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PSYCHOLOGY ACTIVITIES

Volume 2: Cognition

- Thinking
- Conditioning

Created by Kathleen M. Glusick

Table of Contents

Introduction

About This Book

The activities provided in this booklet are created to enrich psychology classes. They provide hands-on activities and demonstrations that engage students in the active study of psychology through experimentation.

This volume introduces the cognition concepts of thinking and learning. These activities allow students to take on the role of both experimenter and subject while learning about cognition. Students will engage in activities that provide demonstrations of the thinking and conditioning process; both of which are essential to the study of psychology.

These psychology activities were created during the development of an experimental psychology course for a high school classroom. The suggestions provided in textbooks and other supplemental material did not offer the hands-on, experimental approach sought by the course instructor. As the class was to be taught in a school utilizing block scheduling (ninety and seventy-five minute classes), lessons that kept students active and interested while demonstrating the key components of psychology were developed. The classroom lessons and materials were used and refined over a two-year period during which four sections of the new psychology course were taught.

The essential goals for each activity were to make them easy to use, to involve and engage the students, and to clarify key psychology concepts.

The topics covered in this booklet, and other *Psychology Activities* volumes, parallel general Psychology textbooks and should be used as a supplemental aid. The activities and demonstrations clarify basic psychology concepts and allow students to see the effect or impact of a concept first hand.

All lessons were created with the teacher and student in mind. The purpose for each lesson is clearly stated and a specific list of materials required for each lesson is provided. Procedures are written in a step-by-step format to allow for easy implementation into a block or typical schedule format. The discussion questions provide closure to the activity and can be done as a class or as individual work to check for student understanding. Hints or tips are offered throughout the booklet to assist teachers in adapting lessons to fit their needs or the ability level of students. The Glossary, which concludes each booklet, defines psychology and experiment terms used throughout the lessons. Student handouts include all necessary instructions and directions as well as material to assist in data collection. Finally, the material is organized in such a way that incorporating the lessons into an existing curriculum is easy and enjoyable.

Current research indicates that students who are actively engaged in the learning process retain information better than those who are passive participants in the

classroom. *Psychology Activities* was created with this concept in mind. The hands on approach to Psychology that this booklet offers will spark and maintain student interest. Being involved as subjects and experimenters allows students to become an active part of their own learning. Participation in these activities also provides students with an episodic memory of a classroom experience, strengthening the concepts being taught and therefore improving learning. Most importantly, when students are actively engaged, they have more fun. These activities make the study of psychology an enjoyable experience for everyone!

About the Author

Kathleen M. Glusick graduated from the University of Wisconsin – Madison with a Bachelor's degree in Broad Field Social Studies and a minor in Psychology. She completed her Master's of Education through Cardinal Stritch University in Milwaukee, Wisconsin. She taught World Cultures, Citizenship, Sociology, and Experimental Psychology during her high school teaching career. After completing her thesis, *The Impact of Brain-Compatible Physical Structures on Classroom Learning*, Peanut Publishing was created to enhance involvement in the classroom by providing teachers with student centered activities.

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THINKING

Thinking: Incomplete Word Sets

Purpose:

- Demonstrate how thinking is influenced by patterns
- Introduce sample tool for use in future experiments

Materials:

- Set List A and Set List B (p. 2)
- Procedure Instructions (below)
- Debriefing & Analysis (p. 3)

Procedure:

- Randomly divide students into Groups A and B.

- Hand out set list, face down and instruct students not to turn their sheets until instructed to do so.

- Explain what students should do once they are told to begin:
  - There will be lists of words on your paper. There is one letter missing from the last word in the list. You are to fill in a letter to complete the word.
  - Do not look at other papers.
  - Turn your sheet back over when complete.

- Instruct students to begin.

- When all students are done, ask what letter someone from Group A filled in the first incomplete word with. Go back and forth through all the answers.

- Go through Debriefing and Analysis (p. 3).

Thinking: Set List A

Name: _____

Base	Mild	Water
Ball	Medium	Flower
B_t	H_t	S_n
Zero	Mittens	Food
Nothing	Boots	Eat
_one	_oat	_eal

Thinking: Set List B

Name: _____

____

Gamble	Base	Mother
Wager	Ball	Father
B_t	H_t	S_n
Finished	Oar	Cards
Complete	Paddle	Deck
_one	_oat	_eal

Debriefing and Analysis

- Explain to students that each condition had different word prompts prior to the incomplete word. These prompts got them thinking in "sets" and therefore they chose different letters to complete the last word.

- Discuss the following questions with students:

  ✎ If it happened, why did someone not follow the set?

  ✎ How does this demonstration relate to occurrences in real life?

  ✎ How can set thinking affect behavior?

  ✎ What is the relationship between set thinking and stereotyping?

Thinking: Scrambled Set List

Purpose:

- Demonstrate how thinking is influenced by patterns
- Introduce sample tool for use in future experiments

Materials:

- Scrambled List A and Scrambled List B (p. 5) (Cut sheet in half)
- Answer Sheet for List A and B (p. 6)
- Data Analysis Chart (p. 6)
- Procedure Instructions (below)
- Debriefing & Analysis (p. 7)

Procedure:

- Randomly divide students into Groups A and B.

- Write "TETLER" on the board and ask students to unscramble it. They should see that it is "LETTER" and explain that this is what they will be doing for this experiment.

- Hand out Scrambled list A or B, face down and instruct students not to turn their sheets until instructed to do so.

- Explain what students should do once they are told to begin:
  - ✎ There will be a list of scrambled words on their paper. They are to unscramble them IN ORDER. Make sure they start at the top of the list and DO NOT go on until they have successfully unscrambled the current word.
  - ✎ Do not look at other papers.
  - ✎ Turn your sheet back over when complete.

- Instruct students to begin.

- When all students are done, ask what the last word was. You should get OWL and LOW for answers.

