Missouri State Human Subjects Protection Application

**Title:** Judgment Confidence Ratings for Association

**Description:** In a judgments-of-memory task, participants are given pairs of words and asked to judge how many people out of 100 would put those two words together. For instance, when given the pair LOST-FOUND, participants should mark that about 75 people say FOUND when given LOST. Maki (2007) and Buchanan (2009) have shown that these judgments are very insensitive to the difference between high frequency and low frequency pairs, as well as upwardly biased. These judgments are similar to judgments of learning, where participants are asked to learn material and then judge how well they will do on an exam of that material. Participants are quite bad at guessing how well they will do, showing very biased answers, especially the poorer performers (Koriat & Bjork, 2006). When asked about the task, participants often describe that it was “easy”, but they had a hard time guessing numbers for the experiment. In fact, a wide range of participant performance exists that cannot be accounted by working memory or fluid intelligence (Buchanan, *manuscript revision*). In this experiment, we will test participant confidence ratings to examine the interaction between participant confidence and performance.

**Protocol:**

**Participants:** Participants will be recruited from the Psychology Undergraduate Pool by use of the SONA system. Generally, these participants will be undergraduates and over 18 years of age. Participants will take the experiments in small groups of one to four people in the researcher’s computer lab.

**Procedures:**

Participants are given instructions (attached) on a free association task and how to judge the word frequency between two words. After these instructions, they are given practice words for judgments. Participants will complete 125 experimental pairs. Every four pairs, they will be asked to make a confidence judgment about the previous pair (resulting in 24 ratings). A separate group of participants will make these ratings without the confidence judgments for comparison These will be given on the computer in a randomized order, along with confidence judgments. The attached packet will be shown on the computer.

**Study Completion:** After study completion data will be analyzed for an interaction between participant performance (accuracy at judgments) and their confidence in making those judgments. The data will be prepared for journal publication.

**Benefits:** There are no direct benefits to participants in this study. However, the general knowledge can be applied to judgments of learning. When studying, students often believe they have enough memory of the material to do well on an exam. As previous research has shown, these judgments are biased toward a better understanding of the material (which is not always the case). This research looks at more basic memory to see if that bias can be reduced to aid in judgments.

**Risks:** There are minimal risks involved in this study, as it is similar to taking a classroom exam.

**Informed consent**: Attached. Participants will be asked to provide consent at the beginning of the study. No penalty is given for withdrawing from the study.

I hereby agree to conduct this study in accordance with the procedures set forth in my project description, to uphold the ethical guidelines as set forth in the Code of Federal Regulations 45 CFR 46, 45 CFR 160 and 164, and the Missouri State University HIPAA Policy, and to report to the IRB any outcomes or reactions to the experiment which were not anticipated in the risks description which might influence the IRBs decision to sustain approval of the project.

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Tim Daugherty

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Erin Buchanan                                    Tara Wagner

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Samantha Saxton Farren Bankovich

#### Introduction to Word Association Experiment

This experiment is concerned with the structure of human associative memory. This knowledge is structured in some way and the mental structure is thought to come about through a process of associative learning. For example, consider the word (and concept of) DOG. We often see the word DOG appear in the same context as the word CAT. “It’s raining cats and dogs.” “I have two dogs, but my neighbor has a cat.” And so on. By experiencing the words CAT and DOG together many times, we develop an association (a mental connection) between them. With lots of this kind of associative learning experience during our lives, we develop a very large and very complex associative memory.

Psychologists are interested in understanding the structure of associative memory and have several ways of investigating it. One method of investigating associative memory is known as a test of “free association.” In free association tests, participants like you are given a series of words and are asked to respond to each word by writing the first word that pops into mind.

When you have finished reading this introduction,

*please wait for further instructions from the experimenter.*

*DO NOT TURN THIS PAGE UNTIL TOLD TO DO SO*

*BY THE EXPERIMENTER !!!*

Here is an example of a free association test.

In the space provided, please write the first word that comes to your mind in response to each of the following words.

|  |  |
| --- | --- |
|  | Your responses: |
| LOST |  |
| OLD |  |
| ARTICLE |  |

When you have finished writing your responses,

*please wait for further instructions from the experimenter.*

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*BY THE EXPERIMENTER !!!*

In this experiment you will be asked to determine how many students out of 100 would respond to a cue word with a specific target word during a free association task. Below is an example of the kind of rating scale you will be using. When you make your ratings, make them by circling the most appropriate number next to each word pair.

