

Cognition: Memory, Problem Solving, and Language

Unit Experiments and Activities

Work independently or in groups of 2-3 to complete one of the following experiments.

Memorization:

- See separate assignment for an experiment on memorizing Pi.

The Seven Dwarfs Recognition Test:

- See separate assignment for an experiment on retrieving the names of the Seven Dwarves.

Reconstructive Memory:

- Conduct the Boeing 747 experiment. Run your experiment at least 3 times with different participants.
- Complete the write up and discuss additional vocabulary that applies.
- Film some or all of your study.

Constructive Memory:

- You will need to find at least 3 pairs of participants who have known each other for at least 2 years. You may use friends, siblings, parents, relatives, teachers, etc.
- Get them together and ask them to remember an exceptional event that they both witnessed/experienced together. Examples could be an accident, crime you witnessed, embarrassing moment, often-repeated family story about something you did as a kids, etc.
- Separate them. Have them write the experience and/or interview them. You need them to provide as much detail as possible.
- Compare the two written accounts. What details were remembered differently? Were there any details remembered exactly the same? Why do you think that is?
- Apply at least 5 vocabulary terms to this experiment.

Visual vs. Auditory Memory:

- Design an experiment to test if people have better visual memory or auditory memory. Run your experiment at least 3 times with different participants. Complete a write up of your findings. Include all vocabulary that applies. Film some or all of your experiment.

Flashbulb Memories:

- How vivid are people's flashbulb memories of 9/11?
- Interview at least 10 different people of different ages. 26-116
- Ask them about 9/11
- Compare their results. How do different ages do? Genders? Political affiliations? Where people were living at the time?
- Include a write up of your experiment. Include all vocabulary that applies. Film some or all of your experiment.

Recall vs. Recognition:

- Complete the 7 Dwarfs activity. Run your experiment at least 3 times with different participants.
- In each experiment, separate your participants into two groups. Give one group the recall activity and give the other the recognition activity.
- Compare their results. Which task is more difficult?
- Write up: Put together a chart or written summary of your results! Apply ALL appropriate vocabulary to this experiment.
- You may film some or all of your trials.

Eyewitness testimony

- Show participants a video of a crime (not too violent) or a car accident. Be sure a lot is happening in the video.
- OR stage a silly “crime”—run through the office or a classroom (with teacher permission) and commit a “crime”
- Run your experiment at least 3 times with different participants.
- Generate a list of questions to ask them after the video.
- How accurate are they as eyewitnesses?
- Include a write up of your experiment. Include all vocabulary that applies. Film some or all of your experiment.

Functional Fixedness:

- Materials: small box, birthday candle, match, thumbtack
- Instruct your participants to attach a candle to a wall and light it. Provide them with the materials: a box, and inside it are one candle, one match, and a thumbtack.
- Give them 2 minutes to complete the task.
- How many of them try to stick the tack through the candle? How many of them try more creative solutions:
- Most people attempt to push the thumbtack through the candle, or melt the bottom of the candle and try and glue it on the wall. The solution is to thumbtack the box to the wall and put the candle inside of it.
- Run your experiment at least 3 times with different participants.
- Include a write up of your experiment. Include all vocabulary that applies. Film some or all of your experiment.

Language:

- Write a rap, song or poem about language development and language theories. Make a video/music video of your work. Include:
 - Language
 - Phonemes
 - Morphemes
 - Grammar
 - Semantics
 - Syntax
 - Babbling stage
 - One-word stage
 - Two-word stage
 - Telegraphic speech
 - Skinner and Chomsky’s views on language acquisition

