The Explicit and the Implicit: Unconscious Mental States

Fall 2014

Midterm Exam

• Wednesday, October 22
  – In-Class Review Monday, October 20
• Students with Disability Accommodations
  – Details via Email

All Lectures and Required Readings To Date

• 15-20 Short-Answer Questions
  – Each Question Worth 3-4 Points
  – 4 Sentences Maximum
• Covers:
  – Introduction
  – Introspection
  – Mind and Body
  – Attention and Automaticity
  – The Explicit and the Implicit
Resources for Exam

• Q&A Session in Class October 20
• Materials on Course Website
  – Lecture Illustrations, Supplements
  – Exam Information, Narrative Review
  – Past Exams (with Scoring Guides)
• Post questions to bSpace Forum
  – By 12:00 Noon Tuesday, October 21

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Two Kinds of Consciousness?

• Phenomenal Consciousness
  – Experiential States
• Access Consciousness
  – Information Interacts with Conscious States
• P-Consciousness w/o A-Consciousness?
  – Background Noise
• A-Consciousness w/o P-Consciousness
  – Blindsight?

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The Contradiction of the Unconscious
Kant, Anthropology from a Pragmatic Point of View (1798)

To have ideas, and yet not be conscious of them, --
there seems to be a contradiction in that; for how can we know that we have them, if we are not conscious of them?
Nevertheless, we may become aware indirectly that we have an idea, although we be not directly cognizant of the same.
A Tumbling-Ground for Whimsies?

James, Principles of Psychology (1890), p. 163

The distinction... between the unconscious and the conscious being of the mental state... is the sovereign means for believing what one likes in psychology, and of turning what might become a science into a tumbling-ground for whimsies.

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Implications of Attention and Automaticity

- Mental Processes can be Unconscious
  - Especially Preattentive or Automatic
- Mental States are Conscious
  - Beliefs, Feelings, Desires
    - Percepts, Memories, Images, Thoughts
- Role of Conscious Mental States
  - Evoke Unconscious, Automatic Processes
  - Created by Unconscious, Automatic Processes

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Can Mental States Be Unconscious?

Can
Beliefs, Feelings, Desires
Percepts, Memories, Thoughts
Feelings, Emotions,
Goals, Motives
Influence Experience, Thought, Action
In the Absence of...
(or Independent of...)
Conscious Awareness
What Do We Mean by Mental States?

- Brentano: Intentionality is the Mark of the Mental
  - Intentionality = "Aboutness"
- James: Mental States Deal with Objects Independent of Themselves
  - Cognitive, Possess Function of Knowing
- Searle: Mental States Have Content
  - Refer to Specific Feature of the World

Conscious and Unconscious Mental States

- In the Cognitive Domain
  - Perceiving, Remembering, Knowing, Thinking
- When Conscious, Have Intentionality
- Unconscious Mental States
  - Must Also Have Intentionality

The Amnesic Syndrome

- Bilateral Brain Damage
  - Medial Temporal Lobe
    - Hippocampus
  - Diencephalon
  - Mammillary Bodies
- Specific Memory Deficit
  - Anterograde Amnesia
    - "Postmorbid" Events
  - Retrograde Amnesia (?)
    - "Premorbid" Events
Memory in the Amnesic Syndrome
Warrington & Weiskrantz (1968)

Study List
Ashcan
Bellhop
Cleanser
Dark
Expert
Follow
Grapevine

Memory in Amnesia
After Warrington & Weiskrantz (1970)

Recognition in the Amnesic Syndrome
Warrington & Weiskrantz (1968)

<table>
<thead>
<tr>
<th>Targets</th>
<th>Lures</th>
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<tbody>
<tr>
<td>Ashcan</td>
<td>Ashtray</td>
</tr>
<tr>
<td>Bellhop</td>
<td>Bellows</td>
</tr>
<tr>
<td>Cleanser</td>
<td>Clearance</td>
</tr>
<tr>
<td>Dark</td>
<td>Dunk</td>
</tr>
<tr>
<td>Expert</td>
<td>Expense</td>
</tr>
<tr>
<td>Follow</td>
<td>Fellow</td>
</tr>
<tr>
<td>Grapevine</td>
<td>Granite</td>
</tr>
</tbody>
</table>
Memory in Amnesia
After Warrington & Weiskrantz (1970)