- Go through Debriefing and Analysis (p. 7).

HINT: Most of debriefing and analysis can be skipped if the "Incomplete Word Set" was completed as some questions repeat.

Name: _____ Name: _____

SCRAMBLED LIST A

WKAH _____

OBRIN _____

RROWSAP _____

ORWC _____

PORRTA _____

CRNADAL _____

BLYJUEA _____

OLW _____

SCRAMBLED LIST B

PU _____

DWNO _____

VOER _____

NDUER _____

FOTRN _____

CKBA _____

GHIH _____

OLW _____

ANSWER KEY

SCRAMBLED LIST A		SCRAMBLED LIST B	
WKAH	Hawk	PU	Up
OBRIN	Robin	DWNO	Down
RROWSAP	Sparrow	VOER	Over
ORWC	Crow	NDUER	Under
PORRTA	Parrot	FOTRN	Front
CRNADAL	Cardinal	CKBA	Back
BLYJUEA	Blue Jay	GHIH	High
OLW	Owl	OLW	Low

Data Collection Chart

Number of Subjects per condition writing each response.

		Thinking Set	
		Birds	Opposites
Responses	Owl	(Follows Set)	(Breaks Set)
	Low	(Breaks Set)	(Follows Set)

Debriefing and Analysis

- Explain to students that each condition had different word lists that centered around a topic – either vegetables or animals. These prompts got them thinking in "sets" and therefore they should have unscrambled the last letters according to the set they were thinking in.

- Discuss the following questions with students:

  ✎ If it happened, why did someone not follow the set?

  ✎ How does this demonstration relate to occurrences in real life?

  ✎ How can set thinking affect behavior?

  ✎ What is the relationship between set thinking and stereotyping?

Thinking: Scrambled Set Response Time

Purpose:

- Demonstrate how thinking is influenced by patterns
- Illustrate how patterns allow thinking to occur at a faster rate

Materials:

- Scrambled Sets List A (p. 9) and Scrambled Sets List B (p. 10)
- Answer Key for Lists (p. 11)
- Student Data Sheet (p. 12)
- Class Data Sheet (p. 13)
- Procedure Instructions (below)
- Debriefing & Analysis (p. 13)
- Stopwatches

Procedure:

- Randomly divide students into Groups A and B.

- Have an A and a B student pair up. Partners should take turns timing each other while they complete the sheet. They should not be able to see the sheet their partner is working on. Hand out Scrambled Set List A and B face down and instruct students not to turn their sheets over until instructed to do so by their partner.
  - ✎ Explain to students that they should unscramble the words in each group before they go on to the next. If they give up on a word, they cannot go back to that word later on.
  - ✎ Instruct Group A to read the instructions on the data sheet to their partner and follow the experiment steps. When B subjects are done, they should switch roles and repeat the process – starting over with reading the instructions again.

- Even though some words may be unscrambled into words other than the "correct" answer, there is a "correct" way to unscramble the words for the set thinking. If students have made a word other than the "correct" response, they should count it as incorrect. Have each student correct their own sheets and record the data on their sheets.
  - ✎ Students should count words they gave up on as incorrect responses.

- Combine class data on the board or overhead (Class Data Collection, p. 13).

- Compute averages and proceed to Debriefing and Analysis (p. 13).

Name: _____

Scrambled Sets List A

1) AOBT	BOAT	11) OLOCRS	COLORS
2) LIAS		12) DER	
3) ARO		13) RENEG	
4) AERTW		14) BELU	
5) HISF		15) RANGOE	
6) OLSHCO	SCHOOL	16) PATLE	PLATE
7) OKOB		17) RKFO	
8) ENICLP		18) NIEKF	
9) NEP		19) PCU	
10) APEPR		20) ODFO	

Name: _____

Scrambled Sets List B

1) AOBT	BOAT	11) OLOCRS	COLORS
2) RKFO		12) LIAS	
3) RENEG		13) NIEKF	
4) PCU		14) AERTW	
5) HISF		15) RANGOE	
6) OLSHCO	SCHOOL	16) PATLE	PLATE
7) DER		17) OKOB	
8) ARO		18) ENICLP	
9) NEP		19) BELU	
10) APEPR		20) ODFO	

Scrambled Set List A – Answer Key

1. BOAT
2. SAIL
3. OAR
4. WATER
5. FISH

6. SCHOOL
7. BOOK
8. PENCIL
9. PEN
10. PAPER
11. COLORS
12. RED
13. GREEN
14. BLUE
15. ORANGE

16. PLATE
17. FORK
18. KNIFE
19. CUP
20. FOOD

Scrambled Set List B – Answer Key

1. BOAT
2. FORK
3. GREEN
4. CUP
5. FISH

6. SCHOOL
7. RED
8. OAR
9. PEN
10. PAPER
11. COLORS
12. SAIL
13. KNIFE
14. WATER
15. ORANGE

16. PLATE
17. BOOK
18. PENCIL
19. BLUE
20. FOOD

Name: _____

Scrambled Set Response Time – Instructions & Data Sheet

✎ **Instructions** (Read to your subject)

When I tell you to begin, turn your sheet over and unscramble the words in order from 1 to 20 (the first one in each section is done for you). If you are stuck on a word, put an X on the line and move on to the next one. You may not go back to any words once you have decided to move on.

✎ **Tell your subject to begin and start to time them.**

✎ **Record the time below.**

	Condition	Time	Number Skipped	Number Incorrect
Individual Data	A			
	B			
Class Data	A			
	B			

✎ **After you have been given the "correct" answers and class data has been compiled, complete the chart above. (Skipped answers count as incorrect)**

✎ **Answer the questions below.**

1. Which condition took longer to complete the task? _____
2. Which condition had more incorrect responses? _____
3. Looking at each other's sheets, what accounts for these differences? _____

_____

_____

_____

Scrambled Set Response Time - Class Data Collection (Overhead)

	Condition	Time	Number Skipped	Number Incorrect
Individual Data	A			
	B			
Class Average	A			
	B			

Debriefing and Analysis

- Before explaining the difference in lists and the impact on thinking:
  - ✎ Have students complete questions on their Instructions & Data Sheet.

