Midterm Results

<table>
<thead>
<tr>
<th>Score</th>
<th>Grade</th>
<th>N</th>
</tr>
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<tbody>
<tr>
<td>49-60</td>
<td>A</td>
<td>3</td>
</tr>
<tr>
<td>43-48</td>
<td>B</td>
<td>6</td>
</tr>
<tr>
<td>38-42</td>
<td>C</td>
<td>17</td>
</tr>
<tr>
<td>32-37</td>
<td>D</td>
<td>15</td>
</tr>
<tr>
<td>0-31</td>
<td>F</td>
<td>6</td>
</tr>
</tbody>
</table>

Top score = 54

Mean = 38.13  
Std. Dev. = 5.796  
N = 47
Autobiographical Memories

- Memories we hold regarding ourselves and our relationships with the world around us
- Depend upon both episodic and semantic memory systems
- Are unique in the way that they play a role in our lives
- Are difficult to study in experimental situations because the experimenter lacks control over the learning situation
The Function of Autobiographical Memory

- Williams, Conway, and Cohen (2008) proposed four functions of autobiographical memory:
  - **Directive** functions
    - Using past experience to solve problems
  - **Social** functions
    - Bonding people together or separating them
  - **Self-representational**
    - Creating and maintaining our self-image
  - **Helping to cope with adversity**
    - Remembering pleasant times when things aren’t so pleasant
The Function of Autobiographical Memory

- Hyman and Faries (1992) found that:
  - Sharing experience and relating advice is common
  - Autobiographical memories are rarely used directly

- Bluck et al.'s (2005) Thinking About Life Experiences (TALE) questionnaire:
  - Found that autobiographical memories actually serve a variety of overlapping purposes, including:
    - Directive
    - Self-related
    - Nurturing existing relationships
    - Developing new social relationships
Many studies of autobiographical memory make the tenuous assumption that participants:

- Can remember their autobiographical memories
- Can remember what evoked their remembrances
- Are aware of the different functions of their memories
- Can reliably categorize their memories
Methods of Study

Classic Diary Method

- Participants are asked to record events in a diary at set intervals
  - Later memories can be objectively compared to the original account of the events in the diary entries
- Individuals can test their memories by:
  - Trying to put the events in order (e.g. Linton, 1975)
  - Repeated, spaced retrieval attempts improve retention
  - Cuing themselves with details of their entry (e.g. Wagenaar, 1986)

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Components of Wagenaar’s Diary

<table>
<thead>
<tr>
<th>Feature of Event</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Who?</td>
<td>Driving alone</td>
</tr>
<tr>
<td>What?</td>
<td>A car accident</td>
</tr>
<tr>
<td>Where?</td>
<td>By the corner bank</td>
</tr>
<tr>
<td>When?</td>
<td>10/8/08 @ 8:00 AM</td>
</tr>
<tr>
<td>Salience?</td>
<td>Once per 15 years</td>
</tr>
<tr>
<td>Emotionality?</td>
<td>Extreme</td>
</tr>
<tr>
<td>Pleasantness?</td>
<td>Extremely unpleasant</td>
</tr>
<tr>
<td>Critical detail</td>
<td>Other driver failed to stop at a red light</td>
</tr>
</tbody>
</table>
Retention is Strengthened by Retrieval

Probability of forgetting an autobiographical diary item as a function of elapsed time and number of prior tests. From Linton (1975).
Sample Diary Study Event

An example of a recorded event from Wagenaar's diary study (1986). Copyright © Elsevier. Reproduced with permission.
Methods of Study

Classic Diary Method

- By manipulating the number of types of cues he provided himself to remember events, Wagenaar (1986) found that:
  - *Who*, *what*, and *where* cues were equally effective in prompting a memory
  - The *when* cue (the date), in isolation, was far less efficient
  - Recall proved an often difficult/unpleasant task; however,
  - He was able to eventually recollect most events with the right cues (and the help of others involved, if necessary)

Methods of Study

Problems with the Classic Diary Method

- Memory for items recorded in this manner is not representative:
  - There is a selection bias:
    - The entries are chosen because they were deemed meaningful
  - Memories are atypically well-encoded and rehearsed
    - Journaling the events is, in effect, a rehearsal with deep processing, which improves their memorability
- All forms of the diary method require dedicated, reliable participants, who are not necessarily representative of the population
Methods of Study

Diary Method with Random Sampling

- Brewer (1988) addressed the selection bias problem by:
  - Providing participants with a beeper and tape recorder
  - Having the beeper go off at random intervals
  - Asking participants to record details about whatever was occurring when the beeper went off

- Using this method, Brewer found that the events were less memorable than those recorded using the classic method.