Anterograde Amnesia as Learning Failure

• “Loss of Memory”
  – Loss of New Learning
• Can Amnesic Patients Learn?
  – “A Relatively Permanent Change in Behavior that Occurs as a Result of Experience”

“Guessing Game”

• Word-Stem Completion
  I’m thinking of a word that begins with these three letters. Can you fill in the blanks?
  Ash____ Bel____
  Cle____ Exp____
• Word-Fragment Completion
  I’m thinking of a word that has these letters in it. Can you fill in the blanks?
  D___k F_I___w
Memory in Amnesia

After Warrington & Weiskrantz (1970)

- Processing of One Item Influences Processing of Another Item
  - “Learning” in the Broadest Sense of Term
- Two Forms
  - Positive
    • Facilitates Processing
  - Negative
    • Inhibits Processing

Explicit vs. Implicit Memory

After Schacter (1987)

- Explicit Memory
  – Conscious Recollection
  – Recall, Recognition
- Implicit Memory
  – Any Effect on Experience, Thought, Action
    • Attributable to Past Event
    – Priming Effects
- Priming Effects Occur in the Absence of Conscious Recollection
  – Represent Unconscious memory
Repetition Priming

- The item presented at the time of testing is a full or partial recapitulation of the item presented during study.
- Examples
  - Stem-Completion: Ash___
  - Fragment-Completion: A_h__n
  - Perceptual Identification: Ashcan
  - Lexical Decision: Ashcan
- Bias in Information-Processing
  - Based on Memory Trace of Prior Experience

Test Format

Control Nature of the Cues During Test

- Stem-Cued Recall
  - Remember a Word on the List Beginning with Gra______
- Stem Completion
  - The First Word You Can Think of Beginning with Gra______

Explicit and Implicit Memory in the Amnesic Syndrome

Graf, Squire, & Mandler (1984)
Explicit and Implicit Memory in Amnesia

- Amnesic Syndrome
- Electroconvulsive Therapy for Depression
- Conscious Sedation for Outpatient Surgery
- General Anesthesia for Major Surgery
- Posthypnotic Amnesia
- Dissociative Disorders
  - e.g., Multiple Personality Disorder
    - Genuine Cases! (Mostly)

Explicit and Implicit Memory in “Normal”, “Intact” Subjects

- Savings in Relearning
  - Nelson (1978)
    - Paired-Associate Learning
    - Significant Savings in Absence of Recognition
- Priming Effects
  - Jacoby & Dallas (1981)
    - Word Identification
    - Priming Dissociated From Recognition

Levels of Processing

Jacoby & Dallas (1981)

- Study Phase
  - “Shallow” Orthographic Processing
  - “Deep” Semantic Processing
- Memory Tests
  - Recognition
  - Perceptual Identification
Primming in Perceptual Identification
Jacoby & Dallas (1981), Experiment 1

Dissociations Between Explicit and Implicit Memory

- Population Dissociations
  - Amnesia
    • Affects Explicit, Not Implicit
- Functional (Experimental) Dissociations
  - Level of Processing
    • Affects Explicit > Implicit
  - Modality Shift
    • Affects Implicit > Explicit

Single Dissociation
Teuber (1955)
Double Dissociation
Teuber (1955)

2 Independent Variables
- A Affects Explicit
  - Does Not Affect Implicit
- B Affects Implicit
  - Does Not Affect Explicit

- "Twin Dissociation"
  - Two Single Dissociations
- Also Triple Dissociations

Crossover Dissociation

Independent Variable A
- Improves Explicit
- Impairs Implicit

Terminological Confusion

- Explicit vs. Implicit Memory
  - Why Not Conscious vs. Unconscious?
- Direct vs. Indirect Memory
- Declarative vs. Procedural Memory
  - Declarative vs. Nondeclarative Memory
Two Kinds of Representations
Anderson (1995)

- Perception-Based (Mental Images)
  - Represent Physical Structure of Event
    - Physical Appearance of Object
    - Spatio-Temporal Configuration of Object, Features
- Meaning-Based (Propositional)
  - Represent Meaning of Event
    - Semantic Relations Among Objects, Features

Semantic Priming in Amnesia

- Category Priming
  - Tree-Oak
- Associative Priming
  - Table-Chair
- Idiomatic Associates
  - Sour-Grapes

Category Priming in Amnesia
Gardner, Boller, Moreines, & Butters (1973)

