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**Noun-sense: Short-Term Memory and Correct Recall of
Concrete, Abstract and Nonsense Words**

Mindi E. Lovelady

Retrieval of items from short-term memory is a repeat phenomenon in an individual's everyday life. Recall of some information from short-term memory is more readily available than others, but learning to maximize the amount of information that is retrieved is possible. Using retrieval techniques that involve word concreteness could be of utility in retrieval of information. 81 undergraduate participants were recruited at Lindenwood University. Each participant was asked to complete a task involving the STM recall of words from a list. The list incorporated concrete and abstract nouns, with nonsense words. Participants demonstrated, with significance, the ability to recall more concrete nouns than abstract nouns or nonsense words. Participants also recalled, with significance, abstract nouns over nonsense words.

Memory can be defined as the storage, retention, and recall of information over a period of time. Memory can be categorized into two separate stores; Long-term memory (LTM), and Short-term memory, (STM) (Baddeley, 1974).

STM can be described as memory that allows an individual to recall limited amounts of information for a limited amount of time. *The Magical 7±2*, written by George A. Miller, argues that the capacity of the STM is limited to seven plus or minus two units of information. *Chunking* can be defined as a mnemonic device that is used to increase the capacity of STM, but research indicates that the “chunks,” although they contain more information, still seem to be limited to seven plus or minus two chunks (Miller, 1956).

The way that information seems to be lost from STM is similar to the way that information is lost from LTM, it just seems to happen in an expedited manner. Learning is a physiological process, and information seems to be lost from STM more readily because it has not been studied as well (Baddeley, 1974).

STM has a phonological loop as well as a visuospatial sketchpad. This means that the ability to recall an item is related to how long it takes to read the word as well as whether or not the item sounds like other items that are requested to be recalled. Baddeley (1974) suggests that words are harder to remember if they are longer than other words and if they sound like other words.

The ability to recall an item from memory is also thought to be influenced by how meaningful the item is to the individual but the *concreteness*, or the ability to visualize the item, is also related to the ability to recall the item. An item that is considered to be low in concreteness is said to be *abstract*, (it does not cue a mental image when the item is thought of). For example, microscope, desk and pen are concrete nouns and glory, freedom, and idea are examples of abstract nouns (Paivio et al, 1956).

The concrete and abstract words that were used in this study were taken from a list of nouns that have been scored as having high or low concreteness. This list of words was published in a paper written by A. Paivio, J.C Yuille and S.A. Madigan; *Concreteness, Imagery, and Meaningfulness Values for 925 Nouns*. This paper also included a list of *nonsense* words. That is, words that are pronounceable, but have no real meaning in the Standard English dialect. Crove, lumal, natpem and rispaw are examples of nonsense words that were included in paper. Nonsense words are not considered to be concrete or abstract (Paivio et al, 1956).

The words taken from the list of 925 nouns were incorporated into a Word List that contained 21 words. The words that were included on each list were similar in length and syllables and they were dissimilar in the way that they sound. This was done to help prevent phonological loops, (auditory loops), from influencing the participant's recall of items, as Baddeley (1976) suggested.

Level of processing may be related to an individual's ability to recall a word. If an item is more deeply processed into STM, such as use of mental imagery when considering the item, the item is more likely to be recalled (Craik & Lockhart, 1972).

A within-subjects, (Repeated Measures) design was used to test each participant's ability to recall the nouns presented on the word list. All three levels of the independent variable were present on each variation of the Word List, making it possible to obtain all of the necessary information in one task.

Participants were asked to review the list of 21 words for 45 seconds and immediately following the review, participants were asked to recall as many words from the list that they were able to. They were instructed that they did not need to recall the words in any particular order.

It was predicted that participants would recall, with statistical significance, more concrete nouns than abstract nouns or nonsense words. It was also predicted that abstract nouns would be recalled significantly more than nonsense words. One Way Repeated Measures Analysis of Variance, (ANOVA), was used to analyze the results.

Method

Participants

Eighty one participants, (37 male and 44 female), were recruited through a population of undergraduate students at Lindenwood University. Ninety seven individuals initially participated in this experiment, however the data obtained from 16 of those individuals was discarded because those participants indicated on the questionnaire, that English was not their native language. This study is specific to language and memory and other variables may influence the scores obtained from individuals who speak English as a second or third language.

The age of the participants ranged from 18 to 24 years. The mean age of participants was 20. Participants were not recruited with any incentive or compensation, but they were thanked upon completion of the experiment and invited inquire about the results in the future.

