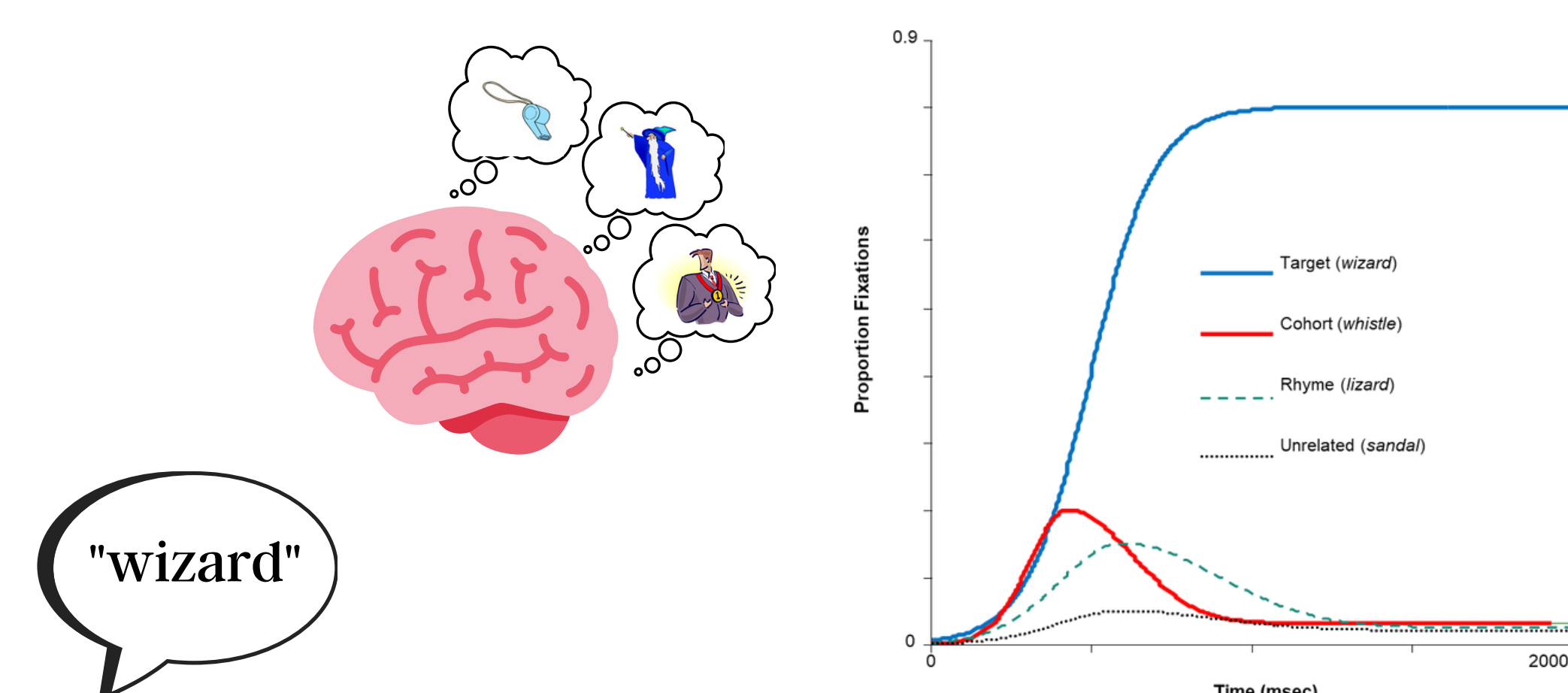


# The development of lexical inhibition in written word recognition: Insight from a new superimposed words paradigm

Emily Phalen, Keith Apfelbaum, Jamie Klein-Packard, Bob McMurray, and the Growing Words Team  
The University of Iowa

## Background

- Previous work on spoken word recognition shows that spoken words are recognized in parallel and compete across time



- An important component of this process is **lexical inhibition**
- Competing words actively suppress each other until one word ultimately "wins"
- Word recognition also occurs for written words, but these don't have the same temporal structure

## Development

- In spoken word recognition, lexical competition develops through adolescence
- In written word recognition, these skills must also develop late, but the timecourse is unknown

## How to measure in children?

- Measuring lexical inhibition is challenging and particularly difficult with children
- One method is masked inhibitory priming in which words are presented in succession, requiring sustained activation of words
- This can't tell us about the dynamics of inhibition during word recognition
- And it's difficult for children

## The current study

Investigate written word recognition using a novel paradigm that amplifies competitor activation. Observe effects on recognition in real time

- Research Question #1:** How does lexical inhibition develop for written words?
- Research Question #2:** Does written word inhibition show the same sensitivity to order as spoken words?

