

Applying Cognitive Psychology Methods Activity 2: Working Memory

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Mental Rotation Task

For this experiment, I presented with an image that comprised three shapes. I was to look at the shape presented at the top, first, and then compare the two similar—but rotated—images with it. The goal was to mentally rotate the given shapes in my visuospatial sketch pad to align with the focus stimuli. The catch was that one of the images looked like the focus stimuli, but it has a malformation that did not align with the focus (no matter how I rotated the shape). The test recorded if I got the correct image from the two options, and then takes an average of the time for each image pairing session.

This research can be used to study the effects of mental rotation upon the visuospatial sketch pad that resides within working memory. In other words, depending on the complexity of the shapes, the time it takes to rotate the shape in your mind will vary. This is because the visuospatial sketch pad is limited in its capacity to hold and manipulate information.

(For the answer to the second part of question one, see the first and second paragraphs of the [comparison](#) section.)

N-Back Task

To complete the experiment, I kept track of letters. More specifically, I held both the letter from one letter ago, and the letter from two letters ago in my phonological loop by using rehearsal. With the latter held in your phonological loop—kept there with auditory rehearsal—you were to compare it with the present letter. Press **m** if it matched, and if it did not match, do nothing. From the onset of seeing a word, and then getting a new letter took a total of 3000 ms. The letter flashed for 500 ms, and then a black screen appeared for 2500 ms, which totaled to three seconds between letters. The difficulty stemmed from the constrictions placed on the phonological store. With only so much space, there was much to do simultaneously:

1. Keep track of the two letters.
2. Make the comparison between n and $n - 2$.

3. Discard the $n - 2$ letter.
4. Assign the previous $n - 1$ as the new $n - 2$.

Comparison

While both the mental rotation task and the N-Back task are used to study working memory, the former is more focused on the visuospatial sketch pad, while the latter is more focused on the phonological loop—specifically, the articulatory rehearsal process that resides within the phonological store. However, the difference between the two tasks can be attributed to the model of working memory. In that, the phonological loop and the visuospatial sketch pad are separated and managed by the central executive.

Furthermore, the visuospatial sketch pad was used for mental rotation. It involved holding an image in your mind and rotating it to fit the focus stimuli. The N-Back task, on the other hand, was used to hold and compare auditory information. Specifically, the process of rehearsal that occurs in the phonological store.

To answer the question of what test was better for my working memory, and I had to choose one, I would say that the N-Back task required more attentiveness than the mental rotation task.¹ For the mental rotation task, I did not have to hold the rotated image in my head for long—just long enough so I could find an imperfection. Thus, if manipulation of information in the mind is the qualifier for what makes a test better or worse, then the mental rotation task was worse.

Regarding the third question, I felt that I was better at the N-Back task. I suppose the reason for me being better is because I have more space allotted for my phonological store when compared to my visuospatial sketch pad. Because I did better at the N-Back test, I would posit that a person's working memory is not equal in all areas. In other words, the capacity of the visuospatial sketch pad and the phonological store are not equal.

¹ If I had another option other than the binary yes or no, I would that I cannot choose one because both tests work on various parts of the working memory. In essence, because each part of the working memory is confined by different physiological restrictions, there would not be an equal playing field to compare them.