A Comparative Study of the Effects of Text and Speech Media on Memory Retention

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Abstract. Objective To explore the text media, voice media affects the quantity of retention. Methods Select 30 undergraduate university students as the research object, using computer software rendering media and record data and statistical analysis. Results (1) The total memory retention of the text group was significantly higher than that of the speech group (t = 2.248, P < 0.05); (2) In the case of operation interference, the memory of the text group is larger than that of the speech group (t = 2.439, P < 0.05); (3) Under the interference of music, the memory retention of the text group is greater than that of the speech group (t = 2.249, P < 0.05). Conclusion The effect of speech media on memory retention is greater than that of text media.

Introduction

Today, with the rapid development of electronic information technology, the wide use of various social media has brought about a tremendous change in the way of communication between people. Different people, the choice of communication media is not the same, the effect of communication is also different.

Memory, from the point of view of information processing, refers to the human brain to the external input information encoding, storage, extraction process. According to the retention time of information, modern psychology divides memory into sensory memory, short-term memory and long-term memory. Study on processing level in the theory of Craik et al showed that in voice communication mode, short-term memory retention than text communication mode is maintained, and long term memory retention than text communication mode to keep the amount of [1].

In order to further study the different communication medium of communication in the process of memory retention has what kind of impact, this study will use the two main means of communication, communication media and voice and text communication media, comparing their memory for short term memory and long term memory in retention effect. According to Atkinson-Shiffrin’s research, retelling is an important means of information conversion in different memory [2]. Therefore, in this study, we will be in the process of experiment into digital computing based and release simple music interference on the voice encoding and repeat as semantic encoding to the memory, in order to reduce the repetition of short term memory and long term memory memory retention effect.
Research Design

Experimental Subjects
Select 30 undergraduate students from Jiangxi University of traditional Chinese medicine (18 girls, 12 boys), stratified randomly into text experiment group and voice experiment group.

Research Methods

Manipulation of Experimental Variables. The first set of independent variables into the text material forming and speech materials presents two levels, text by the computer program materials will be presented randomly by the computer program, speech materials are sound, sound Mandarin, voice frequency is 800Hz, 50db. Second groups of independent variables into music interference and interference of two kinds of operation level, operation disturbance is a simple digital operation, while music disturbance is a Bach Unaccompanied Cello Suite (Bach: Suites for Solo Cello).

Experimental Materials. The experimental group was divided into eight groups, each of which consisted of 4 Chinese characters with two characters. The experimental group was divided into eight groups, each group consisted of 4 pairs of Chinese words. Two groups of experiments were inserted into the basic numerical operations as interference materials, such as 8+1=, 3+4=?, 9-1=?.... After the presentation of the experimental materials, the subjects were asked to calculate the inserted mathematical problems, until the beginning of the recall. After the experiment is completed, the digital interference term is replaced by the music interference and the process is repeated.

Experimental Procedure. Using Java software to compile the whole experimental program. At the beginning of the short-term memory experiment, the computer screen will appear a white image, that is, the note. After watching a group of words will appear, 15 seconds after the show ends, insert the interference materials, the subjects were asked to conduct a simple digital operation, 1 minutes after the subjects were asked to play the previous phrase in the computer, and then enter the next set of phrases, a total of 8 sets of words. The long-term memory is the same as the short-term memory, but the duration is 3 minutes. In the experimental group, the appearance of the speaker will be replaced by the appearance of the speaker, and the other words will be the same as the experimental group.

After the experiment, the interference of the digital arithmetic is replaced by the interference of the music, and the subjects are asked to repeat the experiment for the music interference after half an hour. In the course of the experiment, the computer will automatically record and save the number of entries in the experiment for 8 groups of materials to remember correctly.

Process Control. The experimental group and the experimental group were divided into two groups, each group of advanced short-term memory experiment, and then rest for 10 minutes, then long-term memory experiment. After the interference of the text, 30 minutes of music interference experiment. No communication between the subjects in the experiment.

Data Processing. According to the different experimental material is divided into the experimental group and the experimental group text speech, according to the interference of the different music will be designated as interference and operation interference in class two, the final result; and the short term memory and long term memory data first analyzed separately, then compared each other. All the data were analyzed by SPSS20.
Results

The Difference of the Effect of Communication Media on Memory Retention

In this study, the text group and voice group in an experimental treatment (operation interference and music interference) short-term memory and long-term memory to maintain the amount of average, get the text group overall memory retention quantity and voice group overall memory retention. The results shown in Table 1: general memory text group to maintain an average of 22.96, the overall memory group to keep the amount of the average was 21.83; through the comparison, the overall memory retention of text group was significantly higher than that of voice group. That is to say, the influence of speech media on memory retention is greater than that of text media.

Table 1. Comparison on the Differences of Communication Media on Memory Retention (M±SD).

<table>
<thead>
<tr>
<th></th>
<th>Text group</th>
<th>Voice group</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total memory retention</td>
<td>22.96±5.251</td>
<td>21.83±6.121</td>
<td>2.248*</td>
</tr>
</tbody>
</table>

Note:*P<0.05,**P<0.01

Comparison of the Effect of Interference on Memory Retention

Table 2. Comparison of the Effects of Interference on Memory Retention (M±SD).

