

# What Are Adult Readers Thinking? Exploring Digital Reading Strategies and Processing Times



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# Acknowledgments



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# Shifts to Digital Assessments



## Problem Statement

- Many adults have limited literacy *and* basic digital skills (28% U.S.; NCES, 2024; Olney et al., 2017)
- High-stakes assessments often assume digital fluency
- Digital assessments and materials not always designed for adults with lower skills
- Need to focus on *how* adults respond—not just whether they're correct



## Goals

- Use think-alouds (verbal protocols) in conjunction with processing time as adults read two texts to better understand digital reading strategies



Next



# Thinking-Aloud



- Think-aloud methodology = report any thoughts that come to mind (Ericsson & Simon, 1993)
  - Provide insight into the cognitive and metacognitive processes readers use during comprehension to construct mental models of the text (Magliano & Millis, 2003)
- Verbalizing thoughts while reading may increase cognitive demands and disrupt reading fluency, particularly for less experienced readers (Barkaoui, 2011; Hu & Gao, 2017).
- A case study using wordless picture stories reported differences in think-aloud strategies among adults of varying reading levels (Magliano et al., 2024)
  - Adult literacy students were more focused on content of the immediate picture and produced fewer explanations

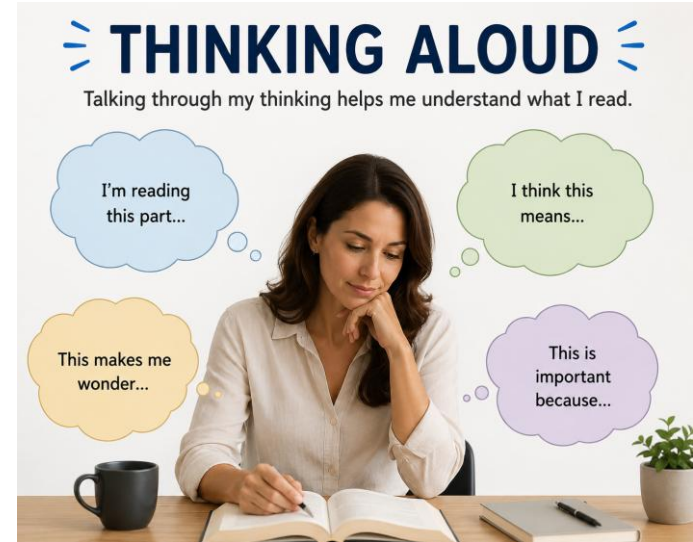
# Why Process Data?



- Instruction, progress monitoring, and class placement is often driven by high-stakes assessments (e.g., adult education specific tests, high school equivalency tests, tests to determine entry for college classes)
- Yet, performance and accuracy on high-stakes assessments presents an incomplete picture of adults' skills
- Process data can tell us more about engagement patterns (e.g., total time spent, number of actions)
  - Some evidence to suggest adults engage with a reading intervention differently (Fang et al., 2018)
  - Also evidence to suggest differences in time allocation patterns on PIAAC Literacy items (Kaldes et al., 2024)

# Study Purpose

- Identify the cognitive and metacognitive strategies used by adult readers (adult literacy, college students with lower and higher reading fluency) while thinking-aloud to digital narratives.
- Examine whether these strategies are differentially associated with text processing time across reader groups.



# Method: Participants



$N = 71$

Mean age = 26.2 ( $SD = 12.76$ ); 76% Female

## Reader Groups:

- 23 adult literacy students (AL)

- 24 low-skilled college (LC)

- 24 high-skilled college (HC)

## Reading Levels

- AL GE: 6.23 (3.88)

- LC GE: 7.25 (1.57)

- HC GE: 12.75 (0)

# Method: Materials

- Two digital linear narratives (3<sup>rd</sup>–4<sup>th</sup> grade reading levels) presented sentence-by-sentence (Magliano et al., 2010)
  - Woman Who Had No Shadow
  - Butch Cassidy Has a Big Heart
- 8 think-aloud locations/text
- 3 open-ended comprehension questions/text