<table>
<thead>
<tr>
<th></th>
<th>% of Targets</th>
<th>Controls</th>
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<tbody>
<tr>
<td>Free</td>
<td>0.2</td>
<td>0.6</td>
</tr>
<tr>
<td>Cued</td>
<td>0.3</td>
<td>0.5</td>
</tr>
<tr>
<td>Baseline</td>
<td>0.4</td>
<td>0.4</td>
</tr>
<tr>
<td>Priming</td>
<td>0.1</td>
<td>0.2</td>
</tr>
</tbody>
</table>
Relations Between Perceptual and Conceptual Priming

<table>
<thead>
<tr>
<th>Test</th>
<th>Perceptual</th>
<th>Conceptual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stem-Completion</td>
<td>ashtray - ash___ cigarette - ash___</td>
<td></td>
</tr>
<tr>
<td>Fragment Completion</td>
<td>follow - f_l__w lead - f_l__w</td>
<td></td>
</tr>
<tr>
<td>Completion Perceptual Identification</td>
<td>nurse - nurse doctor - nurse</td>
<td></td>
</tr>
<tr>
<td>Lexical Decision</td>
<td>nuse - nruse doctor - nruse</td>
<td></td>
</tr>
</tbody>
</table>

Study - Test

Implications of Implicit Memory

• Implicit Memory is Unconscious Memory
  – Can be Dissociated from Explicit Memory
• Can Explicit-Implicit Distinction be Extended?
  – Other Domains of Cognition
    • Perception, Thought, Learning
  – Other Domains of Mental Life
    • Emotion, Motivation

Implicit Memory and Implicit Perception

• An Effect of a Past Event
• On Experience, Thought, or Action
• In the Absence of (or Independent of) Conscious Recollection of that Event

• An Effect of a Current Event*
• On Experience, Thought, or Action
• In the Absence of (or Independent of) Conscious Perception of that Event

*or an Event in the Very Immediate Past (James’s “Specious Present”)
Does the *Limen* Exist?
Leibnitz (1704); Herbart (1816)

- Conscious Perceptions Built Up from Unconscious Perceptions
  - *Petites Perceptions*
- Limen (Threshold) for Conscious Perception
  - Unconscious Perceptions Have Effect on Consciousness
  - Ideas as well as Percepts

Does the *Limen* Exist?
Peirce & Jastrow (1884)

- Comparative Judgments
  - Weight
  - Brightness
- Confidence Rating
- Forced Choice at Zero Confidence

Judgment Accuracy at Zero Confidence
Peirce & Jastrow (1884)
Criticisms of Subliminal Research
Eriksen (1958, 1960); Goldiamond (1958); Holender (1986)

• The Threshold Bugaboo
  – Threshold-Setting Procedures
    • If inadequate, stimuli not truly subliminal
  – Implications of 50% detection
    • “Subliminal” stimuli still detected some of the time

• Theoretical Blinders
  – Subliminal perception confined to “preattentive” perceptual analyses
    • Cannot extend to semantic analyses

Masked Priming Paradigm
Marcel (1983)

• Semantic priming effects
  – Lexical decision
  – Perceptual identification
    Doctor → NURSE
• Target presented supraliminally
• Prime presented “subliminally”
  – Brief or weak exposure
  – Masked exposure

Varieties of Masking
The Subliminal Stroop Effect
Marcel (1983a), Experiment 3

- Subject’s Task
  - Identify Patch of Color

- Color Word Embedded in Patch
  - Congruent or Incongruent
  - Masked
    - Short vs. Long SOA between Word and Mask

The Subliminal Stroop Effect
Marcel (1983a), Experiment 3

Masked Semantic Priming
Marcel (1983a), Experiment 5

- Number of Repetitions
- Response Latency (msec)
- Prime
  - Unrelated
  - Associated

The Subliminal Stroop Effect
Marcel (1983a), Experiment 3

- Subject’s Task
  - Identify Patch of Color

- Color Word Embedded in Patch
  - Congruent or Incongruent
  - Masked
    - Short vs. Long SOA between Word and Mask

The Subliminal Stroop Effect
Marcel (1983a), Experiment 3

- Response Latency (msec)
- Word-Mask SOA
- Color Simultaneous
  - Incongruent
  - No Word
  - Neutral
  - Congruent

The Subliminal Stroop Effect
Marcel (1983a), Experiment 3

- Response Latency (msec)
- Word-Mask SOA
- Color Delayed
  - Incongruent
  - No Word
  - Neutral
  - Congruent
The Subliminal Stroop Revisited
Cheesman & Merikle (1984), Experiment 1