**SAMPLE RATING FORM**

**Assume 100 college students from around the nation gave responses to each CUE word.**

**How many of these 100 students do you think would have given the RESPONSE word?**

**Mark the ratings below using the following scale.**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Rating** | **0** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** |
| **# people** | **0-9** | **10-19** | **20-29** | **30-39** | **40-49** | **50-59** | **60-69** | **70-79** | **80-89** | **90-100** |

|  |  |  |
| --- | --- | --- |
| **Cue** | **Response** | **Circle your rating** |
| PEAR | APPLE | **0 1 2 3 4 5 6 7 8 9** |
| BANJO | GUITAR | **0 1 2 3 4 5 6 7 8 9** |
| TOILET | BOWL | **0 1 2 3 4 5 6 7 8 9** |
| CLAM | SHELL | **0 1 2 3 4 5 6 7 8 9** |
| TANGERINE | ORANGE | **0 1 2 3 4 5 6 7 8 9** |
| SHIELD | SWORD | **0 1 2 3 4 5 6 7 8 9** |
| NYLONS | HOSE | **0 1 2 3 4 5 6 7 8 9** |
| PISTOL | GUN | **0 1 2 3 4 5 6 7 8 9** |

When you have finished writing your responses,

*please wait for further instructions from the experimenter.*

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*BY THE EXPERIMENTER !!!*

**Assume 100 college students from around the nation gave responses to each CUE word.**

**How many of these 100 students do you think would have given the RESPONSE word?**

**Make your ratings using the following scale.**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Rating** | **0** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** |
| **# people** | **0-9** | **10-19** | **20-29** | **30-39** | **40-49** | **50-59** | **60-69** | **70-79** | **80-89** | **90-100** |

|  |  |  |  |
| --- | --- | --- | --- |
| # | CUE | **RESPONSE** | **Circle your ratings** |
| 1 | CROCODILE | ALLIGATOR | **0 1 2 3 4 5 6 7 8 9** |
| 2 | VAN | TRUCK | **0 1 2 3 4 5 6 7 8 9** |
| 3 | SUBWAY | TRAIN | **0 1 2 3 4 5 6 7 8 9** |
| 4 | SPOON | FORK | **0 1 2 3 4 5 6 7 8 9** |
| 5 | GATE | FENCE | **0 1 2 3 4 5 6 7 8 9** |
| 6 | ANCHOR | SHIP | **0 1 2 3 4 5 6 7 8 9** |
| 7 | CHAPEL | CHURCH | **0 1 2 3 4 5 6 7 8 9** |
| 8 | CELLAR | BASEMENT | **0 1 2 3 4 5 6 7 8 9** |
| 9 | PEARL | NECKLACE | **0 1 2 3 4 5 6 7 8 9** |
| 10 | DISH | PLATE | **0 1 2 3 4 5 6 7 8 9** |
| 11 | PONY | HORSE | **0 1 2 3 4 5 6 7 8 9** |
| 12 | BROOM | STICK | **0 1 2 3 4 5 6 7 8 9** |
| 13 | GARLIC | BREAD | **0 1 2 3 4 5 6 7 8 9** |
| 14 | WALL | BRICK | **0 1 2 3 4 5 6 7 8 9** |
| 15 | STONE | ROCK | **0 1 2 3 4 5 6 7 8 9** |
| 16 | JACKET | COAT | **0 1 2 3 4 5 6 7 8 9** |
| 17 | ELK | MOOSE | **0 1 2 3 4 5 6 7 8 9** |
| 18 | SAUCER | CUP | **0 1 2 3 4 5 6 7 8 9** |
| 19 | MOTORCYCLE | BIKE | **0 1 2 3 4 5 6 7 8 9** |
| 20 | COMB | BRUSH | **0 1 2 3 4 5 6 7 8 9** |
| 21 | PICKLE | CUCUMBER | **0 1 2 3 4 5 6 7 8 9** |
| 22 | TORTOISE | TURTLE | **0 1 2 3 4 5 6 7 8 9** |
| 23 | YACHT | BOAT | **0 1 2 3 4 5 6 7 8 9** |
| 24 | CATERPILLAR | BUTTERFLY | **0 1 2 3 4 5 6 7 8 9** |

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**Assume 100 college students from around the nation gave responses to each CUE word.**

**How many of these 100 students do you think would have given the RESPONSE word?**

**Make your ratings using the following scale.**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Rating** | **0** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** |
| **# people** | **0-9** | **10-19** | **20-29** | **30-39** | **40-49** | **50-59** | **60-69** | **70-79** | **80-89** | **90-100** |