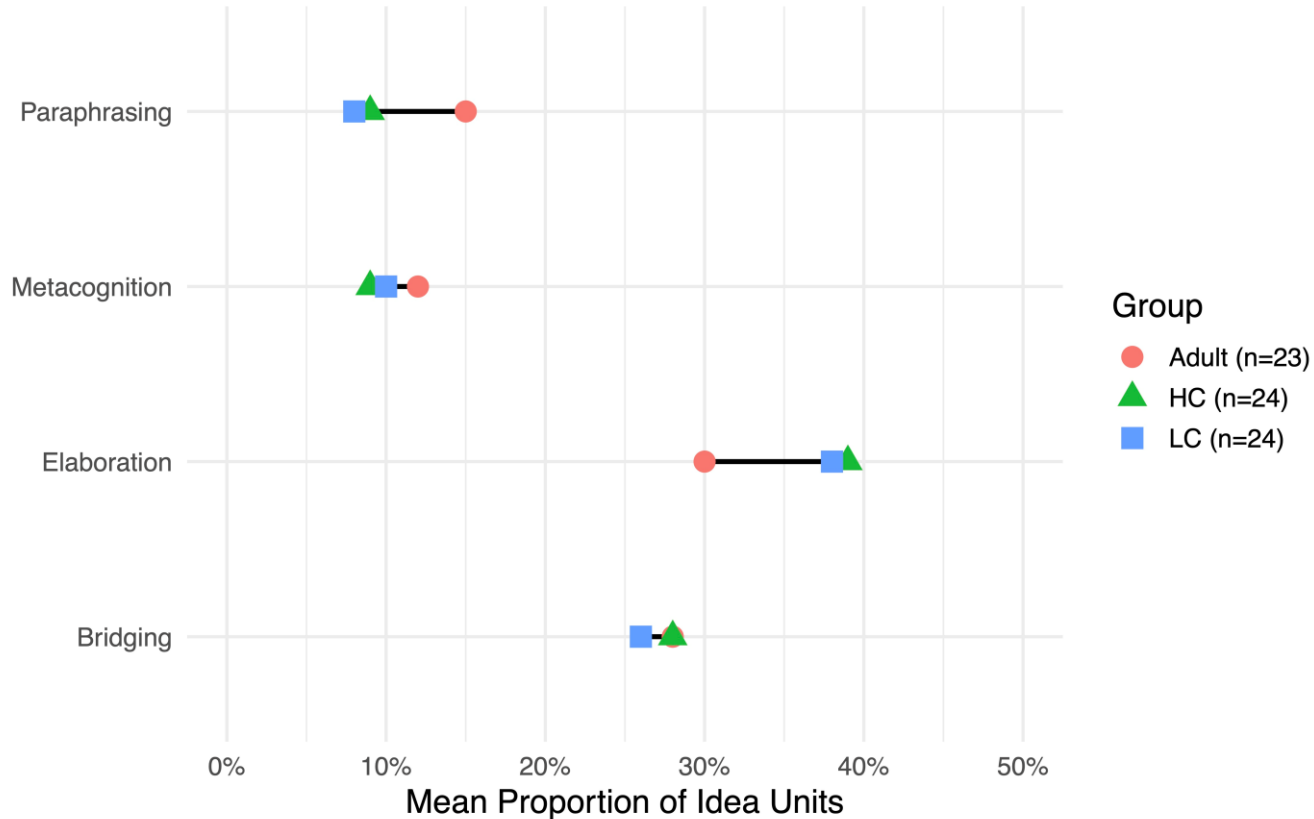


# Method: Coding Scheme

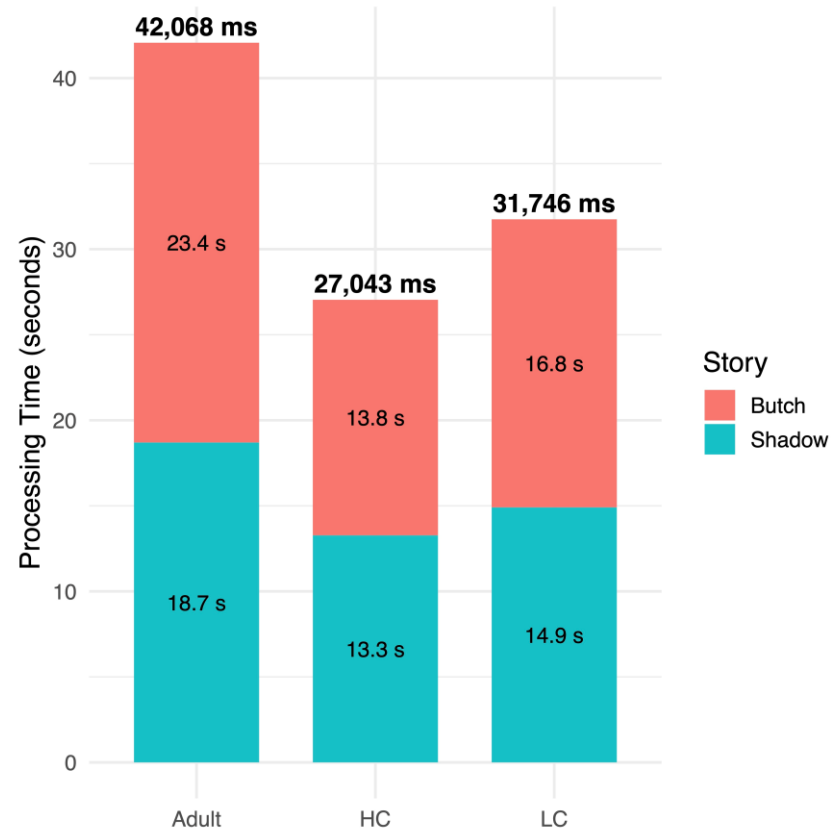


| Strategies                      | Description                                                                                                                  | Example                                                                 |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|
| <b>Paraphrasing</b>             | Statements reflect idea units that are present in current sentence just read (e.g., rephrase, restate)                       | “The pastor was angry”                                                  |
