

Running head: THE EFFECT OF STIMULUS LENGTH AND TYPE

Stimuli Recognition: The Effect of Stimulus Length and Type

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## Stimuli Recognition: The Effect of Stimulus Length and Type

Previous research has looked at memory span of the short-term memory. It has been found that memory span of the short term memory is seven plus or minus two items (Miller, 1994). This does not mean that people can only remember five to nine letters in short term memory at a time because this would mean that people could only remember one long word. That is not the case because people chunk items. Chunking means that a person takes a single unit of something and codes it into larger units (Solso, Maclin, & Maclin, 2005). For example, a person can chunk letters into words and words into phrases. This is beneficial because it increases the capacity of short-term memory.

Previous research has also shown that people remember more short words than long words. This is because people can rehearse or recite short words more than they can the long words because it takes a longer amount of time to recite longer words (Page, 1998). Therefore, if people can rehearse shorter words more, they can remember shorter words better. This previous research leads into the current research. The current research looked at participants' ability to recognize short stimuli compared to long stimuli and the ability to recognize words compared to numbers. Therefore, it is hypothesized that participants would be able to recognize more 2-digit numbers than 4-digit numbers. It is also hypothesized that participants would have greater accuracy remembering short words as compared to long words. In addition, it is expected that participants would recognize more long words with more accuracy than long numbers.

### Method

#### *Participants*

Participants consisted of twenty-two college students from a small Midwestern liberal arts college. All of the participants volunteered to be a part of the study. Ages of

the participants ranged from nineteen to twenty-one. There were six males and sixteen females in this study. All twenty-two of the participants were Caucasian.

### *Equipment*

The equipment for this experiment consisted of a Gateway computer with a Pentium 4 processor that had Windows XP on it, and the model number for the computer was E4300. The monitor was an LCD monitor, which had a resolution of 1024 x 780 pixels. A computer program called, "Cognition Laboratory Experiments," which was written in Java was also used.

### *Stimuli*

The two independent variables were length and type of stimuli. The stimuli consisted of three letter, four letter, seven letter, and eight letter common nouns and two digit numbers and four digit numbers. There were four different conditions, which were short words, long words, two digit numbers, and four digit numbers. Each condition had five trials. The duration of each item on the computer screen was five seconds. The time for recognition was thirty seconds. The font size was twenty-four. The duration of fixation target before block was one second. The word relative x position and y position was .5.

### *Procedure*

All of the participants signed an informed consent form first. Then, they were ready to begin the computer program. All of the participants were used in all four conditions of the experiment. The twenty-two participants did the four conditions in different orders to prevent order effects. Participants had to get onto a computer and go into the "Cognition Laboratory Experiments" website. When the participants entered the

experiment on the computer, they looked at a black screen until they were ready to begin. When they were ready, they clicked the mouse, and then, they saw a white fixation point in the middle of the screen. Next, depending on the condition, they saw a three or four letter word, seven or eight letter word, two-digit number, or a four-digit number appear on the screen. The participants saw a series of ten stimuli. For example, if they were in the short word condition, they were presented with ten different three or four letter words, one at a time. Then, they were presented with a list of twenty words to choose from. Ten of the words were the words that had been presented on the screen, and the other ten words were distracters. They had thirty seconds to click on the words that they remembered seeing on the screen. When participants were finished with the five trials in the condition, they would move on to the next condition. They continued this process until they had completed all four conditions. After the participants were done with all four conditions, they were asked to fill out a demographics form. Then, they were given a debriefing form. The participants' short words accuracy, long words accuracy, two-digit numbers accuracy, and four-digit numbers accuracy were recorded.

