

The Bar in my Barber’s Bar Mitzvah¹: Examining Differences in Morphological Processing Between Typical and Dyslexic Readers

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Introduction

Morphology is the study of morphemes, the smallest units of meaning within language (e.g., *right-ful-ly*)

- First morpheme, “right” lays out the base meaning of correctness
- Second morpheme “ful” adds meaning- full of correctness
- Last morpheme, “ly” modifies the word to be an adverb

Readers use **morphological processing** to decode words and access meaning through morphemes (*re-play-ed*)

Dyslexia is a life-long reading impairment associated with difficulties in phonological (sound) and morphological (meaning) processing, both in **brain** and **behavior**^{2,3}

However, readers with dyslexia who read at a typical level (“compensated dyslexics”) show significant improvements in morphological awareness⁴

Research Question:
How does morphological processing in the brain differ between typical readers and readers with dyslexia?

Method

Control:
Exact Word

15 pilot participants
 M_{age} = 22 years, range: 14 - 49
11 adolescents, 4 adults
10 males, 5 females
All typical readers

Root

Morphological **Word Matching Task**

“Does the word on the left or the right share a meaningful part with the top word?”

- 3 conditions (pictured on right)
- 18 word triplets per condition

Affix

JELLY

?

ROBOTJELLY

SEAFOOD

?

SEAWEEDEASON

UNLUCKY

?

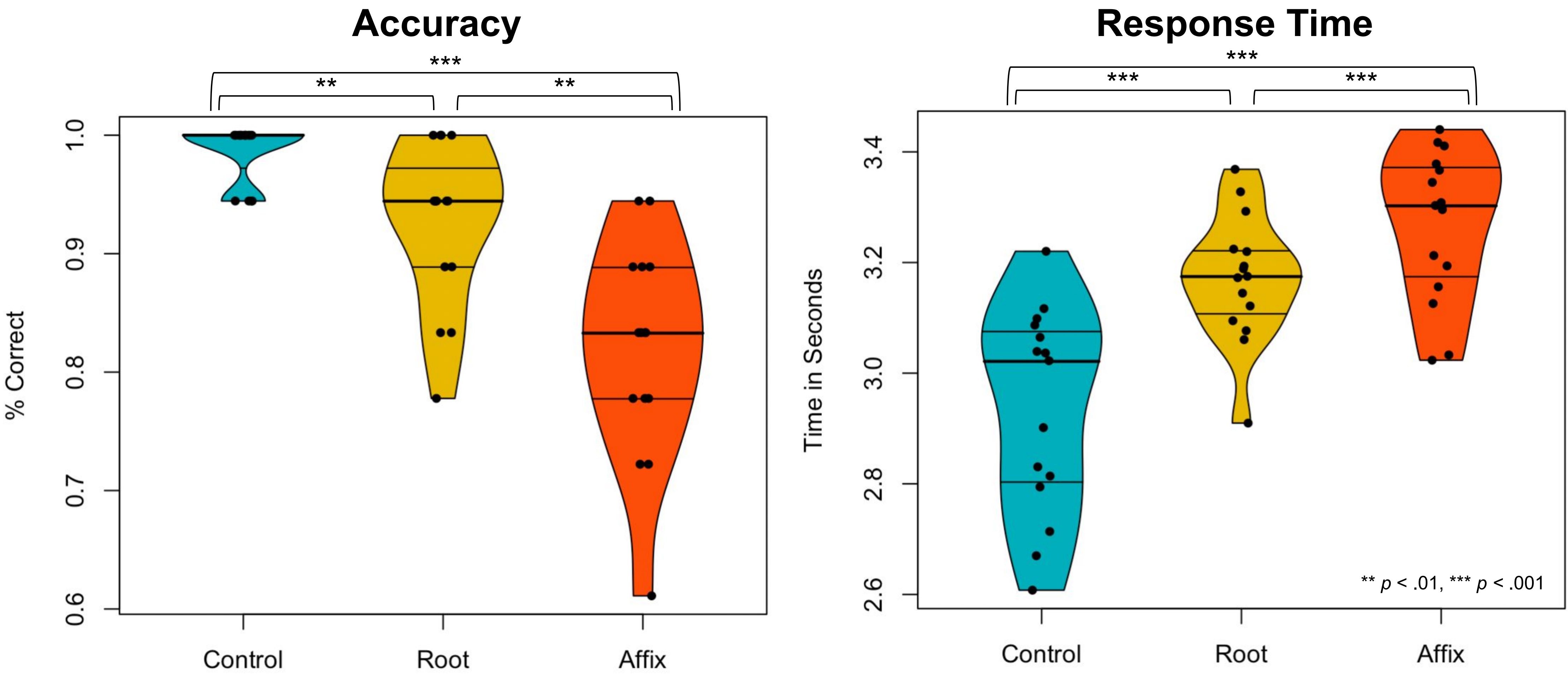
UNICORNUNHAPPY

Results

Morphological processing of roots and affixes is more challenging than whole word processing for adult readers

Whole word matching (*jelly - jelly*) has near ceiling accuracy and the fastest response time

Matching words based on their root morpheme (*seafood - seaweed*) is easier than matching words based on a more abstract affix (*unlucky - unhappy*)



Conclusion

Morphology task works as predicted

- Engages participants into morphological processing
- Significant statistical differences in accuracy & response times across the 3 tested conditions

Next steps: fMRI scanning of typical and dyslexic adult readers to observe neural differences during morphological processing

We predict that there will be neurocognitive differences in readers with and without dyslexia, particularly in the Root Morpheme and Affix conditions in language regions of the brain

References

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Acknowledgements

I would like to give a huge special thank you to Dr. Rebecca Marks, Dr. John Gabrieli, Dr. Liron Rozenkrantz, and everyone else in the Gab Lab for making my internship such a spectacular experience.

I want to acknowledge Reference 1 (above) for my unique title inspiration.

I would also like to thank my lab partner Keira Mooney for being such a great internship partner to wait 10 minutes for the T with.

I want to thank my roommate Ali for being such a great & understanding roommate.

I want to thank everyone who participated in my pilot experiment.

Lastly, I want to thank my family and parents for everything- I love you :)



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