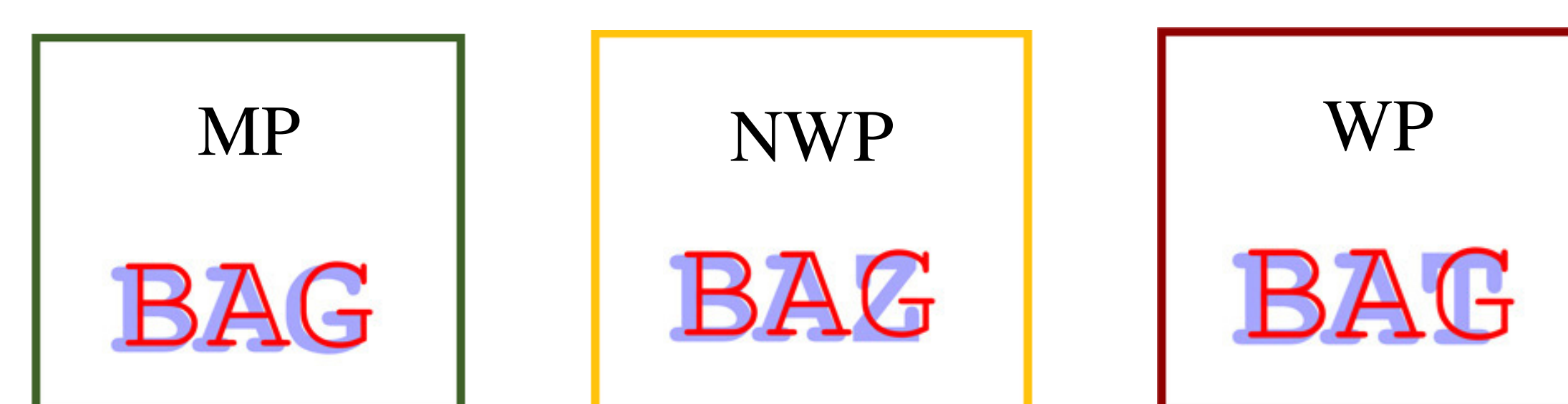
## Methods

### Subjects

- Monolingual, native English speakers with normal hearing
  - Young: 7-8 y/o: n=39
  - Adolescent: 11-12 y/o: n=55
  - Adult: n=26

