“Memeory:” The Effects of Meme Usage on Understanding Neuroscience Content

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Introduction

For almost a decade, neuroscience has become a popular subfield of psychology within the United States (see Stoloff et al., 2010). The study of neuroscience requires students to incorporate interdisciplinary principles from both the social and natural sciences. Many students may struggle with more dynamic physiological concepts of the nervous system (e.g., cellular communication), but even novel vocabulary within neuroscience may also be problematic for those with weaker science backgrounds (Varma et al., 2008). As a result, such text may appear as “dry” and “meaningless” to the unfamiliar reader, and the task of trying to find meaning may even produce anxiety in students without a strong background in the natural sciences. Chundler and Konrady (2006) suggested that meaningfully engaging visual aids can help the comprehension of neuroscience in comparison to illustrations seen in standard educational content (e.g., textbooks, text-related online resources). It has been argued that more symbolic mnemonic imagery (i.e., illustrations that link an image some educational context) may increase attention to unfamiliar content and make it more engaging and comprehensible for subsequent memory retention (Carney & Levin, 2002). Numerous studies in our lab have explored this phenomenon by using illustrations and magazine spreads as alternatives to text-based content, and we found that illustrated materials enhanced short- and long-term retention for testing content that was linked to the illustrations (Smith et al., 2019). In order to explore stimuli that may be more relevant to younger generations, the current study attempts to investigate the use of memes in promoting better comprehension of neuroscience content. Memes found in social media are becoming popular in the communication of others, and its appeal has begun to be incorporated in the classroom for heightened student engagement and critical thinking (Wells, 2018). The purpose this experiment is to investigate how popular ancillary material (memes) can aid in the memory of targeted neuroscience topics with the intent of finding a more engaging pedagogical use in the natural sciences.

References

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Hypotheses

1. Participants who receive variations of relevant ancillary content will perform better in both short- and long-term memory tests of the content
2. Participants with variations of ancillary content will show greater memory benefits when test materials are directly linked to the content.
3. Participants who receive relevant ancillary content will rate the content more engaging when compared to those with irrelevant ancillary content.

Method

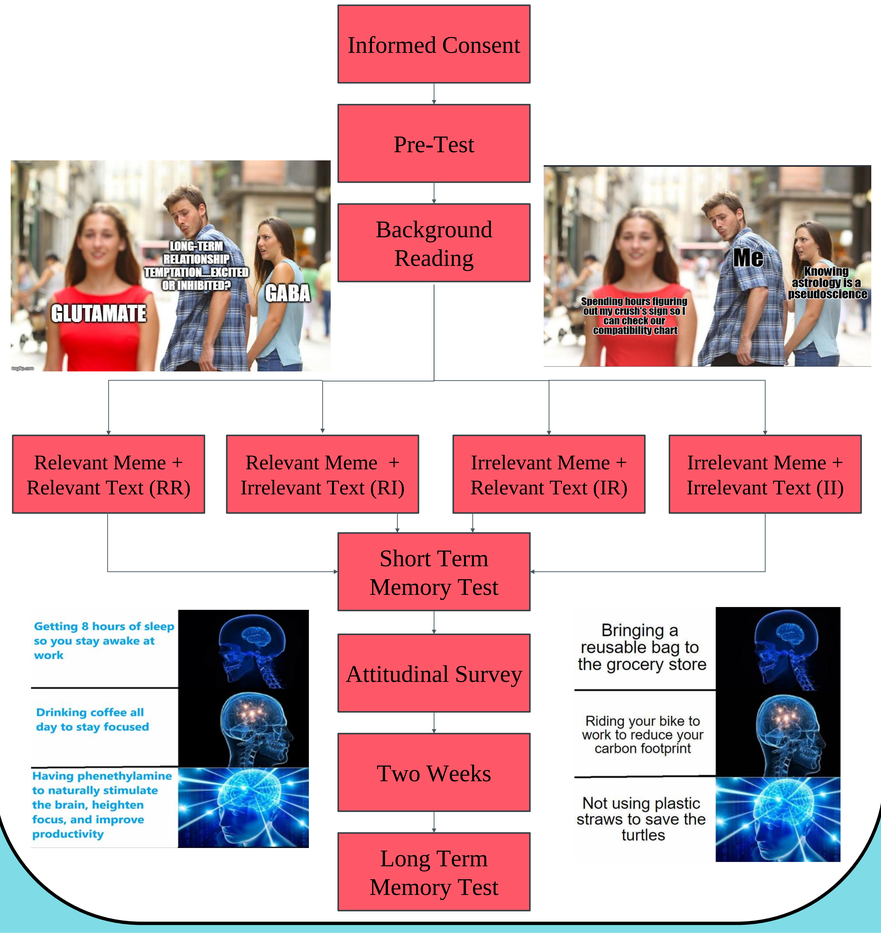
Participants:

n = 84 , Female = 68, Male = 15, Other= 1

ages (*M* = 19.28, *SD* = 2.23)