<table>
<thead>
<tr>
<th>Operational interference</th>
<th>group</th>
<th>memory retention</th>
<th>Short-term memory retention</th>
<th>Long-term memory retention</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Text group</td>
<td>23.38±4.872</td>
<td>24.27±4.217</td>
<td>20.33±3.922</td>
</tr>
<tr>
<td>t</td>
<td>2.439*</td>
<td>-2.130*</td>
<td>2.917**</td>
<td></td>
</tr>
</tbody>
</table>

Note:*P<0.05,**P<0.01

From table 2 can be seen in the operation of interference, the text group memory is greater than the voice group; but in the short term memory, the text group remains less than voice group (P<0.05); but in the long term memory, keep the text group was higher than that of voice group (P<0.01). Therefore, in the operation of interference, keep voice media affect the amount of memory than the text medium, interference calculation of text media under the short term memory is larger, and interference to voice media under the influence of long term memory is also large.

Comparison of the Differences between Music Interference and Memory Retention

Table 3. Comparison of the Effects of Interference Music (M±SD).

<table>
<thead>
<tr>
<th>Music interference</th>
<th>group</th>
<th>memory retention</th>
<th>Short-term memory retention</th>
<th>Long-term memory retention</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Text group</td>
<td>22.89±4.791</td>
<td>23.87±3.758</td>
<td>19.81±3.523</td>
</tr>
<tr>
<td></td>
<td>Voice group</td>
<td>21.32±5.724</td>
<td>24.53±2.722</td>
<td>16.07±3.693</td>
</tr>
<tr>
<td>t</td>
<td>2.492*</td>
<td>-0.556</td>
<td>3.643**</td>
<td></td>
</tr>
</tbody>
</table>

Note:*P<0.05,**P<0.01

Table 3 shows: in music interference group, the text memory is greater than the voice group; but in the short term memory, the text group maintain the difference and voice group is not significant; but in the long term memory, to keep the amount of text group was significantly higher than that of voice group. That is to say, under the interference of the music, the influence of the speech medium on the memory retention is much larger than that of the text media.
Comparative Study on the Memory Retention of Text Media under Different Disturbances

What are the effects of different interferences on text media? Table 4 shows that the effect of operational interference on the memory retention of text media is greater than that of music interference, which is the same as that of short-term memory and long-term memory retention. This shows that music interference has a greater impact on the memory (short-term memory and long-term memory) under the text media.

Table 4. Comparison of Memory Retention of Text Media under Different Disturbances (M + SD).

<table>
<thead>
<tr>
<th></th>
<th>Short-term memory retention</th>
<th>Long-term memory retention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operational interference</td>
<td>23.38±4.872</td>
<td>24.27±4.217</td>
</tr>
<tr>
<td>Music interference</td>
<td>22.89±4.791</td>
<td>23.87±3.758</td>
</tr>
<tr>
<td>t</td>
<td>2.051*</td>
<td>1.988*</td>
</tr>
</tbody>
</table>

Note:*P<0.05,**P<0.01

Comparison of Memory Retention of Speech Media under Different Disturbance

Table 5 shows the effect of interference on Voice Media: operation interference on Voice Media retention is greater than the music interference in short-term memory retention is the same, but there was no difference in long-term memory retention. This shows that music interference has a greater impact on the memory (short-term memory and long-term memory) under the media.

Table 5. Comparison of memory retention of speech media under different disturbances (M + SD).

<table>
<thead>
<tr>
<th></th>
<th>Short-term memory retention</th>
<th>Long-term memory retention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operational interference</td>
<td>22.38±4.872</td>
<td>16.09±4.209</td>
</tr>
<tr>
<td>Music interference</td>
<td>21.32±5.724</td>
<td>16.07±3.693</td>
</tr>
<tr>
<td>t</td>
<td>2.251*</td>
<td>-0.186</td>
</tr>
</tbody>
</table>

Note:*P<0.05,**P<0.01

Discuss

The results of this study show that the effect of speech media on memory retention is greater than that of text media, both in the presence of interference and interference. This can be explained from the memory system. Memory, as a complex cognitive system, has a certain structure. As a working memory, short term memory is mainly based on the selective processing of information in sensory memory, and then, on this basis, the rehearsal strategy, the information into long-term memory. That is to say, long term memory is the result of short-term memory to be repeated [3]. Therefore, in the case of interference, the impact of the media on the memory retention is greater than that of the text media. While short-term memory in processing, encoding tends to sound, and long term memory encoding is based on semantic [4], this could explain why in the music interference, text and voice media media in the short term memory remained no significant difference in quantity, better compared to the operation of interference, interference of music had a greater impact on the short-term memory retention.

But it is worth noting that the relationship between comparison operation and music two kinds of interference of the material we found in the text as the materials of media, digital operation semantic class interference interference for memory retention is more obvious, and the speech is the materials of media, music and voice interference to keep the amount of memory is more obvious. This contradictory conclusion reveals different interference materials for different materials and different
interference patterns of memory. We think this may be because of the same cognitive resources occupied, speech as the interference for the speech materials for the media jamming effect is more obvious, the short-term memory disturbance to voice as the main memory encoding mode is more obvious. The same, this kind of digital computing semantic interference for text semantic materials memorizing medium of the interference is more significant, also has a greater impact on the long term memory of the semantic type of the main memory encoding mode [5]. So when to this kind of digital computing semantic information for interference materials, effects of long term memory is more obvious, and the difference between short-term memory and speech by interference is small, especially when taking text as materials of media, the difference is especially obvious interference. Likewise, when the music voice interference interference materials, short-term memory is affected, especially as the media materials in speech, and for the long term memory, two kinds of interference effects are almost no big difference.

**Conclusion**

To sum up, on the whole, the text and voice communication media have different effects on the amount of memory. Therefore, in some important communication process, we should pay more attention to the use of text media, or in the use of voice media, with text data, in order to achieve better communication.

**Acknowledgement**

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**References**