- Discuss answers on their sheet. Follow with these questions:
  - ✎ Would it have made a difference if the first word was not done for you?
  - ✎ Why do patterns help solve problems?
  - ✎ If a word can be unscrambled in more than one way, should there be one correct answer?

Thinking: Color Interference

Purpose:

- Demonstrate how our mind processes information
- Explain the concept of competing stimuli
- Allow students to participate in a modified version of a classic experiment

Materials:

- Color Board (p. 17)
- Color Word Board (p. 16)
- Stopwatches
- Data Collection Sheet (p. 15)
- Class Data Collection Sheet (p. 18)
- Procedure Instructions (below)
- Discussion & Analysis (p. 18)

HINT: Once copies are made, the words on the "Color Word Board" need to be outlined in the stated color. The words on the "Color Board" need to be outlined in a color different from the one stated. Without this, there is no point to the experiment.

Procedure:

- For this within-group experiment, students should be partnered with another student as a timer, they will then switch roles.

- Hand out Color Board, Color Word Board, Data Collection Sheet and a Stop watch to the timer. Instruct the timer to read through the instructions for the experiment and ask any questions before they begin. Students should then follow the instructions on their Data Collection Sheet.

- Combine individual data so you have class averages.

- Proceed to the Discussion & Analysis (p. 18).

Name: _____

Color Interference Data Collection Sheet

- Instructions (Read to subject):
  I will give you a board with the names of colors written on it. I will time you reading the names of the colors. You should read the entire left column first (top to bottom) and proceed to the next column. If you make a mistake, you may go back and correct it.

- When you are ready to time, give subject the "Color Name Board" and instruct subject to begin (follow along on the answer guide below – circle any uncorrected errors).

- Record the subject's time below – add 2 seconds for every uncorrected error.

- This time, give subject the "Color Board," instruct subject to begin as you start your stopwatch and follow along on the answer guide below.

- Record the subject's time below – add 2 seconds for every uncorrected error.

"Color Name Board" Answer Guide

Red	Yellow	Blue	Yellow	Red
Blue	Blue	Yellow	Green	Blue
Yellow	Red	Red	Yellow	Green
Green	Green	Blue	Blue	Red
Blue	Yellow	Green	Yellow	Yellow
Green	Red	Red	Green	Green

"Color Board" Answer Guide

Blue	Red	Yellow	Green	Blue
Red	Yellow	Blue	Yellow	Red
Green	Green	Red	Blue	Green
Yellow	Blue	Blue	Yellow	Red
Green	Red	Red	Green	Green
Blue	Yellow	Green	Yellow	Yellow

Data Collection: Reading Times (in seconds)

	Color Word Board	Color Board
Your time		
Partner's time		
Class Average time		

Color Word Board

RED	YELLOW	BLUE	YELLOW	RED
BLUE	BLUE	YELLOW	GREEN	BLUE
YELLOW	RED	RED	YELLOW	GREEN
GREEN	GREEN	GREEN	BLUE	RED
BLUE	YELLOW	BLUE	YELLOW	YELLOW
GREEN	RED	RED	GREEN	GREEN

Color Board

BLUE	RED	YELLOW	GREEN	BLUE
RED	YELLOW	BLUE	YELLOW	RED
GREEN	GREEN	RED	BLUE	GREEN
YELLOW	BLUE	BLUE	YELLOW	RED
GREEN	RED	RED	GREEN	GREEN
BLUE	YELLOW	GREEN	YELLOW	YELLOW

Class Data Collection Sheet (time in seconds)

	Color Word Board	Color Board
Individual Student Times		
Class Average time		

Discussion and Analysis

- Analyze class results:
  - Which board took longer to read? How can that be explained?
  - Did some students have big differences in scores and others small differences? How can that be explained?
  - What are variables you could look at that may have influenced the scores? i.e. Gender? Eyesight? Reading ability?
  - Did the subjects who went second do better? Could the fact that they heard all the right answers have made their times faster?
  - Should the conditions be flip-flopped with subjects to counterbalance the effect of going first versus second?

- Explain how the eyes take in all information and when that information conflicts, it takes longer for the brain to process and sort through the information.

HINT: This can be expanded by adding a board with blocks of colors and no words as a third condition. Subjects should just state the color they see.

Thinking: Demonstration Set

Purpose:

- Demonstrate how a "set" causes us to react in a particular way
- Illustrate how a simple activity can confuse many people

Materials:

- Demonstration set overhead (p. 20)
- Procedure (below)
- Discussion & Analysis (below)

Procedure:

- Show the numbers on an overhead, one at a time.
  - ✎ Students should add the numbers in their heads while they are exposed.
  - ✎ Students should write down the sum of the numbers.

- Give students the correct answer (4110) and tally the number who got it correct. (Rarely will many people get it right the first time.)

- Repeat the procedure until all (or most) students obtain the correct sum.

Discussion & Analysis:

- The reason it is hard to add the numbers correctly is that those doing the adding become set to add in terms of 1000. They expect to add 1000 each time in the latter part of the problem. Usually when people get to the "20" their answer goes from 3080 to 4000 instead of 3100. Those who do this end up with a sum of 5010.
  - ✎ Ask students to determine if this is the error they made. If not, can they figure out where they went wrong?
  - ✎ Ask students if anyone did it correctly the first time and made an error during a later attempt.