Design and Procedure:

- 2 x 2 x 3 x 3 Mixed Factors Design:
  - **Between Subjects Factors:**
    - Ancillary Meme Type
    - Ancillary Caption Type
  - **Within-Subject Factors:**
    - Testing Interval (pre-tests, short-term post-test, long-term post-test)
    - Question Type (direct, indirect, non-applicable)
  - **Dependent Measure:** Recognition Scores (short- and long-term)



Results

Figure 1. Percent Recognition by Question Type

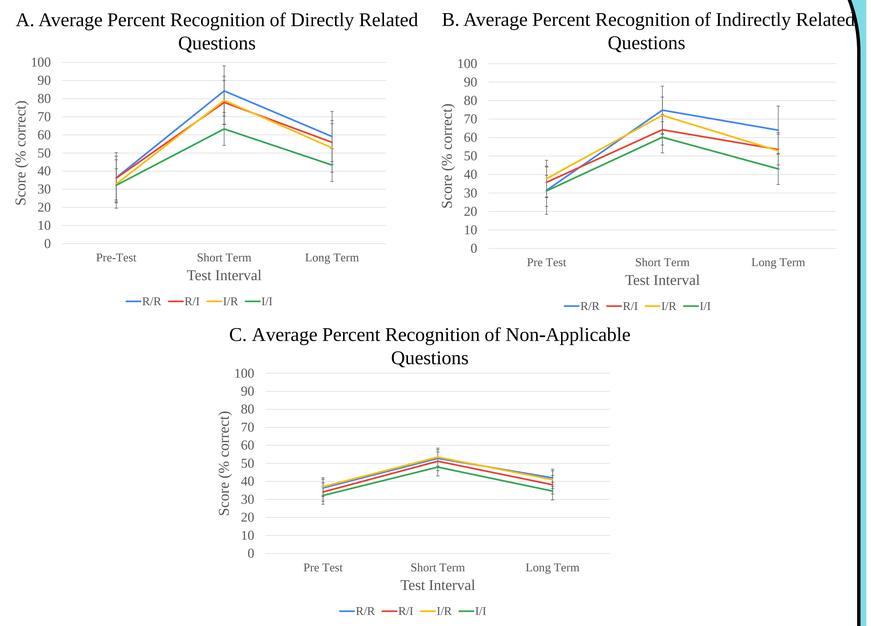


Figure 1. Recognition scores in the pre-test, short-term test, and long-term test across all four conditions. Across all question types, participants scored significantly higher on the short-term test than the pre-test and long-term tests (p=.00). For the directly-related questions (Graph A), those who received a relevant meme had significantly higher recall than those who received an irrelevant meme across all tests (p=.00).

Figure 2. Attitudinal Ratings Toward Ancillary Material

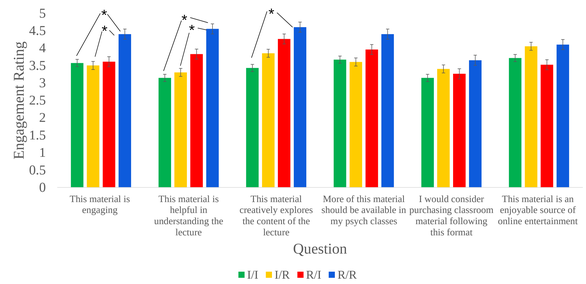


Figure 2. Attitudinal scores across all four conditions. In terms of engagement, helpfulness, and creativity, participants with both forms of relevant content rated their respective materials the highest (p=.00).

Conclusion

The current study showed that short- and long-term testing had higher recognition scores with a relevant caption versus participants that had an irrelevant caption (p<.02). Moreover, there was a significant difference in the recognition scores in participants who received the relevant meme versus participants who received the irrelevant meme in the direct question category (p=0.003). This is indicative of a connection between the relevant ancillary material (memes, captions) and the ability of individuals to recall the information presented in the lecture series. Participants who were in the R/R condition had significantly higher engagement scores in the first three questions when compared to participants in the I/I condition. Furthermore, the R/R condition was also higher than the I/R condition in the first two questions, which might indicate that the meme is more critical to the engaged learning process than the caption. This supports previous findings from Chundler and Konrady (2006) in that visual aids have a potential for pedagogical use in the natural sciences (Wells, 2018).