

12-9-2022

## The Stability of the Speech-to-Song Illusion

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### Recommended Citation

Hsu, Jennifer; Booth, Brooke; Karns, Jordyn; and Constantine, Rodica R., "The Stability of the Speech-to-Song Illusion" (2022). *Undergraduate Research Symposium Posters*. 150.

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## Introduction

- The Speech-to-Song (STS) illusion: when a listener is presented with multiple repetitions of a spoken phrase and begins to hear it as increasingly song-like<sup>[1]</sup>.
- In the present study, we aim to verify anecdotal evidence that suggests the STS illusion is temporally stable and replicate existing evidence that excerpts transform to song by the third or fourth repetition<sup>[2]</sup> and perhaps faster upon future encounters.

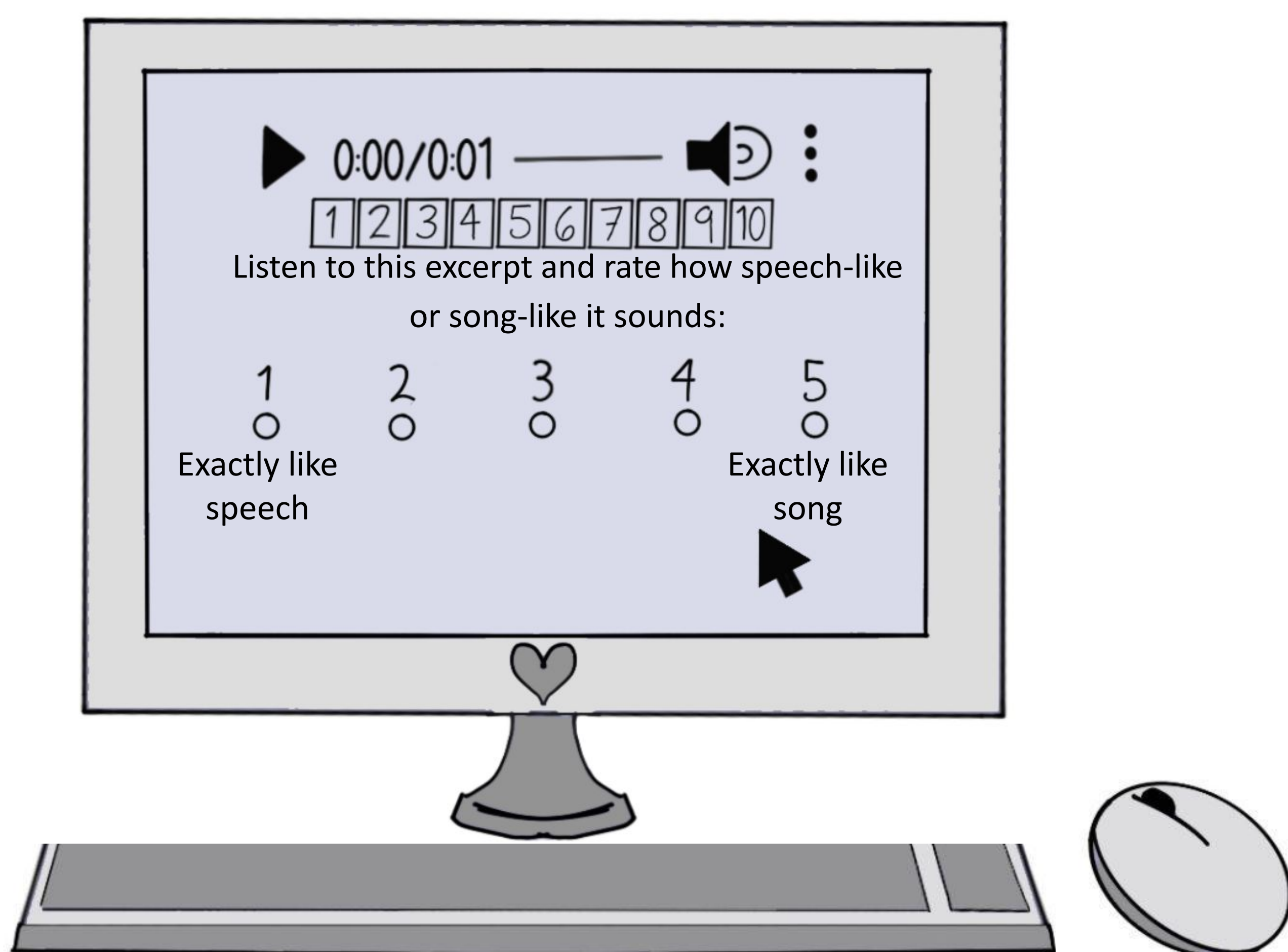
## Research Question

- Once a speech excerpt transforms to song, does it remain heard as song-like over delays of up to 56 days?
- Is the STS illusion elicited more quickly for excerpts previously heard as song-like?