Demonstration Set (Overhead)

$$
\begin{array}{r}
10 \\
1000 \\
40 \\
1000 \\
30 \\
1000 \\
20 \\
1000 \\
10 \\
\hline
?
\end{array}
$$

Thinking: Rhyme Set

Purpose:

- Demonstrate how a "set" causes us to react rather than think or process information correctly
- Allow the class to participate together in an activity

Materials:

- Rhymes (below)
- Procedure (below)
- Discussion & Analysis (below)

Procedure:

- Tell students they are to follow your instructions and respond as quickly as possible.

Rhymes

Teacher:	**Students**:
Say "pop" three times fast.	"Pop, pop, pop"
What do you do at a green light?	"STOP"

- Most will say "Stop" instead of "Go"

Teacher:	**Students**:
Say "silk" three times fast.	"Silk, silk, silk"
What do cows drink?	"MILK"

- Most will say "Milk" instead of "water"

Teacher:	**Students**:
Say "coast" three times fast.	"Coast, coast, coast"
What do you put on bread?	"TOAST"

- Most will say "Toast" instead of "butter"

Discussion & Analysis:

- Ask students the following questions:
  - ✎ Did most get better with each rhyme?
  - ✎ Did some get fooled all the time and others none? What could account for these differences?
  - ✎ Why do people often say the wrong answer?

Thinking: Tricky Reading

Purpose:

- Demonstrate how often we don't pay attention to detail
- Demonstrate how our minds fill in information based on past experience

Materials:

- Overhead of Statement (p. 23)
- Procedure (below)
- Discussion & Analysis (below)

Procedure:

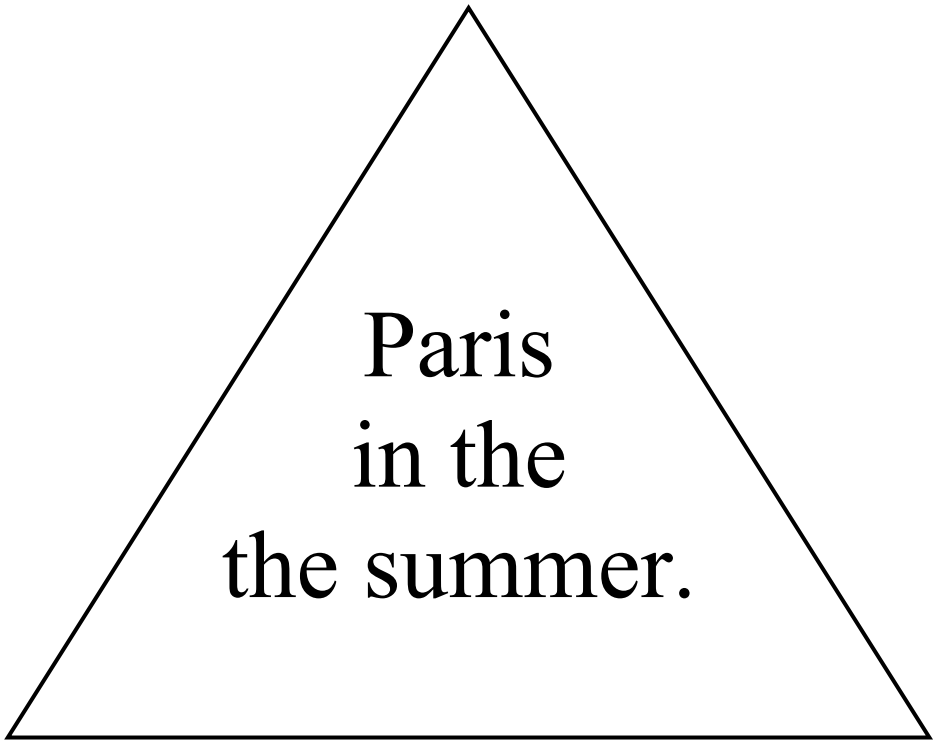
- If done as a class, tell students to read the overhead out loud as soon as you uncover it.
- If done individually, have students break into pairs. Give one student a copy of the statement. Give the following instructions:
  - Subjects are to read the sheet of paper when the Experimenter shows it to them.
  - Experimenters, flip over your sheet of paper.
  - Switch roles.
- Collect data – how many read it correctly – with the word "the" twice? (Most will read only "the" only once.)

Discussion and Analysis:

- If done individually, which group had more errors – the first group or the second group?
- What other variables could you separate data into? (male/female)
- Why do people misread this statement?
- Would the same mistake be made if "in" was doubled or if the format of the words were different?

HINT: Students could individually modify the words or the format and test out a variation of the experiment at home or with friends.

HINT: As a variation, students could be shown the statement for a second or two, and have to rewrite what they saw instead of read the statement out loud. This could provide different results.


Paris
in the
the summer.

Thinking: Counting Confusion

Purpose:

- Demonstrate how often we don't pay attention to detail even with specific directions
- Involve students in a fun, yet thought provoking activity

Materials:

- Overhead of Statement (p. 25)
- Procedure (below)
- Data Chart (below)
- Discussion & Analysis (below)

Procedure:

- Put the statement on the board or show the statement on the overhead.
  - ✎ Instruct students to read the statement.
  - ✎ If doing demonstration individually, have students count ALOUD the F's in the sentence. They should count them only once and should not go back and count them again.
  - ✎ If doing demonstration as a class, have students count SILENTLY the F's in the sentence. They should count them only once and should not go back and count them again.

- Tally in the chart below, the number of F's found by students.

	Number of F's Found					
	1	2	3	4	5	6
Number of Students						

Discussion & Analysis:

- Have students answer these questions in groups:
  - ✎ Were certain F's consistently not counted? What could cause this?
  - ✎ If you missed some, did you go back and find them? Did you miss some the second time around?

HINT: To create more of an "experiment," divide class into groups, males and females or age groupings to compare abilities. Another variation is to compare scores of students who count the F's out loud from an overhead, while others underline the F's on a handout.