## Results

Analysis began with a two-way repeated measures ANOVA. The two independent variables were length and stimulus type. There was a significant main effect of length on recognition such that participants recognized short stimuli with more accuracy than long stimuli,  $F(1,21) = 11.14, p < 0.01$ . Figure 1 shows the effect of stimulus length and type on recognition. There was also a significant main effect of type of stimuli on recognition such that words were recognized with more accuracy than digits,  $F(1,21) = 671.01, p < 0.01$ . These main effects were qualified by a significant

interaction between length and stimulus type,  $F(1,21) = 68.06, p < 0.01$ . This interaction showed that the effect of length depended on whether the stimulus was words or digits.

A t-test showed that when participants were presented with words, accuracy improved as length increased,  $t(21) = -4.39, p < 0.01$ . When participants were presented with digits, accuracy decreased as length increased,  $t(21) = 7.34, p < 0.01$ .

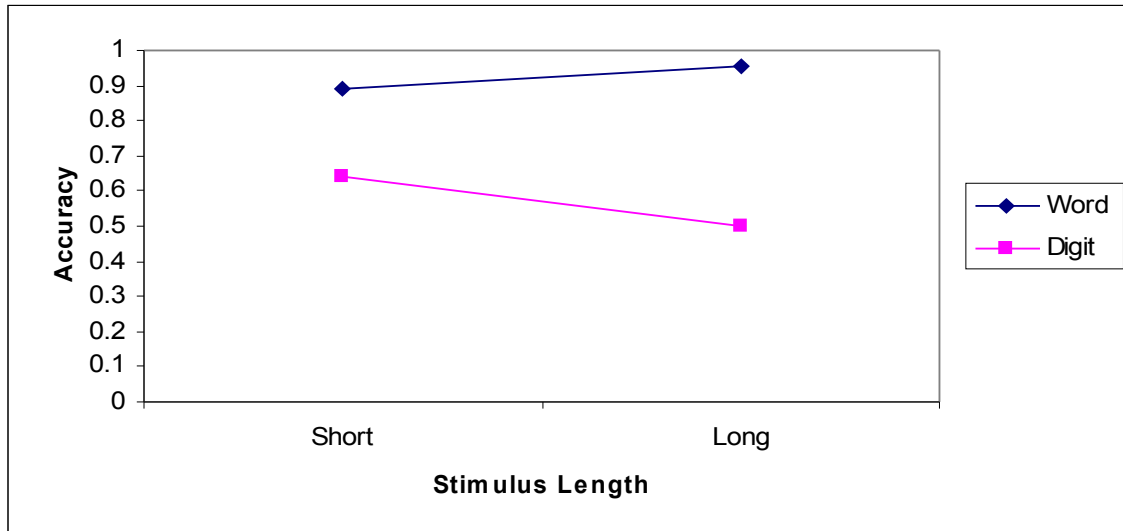


Figure 1. The effect of stimulus length and type on recognition.

### Conclusion

Two of the three hypotheses were supported. Participants were able to recognize more 2-digit numbers than 4-digit numbers. Therefore, participants had a greater percent accuracy in the 2-digit condition than in the 4-digit condition. Also, participants did recognize more long words than long numbers. Thus, participants had a higher percentage of accuracy in the long words condition than in the long numbers condition. For one of the hypotheses, the opposite results were found. Participants could remember more long words than short words. Therefore, participants had greater percentage accuracy in the long word condition than the short word condition. This is the opposite

result of previous studies. Other studies have shown that people remember shorter words better than longer words. Short words do not take as long to rehearse as long words do. Therefore, previous research has shown that people remember more short words than long words because they can rehearse the short words more than the long words (Page, 1998). Therefore, it is interesting that this study found the opposite results. These opposite results could have been found because of the words that were used during the study. For example, some participants reported making stories out of the words that were presented, and they were not able to make up stories about the numbers that were presented. Thus, maybe the longer words were easier to make stories with, and therefore, participants were able to recognize more of these long words. This is an interesting finding that needs to have more research done in the area. Future research could have participants come up with stories with short words and long words. Then, ask the participants if it was easier to come up with stories for the longer words or the shorter words and why they believe that. This could allow researchers to get more information on how participants develop stories to help them remember words.

References

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