***The Brown Peterson Paradigm***

# Introduction

# How much information can be held in short-term memory and for how long are questions that cognitive psychologists seek to answer by doing experiments. A challenge to understanding what can be stored in short-term memory is that humans can use their language knowledge and a process called rehearsal (i.e., saying things overtly out loud or covertly to oneself) to help them.

# Description of Activity

What happens when rehearsal is prevented by other cognitive operations like doing mathematics? The Brown Peterson Lab activity addresses this issue to reveal just how little can be held in short term memory without the help of rehearsal. The activity involves visual presentation of letters followed immediately by the solution of math problems. After the math problem participants indicate whether they remember the letters by typing them.

# Letter Trigrams

Following presentation of a small black fixation cross, three letters are presented briefly. Participants view these letters and try to remember them. The letters are combinations of three letters, mostly consonants, that do not spell a word. They are called trigrams and they do not spell words that one would know. Why might random triplets of mostly consonants be used rather than combinations of consonants and vowels that may spell real words or pseudowords (i.e., combinations that sound like words but do not have a real meaning)? The reason is that if actual words were presented, they would be easy to rehearse because they are part of your long-term memory. You cannot remember novel combinations of letters because by relying on your long-term memory. Instead, you must rely instead on maintaining them in your short-term memory.

# Math Problems

After the brief presentation of the letter trigram, participants are presented with one or more math problems. These are not simple math problems like “2+2”, which one would know the answer to right away because they have previously memorized the answer to problems like these and the answers would be instantly available in long-term memory. Rather, participants are given math problems that require multiple operations. For these problems one needs to remember PEMDAS (parentheses, exponents, multiplication, division, addition, subtraction), the order of operations for solving math problems with multiple steps. Participants are asked to indicate with a press of one or another key whether the math problem answer that is provided is correct or incorrect. To do this one must solve the math problem and compare it with the answer given. Why are more complicated rather than simple math problems used in this activity? It is because the solution of these multiple steps is what prevents you from rehearsing the previously presented letters.

# Do You Remember the Letters?

After the math problem(s), participants are asked to type in the three letters previously presented. It is not easy to remember the letters. Even though there were few, they likely have disappeared from memory during the cognitive processing that occupied the time taken to solve the math problem. The math prevented rehearsal, which is a powerful method that we usually rely on for helping to maintain information in short-term memory. Without the ability to rehearse, information may not stick around in your short-term memory for very long.