## Methods

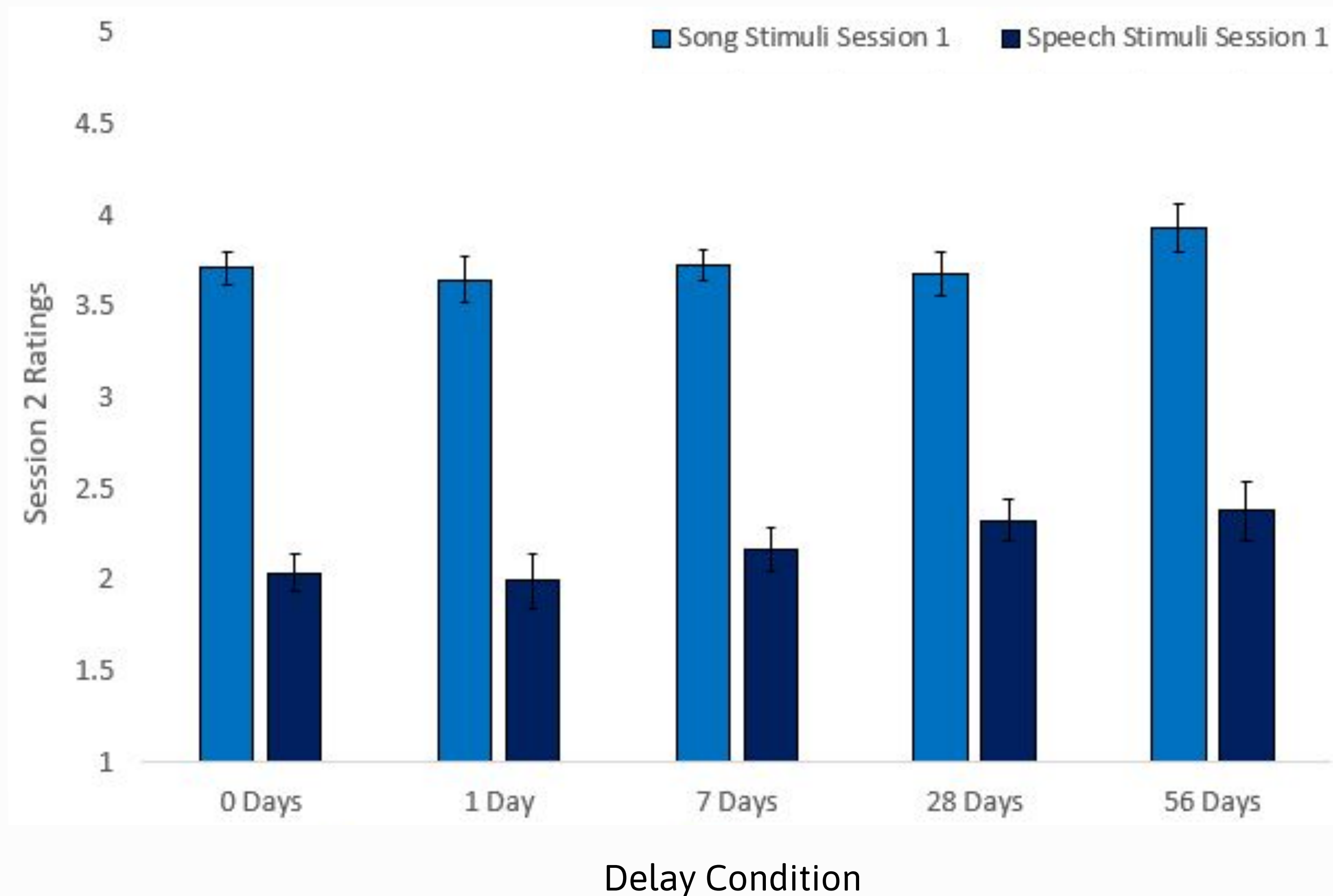
- Participants: 158 individuals, ages 18-65
- Stimuli: 24 natural speech excerpts, 3s each<sup>[3]</sup>.
- Delay Conditions: 0 (same day), 1, 7, 28, and 56 days
- Task: "Listen to this excerpt and rate how speech-like or song-like it is on a scale of 1 to 5."  
(1 = Exactly like speech, 5 = Exactly like song)
- Dependent measures: Average Rating and Transformation Position (How many repetitions until the excerpt sounds like song?)