| <b>Bridging</b>                 | Statements that use idea units conveyed in the prior text to establish how current sentence is related to prior story events | “It just said it gave her seven stones”                                 |
| <b>Elaboration</b>              | Idea units draw upon knowledge external to the text to explain, predict, or associate                                        | “Like it doesn’t say that the witch gave her like a potion or anything” |
| <b>Metacognitive Statements</b> | Idea unit expresses level of understanding about story content                                                               | “I’m just wondering why”                                                |

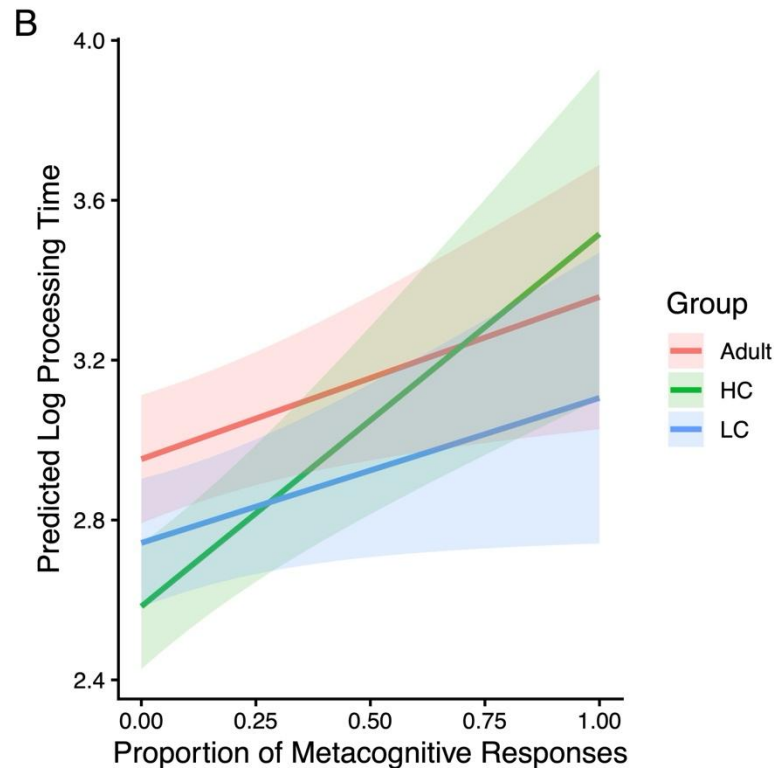
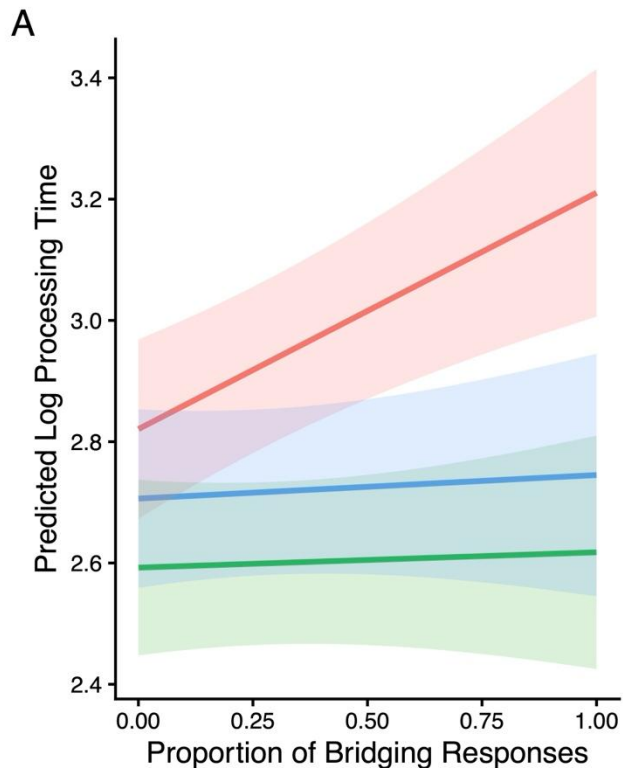
# Results: Think-Aloud Strategy Use by Groups