<table>
<thead>
<tr>
<th>Prime Detectability</th>
<th>No Mask</th>
<th>90%</th>
<th>55%</th>
<th>25%</th>
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<tbody>
<tr>
<td>Response Latency (msec)</td>
<td>400</td>
<td>450</td>
<td>500</td>
<td>550</td>
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</table>

Objective and Subjective Thresholds in Theory
Cheesman & Merikle (1985, p. 333)

Subjective Threshold: “The level of detectability where perceptual information is actually discriminated at chance levels”

Objective Threshold: “The detection level where subjects claim not to be able to discriminate perceptual information at better than chance level”

Subjective and Objective Thresholds in Practice
Cheesman & Merikle (1984), Experiment 2

<table>
<thead>
<tr>
<th>Threshold Level</th>
<th>Supra</th>
<th>Subj</th>
<th>Obj</th>
</tr>
</thead>
<tbody>
<tr>
<td>Response Latency (msec)</td>
<td>300</td>
<td>400</td>
<td>600</td>
</tr>
<tr>
<td>Short Prime-Target SOA</td>
<td>Incongruent</td>
<td>Congruent</td>
<td>Incongruent</td>
</tr>
<tr>
<td>Medium Prime-Target SOA</td>
<td>Incongruent</td>
<td>Congruent</td>
<td>Incongruent</td>
</tr>
<tr>
<td>Long Prime-Target SOA</td>
<td>Incongruent</td>
<td>Congruent</td>
<td>Incongruent</td>
</tr>
</tbody>
</table>
Objective and Subjective Thresholds in Theory
Cheesman & Merikle (1985, p. 333)

Threshold

Subjective

Perceptual

Semantic

Priming

"The detection level where subjects claim not to be able to discriminate perceptual information at better than chance levels"

"The level of detectability where perceptual information is actually discriminated at chance levels"

Implicit Perception Beyond the Subliminal

• Implicit Perception Can Occur When the Stimuli are Clearly Supraliminal
  – Suprathreshold Intensity
  – Unmasked (Typically)
• Neurological Patients
  – Blindsight, Neglect, Prosopagnosia
• Normal, Neurologically Intact Subjects
  – Attention Directed Elsewhere
  – Limitations on Attentional Processing

Patient D.B.’s Scotoma
Weiskrantz

Weiskrantz

“Guesses” Above Chance Level
- Presence vs. Absence
- Location
- Form
- Movement
- Velocity
- Orientation
- Size

Finger-Pointing Performance by D.B. Weiskrantz (1986)

Detection of Grating by D.B.
Weiskrantz (1986)

% Correct

0 20 40 60 80 100

Bar Width (Minutes)

Intract

Scotoma

Visual Field

Chance

“Deaf Hearing” in Patient IA
Garde & Cowey (2000)

% Correct

0 10 20 30 40 50 60 70 80 90 100

Detect Local Lang Melody Noise Tone

Task

Detect Local Lang Melody Noise Tone

Task

Prosopagnosia
Bodamer (1947)

• Inability to Recognize/Identify Familiar Faces
  – Can Describe Features
  – Recognize Other Objects
• “Fusiform Face Area”
Face-Name Priming in Prosopagnosia
De Hann, Bauer, & Greve (1992)

Hemispatial Neglect
Riddoch (1935); Brain (1941)

- Ignore Space Contralateral to Lesion
  - Temporoparietal-Occipital Junction
  - Cingulate Gyrus, Thalamus
- Types
  - Body-Centered
  - Object-Centered
- Inattention
  - Disengage
  - Shift
  - Engage

Clinical Tests
Heilman, Watson, & Valenstein (1993)
Implicit Perception in Neglect

A
B

Priming in Preattentive Processing:
Parafoveal Stroop Effects
Gatti & Egelth (1978); Merikle & Gorewich (1979)

Parafoveal Stroop Effects
Gatti & Egelth (1978); Merikle & Gorewich (1979)
Implicit Perception in Dichotic Listening
- Shadow Demanding Prose Passage
- Paired Associates on Unattended Channel
  - Taxi-FARE, War-PEACE
- Recognition Test
- Homophone Spelling Test
  - FARE vs. FAIR, PEACE vs. PIECE

Priming in Homophone Spelling

Inattentional Blindness
Mack & Rock (1998)