FINISHED FILES ARE THE RESULT OF YEARS OF SCIENTIFIC STUDY COMBINED WITH THE EXPERI-ENCE OF YEARS.

Thinking: What's Your Estimate? Car Accident

Purpose:

- Demonstrate how people interpret events differently
- Illustrate the impact of wording on our thought process

Materials:

- Video of a car accident (not included)
- Procedure (below)
- Student questions (p. 27)
- Speed Data Collection Chart (p.27)
- Glass Data Collection Chart (p. 28)
- Speed versus Glass Data Collection Chart (p. 28)
- Discussion & Analysis (p. 29)

Procedure:

- Have all students watch a video clip of a car accident. It is important that there is NO broken glass in the selected video clip.
  - ✎ Instruct students to watch the video.
- Randomly pass out the question slips, one to each student.
  - ✎ Remind students to write their answer in terms of miles per hour.
- Either have students call out their question type and answer for you to record on the Data Collection Chart, or have students group themselves by question type (use groups A, B, C, & D rather than wording) and figure out their average group answer. Try to keep students unaware of the difference in wording between groups.

HINT: Having students get into groups to figure out their group average is an opportunity for movement, and a review of averaging.

- Explain to students that you will give them the results of this experiment later.
- The next day, or several days later, ask students to write down their answer to the following question: Was there any broken glass as a result of the car accident you watched on the video the other day? Collect responses by question wording conditions.
- Proceed to Discussion & Analysis (p.29).

HINT: For time purposes, the broken glass part of this experiment can be omitted. The amount of analysis for this experiment can be increased or reduced to meet your needs.

Make copies of the following questions and cut into slips of paper to hand out to individual students:

How fast was the car going when it contacted the other car? (in m.p.h.)

How fast was the car going when it bumped the other car? (in m.p.h.)

How fast was the car going when it hit the other car? (in m.p.h.)

How fast was the car going when it smashed the other car? (in m.p.h.)

Speed Data Collection Chart (instructor use only)

	Question Wording			
	Contacted	Bumped	Hit	Smashed
Individual Answers				
Class Averages				

Glass Data Collection Chart

		Word Type			
		Contacted	Bumped	Hit	Smashed
Broken Glass Response	**Yes**				
	No				
	% respond-ing YES				

Speed Versus Glass Data Collection Chart (overhead/board)

	Word Type			
	Contacted	Bumped	Hit	Smashed
Average Speed				
Percent Who Said Yes About Broken Glass				

Discussion & Analysis

- To analyze speed estimates and the impact of wording:
  - ✎ Show students the average estimated speed for each condition. Did the wording of the question have an impact on estimations?
  - ✎ Was the impact of wording what would have been expected – with the "smashed" condition yielding the highest speeds?
  - ✎ What accounts for the differences in estimations?
  - ✎ If there was not much difference between conditions, what could account for this? i.e. Video error, students talking/not paying attention?
  - ✎ How does this apply to real life accident witnesses and police questioning?

- To analyze the broken glass question results:
  - ✎ Show students (or have them figure out) the percentage of people per condition who responded yes to thinking there was broken glass.
  - ✎ Was there a difference in responses based on condition?
  - ✎ Were these results what you could expect to find?
  - ✎ If there was not much of a difference, what could account for this lack of a finding? i.e. Video clip not appropriate – either there was broken glass or there was no chance of there being broken glass (accident too minor).

- To discuss entire experiment:
  - ✎ Looking at the Speed versus Glass Chart, what conclusions can be drawn?
  - ✎ Does wording impact our thought process? If yes, what is the impact?
  - ✎ How could this experiment be altered to yield stronger results?
  - ✎ Would reading the question before watching the video have influenced perception of speed?
  - ✎ Should a shorter or longer period of time have come between watching the video and being asked about the broken glass?
  - ✎ What are some confounds with this experiment?

Thinking: Seeing What's Not There

Purpose:

- Demonstrate how suggestive wording influences our thought processes

Materials:

- Video of a car driving on a country road (not included)
- Procedure (below)
- Student questions (p. 31)
- Data Collection Chart (p. 31)
- Discussion & Analysis (p. 32)

Procedure:

- Have all students watch a video clip of a car driving on a country road. It is important that there is NOT a barn in the selected video clip.
  - ✎ Instruct students to watch the video. Mislead the students into thinking the experiment is on how males and females perceive speed.

- Randomly pass out the Video Question Slips, one to each student.
  - ✎ Remind students to write their name on the slip and their answer in terms if miles per hour. (This reinforces the misconception that the purpose of the study is to estimate speed). You need the name to match the data later on.

- Collect questions/answers and tell students you need to analyze the data and will let them know your results later.

HINT: The questions can be altered based on the video used in the demonstration. If there *is* a barn in the video, chose a different country item not pictured to ask about. If using a city road, again, alter the questions accordingly.

- Several days later, hand out the Recall Question Slips, one to each student.
  - ✎ Remind students to write their name on the slip and to not discuss their answers with those around them.

- Pass back the first question slips and collect data on the Data Collection Chart.

- Proceed to Discussion and Analysis (p. 32).

Video Question Slips (Copy and cut into individual slips)

✎ Name: _____

How fast was the car going when it passed the barn on the country road? _____

✎ Name: _____

How fast was the car going on the country road? _____

Recall Question Slips (Copy and cut into individual slips)

✎ Name: _____

In the video of the car driving on the country road was there:

_____ Yes No (Circle one)

_____ Yes No

_____ Yes No

(Before copying, write in "A BARN" for one option, and write in two other items that *were* present in the video clip. Name is included so data can be paired with previous slips.)