![Recall Accuracy](chart.png)
Methods of Study

Diary Method with Random Sampling

- Conway et al.’s (1996) diary study with random sampling:
  - Task:
    - Record events *and thoughts* in a diary when randomly prompted
    - Recognize actual events from plausible, yet invented alternative ones
  - Categorize each recognized memory as either:
    - **Remembered** if it was accompanied by a feeling of recollecting the initial experience
    - **Known** if the memory was only familiar to them, without recollection
  - Results:
    - True events were more likely to be recollected than fake events
    - Events were twice as likely to evoke recollection than thoughts
Methods of Study

Memory Probe Method

- Memory Probe Method
  - A cued recall task developed by Galton (1879)
  - Revised by Crovitz and Shiffman (1974):
    - Task:
      - Provide participants with a cue word or time period
      - Ask them to recollect an autobiographical memory associated with the cue
    - Suffers from a lack of experimental control
Methods of Study

Memory Probe Method

- People are bad at dating memories and retrieving them based on temporal cues
- Especially when the events are all clustered around the same time (e.g. Means et al., 1988)
- People tend to date memories indirectly either by:
  - Recollecting incidental features (e.g. the weather at the time)
  - Linking it to other events that are more easily dated (big trips, holidays, or extreme events)
Autobiographical Memories Across the Lifespan

- **Infantile Amnesia:**
  - People tend to recall relatively few memories from the first 2 to 5 years of life
  - The average age of one’s first memory varies by culture
  - Explanations include:
    - Freudian repression; underdeveloped hippocampus; underdeveloped sense of self

- People of all ages tend to recall numerous memories from the very recent past
  - Due to the **recency effect**

- **Reminiscence Bump** (Rubin, Wetzler, & Nebes, 1986):
  - People over the age of 40 tend to report more memories from the period between ages 15–30 than from other eras
Cross-Cultural Comparison of Lifespan Retrieval

Lifespan retrieval curves for participants from five countries. From Conway et al. (2005).
Autobiographical Memories Across the Lifespan

Explanations for the Reminiscence Bump

- **The Life Narrative:**
  - A coherent account of who we are and how we got here that is built up through life
  - Events that influence the narrative are ranked as important, emotionally intense, and are typically well encoded
    - Positive events from young adulthood are especially memorable
  - Many of these events occur during the period of the bump (Bernsten & Rubin, 2004):
    - Age of first love (16 years, on average)
    - College
    - Marriage (27 years)
    - Children (28 years)
Distribution of involuntary memories for participants who were over 40 years old. Only positive memories show the reminiscence bump. From Glück and Bluck (2007).
Glück and Bluck (2007) investigated the life narrative hypothesis:

- **Sample:**
  - 3541 life events from 659 participants aged 50–90

- **Task:**
  - Rated memories based on their:
    - Emotional valence (negative to positive scale)
    - Personal importance
    - Sense of control over the event

- **Results:**
  - Reminiscence bump found only for positive memories with a high sense of control

- **Conclusion:**
  - Autobiographical memories from this period are important in creating a positive life narrative
Autobiographical Memories Across the Lifespan

Exceptions to the Reminiscence Bump

- While memories from verbal and visual cues peak during the typical reminiscence bump period:
  - Memories cued by smell peak earlier, between 6–10 years (Chu & Downes, 2002; Willander & Larsson, 2006)
  - This is NOT because odor memories are more emotional (visual cues are)
  - Perhaps because odor cues are not easily rehearsed, they are less tied to the developing life narrative
A Theory of Autobiographical Memory

Conway (2005)

- Autobiographical memory:
  - A system that retains knowledge concerning the **experienced self** (the “me”), consisting of memories that are:
    - Always addressed by the content of the memory
    - Only are accompanied by a recollective experience if they are able to access related episodic memories
    - Transitory and constructed dynamically on the basis of the **autobiographical knowledge base**
      - Low-level sensory episodes are lost most rapidly
    - Depends on the interaction between the knowledge base and the **working self**
Conway’s Model of Self