Participants were enrolled in Introduction to Anthropology and Introduction to Sociology courses and recruited through these respective classes. Each of the Introduction classes fulfilled a requirement of the General Education curriculum at the university, and thus it is believed to be a representative sample of the population of students. Lack of prior knowledge of the subject area was desired, and thus testing Introduction students appears to be an adequate method of acquiring these types of students in a random manner.

Materials

An Informed Consent Form, Directions, Word List, Demographic Questionnaire, Data Sheet and a Feedback letter that were specific to this experiment were developed and given to each participant (See Appendices A, B C, D, E, and F).

Three variations of the Word List were developed for use in this experiment; Word List A, Word List B, and Word List C (see Appendix C). All three lists contained the same words, but they were presented in a different order for exposure.

The Demographic Questionnaire (see Appendix E) inquired about each participant's age, sex, class rank, experience of stress related to the experiment, and any prior knowledge regarding abstract, concrete, and nonsense words.

A stopwatch and a well-lit, well ventilated classroom that contained at least 40 desks and chairs was also used in addition to the other materials developed for this study

Procedure

Participants were each given a Participant's Packet containing two consent forms, Directions, Word List A, B, or C, an Answer Sheet, demographic questionnaire, and feedback letter. Participants were instructed to fill out the first two pages that contained the Informed Consent Forms and not to proceed any further than that until they were instructed. Participants were then asked to flip to page three of the packet and read the instructions. Verbal directions were given as well. Participants were asked not to flip to page four until instructed to do so. Once requested, participants flipped to the Directions and read them carefully. They were allowed the opportunity to ask questions to clarify the directions. Once every participant in the group indicated that he or she was ready to proceed, participants were told to flip to page five and begin reviewing the list of words they were presented with. Participants were allowed 45 seconds for this review task.

Once time ran out, participants were instructed to immediately flip to the next page and begin recalling as many of the words as they could. Participants were reminded that they need not recall the words in any particular order. Forty five seconds was the time allowed for

the recall task.

Upon completion of the review and recall task, participants filled out the Post-test questionnaire and asked any questions they had. Participants were instructed to remove the first and last page of their Participant's packet - which gave them a copy of the Informed Consent Form and Feedback Letter. The remaining portion of each participant's packet was collected. Participants were thanked for their participation and invited to contact the experimenter upon completion of the project. Before any scores were compiled into data, all identifying information was removed from the packets. Participants were only identifiable by their participant number.

Results

An One-Way Repeated Measures Analysis of Variance, (ANOVA), was performed on the data obtained from each participant, regarding their responses in the recall task they were asked to complete. The analysis of the data obtained from the participants revealed a significant main effect of the experimental condition, $F(1, 80) = 178.077, p < .05$. Overall, participants demonstrated, with significance, ($M = 4.010$) the ability to recall more concrete nouns from short-term memory than abstract nouns ($M = 2.161$) or nonsense words ($M = 1.004$). Three Tukey Tests were conducted and revealed that recall of concrete nouns had a significantly higher mean (main effect) ($M = 4.010$) than the means of recall for both abstract nouns and nonsense words. The Tukey Tests also revealed that abstract nouns were recalled with statistical significance over nonsense words. Finally, the Tukey Tests revealed that nonsense words were not recalled with any significance.

Discussion

As predicted, analysis of the aggregate data obtained from the participants revealed that not only is there a difference among means of the experimental conditions, but also, concrete nouns have a significantly higher mean in word type recall.

The results that were obtained in this study were highly consistent with the findings of Pavio, Yuille, and Madigan that suggests that the ability to recall information is in fact, related to the ability of an individual to visualize the information, as well as how meaningful the information is to a person.

An alternative explanation for the findings obtained from this research study could be related to the types of classes that were tested, size of the groups that were tested, prior knowledge of the subject area, and cheating (rendering scores invalid). This experiment could not control for extraneous variables, and thus these potential variables could have had an impact on the scores obtained from each participant.

Research in this area may be beneficial to students and to academic professionals in terms of memory enhancement and learning techniques. It may be possible to use these findings to explore alternative avenues for professionals to teach new material, and for students to explore new ways of committing material to memory.

In the future, it is suggested that researchers draw a sample population from Introduction (GE) classes for the various types of degrees offered at the university. Also, it may be wise to work with a partner. In dealing with the amount of data obtained from the participants, it would prove to be helpful to have two minds and two sets of hands at work. It would be helpful managing a larger group of participants, if two experimenters are present.

Presenting the material in “packet” form was a highly efficient way to conduct the

study. The flow of the task was smooth and there did not appear to be any problems or confusion in carrying out the task. If future researchers would like to be economical in the manner that he or she goes about conducting the study, it is wise to put the saved effort and time into preparation for conducting the study.