Which Line is Longer?
Inattentional Blindness
Mack & Rock (1998)

- Failure to Consciously Perceive Object
  - Otherwise Salient
  - Attention, Expectation Otherwise Engaged

“Nothing is Consciously Perceived Without Attention”

- But Is There Implicit Perception?
  - Unconscious Perception Without Attention

Stem-Completion Priming in Inattentional Blindness
Mack & Rock (1998), Chapter 8
Word-Picture Priming in Inattentional Blindness
Mack & Rock (1998), Chapter 8

<table>
<thead>
<tr>
<th>No IB</th>
<th>IB</th>
<th>Control</th>
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<tbody>
<tr>
<td>100</td>
<td>80</td>
<td>60</td>
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<tr>
<td>80</td>
<td>60</td>
<td>40</td>
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<td>40</td>
<td>20</td>
</tr>
<tr>
<td>40</td>
<td>20</td>
<td>0</td>
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Full Attention | Divided Attention | Unmasked | Masked | Baseline

Attentional Blindness
Kihlstrom (2013)

- Failure to Consciously Perceive Object
  - Otherwise Salient
  - Do Not Depend on Lack of Attention, Expectation
  - Lack of Conscious Perception Despite Attention

- Forms
  - Motion-Induced Blindness
  - The Attentional Blink
  - Repetition Blindness
  - Change Blindness

- But Again: Is There Implicit Perception?

Repetition Blindness in the “RSVP” Procedure
After Kanwisher (1987)
Priming of Lexical Decision in Repetition Blindness
Morris & Harris (2004), Experiment 1

The Attentional Blink in the “RSVP” Procedure
After Raymond & Shapiro (1992)

Lexical Priming in the Attentional Blink
Shapiro, Driver, Ward, & Sorensen (1997), Experiment 1
Semantic Priming in the Attentional Blink
Shapiro, Driver, Ward, & Sorensen (1997), Experiment 2

[Bar chart showing correct versus incorrect identification for related and unrelated items.]

Semantic Priming in the Attentional Blink
Maxi, Frigen, & Paulson (1997), Experiments 2, 4, and 5

[Bar chart showing proportion correct vs. T1-T2 lag for associated and unrelated items.]

Change Blindness in RSVP
After Simons & Levin (1997)

[Graph showing change blindness over time.]
Scope of Subliminal Perception

- Subliminal Advertising
- Subliminal Self-Help Tapes
- Silverman: "Mommy and I Are One"
  - Impairs Performance in Schizophrenia (etc.)
  - Improves Performance in Normals

Subliminal Affective Priming

- Connotative, Not Denotative, Meaning
  - Emotional Valence of Word, Concept
- Affectively Valenced Prime
  - *Enemy, Friend*
- Affectively Valenced Target
  - *Wins, Loses*
- Priming on Affective Judgment
  - Prime-Target Affective Congruence

Subliminal Affective Priming

Greenwald et al. (1989), Experiment 3

<table>
<thead>
<tr>
<th>Target-Prime Relation</th>
<th>Prime Duration (msec)</th>
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<tbody>
<tr>
<td></td>
<td>80 Unmasked</td>
</tr>
<tr>
<td></td>
<td>80 Masked</td>
</tr>
<tr>
<td></td>
<td>40 Masked</td>
</tr>
<tr>
<td>Pos-Pos</td>
<td>800</td>
</tr>
<tr>
<td>Pos-Neg</td>
<td>780</td>
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<tr>
<td>Neg-Pos</td>
<td>760</td>
</tr>
<tr>
<td>Neg-Neg</td>
<td>740</td>
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</tbody>
</table>

Response Latency (msec)
Predicting Priming from Detection
Greenwald, Draine, & Abrams (1996)

Subliminal Semantic Priming and Prime-Mask SOA
Greenwald et al. (1989); Draine & Greenwald (1998)

Subliminal Semantic Priming and Prime-Target SOA
Greenwald et al. (1989)
Construction of Two-Word Primes
Greenwald & Liu (1985); Greenwald (1992)

- **Hero Wins** (Positive/Positive)
- **Enemy Wins** (Negative/Positive)
- **Hero Loses** (Positive/Negative)
- **Enemy Loses** (Negative/Negative)
  - Positive Phrase Composed of Negative Words
    - Primes Affective Judgments of *Positive* Targets(?)

