



The Effect of Context Timing on the Comprehension of Texts with Varying Linguistic Fluency

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Background

Context timing has been found to be greatly influential on comprehension

- Context received **prior** to target material is most beneficial (Bransford and Johnson, 1972; see also Dooling and Lachman, 1971)

Fluency is the “the subjective experience of ease or difficulty associated with completing a mental task” (Oppenheimer 2008)

- High fluency** – feels easier to process
- Low fluency** – feels more difficult to process
- Shown to be influential in decision making
 - Low fluency is associated with negative decisions (Okuhara et. al 2018; see also Oppenheimer 2006)

Linguistic fluency is a subtype of fluency, describing the ease or difficulty of linguistic processing (Alter and Oppenheimer, 2009)

There is support suggesting that context may interact with the fluency of material, specifically that prior context would be most beneficial when confronted with low fluency material

- Early context was beneficial only when reading a passage in a second-language (harder to process, i.e. low fluency), but not in a first-language (Omaggio 1979)

Research Questions

Based on the literature, our study aimed to answer the following questions:

- Would **prior** context benefit comprehension?
- Would **low fluency** negatively affect comprehension?
- Would context timing have unique effects on comprehension depending on the fluency of the material, where **prior context** is most beneficial when reading a **low fluency** passage?

Methods

Participants were presented the title, **Playing Card Games**

- before** or **after** the passage

Participants were given one of two adapted versions of Anderson et al. (1977):

- Changed sentence structure and vocabulary to be **low** or **high** fluency

Low Fluency passage (harder to process)

Every Saturday evening, four good friends get together. When Jerry, Mike, and Pat arrived, Karen was sitting in her living room writing some notes. She quickly picked up the cards and stood to greet her friends at the door. They followed her into the living room but as usual they couldn't agree on exactly what to do. Jerry finally made a choice and set things up. Finally, they began. Karen's radio filled the room with soft and nice music. Early in the evening, Mike noticed Pat's hand and the many diamonds. As the night continued, their activities got faster. Finally, there was a break. Taking advantage of this, Jerry thought about the pattern in front of him. Mike cut short Jerry's thoughts and said, "Let's hear the score." They listened carefully and talked about how they did. When all the comments were heard, Karen's friends went home, tired but happy.

High Fluency passage (easier to process)

Every Saturday evening, four good friends get together. When Jerry, Mike, and Pat arrived, Karen was sitting in her living room writing some notes. She quickly picked up the cards and stood to greet her friends at the door. They followed her into the living room but as usual they couldn't agree on exactly what to do. Jerry finally made a choice and set things up. Finally, they began. Karen's radio filled the room with soft and nice music. Early in the evening, Mike noticed Pat's hand and the many diamonds. As the night continued, their activities got faster. Finally, there was a break. Taking advantage of this, Jerry thought about the pattern in front of him. Mike cut short Jerry's thoughts and said, "Let's hear the score." They listened carefully and talked about how they did. When all the comments were heard, Karen's friends went home, tired but happy.

After reading the passage and title, we measured their comprehension of the passage in two ways:

1) Self-report measure

Who hosted the game night?