Data Collection Chart

	Question type	
	"Barn" in question	"Barn" not in question
Number answering "YES" to there being a barn (raw data)		
Percent answering "YES" to there being a barn (analysis)		

Discussion and Analysis

- To analyze the impact of question wording:
  - ✎ Show students the Data Collection Chart. Did having the word "barn" in the question impact whether or not a barn was recalled?
  - ✎ What accounts for the differences in recall?
  - ✎ If there was not much difference between conditions, what could account for this? i.e. Video error, students talking/not paying attention?
  - ✎ How does this apply to real life? How susceptible are our memories to misinformation?

- To discuss entire experiment:
  - ✎ What conclusions can be drawn from this experiment?
  - ✎ Now knowing the purpose of the experiment, how many students remember seeing a barn? How powerful was the suggestion?
  - ✎ How could this experiment be altered to yield stronger results?
  - ✎ Should a shorter or longer period of time have come between watching the video and being asked about seeing a barn?
  - ✎ What are some confounds with this experiment?
  - ✎ Was the video clip a good choice for this experiment? How could it have been better?
  - ✎ How could you alter this experiment to test the power of suggestion in a different way?

CONDITIONING

Conditioning: Unlearning Grammar

Purpose:

- Demonstrate how we are conditioned to use proper grammar and how difficult it is to "unlearn" something

Materials:

- Paragraph Handouts (p. 34 & 35)
- Data Analysis Chart (p. 36)
- Procedure Instructions (below)
- Debriefing & Analysis (p. 37)
- Stopwatches

Procedure:

- Randomly divide students into two groups.

- Distribute Paragraph Handouts face down – Condition A to one group, Condition B to the other group.

- Have students pair up with someone in their own group. Explain that they are going to take turns doing the activity and timing their partner. The timer will start when their partner tells them to begin.

- Instruct those students going first to turn their sheet over and read the instructions carefully.

HINT: If students don't do well reading or following instructions carefully, conditions may be divided so that the instructions can be read out loud and questions can be answered.

  - ✎ Students should follow the instructions on their handout. They should record their time when finished writing and switch roles.

- Instruct students to trade papers with their partner and look for any errors. Condition A should look for punctuation and capital letters. Condition B should look for missing punctuation and letters that should be capitalized.
  - ✎ Students should circle any errors.
  - ✎ Students should add 2 seconds per error to the time recorded. Circle the new time.

- Collect data on the Grammar Data Collection Chart.

- Proceed to Debriefing and Analysis (p. 37).

Name: _____

Paragraph Handout – Condition A

Instructions:

On the lines provided, copy the paragraph below but **omit (do NOT use) any punctuation or capital letters.**

Tell your partner to begin timing when you are ready to write and to stop when you are done.

A park used to be where the Walgreen's store now stands. Kids used to play on a swing set and a slide. There was a big Maple tree in the middle. Now kids don't have a place to play. Many people were sad to see it torn down. The store is doing good business though! This is a sign of the times. My friend, Mary, is very disappointed about the loss of the park.

Your time (in seconds): _____

Name: _____

Paragraph Handout – Condition B

Instructions:

On the lines provided, copy the paragraph below **exactly as it is written.**

Tell your partner to begin timing when you are ready to write and to stop when you are done.

A park used to be where the Walgreen's store now stands. Kids used to play on a swing set and a slide. There was a big Maple tree in the middle. Now kids don't have a place to play. Many people were sad to see it torn down. The store is doing good business though! This is a sign of the times. My friend, Mary, is very disappointed about the loss of the park.

Your time (in seconds): _____

Name: _____

Grammar Data Collection Chart

		Condition A (Omit Grammar)	Condition B (Include Grammar)
Individual Data	Number of Errors		
	Writing Time (in sec.)		
Class Averages	Number of Errors		
	Writing Time		

✎ What are some conclusions you can draw from this data?

✎ Did you fall above or below the class average in your condition?

✎ Did you follow the instructions correctly?

✎ Did your partner follow the instructions correctly?

Debriefing and Analysis

- Explain the difference between Condition A and Condition B.
- Have students answer the questions on their Handout.
- Discuss student answers.

HINT: This is a good time to point out the importance of following directions. If students did not pay close attention to what they were instructed to do, results are not as strong as what they could be.

- Pose the following questions for discussion:
  - ✎ Based on our results, can we say it is difficult to "unlearn" grammar?
  - ✎ If results did not show this, why didn't they?
  - ✎ How much was lack of attention to the instructions an issue?
  - ✎ How else could you analyze the data? (i.e. by gender?)
  - ✎ How do certain things in our life become automatic?
  - ✎ Were there specific words or punctuation marks that caused errors for many people?
  - ✎ What were some confounds in this experiment?
  - ✎ How else could you study unlearning?

Conditioning: Jumping Jack Clap

Purpose:

- Demonstrate how our body functions become conditioned (subconsciously)

Materials:

- Jumping Jack Clap Handout (p. 39)
- Class Data Analysis Chart (p. 40)
- Procedure Instructions (below)
- Discussion & Analysis (p. 40)
- Stopwatches

Procedure:

- Randomly pair students. This is a within-subjects design so students will be both experimenter and subject.

- Hand out procedure and data sheet to the experimenters. Instruct experimenters to read through the sheet silently. The student procedure is as follows:
  - Tell your subject to sit and relax for 2 minutes. Time 2 minutes.
  - Take your subject's pulse for 10 seconds, multiply by six and record this as the "resting pulse."
  - Tell your subject you are going to clap five times after which he/she is to get up and do jumping jacks for 30 seconds.
  - Take your subject's pulse again and record it as Trial #1.
  - Repeat this procedure nine times in a row, recording data after each time.
  - Have your subject sit and relax until his/her pulse returns to the initial resting pulse rate (check pulse every minute).
  - Clap your hands five times and take your subject's pulse (without doing jumping jacks).

- Have students switch roles and repeat the procedure.

- Collect class data (Data Analysis Chart, p. 40).

HINT: You can expand this experiment by measuring the amount of time it takes for extinction to occur (how many times does clapping have to be paired with no jumping jacks for the heart rate to remain at the resting rate?).