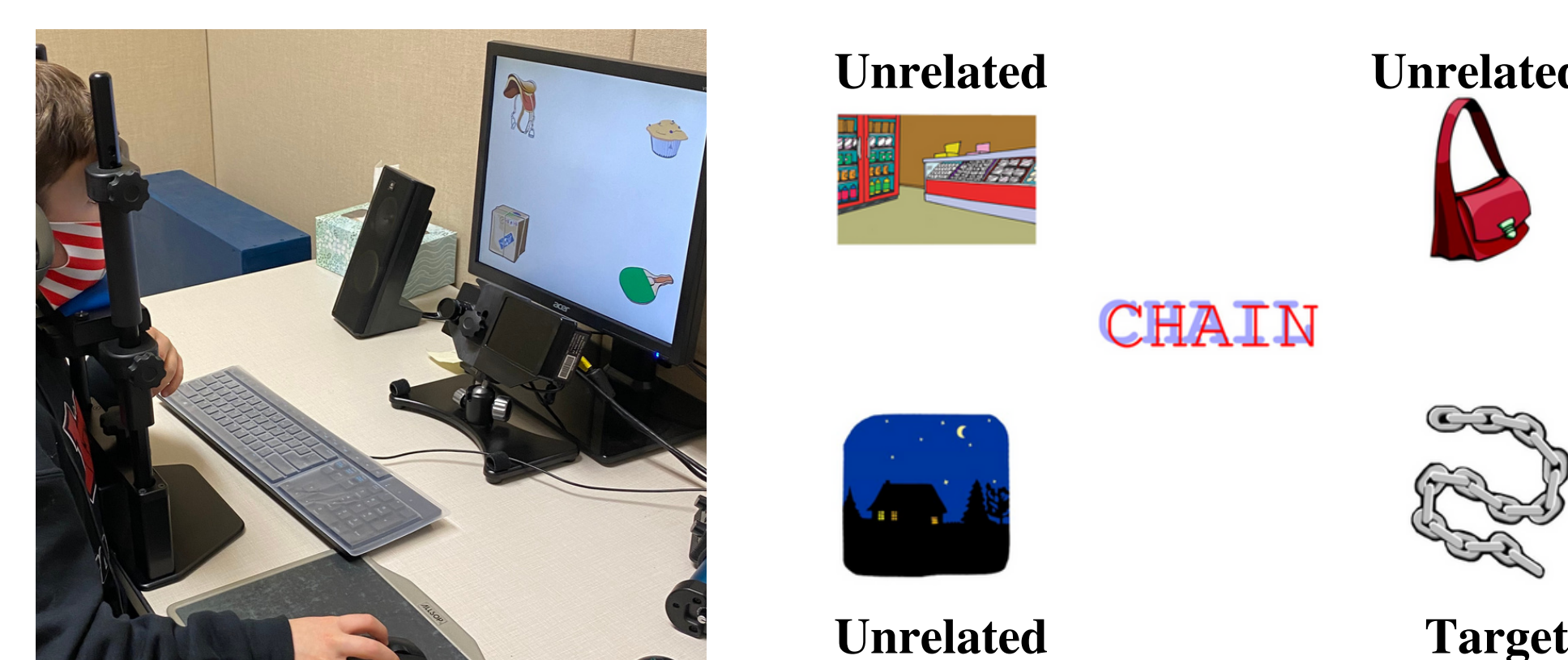
### Superimposed words paradigm

- Overlaid competing words including matched pairs (MP), competing word pairs (WP), and non-word pairs (NWP).
- Participants were asked to click on the picture that corresponded with the word in **red**.



- To observe inhibition, you must boost activation for a competing word to see if it slows activation to the target.
- Within the WP condition, there is also visual clutter that may slow activation.
  - Solution: compare WP to NWP: similar visual clutter, not activating competing word.