This effectiveness of this experiment and the ability to control for unknown or confounding variables is directly related to how the researcher goes about carrying out the study. A good rule of thumb for administering this task is to be able to have a large group of participants complete the task within five to seven minutes. Practice administering the experiment several times before it is actually carried out. Attention and memory are key, so the researcher must be clear, concise, and efficient with the participants.

References

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Appendix A

Informed Consent Form

I, _____, (print name), understand that I will be taking part in a research project that requests me to review a list of words for 45 seconds. Upon reviewing the set of words, I understand that I will be given 45 seconds to recall as many words as I am able to. I understand that I should be able to complete this experiment entirely in approximately five minutes. I am aware that my participation in this study is strictly voluntary and that I may choose to withdraw from the study at any time without any penalty or prejudice. I understand that the information obtained from my responses will only be analyzed as part of aggregate data and that all identifying information will be absent from the data in order to safeguard the anonymity of myself and all other participants.. I am also aware that my responses will be kept confidential and that data obtained from this study will only be available for research and educational purposes. I understand that any questions I may have regarding this study shall be answered by the researcher to the best of her ability. Finally, I verify that I am at least 18 years of age and legally able to give consent to participate in this research project.

Signature of Participant

Date:

Signature of Researcher Obtaining Consent

Date:

Contact Information

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Appendix B

Directions

You will be given 45 seconds to study a list of 21 words. Please review as many words as you can before time is up. Once time is up, you are asked to immediately attempt to recall as many words as you are able to. You will be given 45 seconds to complete this task.

Please mark your answers on the Answer Sheet that you have been provided with. You do not have to recall the words in any particular order.

Please do not flip this page until you are instructed to do so. Also, please do not begin marking on the Answer Sheet until you have been instructed to do so. I will let you know when to flip your pages, (from Directions to the Word List, and from the Word List to the Answer Sheet).

Please use your Answer Sheet to recall as many words as you are able to in the amount of time that you are given.

Finally, upon completion of the experiment, I will ask you to complete a Post-Test Questionnaire, and I will provide you with a Feedback Letter regarding this experiment.

Do your best, but please do not stress yourself if you feel that you are unable to recall many or any words. Your participation in this experiment is beneficial in any event.

Appendix C

Word List A

bird

concept

ator

arrow

moral

crove

microscope

effort

rispaw

apple

interest

firap

money

chance

persait

pencil

glory

natpem

table

honor

lumal

Appendix D

Answer Sheet

Participant Number: _____

1

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Appendix E

Post-test Questionnaire

1. How old are you?

2. Are you male or female?
MALE FEMALE

3. Please indicate your class level at Lindenwood University
Freshman Sophomore Junior Senior Don Know

4. Have you ever suffered from amnesia or been subject to injury that a doctor has diagnosed to affect the performance or ability of your short-term memory?
YES NO

5. Before you participated in this study, were you familiar with the concept of concrete, abstract, and / or nonsense words?
YES NO

6. Did you, or are you experiencing any stress as a result of exposure to any or all of the words on the list you were presented with?
YES NO

7. Is English your native language?
YES NO

Appendix F

Feedback Letter

Thank you for participating in my research project. The study you were involved in was to determine if people are able to correctly recall more *concrete* or more *abstract* words with statistical significance. A *concrete* word is a word that cues a mental image when you think of it. An *abstract* word does not cue an image. The word list that you were given to review also contained nonsense words. A *nonsense* word is pronounceable, but it has no meaning. It is neither concrete nor abstract. I predict that participants will be able to correctly recall more concrete words than abstract words from the Word List that each participant was given. It is also predicted that participants will not be able to recall nonsense words with any significance.

The words that were presented to you in the Word List were obtained from a paper that was written by A. Paivio, entitled *Concreteness, Imagery, and Meaningfulness Values for 925 Nouns*, and it was published in the Journal of Experimental Psychology. Each word in the list was rated by the author as having high concreteness or low concreteness.

Please note that I am not interested in your individual results. Rather, I am only interested in the aggregate data of the larger group of participants involved in this particular experiment. No identifying information about you will be associated with any of the findings. Your participation in this project is greatly appreciated!

If you have questions or concerns regarding any portion of this study, please do not hesitate to inquire now or in the future. My contact information is found at the bottom of this letter. If you are interested in obtaining a summary of these findings at the conclusion of this project, I invite you to contact me and the results will be made available to you.

The results may be of interest or beneficial to you in your academic pursuits.

Thank you again for your valuable contribution to this study. I appreciate your time, effort and involvement.

Sincerely,

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