The knowledge structures within autobiographical memory, as proposed by Conway (2005).
Conway’s (2005) Theory of Autobiographical Memory

The Autobiographical Knowledge Base

- A hierarchical structure involving an overall life story

*Sensory details (primarily visual) help authenticate memories*
Conway’s (2005) Theory of Autobiographical Memory

The Working Self

The Working Self:
- A complex set of *active goals* and *self images* through which information is filtered and encoded
- Comprises:
  - Conceptual self-knowledge
  - Personal details (occupation, family background, etc.)
  - Professional aims
- Partly constructed by:
  - Family background
  - Peers
  - Education
  - Myths and stereotypes
Conway’s (2005) Theory of Autobiographical Memory

The Working Self

- An *effective* working self is:
  - Coherent
  - Largely grounded in reality
    - Sensory details (primarily visual) help authenticate memories

- When divorced from reality, the working self can produce:
  - Confabulations and delusions
Conway’s (2005) Theory of Autobiographical Memory

Autonoetic Consciousness

- **Autonoetic Consciousness** (Tulving, 1989):
  - The capacity to perform mental time travel and reflect on our thoughts
  - Recollecting the sensory/perceptual details of a memory
    - Provides the awareness of having previously experienced a certain event
    - Allows us to decide whether a recollection is real or not
  - A relatively slow process (around several seconds)
  - Relies on the frontal lobe
Flashbulb Memories
Brown and Kulik (1977)

- **Flashbulb Memories:**
  - Are memories for major events with an exceptional level of vividness and detail
    - e.g. Assassinations, natural disasters, terrorists attacks
  - Arguably thought to arise from a mechanism that produces traces qualitatively different from typical memories, called **now print:**
    - Extreme emotion leads to near photographic record of the event and its physical context
  - Are more common when the person remembering is affected by the event
    - e.g. more black people have flashbulb memories for the Martin Luther King assassination
Flashbulb Memories

Not All that Meets the Eye

- **Flashbulb Memories:**
  - Are not especially immune to forgetting over long delays
    - Neisser and Harsch’s (1992) Challenger study
  - Despite being subjectively clearer than everyday memories, are just as prone to forgetting when cues are self-generated
    - Talarico and Rubin’s (2003) 9/11 study
  - Are not necessarily clearer/more vivid than other memories
    - Rubin and Kozin (1984)
Flashbulb Memories

Neisser and Harsch’s (1992) Challenger Study

- Task:
  - Asked participants to recall the circumstances when they learned about the Challenger space shuttle disaster at two time points:
    - 1 day after the event – 21% said they saw the disaster on TV
    - 2.5 years later – 45% said they saw it on TV
  - Despite being vivid, accuracy decreased substantially

- Results:
  - Delay reduced accuracy but not confidence in their memories

- Conclusion:
  - Flashbulb memories are not as accurate as they seem
Flashbulb Memories

Alternative Accounts

- It is not necessary to posit a separate system to produce flashbulb memories
  - They might seem more memorable for other reasons:
    - They are not easily confused with other events
    - They are the subject of repeated rehearsal
    - They tend to have meaningful changes on our lives
    - They evoke strong emotions
Social and Emotional Factors

Preserving Self-Esteem

- Autobiographical memories are often distorted in ways to preserve self-esteem by:
  - Emphasizing our own role and significance in events
  - Selectively forgetting failure and remembering praise

- These distortions can prove beneficial:
  - Depressed individuals tend to recall fewer autobiographical details
    - This is preferable to ruminating over more detailed negative memories
Social and Emotional Factors

Preserving Self-Esteem

- Conway (1990)
  - Task:
    - Prior to an exam, students were asked to report their:
      - Expected exam grades
      - Amount/level of preparation
      - Assessment of the exam’s validity and the grade’s importance
    - Two weeks later, participants were asked the same questions
  - Results:
    - Individuals with better-than-expected exam results:
      - Reported the same amount of preparation as before
      - Increased their rating of the grade’s importance
    - Individuals with worse-than-expected exam results:
      - Reported doing less preparation
      - Rated the grades as being less important and the exam less valid
Social and Emotional Factors