### Visual World Paradigm



Rhyme overlap

JUMP

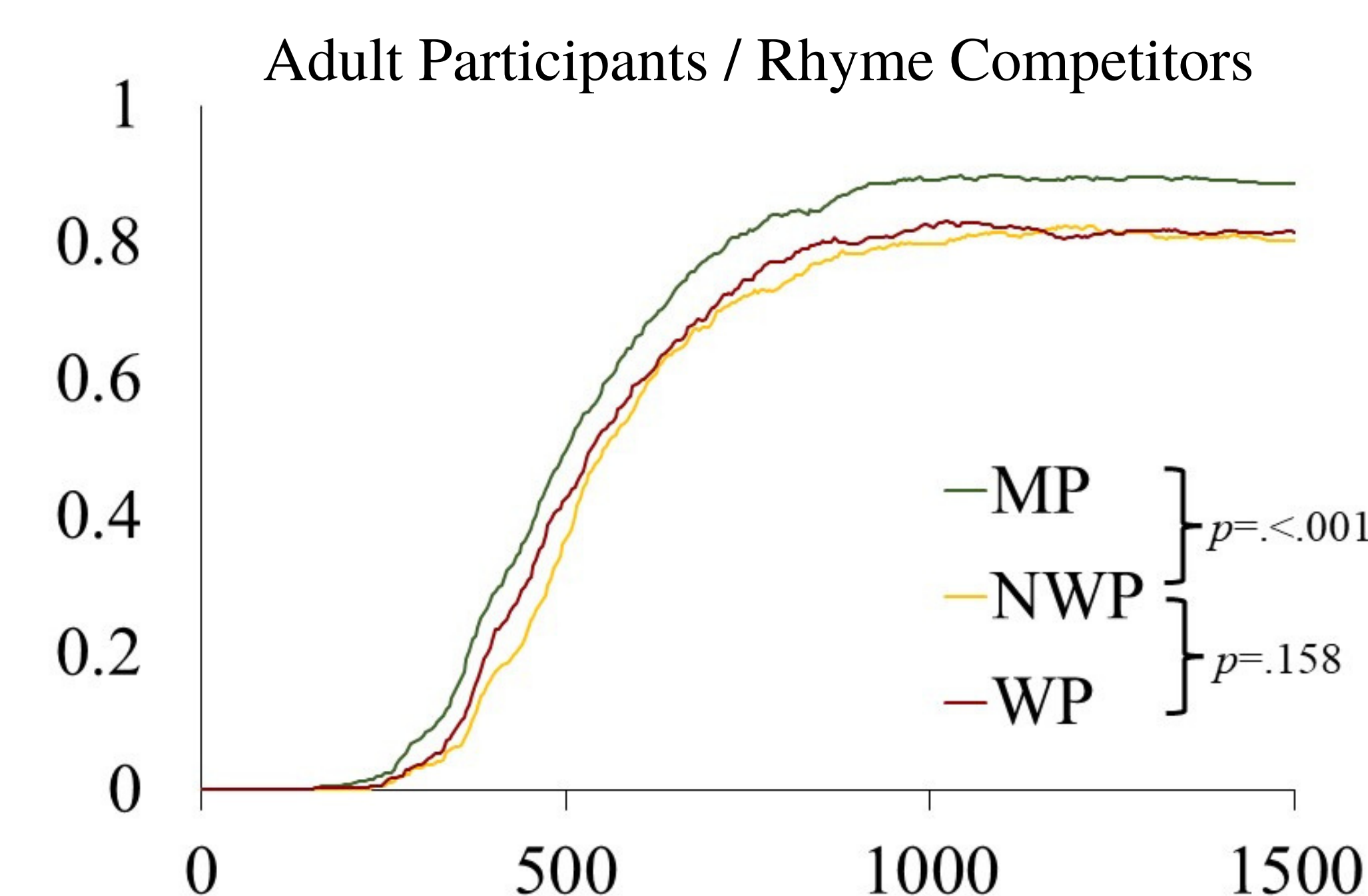