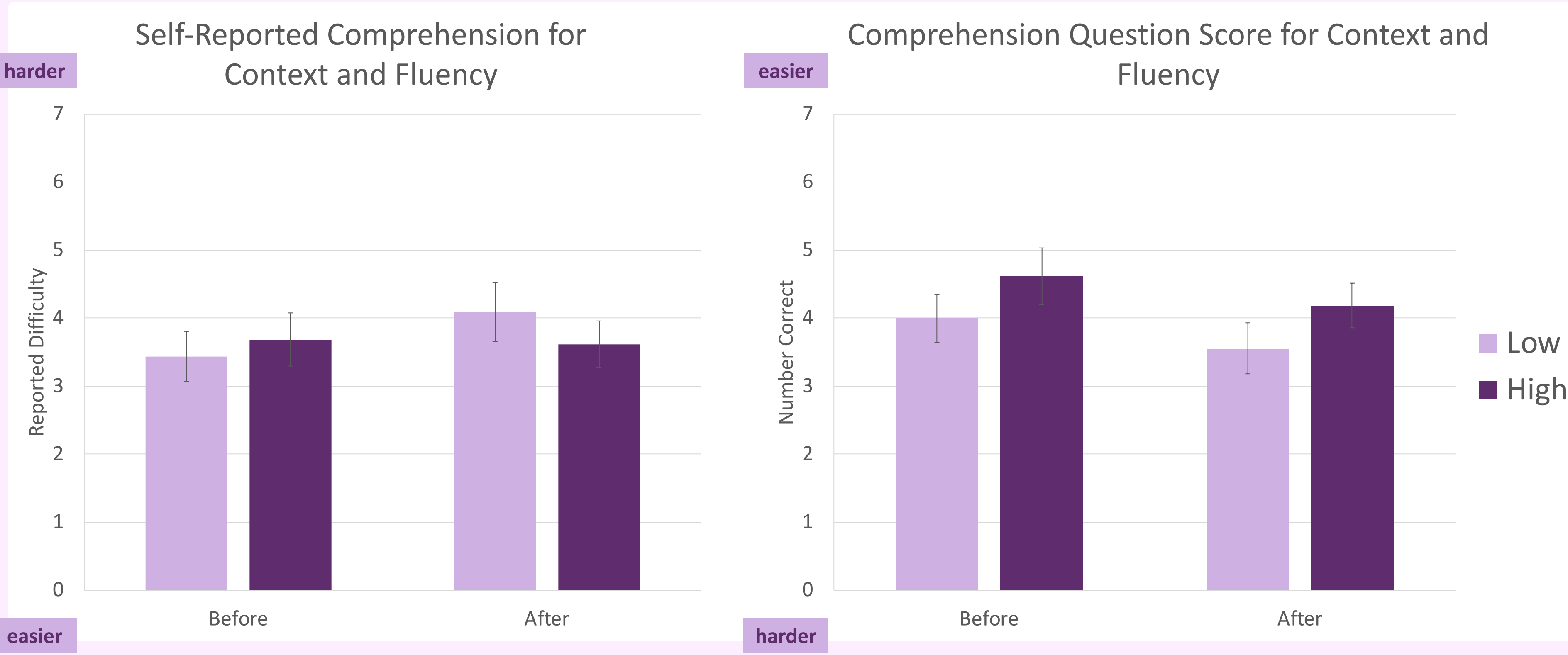
a. Jerry b. Mike c. Pat d. Karen

2) Seven close-ended (multiple choice) questions intended to gauge comprehension

On a scale of 1 to 7, rate how easy or difficult it was to understand the previous passage:

1 = very easy 7 = very difficult

Results



ANOVA was calculated for both measures:

No significant effect for context timing

- Self-report: $F(1,64) = 0.56, p = .458; \eta_p^2 = .009$
- Comprehension questions: $F(1,64) = 1.36, p = .25; \eta_p^2 = .021$

No significant effect for fluency

- Self-report: $F(1,64) = 0.087, p = .770; \eta_p^2 = .001$
- Comprehension questions: $F(1,64) = 2.83, p = .098; \eta_p^2 = .042$

No significant interaction between context timing and fluency

- Self-report: $F(1,64) = 0.8786, p = .352; \eta_p^2 = .014$
 - Before, Low: $M = 3.44, SE = 0.369$
 - Before, High: $M = 3.69, SE = 0.434$
 - After, Low: $M = 4.09, SE = 0.391$
 - After, High: $M = 3.62, SE = 0.342$
- Comprehension questions: $F(1,64) = 2.90 \times 10^{-4}, p = .99; \eta_p^2 = .00$
 - Before, Low: $M = 4.00, SE = 0.354$
 - Before, High: $M = 4.62, SE = 0.416$
 - After, Low: $M = 3.56, SE = 0.375$
 - After, High: $M = 4.19, SE = 0.328$

Conclusions

Changes to methodology and design:

- Increase the power
- Improve the online experiment’s design
 - Only 77 out of 93 participants responded to our manipulation check: “What was the title of the story?”
 - Of these, 68 out of 77 respondents correctly responded
- Pre-test the passages to ensure manipulation of fluency

Future Research:

- To what extent may fluency affect comprehension?
- How may different types of fluency affect comprehension?
- If comprehension is affected by fluency, how may context interact to affect it?
- What are the nuances of context’s possible effects on comprehension?

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