The Apocalypse of Dementia: Metaphor Effectiveness in Neuroscience Pedagogy

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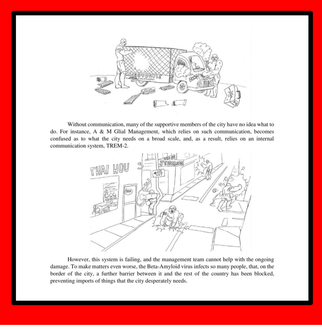
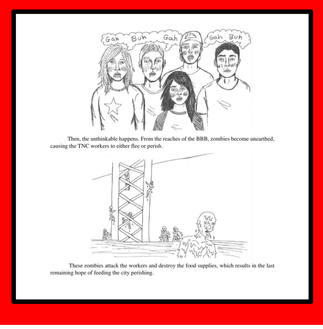
Introduction

The use of graphic novelization is a great tool to aid classroom learning (e.g., Niebert, Marsch, & Treagust, 2012). There has been evidence to suggest that more biologically-oriented content may be difficult to grasp due to its complicated vocabulary, so the use of graphic novelization has been implemented as a pedagogical tool to assist students who have weaker backgrounds in the natural sciences (e.g., Aleixo, & Sumner, 2017; Hosler & Boomer, 2011). Numerous studies in our lab have elucidated this phenomenon by showing that graphic novelization augments understanding of various principles in neuroscience (see Smith, Ferrara, Kaffee, & Reynolds, 2016; Smith, Goodmon, Ferrara, & Reynolds, 2016). While previous work has shown that graphic novelization enhances such content, it is uncertain as to whether metaphors must be visually-based, as opposed to being word-based. In addition to exploring the effectiveness of metaphor types, this study looked at whether feedback from a short-term test influenced long-term retention. Furthermore, participants were assessed on their retention of materials that were either presented in just background information, or materials that were supplemented with ancillary content. The current study incorporated the use of metaphors (in the form of a zombie apocalypse) to convey the progression of neurodegenerative diseases.

Hypotheses

1. Participants will find the pictorially-based metaphors (i.e., graphic novelization) to be the most engaging and effective form of ancillary content (when compared to just text-based information).
2. Participants who receive the correct answers after the short-term memory test will perform better than those who do not receive the correct answers at long-term retention interval.
3. Participants will perform better on content that was supplemented in the ancillary materials, in comparison to information just presented in the background reading.





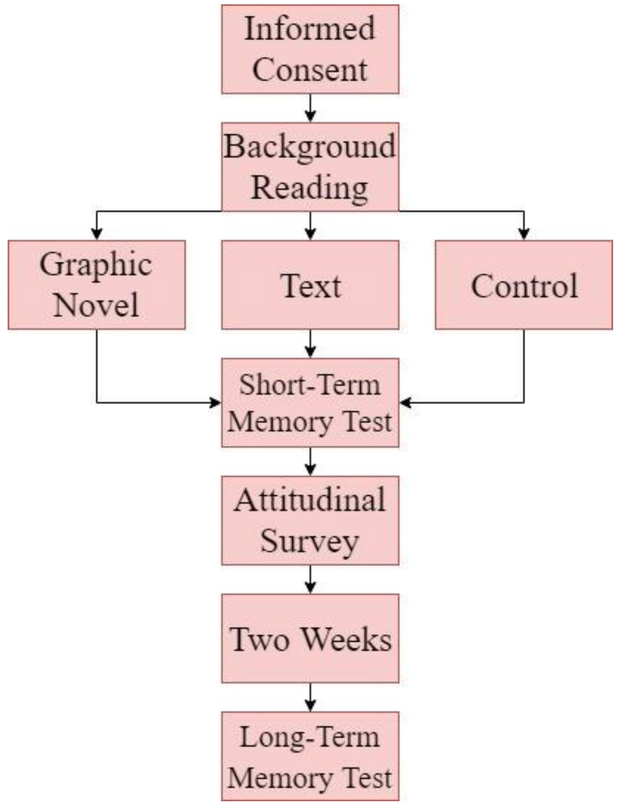
Methods

Participants:

n = 135**,** Female = 110, Male = 25
ages (*M* = 19.68, *SD* = 2.12)

Design and Procedure:

- 3 x 2 x 2 x 2 Mixed-Subjects Factorial Design:
  - Between Subjects Factors:
    - Ancillary Material Type (graphic novel, text-based metaphor, control)
    - Feedback of Correct Answers (correct answers, no answers)
  - Within-Subject Factors:
    - Testing Interval (short-term, long-term)
    - Question Location (supplemented in narrative, not supplemented)
  - Dependent Measure: Recognition Scores (short- and long-term)



Results

Figure 1. Average percent recognition scores as a function of ancillary material type

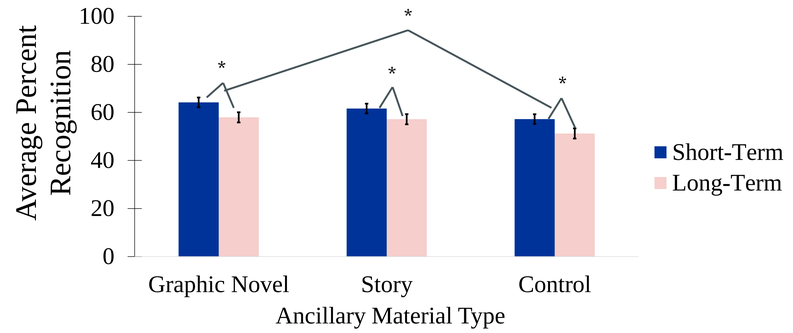


Figure 2. Average percent recognition scores as a function of feedback of correct answers

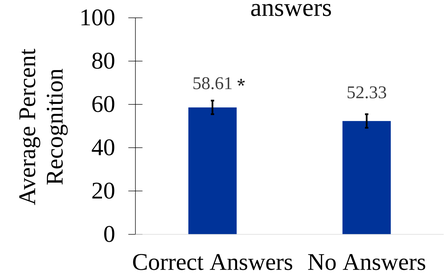
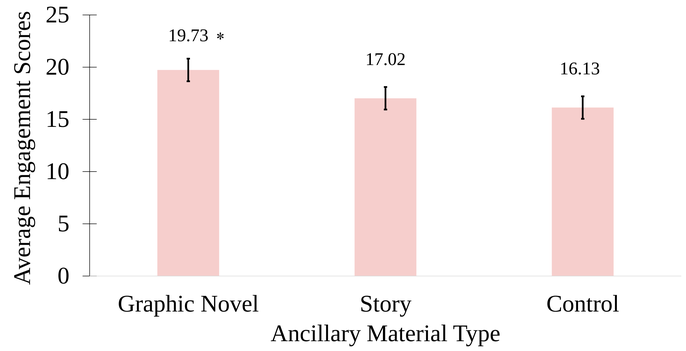


Figure 3. Average engagement scores as a function of ancillary material type



Conclusion

The current study demonstrated that both forms of thematic ancillary material (graphic novel, story) elicited higher recognition scores when compared to control materials. However, the relative effectiveness between the materials was slightly different. Those who received the graphic novel showed a significantly higher memory benefit over the control (p = .02), but the same was not found for those who received the story content (p = .07). Collapsed across conditions, the inclusion of feedback on correct answers led to higher memory recognition for long-term testing when compared to those who did not receive feedback. Furthermore, the graphic novel was rated as being the most engaging form of ancillary material when compared to the other two conditions. Taken together, graphic novelization seems to be a promising method of disseminating information about neurodegenerative disorders.

References

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