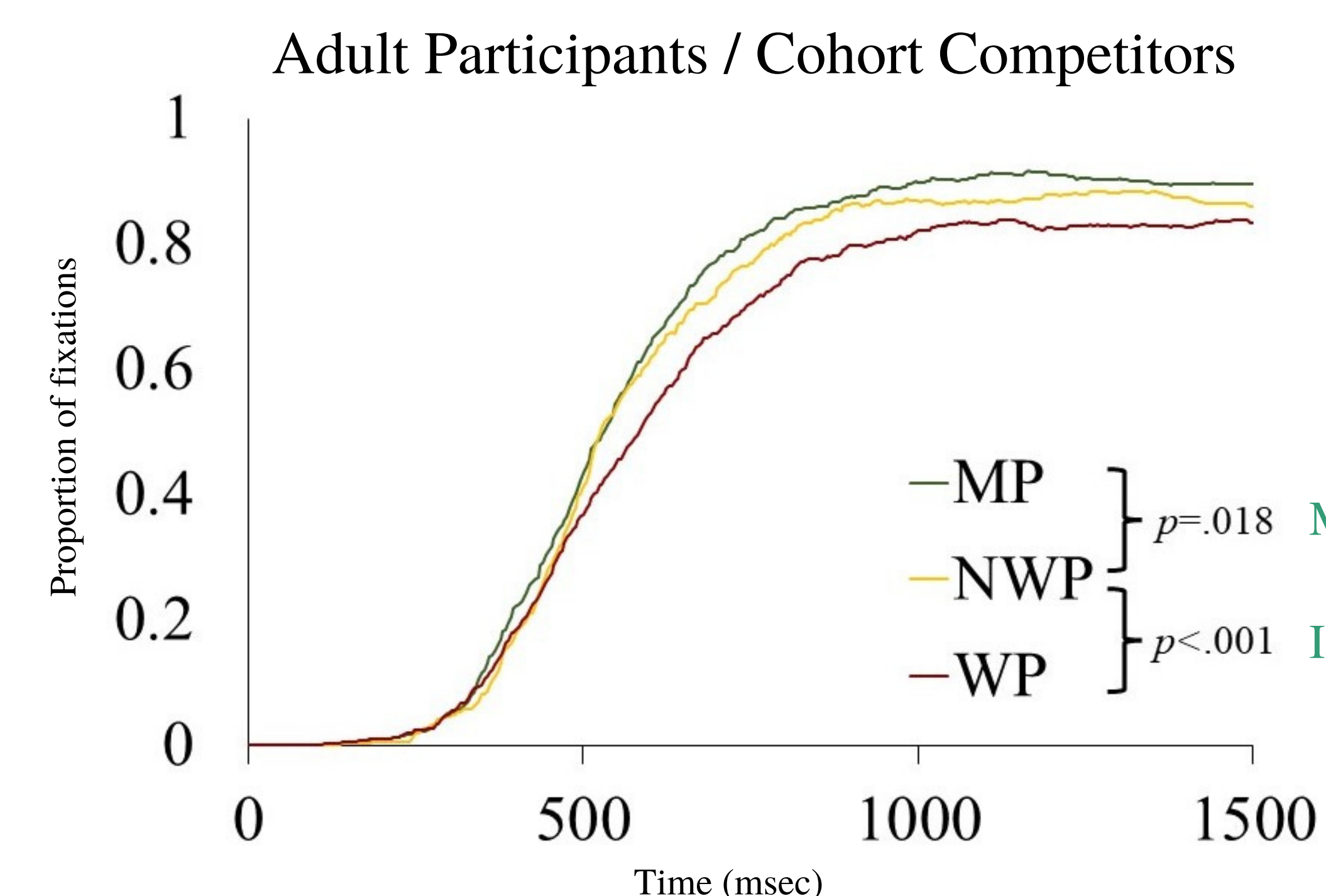
Cohort overlap

