

Exploring Learning Math Through Parody Song: Facts and Application-Based Word Problems

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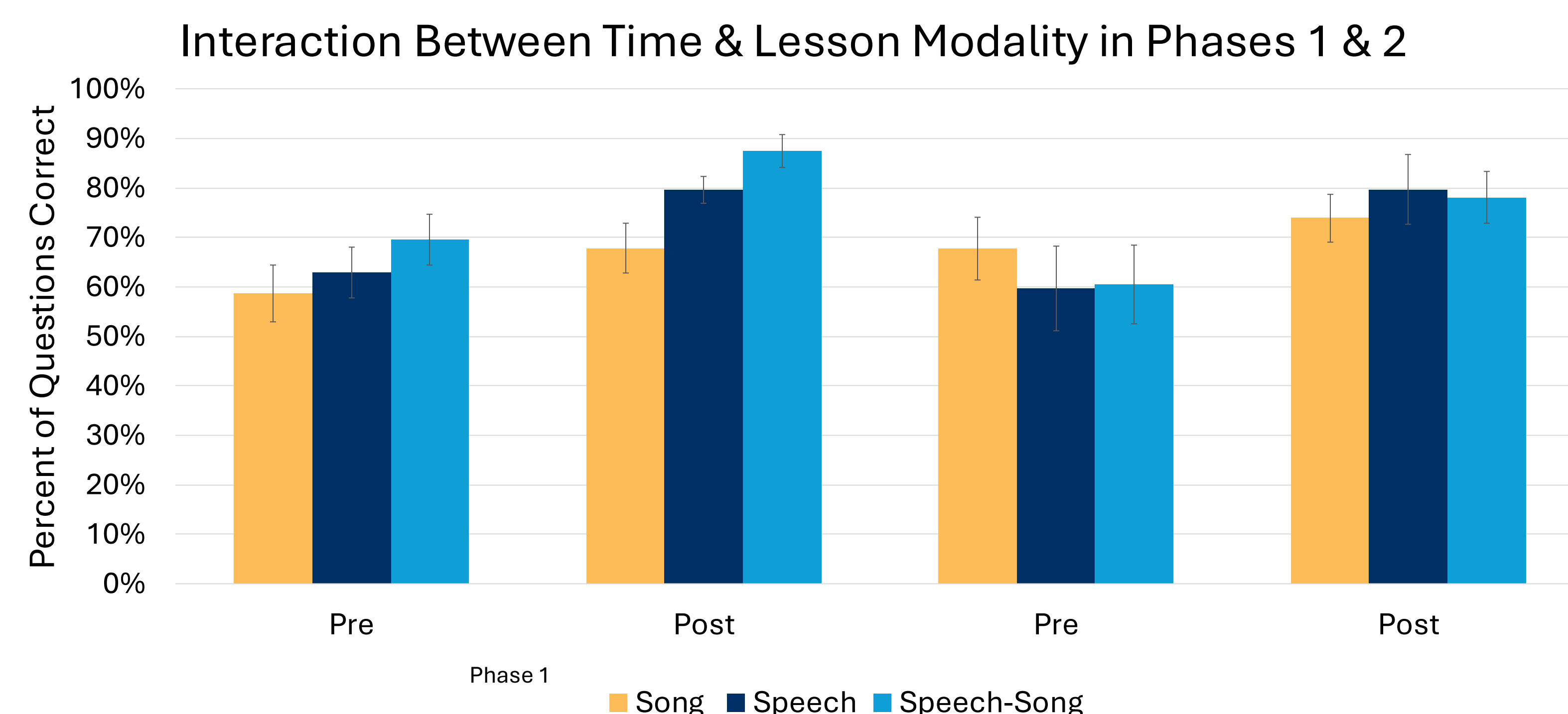
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Background

- Song can improve short and long-term recall comprehension^{7,10}
- Participants in music-inclusive lesson conditions show improvement in test accuracy^{6, 8,11}.
- Music intervention can have a positive effect on motivation⁴.
- Math anxiety can be “moderated” through math motivation³.