- Proceed to Discussion and Analysis (p. 40).

Name: _____

Jumping Jack Clap - Student Handout

Procedure Instructions

Instructions for experimenter (read through first, then follow steps):

- Tell your subject to sit and relax for 2 minutes. Time 2 minutes.
- Take your subject's pulse for 10 seconds, multiply by six and record this as the "resting pulse."
- Tell your subject you are going to clap five times after which he/she is to get up and do jumping jacks for 30 seconds.
- Take your subject's pulse again and record it as Trial #1.
- Repeat this procedure nine times in a row, recording data after each time.
- Have your subject sit and relax until his/her pulse returns to the initial resting pulse rate (check pulse every minute).
- Clap your hands five times and take your subject's pulse (without doing jumping jacks).

Individual Data Collection

Resting Pulse	Trials – 60 second pulse after jumping jacks										Resting Pulse	Final Pulse (clap only)
	1	2	3	4	5	6	7	8	9	10		
	Average pulse during 10 trials:											

Name: _____

Jumping Jack Clap - Student Handout

Class Data Collection

Averaged Data

	Average Resting Pulse Rate (A)	Average Trial Pulse Rate (B)	Average Final (clap only) Pulse Rate (C)
First Subjects			
Second Subjects			
All Subjects (combine data)			

Data Analysis

	Difference Between Resting and Trial Pulse	Difference Between Resting and Final Pulse
First Subjects		
Second Subjects		
All Subjects (combine data)		

✎ From your data, were subjects conditioned? Use your data to explain your answer.

Discussion and Analysis:

- Have students complete the Average Data table and the Data Analysis table.
- Discuss whether subjects were conditioned.
  - ✎ After clapping, did the average pulse increase when no jumping jacks were done?
  - ✎ Does the increase seem significant or similar to the average trial increase?
  - ✎ What are some possible explanations if conditioning didn't occur?
- Discuss whether being an experimenter first affected being a subject.
  - ✎ Was there a difference in pulse rates between those who went first and those who went second?
  - ✎ Did conditioning seem to work better for those who were subjects first since they didn't know what to expect?
  - ✎ Did conditioning seem to work better for those who were subjects second since they knew their heart rate was supposed to increase for clapping alone?
  - ✎ How else could condition order have influenced the experiment?
- Discuss the entire experiment:
  - ✎ Should the amount of trials been increased or decreased?
  - ✎ What are some other things that could be paired with exercise for conditioning?
  - ✎ How would you go about showing extinction?
  - ✎ How would you go about showing spontaneous recovery?
  - ✎ What were some confounds in this experiment?
  - ✎ Diagram this experiment showing the unconditioned stimulus, unconditioned response, conditioned stimulus, and conditioned response.

Conditioning: Catch the Ball

Purpose:

- Demonstrate the principles of classical conditioning
- Involve students actively in classical conditioning

Materials:

- A small ball (raquetball ball)
- A shield (either a box or a cloth hanging down) with a hole in it (so hand can fit through)
- Procedure Instructions (below)
- Discussion & Analysis (below)

Procedure:

- Chose a student to be your subject for the demonstration.
- Have the subject put their hand through the shield. Explain that you will be dropping a ball into their hand for them to catch. Let them hold the ball for a couple seconds so they know what to expect.
- Face the student so the rest of the class can see the ball dropping into the hand.
- Without any pairing, drop the ball into their hand a couple times.
- Start saying "Ready, set, catch" before you drop the ball. After several trials, say "Ready, set, catch" but do not drop the ball.
- Observe whether the hand shows a catching reflex (effective conditioning).

Additional Procedures:

- Show extinction and spontaneous recovery.
- Change cues to a visual one – smiling, sticking out tongue, surprise look.
- Change cues to a different auditory one – bell, buzzer, "go."

Discussion and Analysis

- Identify the unconditioned stimulus, unconditioned response, conditioned stimulus and conditioned response.
- Was conditioning successful?
- If not, what in the demonstration needed to be changed?
- Repeat the procedure and see if you are successful with a new subject who knows what to expect.
- Discuss ways to alter the experiment to test a similar principle.
- What were confounds in this demonstration?

Conditioning: A Number Story

Purpose:

- Demonstrate the principles of classical conditioning
- Involve students actively in classical conditioning

Materials:

- A short story with a lot of numbers (p. 44 – or use a children's counting book)
- An unconditioned stimulus (your voice, an action, a bell, a buzzer, a whistle, etc.)
- Procedure Instructions (below)
- Discussion & Analysis (p. 44)

Procedure:

- Read the following to your class:

  I am going to test your listening ability by reading you a short story. Every time I say a number, raise your hand. Got it? Any questions? Let's practice.

  One day I went to the store to get **two** gallons of milk and **four** chocolate chip cookies.

  (Students should have raised their hands 3 times.)

- Begin reading the story. Read a few sentences without pairing numbers with an unconditioned stimulus.

- Begin your unconditioned stimulus (scratching your head, smiling, rubbing your nose, making your voice loud, sounding a bell, etc.) right before you say a number.

- Near the end of the story, do your unconditioned stimulus without saying a number and see how many raise their hands.

Additional/Alternate Procedures:

- Show extinction and spontaneous recovery.
- Change cues to a visual one, if you were doing auditory – smiling, sticking out tongue, surprised look.
- Change cues to a different auditory one, if you were doing visual – bell, buzzer, "go."

Sample Number Story

One bear bouncing, bouncing on the bed. *One* was alone until he saw Fred. Then there were *two* bears bouncing on the bed. "*One* now *two*," said *One* to Fred. *Two* bears bouncing, bouncing on the bed. If there were *three* I'd hit my head. "Good thing there's only *two*," the *one* bear said.

(Now introduce unconditioned stimulus)

"Hey you *two*, I want to jump!" said Salli Mae. "But then there will be *three* bears on the bed," said Jay!

