Encoding Specificity:
The effects of Context and Instructional Set

By: Amanda Charnigo
Abstract

In this research project Ben, Megan, and I put a PowerPoint slideshow together for our participants. This slideshow that we put together as a group consisted of sentences of adjective and noun pairs. However, these words were Homonyms, meaning they looked and sounded similar but the meanings of the words were different. When meeting with the participants once everyone arrived we then divided the group in half and had one half stay present in the room and told the other half to remain outside the door in the hallway until further notice. With the first group, we presented the slideshow and immediately after, we had them recall all the nouns they could remember and recognize by circling them on the worksheet we had given them. As for the second group we did the same presentation however when we were finished with the PowerPoint we had them listen to a variety of music and told them to focus on the beat of each song by taping their fingers on the desk or just listening to the beat. After about five minutes of listening to music we then had them recall what they recognize from the slideshow on the worksheet. In this research we found that the same adjective, meaning the old-old pairs that were presented in both the PowerPoint and on the worksheets we handed out after the presentations had a better percentage for recall than new-old and new-new word pairs.
Encoding Specificity: The effects of Context and Instructional Set

This research project was designed to test the encoding specificity principle, which explains how well humans encode and retrieve information and how it affects one’s memory. Therefore in our experiment we wanted to see if changing the semantic context would affect one’s recognition memory. Tulving and Thomson (1973) explain encoding specificity as “operations performed on what is perceived determine what is stored, and what is stored determines what retrieval cues are effective in providing access to what is stored.” After, reading the article that was assigned to us titled “Effects of Changed Semantic Context on Recognition Memory” (Light, &Carter-Sobell, 1970), I became extremely interested in this project and wanted nothing less but to learn more on this topic and how we use it in everyday life. I had thought that our instructions for our project were presented in an explicit manner, therefore I was curious as to why people confused the words such as the homonyms that were presented to the participants when they were tested and told to recall as many as they could remember. Although, my curious questioning wasn’t able to be addressed or answered in this research I was still glad our results turned out the way we expected them to. In a previous study by Rowe (1973) he concluded that “the increase in recognition which accompanies increases in presentation frequency presumably reflects the increased probability of finding at least one relevant list marker as more become available.” It was also interesting to find that according to (Mirman, Strauss, Dixon & Magnuson, 2009) other studies have suggested that the representational distance between two noun meanings is smaller than the distance between a noun meaning and a verb meaning. My hypothesis was that the participants would have better percentage of
recognition memory when they’re tested on the information the same way it was presented to
them.

Method

Participants

As researchers, we handed out sign-up sheets to several classes asking if anyone would
be interested in wanting to participate in research study at Penn State York. Turnouts of 24
students which included three males and 21 females, all of whom volunteered to sign-up and
participate in our study; they also received extra credit from their professor for participating.
The students ranged anywhere from 19-21 years of age.

Materials

The first piece of material we constructed as a group was figuring out what pairs of words
we were going to use in our presentation and on the answer worksheet we provided. Therefore,
all three of us came up with at least 30 word pairs and wrote them on our own sheet of paper.
Then we choose what words we were going to use as a group based re-occurrence on each list we
made. After reviewing all the words we found 15 old-old pairs. In other words, it had the same
noun-same adjective as in the presentation, we also had 15 different adjective- same noun pairs
from the presentation and then we came up with another 15 word pairs however, these were
random word pairs that weren’t even in out presentation also called old-old words which
consisted of different adjective and different noun, we considered them be the distractions on the
answer sheets. Our second, piece of material was putting together our PowerPoint and then we
also chose to use Pandora (which is an internet based radio) as our distracter delay for group two.
Procedure

When students arrived they were told to choose a seat while one member of the researchers came around and took attendance. As an entire class we divided them into two groups, and had one group stay in the room while the other group waited in the hallway. Both, groups one and two of participants were presented with approximately five minutes of a slideshow presentation consisting of sentences in which our word pairs (old-old, new-old, and new-new) where included. The only differences between the two groups were that group one had an immediate recall test after the presentation. On the other hand, group two was presented the same way as group one but they were only group with a delay before taking the recall test. In this case, the delay lasted no longer then four to five minutes and took place before the recall test and after the presentation. When handing the answer sheet out to the participants they were instructed to circle which pairs of words they could recall from the presentation.