CROWN

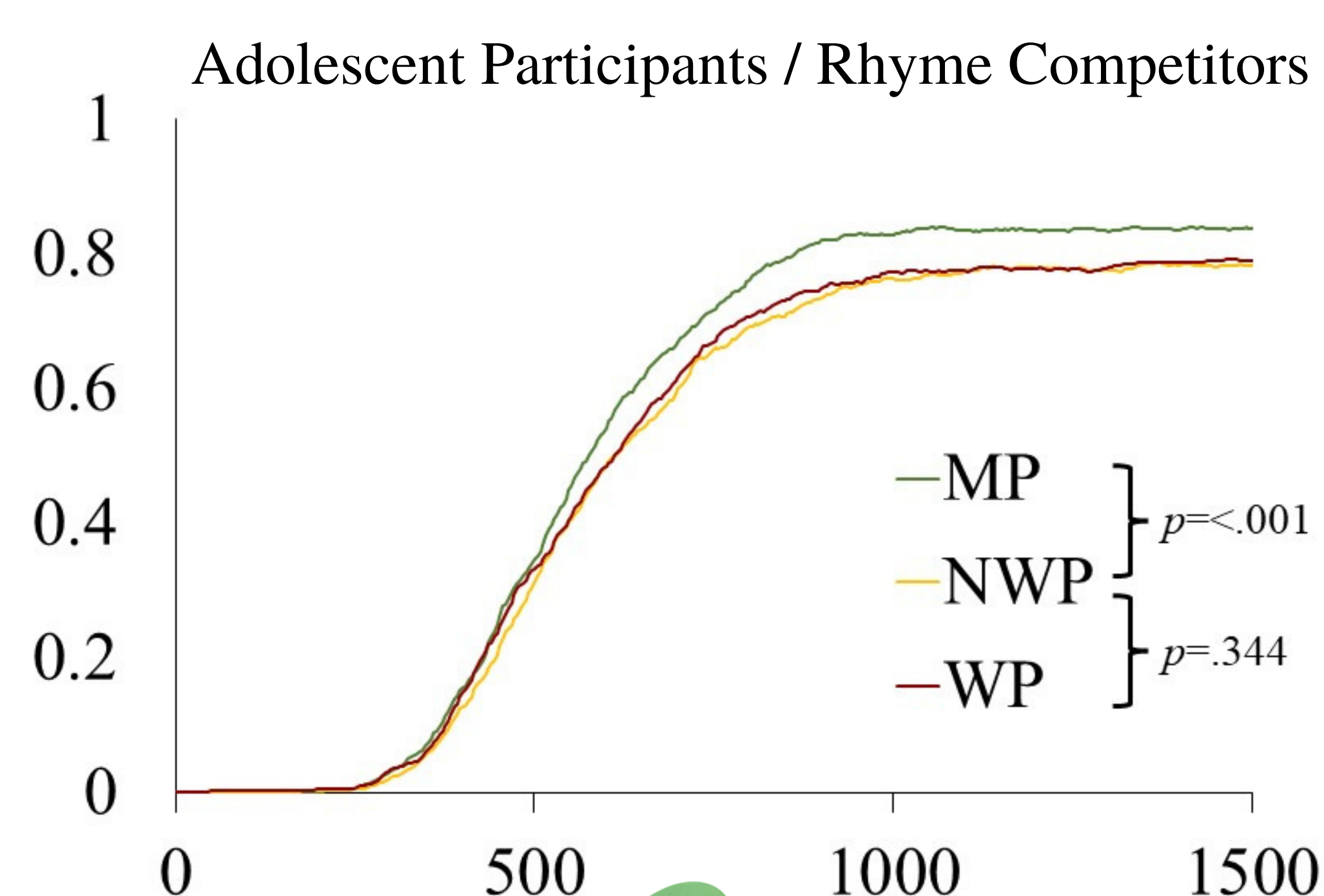
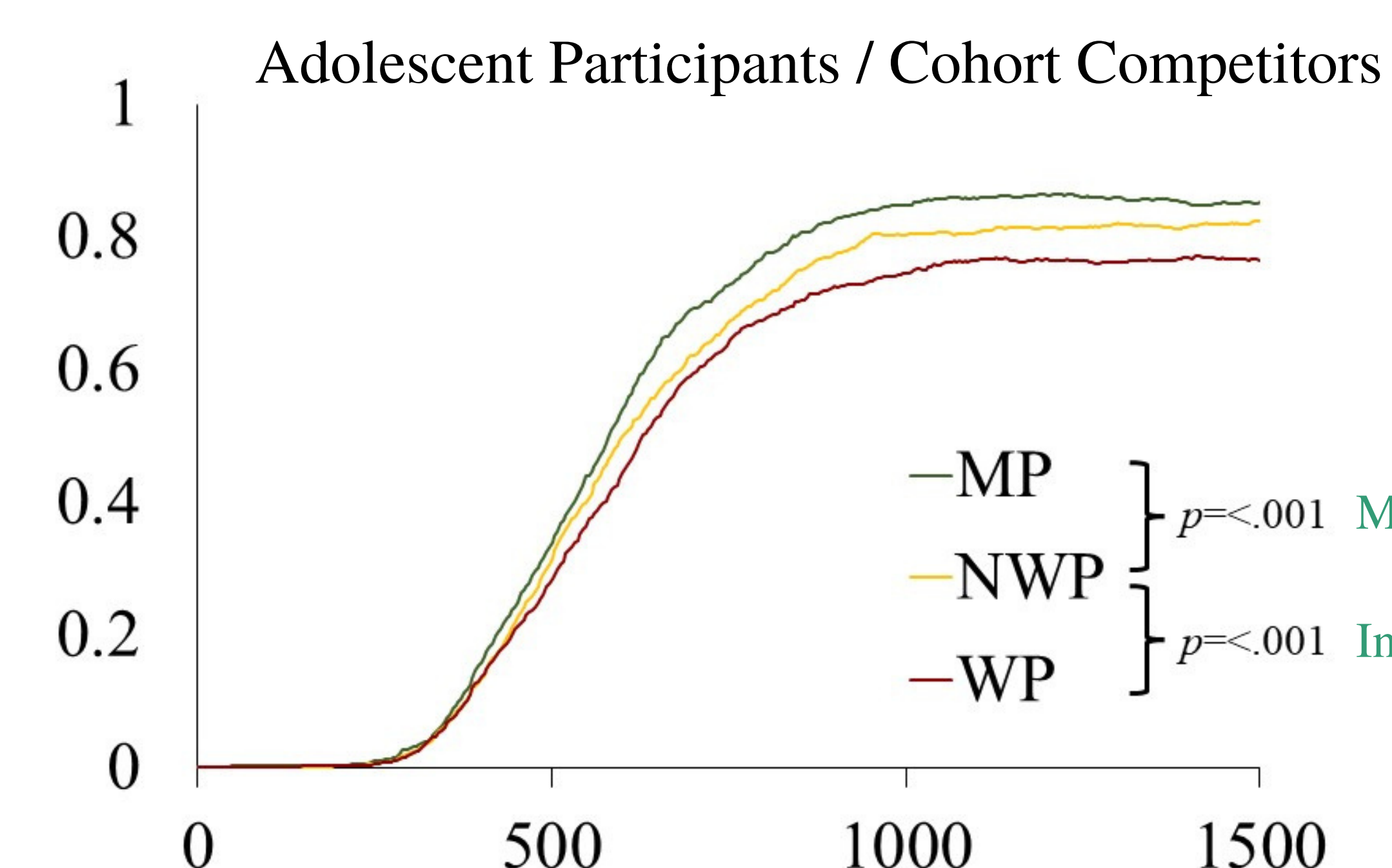
### Hypotheses