|  |  |  |  |
| --- | --- | --- | --- |
| # | CUE | **RESPONSE** | **Circle your ratings** |
| 25 | ESCALATOR | ELEVATOR | **0 1 2 3 4 5 6 7 8 9** |
| 26 | SHRIMP | LOBSTER | **0 1 2 3 4 5 6 7 8 9** |
| 27 | TROUSERS | PANTS | **0 1 2 3 4 5 6 7 8 9** |
| 28 | BULL | COW | **0 1 2 3 4 5 6 7 8 9** |
| 29 | CAT | DOG | **0 1 2 3 4 5 6 7 8 9** |
| 30 | RAT | MOUSE | **0 1 2 3 4 5 6 7 8 9** |
| 31 | ROPE | TIE | **0 1 2 3 4 5 6 7 8 9** |
| 32 | GARAGE | CAR | **0 1 2 3 4 5 6 7 8 9** |
| 33 | CHEESE | CAKE | **0 1 2 3 4 5 6 7 8 9** |
| 34 | WHIP | CHAIN | **0 1 2 3 4 5 6 7 8 9** |
| 35 | ROOSTER | CHICKEN | **0 1 2 3 4 5 6 7 8 9** |
| 36 | BUREAU | DRESSER | **0 1 2 3 4 5 6 7 8 9** |
| 37 | ASHTRAY | CIGARETTE | **0 1 2 3 4 5 6 7 8 9** |
| 38 | CHISEL | HAMMER | **0 1 2 3 4 5 6 7 8 9** |
| 39 | PAN | POT | **0 1 2 3 4 5 6 7 8 9** |
| 40 | VINE | GRAPE | **0 1 2 3 4 5 6 7 8 9** |
| 41 | DAGGER | KNIFE | **0 1 2 3 4 5 6 7 8 9** |
| 42 | PAJAMAS | BED | **0 1 2 3 4 5 6 7 8 9** |
| 43 | CELERY | CARROT | **0 1 2 3 4 5 6 7 8 9** |
| 44 | RACQUET | BALL | **0 1 2 3 4 5 6 7 8 9** |
| 45 | PUMPKIN | PIE | **0 1 2 3 4 5 6 7 8 9** |
| 46 | STOVE | OVEN | **0 1 2 3 4 5 6 7 8 9** |
| 47 | MISSILE | ROCKET | **0 1 2 3 4 5 6 7 8 9** |
| 48 | LETTUCE | TOMATO | **0 1 2 3 4 5 6 7 8 9** |

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**Assume 100 college students from around the nation gave responses to each CUE word.**

**How many of these 100 students do you think would have given the RESPONSE word?**

**Make your ratings using the following scale.**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Rating** | **0** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** |
| **# people** | **0-9** | **10-19** | **20-29** | **30-39** | **40-49** | **50-59** | **60-69** | **70-79** | **80-89** | **90-100** |

|  |  |  |  |
| --- | --- | --- | --- |
| # | CUE | **RESPONSE** | **Circle your ratings** |
| 49 | AIRPLANE | JET | **0 1 2 3 4 5 6 7 8 9** |
| 50 | HORNET | WASP | **0 1 2 3 4 5 6 7 8 9** |
| 51 | TACK | PIN | **0 1 2 3 4 5 6 7 8 9** |
| 52 | DOLL | TOY | **0 1 2 3 4 5 6 7 8 9** |
| 53 | TIGER | LION | **0 1 2 3 4 5 6 7 8 9** |
| 54 | KEY | DOOR | **0 1 2 3 4 5 6 7 8 9** |
| 55 | SOFA | COUCH | **0 1 2 3 4 5 6 7 8 9** |
| 56 | HARE | RABBIT | **0 1 2 3 4 5 6 7 8 9** |
| 57 | BLOUSE | SHIRT | **0 1 2 3 4 5 6 7 8 9** |
| 58 | TABLE | CHAIR | **0 1 2 3 4 5 6 7 8 9** |
| 59 | GOWN | DRESS | **0 1 2 3 4 5 6 7 8 9** |
| 60 | FAWN | DEER | **0 1 2 3 4 5 6 7 8 9** |
| 61 | TOAD | FROG | **0 1 2 3 4 5 6 7 8 9** |
| 62 | SKYSCRAPER | BUILDING | **0 1 2 3 4 5 6 7 8 9** |
| 63 | SACK | BAG | **0 1 2 3 4 5 6 7 8 9** |
| 64 | RADIO | STEREO | **0 1 2 3 4 5 6 7 8 9** |
| 65 | PEN | PENCIL | **0 1 2 3 4 5 6 7 8 9** |
| 66 | TRACTOR | TRAILER | **0 1 2 3 4 5 6 7 8 9** |
| 67 | CAULIFLOWER | BROCCOLI | **0 1 2 3 4 5 6 7 8 9** |
| 68 | DRAIN | SINK | **0 1 2 3 4 5 6 7 8 9** |
| 69 | SAXOPHONE | TRUMPET | **0 1 2 3 4 5 6 7 8 9** |
| 70 | LIME | LEMON | **0 1 2 3 4 5 6 7 8 9** |
| 71 | BARREL | BUCKET | **0 1 2 3 4 5 6 7 8 9** |
| 72 | SPADE | SHOVEL | **0 1 2 3 4 5 6 7 8 9** |

When you are finished with your ratings, please turn this booklet over so that the page of instructions is face up. Then wait for further instructions from the experimenter.FREE ASSOCIATION FOLLOW UP QUESTIONS

In a free association test, participants such as myself see a list of words.  We

would be expected to

(a) highlight those words we think are pleasant.

(b) put a check mark by each word that we recognize.

(c) write down the first word that comes to mind for each word in the list.

(d) try to remember each word for a future memory test.

If given the pair QUACK-DUCK in the experiment, I was supposed to guess the

number of people who would

(a) give DUCK in response to QUACK

(b) give QUACK in response to DUCK

(c) give FAKE in response to QUACK

(d) give HUNT in response to DUCK