Results

The recognition data were analyzed using a repeated measures ANOVA with word pair type a within-participants factor and delay a between-participants factor. The main effect for word pair type was significant, $F(2, 26) = 65.34, p < .001, \eta^2 = .83$. Newman-Keuls multiple comparisons showed that old-old word pairs (64.2%) were recognized better than new-old word pairs (39.5%) and new-new word pairs (10.2%), all $ps < .001$. New-old word pairs were also recognized better than new-new word pairs. No other main effects or interactions were significant. These data are shown in Table 1.

Discussion
In our research, when testing Changed Context and Homonyms, we based it upon the principle of Encoding Specificity. The principle of Encoding Specificity is literally measuring how much information one can learn and retrieve. It is described more thoroughly in the study by Tulving and Thomson (1973) in their section titled; Encoding Specificity. Interestingly enough, ‘it has been known for a long time, of course, that how well a thing is remembered does not depend only on what it is, but also on how it is stored in memory (Tulving & Thompson, 1973). Based on our results, we can conclude that by using homonyms in sentences and changing the context of the word-pair; can have an effect on one’s memory when being tested. After reviewing the article by (Light, &Carter-Sobell, 1970), and researching several other articles, we observed that no matter what kind of testing is occurring, the result on this topic will more than likely be the same every time. For instance, Rowe (1973) designed two experiments in his research to measure frequency and recognition of homonyms. However, his experiments included repeated words, repeated phrases, same-meaning phrases, and different-meaning phrases. Therefore, even by doing a different experiment, one may think that there is a possibility for any kind of change in the results. However, not on this topic because according to several researchers. It has been concluded that the more repetition, the better the recall. Additionally, when presented with information; it’s best to test that information the same way (e.g. Lightight & Carter-Sobell, 1970; Mirman, Strauss, Dixon & Magnuson, 2009; Rowe, 1973; Tulving & Thompson, 1973). Also, actually having time to think it over; basic knowledge does conclude for everyone most of the time that however you learn information whether, you’re studying in a quiet place or in a room full of distractions you are more likely to recall and recognize information better in that same type of environment when tested on it. After learning from this experiment, it caused me to think about how the findings could be further investigated.
To expand on this research, I would create another experiment to answer the question: How could we “control” our brain so that we can adjust to different environmental settings when encoding and retrieving information? This experiment would work in terms of adjusting, not a lot, but to a state where we can’t help our surroundings. For example, if someone were to live with a roommate who is always loud and is always around; to what extent could we strengthen our focus and attention so that it doesn’t bother the subject and interfere with their study.
References


Table 1:

*Recognition Memory Performance*

![Recognition Memory Performance Chart]

<table>
<thead>
<tr>
<th>Type of Word Pair</th>
<th>Percent Correct Recognition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Old-Old Word Pair</td>
<td>64.2</td>
</tr>
<tr>
<td>New-Old Word Pair</td>
<td>39.5</td>
</tr>
<tr>
<td>New-New Word Pair</td>
<td>10.2</td>
</tr>
</tbody>
</table>
Figure 1:

*Examples of Words Pairs*

<table>
<thead>
<tr>
<th>red BOW</th>
<th>hunter’s BOW</th>
</tr>
</thead>
<tbody>
<tr>
<td>traffic JAM</td>
<td>strawberry JAM</td>
</tr>
<tr>
<td>wooden MATCH</td>
<td>cricket MATCH</td>
</tr>
<tr>
<td>vegetable OIL</td>
<td>crude OIL</td>
</tr>
</tbody>
</table>