Masked Phrase Priming
Greenwald & Liu (1985); Greenwald (1992)

![Response Latency Chart]

- **Positive**
- **Negative**

<table>
<thead>
<tr>
<th>Pair Type</th>
<th>Pos/Pos</th>
<th>Pos/Neg</th>
<th>Neg/Neg</th>
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<tbody>
<tr>
<td>Response Latency (msec)</td>
<td>1000</td>
<td>950</td>
<td>900</td>
</tr>
</tbody>
</table>

Limitations on “Subliminal” Perception
(Masked Priming)

- Effects are Fairly Weak
- Effects are Time-Limited
  - Prime-Mask SOA Can’t Be Too Short
    - Prime Duration Long Enough to Permit Processing
  - Prime-Target SOA Can’t Be Too Long
    - Retention Interval Short Enough to Prevent Forgetting
- Semantic Processing Possible
  - But Analytically Limited
Scope of Implicit Perception

- "Subliminal" Perception
  - "True" Subliminality (Intensity, Duration)
  - Masking
- Neurological Syndromes
  - blindsight, etc.
  - neglect
  - prosopagnosia
- "Preattentive" Processing
  - parafoveal presentation, dichotic listening
  - inattentional blindness
  - attentional blindness
    - attentional blink, repetition blindness, change blindness (?)

What Are the Relationships Between Implicit Memory and Implicit Perception?

- Implicit Memory
  - Prime is a Stimulus in the Past Environment
- Implicit Perception
  - Prime is a Stimulus in the Current Environment
    - James' "Specious Present"
- Is There Anything Else?
  - Implicit Thought
  - Implicit Learning

Implicit Thought Defined

Kihlstrom, Dorfman, Shames (1996)

- The Effect of Some Idea
  - Itself Neither a Percept Nor a Memory
  - Thought, Image, Judgment, Decision
    - Perception-Based
    - Meaning-Based
- on Experience, Thought, and Action
- in the Absence of
  - or Independent of
- Conscious Awareness of that Representation
What Are the Relationships Between Implicit Memory, Perception, and Thought?

- Implicit Memory
  - Prime is a Stimulus in the Past Environment
- Implicit Perception
  - Prime is a Stimulus in the Current environment
  - Or the Environment of the Very Recent Past
- Implicit Thought
  - Prime is Not a Stimulus at all
  - Internally Generated Idea or Image

Unconscious Thought (?)

The “Stages of Thought”, after Wallas (1926)

- Preparation → Incubation → Unconscious
- Intimation (Intuition)
- Illumination (Insight) → Verification

Implicit Learning Defined

After Reber (1967)

- The Acquisition of New Knowledge
  - Semantic or Procedural
- by Virtue of Experience
- in the Absence of
  - or Independent of
- Conscious Awareness of that Knowledge.
Evidence for Implicit Learning

• Artificial Grammar Learning
• Learning of Complex Systems
• Sequence Learning
• Category Learning
• Classical and Instrumental Conditioning

But Problem of Matching Explicit and Implicit Tests

What Are the Relationships Between Implicit Memory and Implicit Learning?

• Implicit Memory
  – Unconscious Influence of Episodic Memory
  – Source Amnesia (The Claparede Story)
    • Consciously Aware of New Learning
    • No Awareness of Learning Experience
• Implicit Learning
  – Unconscious Influence of Semantic or Procedural Knowledge
    • Aware of Learning Experience
    • No Awareness of New Knowledge

The Cognitive Unconscious
Rozin (1976); Kihlstrom (1987)

• Automaticity of Thought Processes
• Unconscious Cognitive States
  – Implicit Memory
  – Implicit Perception
  – Implicit Thought
  – Implicit Learning
• What about Unconscious Mental Life Beyond Cognition?
A Short List of Mental Functions
Immanuel Kant (1724-1804)

“There are three absolutely irreducible faculties of mind: knowledge, feeling, and desire.”
Critique of Judgment (1790)

The Trilogy of Mind
Hilgard (1980)

• Cognition
  – Knowledge and Beliefs
• Emotion
  – Affect, Moods, Feelings
• Motivation
  – Drives, Needs, Desires, Goals, Purposes

Emotion, Motivation, and Automaticity

• Emotional and Motivational States Can Be Elicited Automatically by Effective Stimuli
  – Unconscious Activation
    • Bargh’s “Auto-Motive” Model
    • Subliminal Affective Priming
• But the States Themselves are Conscious
  Can Emotional and Motivational States Themselves Be Unconscious?
Explicit and Implicit Motivation
After McClelland, Koestner, & Weinberger (1989)