Memorization of Pi

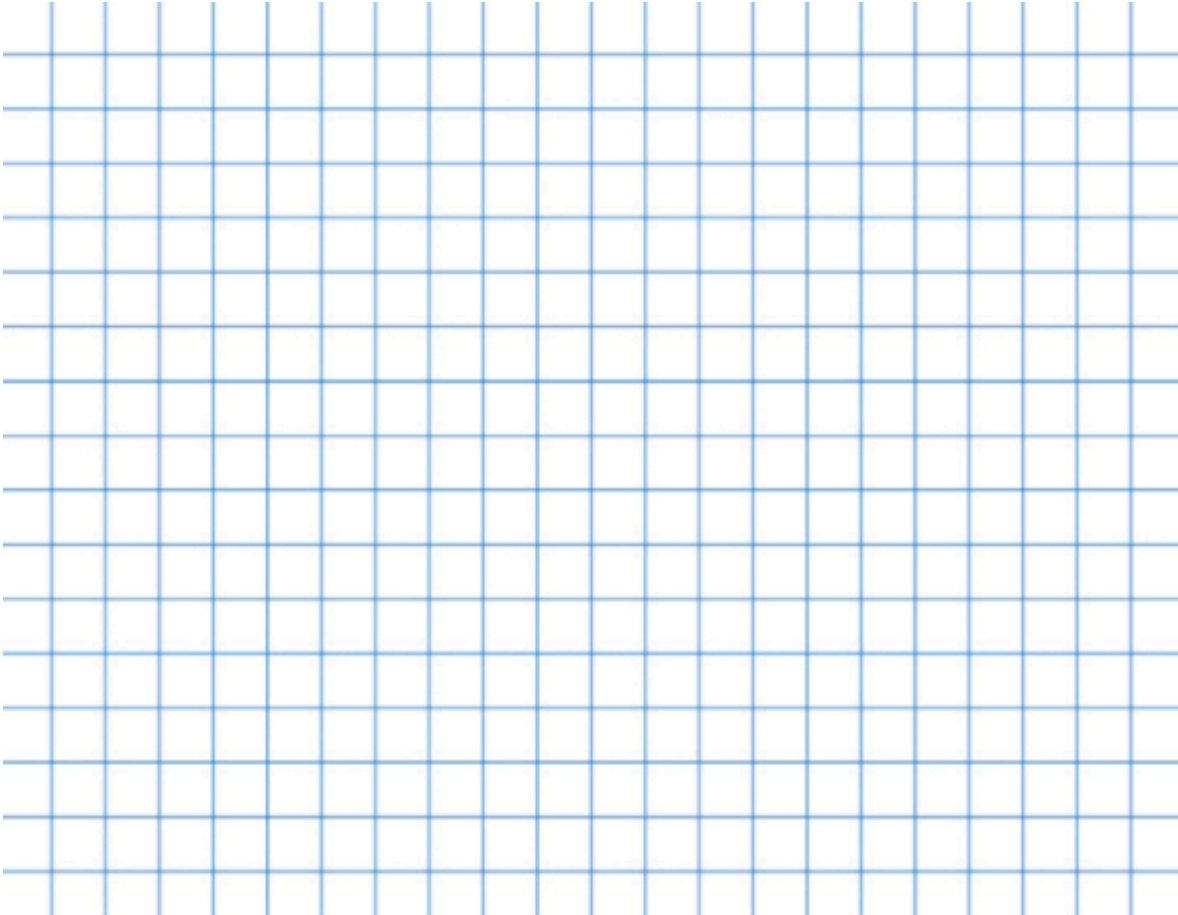
Each group will be given three minutes to memorize the following approximation of Pi. You will need to time them.

Group one—give them the number only.

Group two—give them the story.

DO NOT LET YOUR DIFFERENT GROUPS KNOW THAT EACH IS RECEIVING DIFFERENT MATERIALS!

- After the 3 minutes has elapsed, collect all Pi materials and ask them to remember as much of Pi as possible and write it down. Be sure they work SILENTLY and have a separate sheet of paper to do this on.
- Debrief with the subjects.
- Run this at least 3 times with different participants.
- Use the graph below to record your results.



Which group does better? Why? Be sure to use vocabulary from the unit.

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Subject 1:

You will have three minutes to memorize the number Pi.

3.1415926535897932384

Subject 2:

You will have three minutes to memorize the number Pi. The following story will help you memorize Pi all the way to 19 digits past the decimal point. You can use this to amaze your friends and family!

3 Imagine 3 people – a pair of teenagers, and a very old man – sitting at a round table (shaped like the dot of a decimal point)

14 15 92 The teenagers are 14 and 15 years old – the 14 year old is jealous of the 15 year old because the 15 year old has just received a temporary learner permit and the very old man is 92 years of age.