# Results: Think-Aloud Processing Time by Story and Group



# Results: Strategy Use\*Group Predicting Processing Time



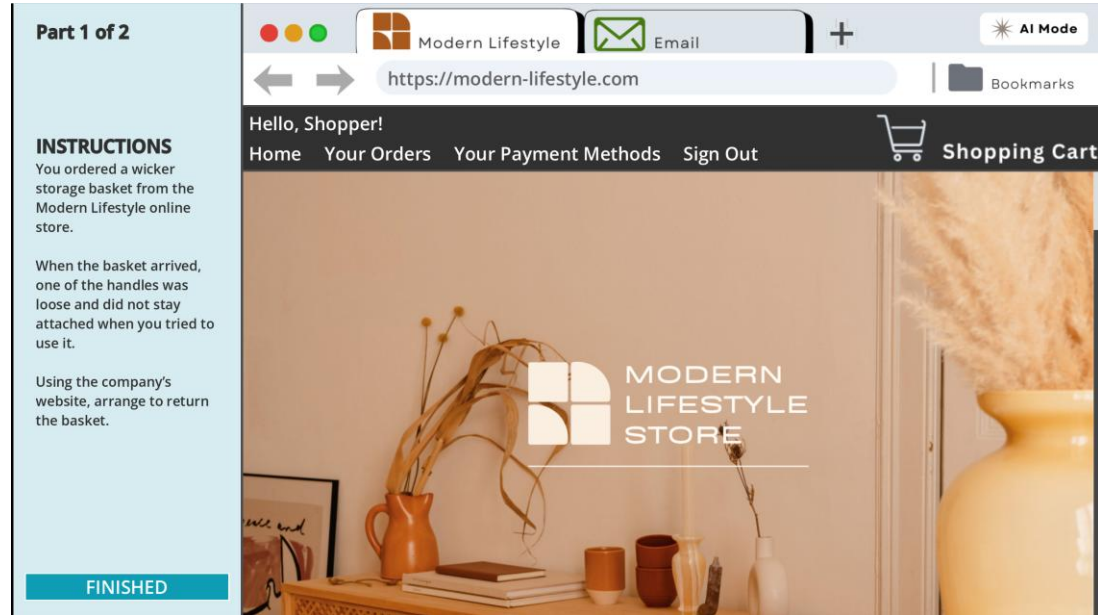
# Key Take-Aways



- Adults exhibit varying strategies during reading of digital texts
  - AL students more paraphrasing (Magliano & Millis, 2003)
  - College students more elaborating (Magliano et al., 2020)
- Processing time reflected more than reading speed
  - AL students = longer processing time was linked to more bridging
    - More computational effort because less proficient at bridging
  - HC students = longer processing time linked to more metacognitive statements
    - Consistent with past research on comprehension performance (e.g., Helder et al., 2016)

# Future Directions

- Incorporate comprehension performance to triangulate with think-aloud strategies and processing data
- More process data using digital items similar to PIAAC APS environments
  - Clicks, Scrolling, etc
  - Action Sequences
  - Timing



Thank you!!!  
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