Three's too many to jump on the bed, if there's *three* or more we'll hit the floor. Or bump our heads, especially with *four*!

Well, now we're stuck, what should we do? Everything was fine when there was only *two*. But then there was *three*, and now there's *four*! What happens if *five* comes walking through the door?

Nobody should be jumping on the bed said Ned. Not *one*, not *two*, not *three* or more. All of our feet should be on the floor. All *five* will be in trouble if Mom comes to the door. She'll throw *one* big fit if you do this anymore!

So Ned hit the road – no need to be told, so now there were *four* left to be scold.

"Well I was here first," said *One* to the *three*. You all need to leave the bed to me. It's the perfect size for *one*, can't you see?

"I guess I'll be going," said Salli Mae. As she turned to leave, out bounced Jay. Now there were *two* left on the bed to play. Fred said to *One*, "I want to stay!" "You have to go, there's no other way."

(At some point introduce the unconditioned stimulus – there are no numbers in the last section)

Both bears were bouncing on the bed that day. And both bears fell off, I'm sorry to say. So learn from them as they bumped their heads – no more bouncing with friends on the bed!

Discussion and Analysis

- Identify the unconditioned stimulus, unconditioned response, conditioned stimulus and conditioned response.
- Was conditioning successful?
- If not, what in the demonstration needed to be changed?
- If you repeated the procedure with the same group of subjects would you see stronger or weaker results?
- Discuss ways to alter the experiment to test a similar principle.
- What were confounds in this demonstration?

Conditioning: Suited for Water Squirting

Purpose:

- Demonstrate the principles of classical conditioning
- Involve students actively in classical conditioning

Materials:

- A squirt bottle
- A deck of cards
- Procedure Instructions (below)
- Discussion & Analysis (below)

Procedure:

- Chose a student to be your subject for the demonstration. (Choose a student who does not mind getting a little wet) Have the student leave the room for a minute.
- Explain the idea of this demonstration to the class and have them take note of the subject's face, before introducing water, while being squirted with water and after the water conditioning stops.
- Have the subject sit facing you and the class. Explain to the subject that they should state whether the card they are being shown is a club, heart, spade, or diamond. Give another student a deck of cards and have them show them to the subject one at a time.
- Allow the subject to go through at least two of each suit before pairing the water with the response of "Club."
- Whenever a club card comes up and the subject says "clubs," squirt him/her in the face with water. Pair the club suit and water several times. Observe the face made when squirted with water.
- Observe whether the face shows a "water squirt" expression when the club card is not followed by water (effective conditioning).
- Show extinction by not pairing the club with water and see how many times the two are unpaired for the subject to stop showing a "squirt" face when a club come up.

Discussion and Analysis

- Identify the unconditioned stimulus, unconditioned response, conditioned stimulus and conditioned response.
- Was conditioning successful?
- If not, what in the demonstration needed to be changed?
- Repeat the procedure and see if you are successful with a new subject who knows what to expect.
- Discuss ways to alter the experiment to test a similar principle.
- What were confounds in this demonstration?

GLOSSARY

Glossary

Between-Groups design:
An experiment design in which the performance of two or more groups is compared.

Competing Stimuli:
Two or more stimuli vying for attention.

Conditioned Response:
A response to a stimulus that does not occur naturally.

Conditioned Stimulus:
A stimulus that elicits a response it naturally has no connection to.

Conditioning:
A training process through which a specific response follows a specific stimuli. An unconditioned stimulus elicits an unconditioned response. The unconditioned stimulus is paired with a conditioned stimulus, which, after several pairings, elicits a conditioned response.

Confound:
A variable that was not controlled in an experiment that could yield an alternate explanation for the results.

Control Group:
A condition or group of subjects who do not receive treatment in an experiment.

Counterbalancing:
When using a within-subjects design, this alternating of conditions lessens the effect of an extraneous variable across the conditions.

Data:
Observations that are recorded.

Debriefing:
At the conclusion of an experiment, the purpose of the experiment is explained to the subjects.

Dependent Variable:
The variable that is being measured in an experiment.

Extinction:
When a conditioned stimulus no longer elicits a conditioned response.

Hypothesis:
The expected outcome of an experiment or possible answer to a research question.

Independent Variable:
The variable that is manipulated or changed in an experiment.

Interaction:
The impact of the dependent measure on each level of the independent variable.

Main Effect:
The impact of the dependent measure on the independent variable.

Mean:
The arithmetic average of scores. Total sum of scores divided by the number of scores.

Objective:
Not impacted by attitudes, feelings, or beliefs.

Operational Definition:
Exact meaning or procedures used to produce an effect or measure a variable.

Random Assignment:
Assigning subjects to groups so that each subject is equally likely to be assigned to each condition.

Random Selection:
Selecting subjects for an experiment so that each potential subject has an equally likely chance to be chosen.

Reliable:
When the same results are consistently obtained from the same test, measure, or procedure.

Sample Size:
The number of subjects used to represent the population being studied.

Set Thinking:
When presented with stimuli, thought processes connect to other information associated with the initial stimuli.

Situation-relevant Variables:
Variables that are due to the environment in which the experiment is taking place. They may impact the dependent measure and may be a confound.

Spontaneous Recovery:
When, after extinction occurs, a conditioned response returns with minimal pairings of the unconditioned and conditioned stimulus.

Subjectivity:
Observations or data that is influenced by feelings, attitudes, and beliefs.

Suggestive Wording:
Questions, directions, or other wording that is leading or implies a specific correct response.

Unconditioned Response:
A response that naturally follows a specific stimulus.

Unconditioned Stimulus:
A stimulus that naturally elicits a specific response.

Validity:
How well a dependent measure assesses what it is intended to.

Within-Subjects Design:
An experiment design in which a participant is subject to each level of the independent variable.

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