Brain's activities uncoordinated .

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## Function of Neuronal Workspace – 3

- Baddeley's Articulatory loop & phonological store, visual-spatial sketch pad
  - Keeps visual and language information active
- Compare events in different neural systems
  - Detect relationships, combinations, conflict between auditory an visual-spatial information.
- Anterior cingulate cortex – detects & resolves conflict in different neural systems

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## Function of Neuronal Workspace – 4

- Difference between sleep and wakefulness
- In sleep, communication between different parts of the brain breaks down
  - Activity in different parts of brain not coordinated
  - Sleeping people not conscious of their experience

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### Conscious = Justification for Action

- Consciousness → spontaneous, intentional behaviour
- Blind sight, amnesia – patients see or remember something, but their behaviour is consistent with blindness or amnesia. Why don't blind sight patients use visual information?
- The don't use 'unconscious' information to guide behaviour.

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### Conscious = Justification for Action - 2

- Amnesic patients show memory when tested on implicit memory task.
- Why don't amnesic patients use implicit memory information?
- Normal Ss in implicit memory study don't use implicit memory to do explicit task. Why not? Why don't they guess on basis of implicit info?

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### Conscious = Justification for Action

- Conscious experience = linking a lot of different information into coherent whole.
- Quality of conscious experience convinces us that experience is 'real'
  - ▲ We can act on experience
- Experience in blind sight or amnesia is not unified or conscious & therefore lacks 'realness'.
  - Ss don't act on it

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## Summary

- Attention unifies information processed in specialized modules → coherent perception of world
  - Unite movement, colour, pattern etc into perception or image of one object
- Neuronal Workspace allows comparisons of information in different modules or modalities
  - Relate sound to seen object, imagine smell of seen object
- Mental workspace allows discovery of relationships & conflict (Competing responses)

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- Anterior cingulate cortex activates conflict resolution mechanisms → Central executive
- CE → Working memory maintains representation of situation & goal, inhibits habitual response
- CE → integration of different processing streams → coherent perception
  - flexibility, creativity.

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- End of lecture

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## Automatic Actions

Spelke, Hirst & Neisser

- Practice → automatization, unitization of sequence of responses
- Ss practiced reading encyclopedia while writing dictated words
- After weeks of practice, could do both tasks
- Ss reported doing dictation 'unconsciously' but correctly 'guessed' words on memory test

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