## Artistic Representation of the Rating Task Paradigm



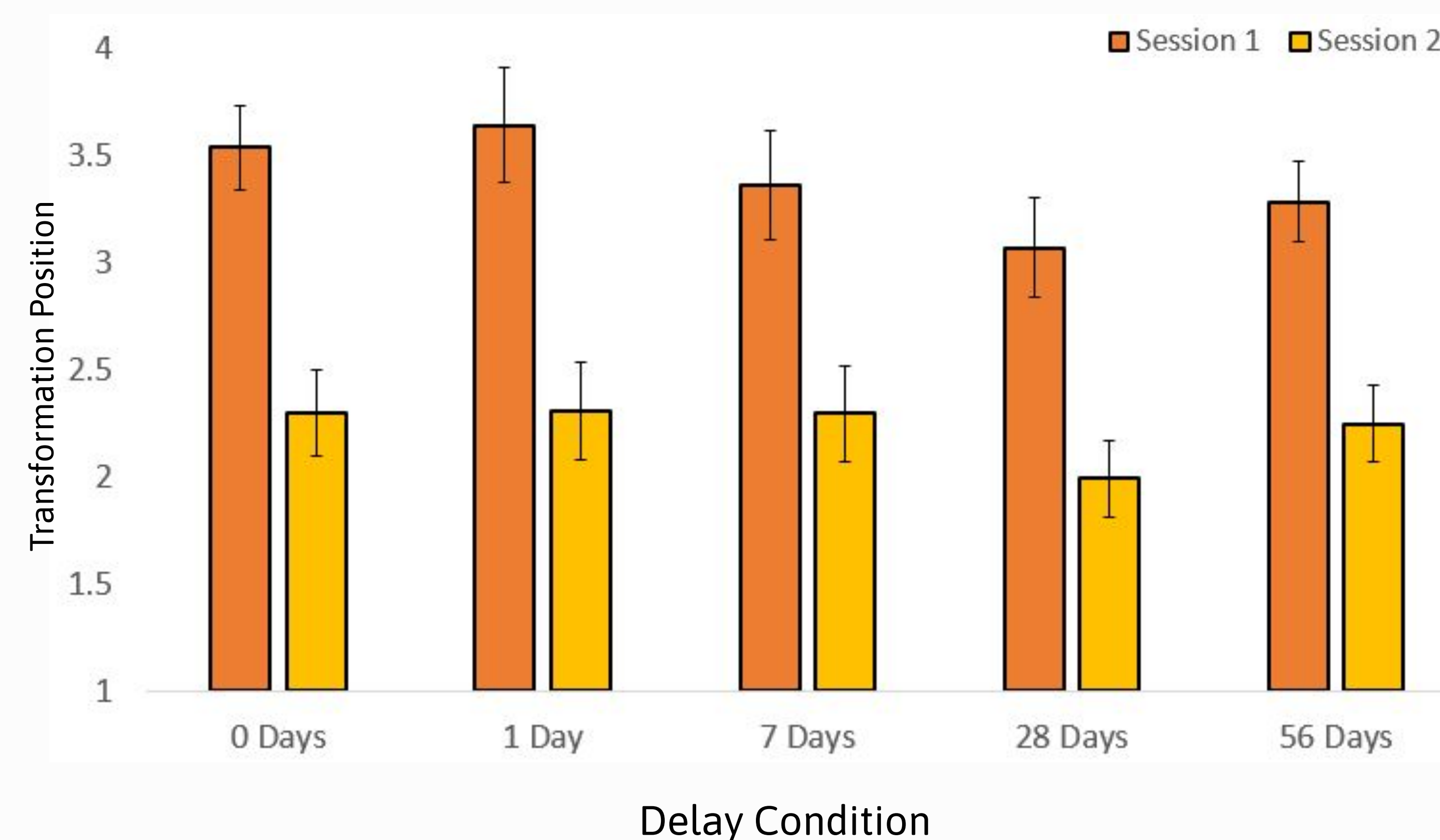
## Results

### Session 2 Ratings of Excerpts Initially Heard as Speech or Song



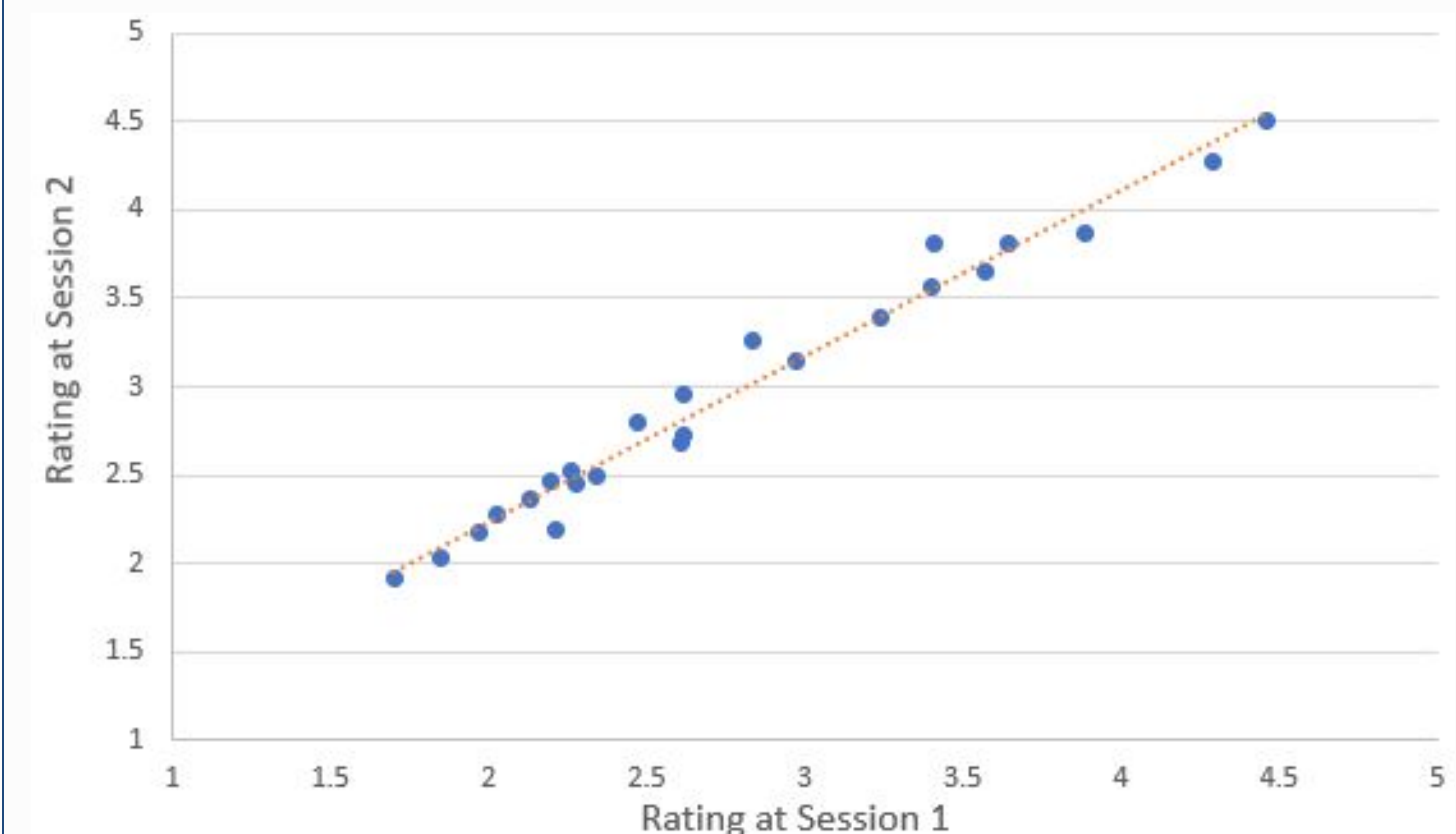
At session 2, excerpts initially heard as song continued to have higher ratings than stimuli initially heard as speech ( $F(1, 150) = 652.16, p < .001$ ).

### Excerpts Transformed Faster at Session 2 Compared to Session 1



Results showed the STS illusion occurs more readily upon second exposure to previously transformed excerpts ( $F(1, 153) = 32.86, p < .001$ ).  
Transformation Position  $M$ : Session 1 = 3.38, Session 2 = 2.23

### Average Ratings of Individual Stimuli Across Sessions



$r = 0.99, p < .001$

## Conclusions

- We validated anecdotal evidence that the STS illusion is stable for delays up to 56 days.
- Excerpts are rated consistently across sessions.
- Our results replicate prior evidence showing the STS illusion occurs after 3 to 4 repetitions<sup>[2]</sup> and further show earlier transformation of excerpts previously rated as "song-like" at a later presentation.

## Future Directions

- Future research can investigate if children and adults experience the STS illusion while taking individual differences of musical aptitude and prosodic speech processing into account.

## References

- <sup>[1]</sup> Deutsch, D., Henthorn, T., & Lapidis, R. (2011). The illusory transformation of speech to song. *Journal of the Acoustical Society of America*, 129(4), 2245–2252.
- <sup>[2]</sup> Falk, S., Rathcke, T., & Dalla Bella, S. (2014). When speech sounds like music. *Journal of Experimental Psychology: Human Perception and Performance*, 40(4), 1491.
- <sup>[3]</sup> Tierney, A., Dick, F., Deutsch, D., & Sereno, M. (2013). Speech versus song: multiple pitch-sensitive areas revealed by a naturally occurring musical illusion. *Cerebral Cortex*, 23(2), 249-254.