Recovered Memories

- Freud proposed that the ego defends itself from anxiety by repressing negative memories
  - Freud’s theory has received only limited empirical support

- Reports of previously repressed memories being uncovered appear in clinical and criminal settings
  - Many of these memories have been proven untrue

- **False Memory Syndrome**:
  - The belief, induced by another person through leading questioning, that a nonevent actually occurred
  - Certain individuals (e.g. children and the depressed) are more susceptible to false memories
Social and Emotional Factors

Post-Traumatic Stress Disorder (PTSD)

- **Post-Traumatic Stress Disorder (PTSD)**
  - The array of symptoms resulting from situations of extreme stress:
    - Heightened anxiety
    - Nightmares
    - **Flashbacks** when confronted with reminders of the trauma
      - Highly detailed, *situationally-accessible* memories that cannot be called to mind intentionally unlike *verbally-accessible* memories (Brewin, 2001)
  - Not all individuals experiencing a trauma develop PTSD
Patterns of recovery function following post-traumatic stress disorder (PTSD), with the approximate percentage of patients following each pattern. Data from Bonanno (2005).
Social and Emotional Factors
Post-Traumatic Stress Disorder (PTSD)

- PTSD is likely tied to classical conditioning:
  - The trauma’s context becomes associated with extreme stress
  - Reminders (physical stimuli or thoughts) can then trigger memories of the trauma
  - Treatment often involves *extinguishing* the fear response:
    - Have the patient re-imagine the event under safe and controlled conditions, under a therapist’s supervision
    - Treatment often reduces symptoms
Social and Emotional Factors

Post-Traumatic Stress Disorder (PTSD)

- The **Autonomic Nervous System (ANS)** and Stress
  - Upon encountering a threat:
    - The ANS releases stress hormones (adrenalin and cortisol)
    - Flight-or-fight mechanisms are enacted
  - When the threat has passed:
    - The brain signals the adrenal glands to stop producing the stress hormones
  - In PTSD patients, this normalization process is likely disrupted
    - Stress is prolonged
    - A drug (propranolol) helps fix the normalization process
      - Reduces the emotional impact of the associated memories
Social and Emotional Factors

Post-Traumatic Stress Disorder (PTSD)

- PTSD patients tend to have smaller hippocampi
  - PTSD might lead to reduced hippocampal volume
  - Prolonged stress in animals can disrupt hippocampal functioning and cause neuronal death
- Reduced hippocampal volume is also a risk factor for PTSD
  - Gilbertson et al.’s (2002) twin study:
    - Vietnam veterans with PTSD and their nonveteran twins both tend to have small hippocampi
    - Vietnam veterans without PTSD and their nonveteran twins both tend to have normally-sized hippocampi
Social and Emotional Factors

Involuntary Memories (e.g. Flashbacks)

- The frequency of involuntary flashbacks in PTSD patients corresponds to the individual’s proximity to the trauma.

Reappearance Hypothesis (Neisser, 1967):
- The standard clinical interpretation for involuntary memories, stating that the same memory can repeatedly appear and disappear, without change.

Berntsen and Rubin (2008) set out to determine whether intrusive memories:
- Also occur in the general population.
- Follow the same general principles as regular autobiographical memories.
Social and Emotional Factors
Bernsten and Rubin (2008)

- In a telephone survey of the general population, Bernsten and Rubin (2008) found that:
  - Recurrent memories are:
    - Frequent
    - Decline in frequency, but increase in positivity/intensity with age
    - Show the reminiscence bump
    - Tend to change over repetitions (according to a follow-up study)
  - Recurrent dreams are:
    - Less frequent
    - Show a modest correlation with recurrent memories

- Conclusion:
  - Recurrent memories occur normally in life and follow the same principles of other autobiographical memories
Berntsen & Rubin (2008)
<table>
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<tr>
<th></th>
<th>Psychogenic Amnesia</th>
<th>Organic Amnesia</th>
</tr>
</thead>
<tbody>
<tr>
<td>No clear link to brain damage</td>
<td>Caused by brain damage</td>
<td></td>
</tr>
<tr>
<td>Loss of original sense of personality</td>
<td>Sense of personality retained</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Orientation and time and place disrupted</td>
<td></td>
</tr>
</tbody>
</table>
Psychogenic Amnesia