6 5 At the center of the table there is a 6 pack of soda. The three individuals split one of the cans and now there are 5 left remaining on the table.

3 5 8 The youngest teenager brags that he can drink 3 of the remaining cans all by himself. “That is nothing” says the other teen, “I can drink all 5 of the remaining cans.” The old man interrupts and boasts, “I am really old but I can match whatever you young punks can do: Your 3 and your 5 makes 8 and I can easily drink 8 cans of soda.

97 93 238 4 The teens are embarrassed about bragging to the old man, so they change the subject. “Let’s watch basketball on TV!” they say. “Wow!” says the old man, turning on the set. “It’s an exciting game. The score is 97 to 93 with only 2 minutes and 38 seconds left to go! Imagine that – a 4 point lead with only a little time (2 minutes and 38 seconds) left !”

Reconstructive Memory (Rumor Chain Activity)

From Douglas Bernstein and Sandra Gross (*University of Illinois*)

Our long-term memories are stored by attaching new information to something we already know and understand. This is referred to as a schema. A schema is a cognitive system which helps us organize and make sense of information. For example, you may have developed a schema that all homeless people are rude. Because of this schema, you organize your actions around it and more readily look for and remember information that supports this view while discarding information that disagrees with this perspective. Schemas exert a great deal of influence over us and sometimes hinder us from remembering new information because it does not fit into our schema.

Sometimes when we try to construct or recall a memory, the information is distorted by adding or changing some of the details in order to fit with a schema. It is possible to have very accurate memory of the themes of specific events but inaccurate accounts of the specific details of the event. We may change or tweak the memory a bit in order for it to be more consistent with a schema. In other words, we adjust the memory a little bit so that it is more consistent with some schema we already have.

Have three to five members of the class volunteer to participate in a demonstration. Instruct all but one of the volunteers to move into the hallway and shut the classroom door. Then read the story below to the remaining participant. Read as if you are a news anchor.

The Story:

A TWA Boeing 747 had just taken off from Miami International Airport for Los Angeles when a passenger near the rear of the aircraft announced that the plane was being taken over by the People's Revolutionary Army for the Liberation of the Oppressed. The hijacker then held a 357 magnum to the head of Jack Swanson, a flight attendant, and forced him to open the cockpit door. There, the hijacker confronted the pilot, Jane Randall, and ordered her to change the course for Cuba. The pilot radioed the Miami Air Traffic Control Center to report the situation but then suddenly hurled the microphone at the hijacker, who fell backward through the open cockpit door and onto the floor, where angry passengers took over from there. The plane landed in Miami a few minutes later and the hijacker was arrested.

After you have read the story, ask for one of the students from the hallway to come into the classroom. Then have the participant who heard the story retell it to the new person. Repeat the process until all participants have heard and retold the story. Then have a discussion with the students about what happens to memory in the rumor chain.

First, did the story get progressively shorter as some details, such as the name of the revolutionary group and sometimes the flight's origin and destination, are left out? This is referred to as *leveling*.

Second, were some details- perhaps the caliber of the gun or, especially for women students, the gender of the pilot- retained at a higher rate? This is referred to as *sharpening*. This is a great example of how schemas impact memory.

Third, because many of the elements of the story are encoded semantically (ie., the meaning or gist of the story rather than verbatim), they are likely to be altered in line with each teller's schemas- the subjects own background knowledge and expectations. This phenomenon is an example of *assimilation*.

Optional task: Have students research the impact of reconstructive memory on eye witness accounts.

The Seven Dwarfs Recognition Task

Divide your participants into two groups and randomly give them the Recall list or the Recognition task. Have them flip over the lists and complete the task in one minute.

Recognition task: Please circle any names that you feel confident are correct. Please cross out any names that you know are incorrect. Leave the others blank.

Grouchy
Gabby
Fearful
Sniffy
Wishful
Puffy
Sleepy
Smiley
Jumpy
Hopeful
Shy
Droopy
Dopey
Dumpy
Sneezy
Lazy
Pop
Grumpy
Bashful
Cheerful
Teach
Shorty
Nifty
Happy
Doc
Wheezy
Stubby
Stinky
Sleazy
Busy

Recall Task: please list the 7 Dwarfs from Snow White.