

Can Music Impact Working Memory Performance?



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Introduction

- A study done by Salamé and Baddeley(1989) examined how background music affected short- term memory. They concluded vocal music was more disruptive than instrumental music, although both disrupted short-term memory performance. But how will different types of non-lyric music affect working memory performance? The goal of this research project is to investigate if different types of music have effects and what effects they have on participants' digital span performance.

Methods

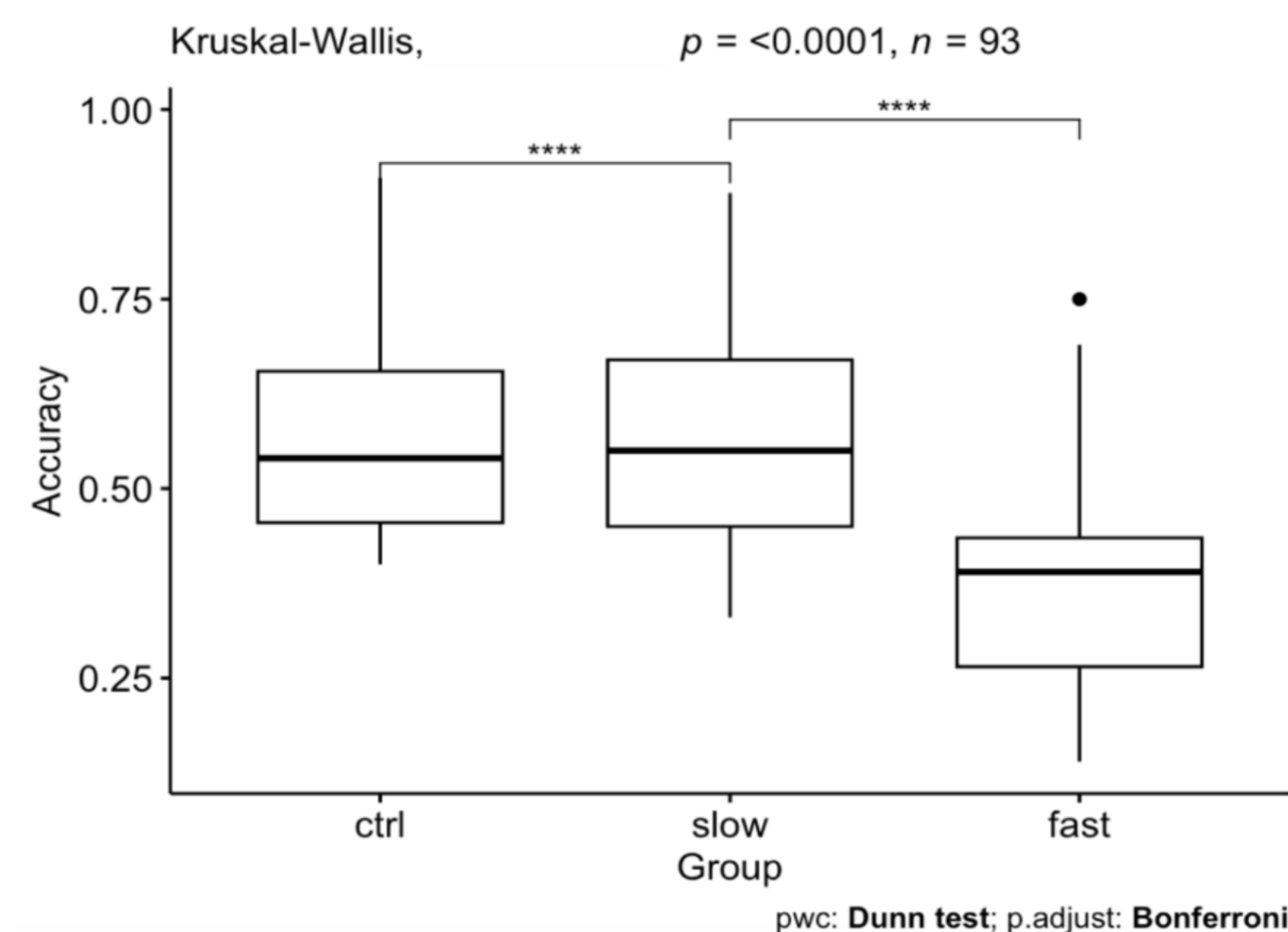
- 31 college students aged 19-26
- Performance of digital span tests
- Each trial with 3 sequences
- 3 Trials counterbalanced - no music, slow music, and fast music (without lyrics).
- 9 sequences of 15 digits

- H0: The introduction of music will have no effect on the capacity of working memory.
- H1: Faster-paced music will have a negative effect on working memory, whereas slower-paced music will either have no effect or a trending negative effect on working memory.

Result

Ran Kruskal-Wallis test and Dunn's test for data analysis

- ❖ Box-plot: More people have high accuracy in control and slow (right-skewed); more people have low accuracy in fast music (left-skewed)
- ❖ Kruskal Wallis test: p value = 0.00000148, indicates that at least one sample stochastically dominates one other sample.
- ❖ Effect-size test: $\eta^2 = 0.276$, large effect size (>0.14), indicates that the magnitude of differences between groups with different music types are large.
- ❖ Dunn's test: Fast group and control group has significant difference ($p= 0.00000267$); fast group and slow group has significant difference ($p=0.0000216$).



Conclusion and Discussion

The null hypothesis can be rejected as fast music negatively affects working memory performance, while slow music did not show a significant impact. We also noticed a slightly higher median of the slow music group than the control group, which may indicate that slow music, including classical music, can potentially increase working memory performance. However, since the variance is extremely small and the Dunn's test showed that there is no significance in the pair of the slow music group and control group, we cannot make this conclusion.

Limitations of this experiment include fatigue, limited size and sample normality.

As for future directions, we encourage researchers to investigate whether slow music, including classical music, can help increase cognitive functions, including working memory. It could help many people with mental incapacities.

References

- Salamé, P., & Baddeley, A. (1989). Effects of Background Music on Phonological Short-Term Memory. *The Quarterly Journal of Experimental Psychology Section A*, 41(1), 107–122.
<https://journals.sagepub.com/doi/10.1080/14640748908402355>