- Hypothesis #1:** If listeners have lexical inhibition, then we should observe slower recognition in WP than in NWP because the primed word will suppress the target.
- Hypothesis #2:** If lexical inhibition develops similarly in written word recognition and spoken word recognition, this inhibition effect will be stronger for older children and adults than for young children

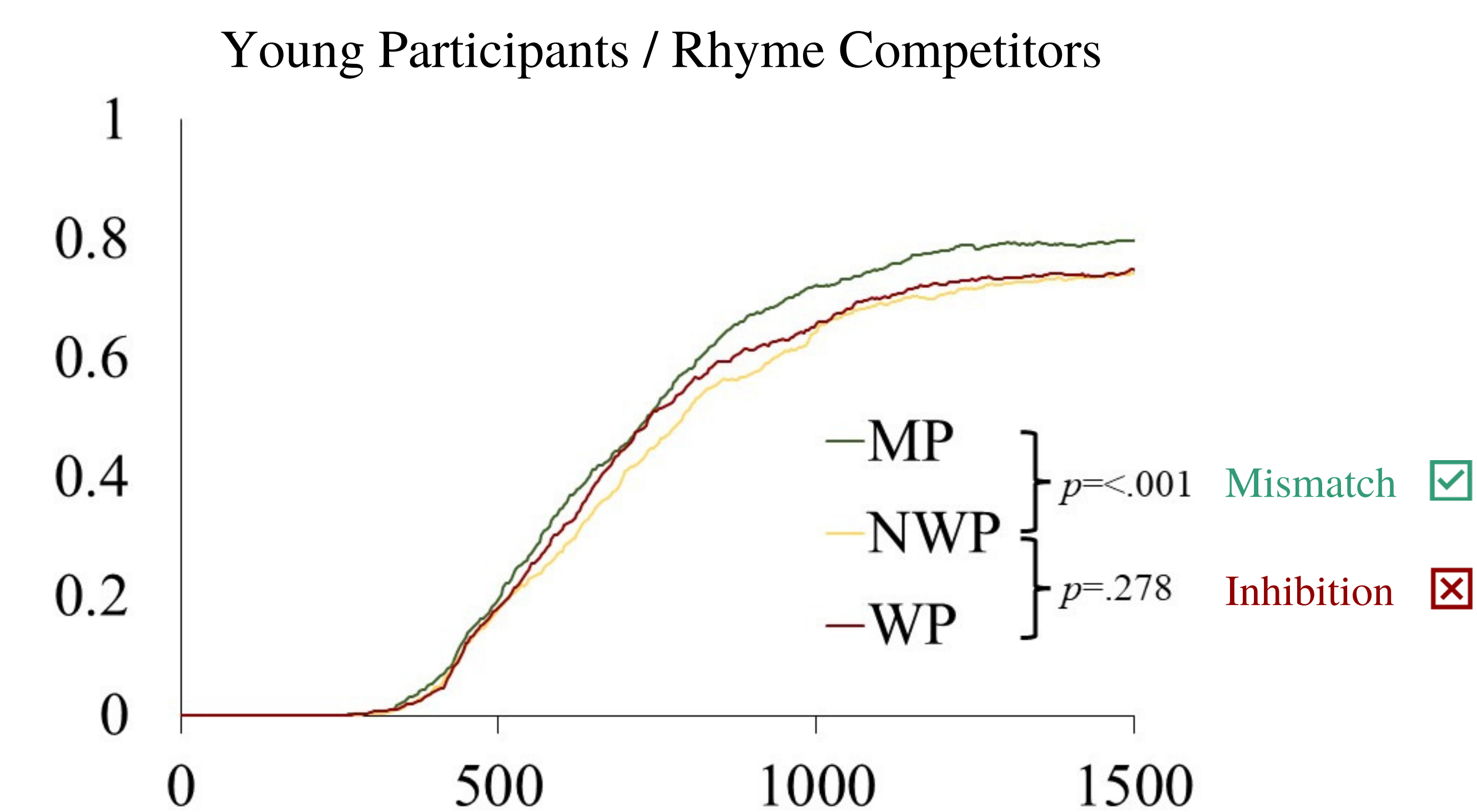
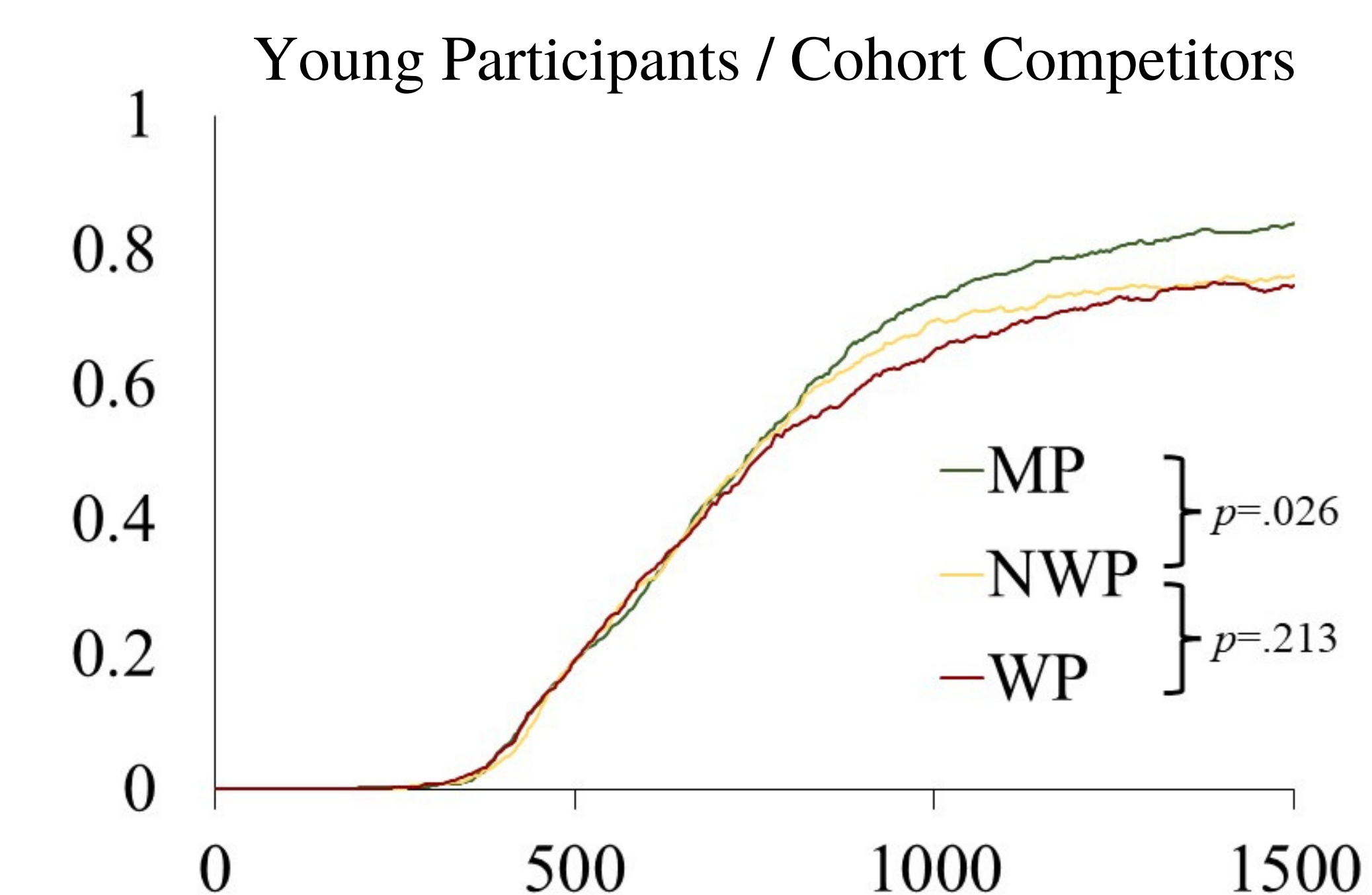
## Results



Adults show evidence of lexical inhibition for cohort competitors but not for rhymes. Adolescents show a similar pattern.



## Results Continued



Young school-aged children only display an effect for mismatched input but do not display lexical inhibition in either condition.

## Discussion

- Adults show lexical inhibition similar to spoken words, with **more competition from cohorts than rhymes**
- Adolescents display a similar pattern to adults
- Young children do not show evidence of lexical inhibition in written words
- Lexical inhibition for written words develops between 7 and 12 years.**
- This mirrors the timecourse of development for spoken word recognition
- It may be that cohorts compete more due to increased emphasis of word onsets in *spoken* language

read about the  
Growing Words Project