- **Explicit Motivation**
  - Conscious Drive, Need, or Goal
    - nAchievement, nPower, nAffiliation/Intimacy

- **Implicit Motivation**
  - Any Effect of a Motive, Drive or Goal on Experience, Thought, or Action
    - Absence of Conscious Awareness of Motive
      - Or, independent of Conscious Motive

Assessing Explicit and Implicit Motivation
After Jackson (1965); McClelland, Koestner, & Wenberger (1989)

- **Personality Research Form**
  - Questionnaire Measure
    - “I enjoy doing things which challenge me”
    - “I will keep working on a problem after others have given up”
    - “I often set goals that are very difficult to reach”

- **Thematic Apperception Test**
  - “Picture-Story Exercise”
    - Outperforming Someone Else
    - Meeting or Surpassing a Self-Imposed Standard of Excellence
    - Unique Accomplishment
    - Involvement in Advancing One’s Career

Explicit vs. Implicit Motives
Kollner & Schultheis (2014)
Critique of Implicit Motives

• Lack of Correlation ≠ Dissociation
  – Prima Facie Evidence

• Might be Method Variance
  – Self-Report
  – Judges’ Ratings
  – Behavioral Observation

• Might Reflect Two Different Constructs

The Emotional Unconscious
Kihlstrom, Mulvaney, Tobias, & Tobis (2000)

• Automaticity of Emotional Response
  – Zajonc, Immediate Emotional Response
  – Ekman, Innate Facial Expressions of Emotion

• Emotional Response as an Expression of...
  – Implicit Memory
  – Implicit Perception

• Implicit Emotion per se
  – Dissociable from explicit emotion?

Multiple-Systems Theory of Emotion
Lang (1968); Rachman & Hodgson (1974)

• Three Components to Emotional Response
  – Cognitive (Subjective Experience)
  – Physiological (Covert Somatic Response)
  – Behavioral (Overt Behavioral Response)

• Imperfect Coupling Between Systems
  – Leads to Desynchrony
Multiple-Systems View of Emotion
Lang (1968)

Emotional State
  - Verbal-Cognitive
  - Overt Motor
  - Covert Physiological

Desynchrony
Rachman & Hodgson (1974)

Explicit and Implicit Emotion
After Kihlstrom, Mulvaney, Tobias, & Tobis (1996)

- **Explicit Emotion**
  - Subjective Mood, Affect, or Feeling
- **Implicit Emotion**
  - Any Effect of an *Emotion* on Experience, Thought, or Action
    - Overt Motor Response
      - Facial Expressions
    - Covert Physiological Response
      - Autonomic Nervous System
  - In the Absence of Conscious Feeling State
    - Or Independent of Conscious Feeling State
Dissociations Between Explicit and Implicit Attitudes

- Explicit Attitude
  - Affective Disposition to Favor/Oppose
    - Pro/Anti, Like/Dislike, Positive/Negative
  - Assessed by Self-Report Scales

- Implicit Attitudes
  - Effect on Experience, Thought, or Action
    - Physiology or Behavior
  - Attributable to Attitude
  - Independent of Awareness of that Attitude 112

Implicit Attitude Test
Greenwald et al. (1998); Banaji & Greenwald (2013)

- Make Dichotomous Judgment
  - Phase 1: Is X a Swedish or Finnish name?
    - Aaltonen, Eriksson, Haapakoski, Lind, Numminen, Sundqvist
  - Phase 2: Is Y a Good or a Bad Thing?
    - Admiration, Aggression, Caress, Abuse, Freedom, Crash

- Then Superimpose Tasks
  - Swedish-Finnish Alternates with Good-Bad
    - Phase 3: Swedish Shares Key with Good
      - Finnish Shares Key with Bad
    - (Phase 4 is a Control Condition)
    - Phase 5: “Swedish” Shares Key with “Bad” 113

Pattern of Responses Reveals Implicit Associations
Greenwald et al. (1998)

Stimulus-Response Compatibility
Fitts & Seeger (1953), after Small (1951)
Faster Responses when Compatible with Stimulus
“Left” with Left key, “Right” with Right

- Implication of S-R Compatibility
  - Same Response to Swedish Names, Positive Words
    - Faster Latencies: Association Swedish ↔ Good
  - Same Response to Finnish Names, Negative Words
    - Faster Latencies: Association Finnish ↔ Bad 114
The “Race IAT”
Paper & Pencil Version
Project Implicit (2007)