Fugue

- **Fugue:**
  - A sudden loss of autobiographical memory
  - Usually accompanied by wandering
  - Typically lasts only a few hours/days
  - The patient usually has no memory for the fugue period after recovery
  - General semantic knowledge remains largely intact
  - Episodic learning is usually impaired
- Frequently corresponds with:
  - Preceding periods of stress
  - Depressed mood
  - A history of transient, organic amnesia
  - Possible ulterior motives
- Hypnosis and drugs are generally ineffective at treating it
Psychogenic Amnesia

Psychogenic Focal Retrograde Amnesia:

- A highly infrequent loss of access to memories acquired prior to a trauma without:
  - Signs of anterograde amnesia
  - A link to brain damage

- Sometimes can be explained by ulterior motives
  - i.e. is “functional” in some way
Psychogenic Amnesia

Situation-Specific Amnesia

- Situation-Specific Amnesia:
  - Forgetting of a single, specific event
    - 30% of people accused of violent crimes and murders claim to be amnesic for the incident
  - Most common with:
    - Extreme emotions, especially passion
    - More violent offenses
    - Alcohol and its “blackout” effects
  - Likely a retrieval failure, rather than encoding/consolidation
  - Over half report at least partial memory recoveries after a year (Yuille & Cutshall, 1986)
Psychogenic Amnesia
Is Situation-Specific Amnesia Real?

- Evidence for a …

<table>
<thead>
<tr>
<th>Genuine Phenomenon</th>
<th>Malingering</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occurs in suspects who voluntarily turn themselves in</td>
<td>Often have a clear motive for forgetting</td>
</tr>
<tr>
<td>Amnesia is often not a viable legal argument (e.g. in UK law)</td>
<td></td>
</tr>
<tr>
<td>Occurs in victims/eyewitnesses who have no reason to malinger</td>
<td></td>
</tr>
<tr>
<td>Accounts are consistent</td>
<td></td>
</tr>
</tbody>
</table>
Multiple Personality Disorder:
- A rare disorder, in which numerous personalities exist within a single person
  - The personalities may or may not be mutually aware
    - If not, they share implicit memory (Nissen et al., 1988)
- Prevalence varies across cultures
- Possible causes:
  - It simply reflects symptoms that are fashionable and reinforced by clinicians (Merskey, 1992)
    - Like “glove anesthesia” or catatonia
  - Patients may be trying out a new life (Kopelman, 2002)
Semantic and episodic aspects of autobiographical memories are dissociable:
- Retrograde amnesia can affect memory for both personal and public events, or either one, separately

**Confabulation**
- Fabricated autobiographical memories, lacking an intention to mislead
  - *Provoked variant*: Arises from a patient’s attempt to fill in knowledge gaps, to avoid embarrassment
  - *Spontaneous variant* (e.g. Patient RR):
    - More elaborate stories
    - Less common
    - Linked to frontal lobe damage
Autobiographical Memory and the Brain

Neuropsychological Studies

- **Dysexecutive Syndrome** (e.g. Patient RR):
  - Symptoms:
    - Confabulation
    - Difficulty setting up appropriate retrieval cues
    - Inability to filter out irrelevant or implausible responses
  - Results from frontal lobe damage

- **Delusions**
  - Persistent, elaborate, and patently false beliefs about the self/world
    - Attempt to explain extraordinary experiences/thoughts/feelings
  - Associated with schizophrenia but not any particular brain region
  - Generally not associated with executive deficits
Anatomical Basis of Autobiographical Memory

- Evidence suggests that:
  - Autobiographical memory relies on:
    - **Executive areas** in the left prefrontal regions
    - Serve to evoke related memories
    - **Visualization areas** in the occipital and temporal lobes
    - Damage to these areas results in poor autobiographical memory
  - Autobiographical retrieval:
    - Relies more on amygdalar, hippocampal, and right IFG activity
  - Semantic retrieval:
    - Relies more on prolonged left-frontal activation

Based on Greenberg et al. (2005).

AMY, amygdala; HIP, hippocampus; IFG, inferior frontal gyrus.