Previous Findings from Phase 1 and 2:

- In both phases, participants were able to learn through song (sig. pre-post accuracy)⁵
- Both phases had **no significant lesson modality interactions**. Song had a similar level of improvement as other conditions⁵.
- The **sung lesson was harder to comprehend** than the spoken lesson².



Research Questions for Phase 3:

1. Are there differences in sung conditions (song, speech-song, with lyrics) effectiveness?
2. Does sung instruction result in enhanced comprehension and verbatim long-term memory?
3. Does melody familiarity influence effectiveness?
4. Will lessons with text (lyric videos) yield more accurate long-term recall?

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Methods

Design

- Repeated Measures Between-Subjects Design
 - Three-way ANOVA: **Lesson Modality** (5 Levels) x **Time** (3 Levels) x **Knowledge Type** (2 Levels)
- In-person laboratory setting using Qualtrics.

Participants

- Goal N: 70 undergraduate psychology students ($f=0.35$, $p=.05$, power=0.8)

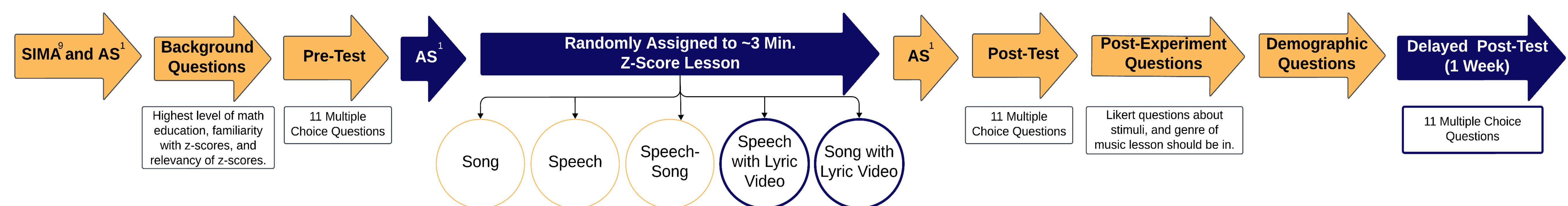
Stimuli

- **Parody of “As It Was” by Harry Styles.**
- The spoken lesson was the shortest (3’06”).

Materials

- 11 multiple choice (5 knowledge, 5 application, 1 check question)
 - **Fact-based:** Verbatim facts and formulas. “Z-score is a _____(standard score)”.
 - **Application-based:** Applying learned facts. “If a weight average of 170 lbs with a standard deviation of 9, what is the z-score for a cow weighing 163 lbs?”
- Affective Slider (AS) measured pleasure and arousal¹.
- Single-Item Math Anxiety scale (SIMA) measured level of math anxiety⁹.

Proposed Research Design for Phase 3



Expected Findings

- Participants in the song condition will have better long-term recall.
- There will be a significant interaction between pre-test delay-test accuracy and lesson modality.
- There will be an effect of melody familiarity in the delay post-test for sung conditions.
- Song with lyric video lesson will have the highest effectiveness.

Implications

- The use of song as an **educational tool extends beyond just being a mnemonic device.**
- Sung instruction can help aid adult student engagement without the need for active participation (e.g., writing songs, singing songs).

Research Design Considerations for Phase 3

1. Adding AS measure after the pre-test to assess arousal/pleasure changes after completing a math test/listening to music.
2. Changing the lesson topic to increase relevance for most participants (psychology students completing for credits).
3. Making stimuli a parody song to explore the effect of melody familiarity without the need for stimuli repetition.
4. Using lyric *video* to ensure participants are still under time constraints, removing the effect of self-regulation.
5. Adding a delayed post-test to observe the potential impact of the lesson condition on long-term recall.

Acknowledgments

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