Implicit Stereotyping in White Subjects
Greenwald et al. (1998)

Correlation with Explicit Prejudice: \(0.07 < r < 0.30\)

<table>
<thead>
<tr>
<th>Condition</th>
<th>Response Latency (msec)</th>
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<td>White/Pos First</td>
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<tr>
<td></td>
<td>Pos/Neg</td>
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<td>White/Pos</td>
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<td></td>
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Implicit Stereotyping in Japanese and Korean Subjects
Greenwald et al. (1998)

Correlation with Explicit Prejudice: \(-0.04 < r < 0.64\)

<table>
<thead>
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<th>Subjects</th>
<th>Response Latency (msec)</th>
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<tr>
<td>Koreans</td>
<td>Jap/Kor</td>
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<tr>
<td></td>
<td>Pos/Neg</td>
</tr>
<tr>
<td></td>
<td>Kor/Pos</td>
</tr>
<tr>
<td></td>
<td>Jap/Pos</td>
</tr>
</tbody>
</table>
The “Blindspot”
Banaji & Greenwald (2013)

“Hidden biases we all carry from a lifetime of exposure to cultural attitudes”
Age, gender, race, ethnicity, religion, social class, sexuality, disability status, nationality

“Perceptions of social groups – without our awareness or conscious control – shape our likes and dislikes and our judgments about people’s character, abilities, and potential”

Problems with the IAT
Arkes & Tetlock (2004); Levitin (2013)

• Confounding Factors
  – Target Familiarity
  – Task Difficulty
  – Complementarity Assumption
    • Negative vs. “Less Favorable”
    • Positive vs. “More Favorable”
  – Associations vs. Attitudes
• Construct Validity
  – Predict External Criterion
  – Relevant Group Differences
    • “Would Jesse Jackson Fail the IAT?”

External Validity of the IAT
Greenwald et al. (2009)

122 Reports, 184 Samples, 14,900 Subjects

[Graph showing explicit-criterion, IAT-criterion, and explicit-IAT validity across different groups]
Correlations Between Explicit and Implicit Attitudes

Nosek (2007)

\[ r_{med} = .48 \]

Problems with IAT

• Dissociation from Explicit Measure?
  – Significant Correlations Show Validity
  – Nonsignificant Correlations Show Dissociation
  – Correlations Usually Significant
    • Increase with Importance
    • Decrease with “Social Sensitivity”

• The Psychologist’s Fallacy (James, 1890)
  – Every Event has a Psychological Explanation
  – Psychologist’s Explanation is the Right One

QUAD Model of Automatic Bias in Stereotyping and Prejudice

Sherman et al. (2008)

• Dual-Process Theory of Stereotyping
  – Stereotypes/Prejudice Are Automatically Evoked
  – Both Subject to Conscious Self-Regulation

• Models 4 Parameters, Not Just 2
  – Automatic Association Activation (AC) of Bias
  – Discriminability of Correct Response (D)
  – Overcoming Bias (OB) to Select D
  – Guessing (G) When D and AC Fail
The Quad Model Applied to the Black-White IAT
Beer et al. (2008), after Sherman et al. (2008)

Black vs. White Face
Positive vs. Negative Word

Parameter Estimates: Black-White IAT
Conrey et al. (2005)

Parameter Estimates: Black-White IAT
Beer et al. (2008)
Extending the Explicit-Implicit Distinction

When Searching for Explicit-Implicit Dissociations…

…the More Your Study Looks Like a Study of Implicit Memory the More Convincing that Study Will Be.

Balancing the Ledger

**Strong Evidence**
- Implicit Memory
- Implicit Perception

**Weaker Evidence**
- Implicit Learning
- Implicit Thought

**Ambiguous Evidence**
- Implicit Motives
- Implicit Emotions

The Contradiction of the Unconscious

*Kant, Anthropology from a Pragmatic Point of View (1798)*

*To have ideas, and yet not be conscious of them,* -- there seems to be a contradiction in that; for how can we know that we have them, if we are not conscious of them?

Nevertheless, we may become aware indirectly that we have an idea, although we be not directly cognizant of the same.
The distinction... between the unconscious and the conscious being of the mental state... is the sovereign means for believing what one likes in psychology, and of turning what might become a science into a tumbling-ground for whimsies.