

Memory for emoji-fied text: A comparison of emojis with semantically redundant versus inferential functions

Laurie Beth Feldman, Andriana L. Christofalos, & Heather Sheridan
University at Albany, State University of New York

Introduction

Emojis aid readers in lower-level word access

- Semantic Congruency Effect: Congruent synonym emojis facilitate reading when emojis map onto single word meaning (e.g., Barach et al., 2021; Beyersmann et al., 2022).

e.g., *My tall coffee is just the right temperature* ☕

Emojis aid readers in higher-level, integrative processing

- Emojis congruent with sarcastic (e.g., Garcia et al., 2022), ironic (e.g., Weissman & Tanner, 2018), or indirect disclosures or opinions (e.g., Holtgraves & Robinson, 2020) facilitate comprehension.

e.g., *She spotted Erin across the room at the party and noticed that she was looking a bit scruffy. She texted her to say,*

"I see you made an effort" 😊

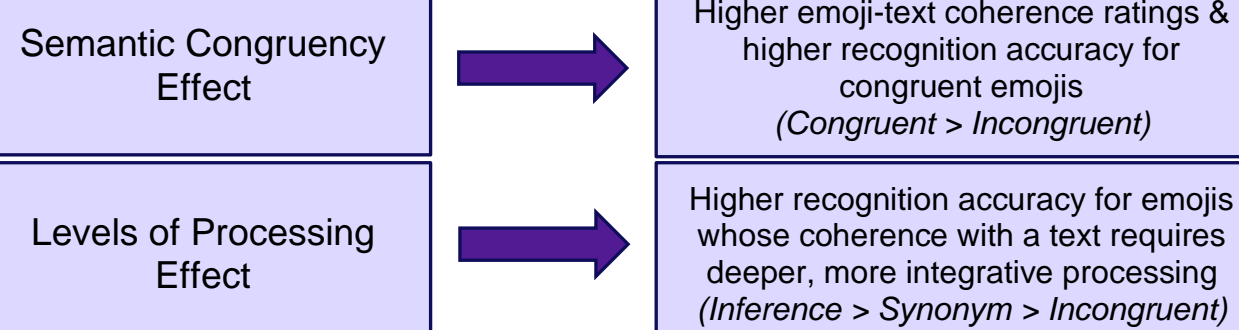
Levels of Processing Framework: Memory for text depends on depth of processing (Craik & Lockhart, 1972)

- Lower-level word access → shallow processing → weak memory traces
- Higher-level integration → deeper processing → stronger memory traces

Research Question

Does memory for emojis differ depending on the level of processing supported by their function within a text?

Predictions



Methods

Participants

- 142 undergraduates at the University at Albany, SUNY participated online for course credit.

Materials

- 60 two-sentence passages, each ending with an emoji.
- Both sentences contain cues to an inference, and the second sentence contains a target word that is synonymous with an emoji (redundant)
- Passages presented with emojis with one of three relations to the text (see Table 1)

Procedure

- Participants rated emoji-text coherence and then performed an emoji recognition task (50% old, 50% new) within a Qualtrics survey
- See Figures 1 and 2 for sample trials in each experimental task
- Tasks were separated by a brief demographics questionnaire (1-2 minute break between experimental tasks)

Table 1. Examples of Emoji-Text Relations.

Passage	Emoji-text Relation	Emoji
Bobby brought home a new <i>pet</i> to live in the <i>tank</i> . He hoped he would remember to buy some <i>mice</i> to feed it on his way home from <u>basketball</u> practice the next night.	Congruent Synonym (Redundant)	🏀
	Congruent Inference	🐍
	Incongruent	⚖️

Note: Target words depicting the synonym emoji are underlined and inference cues are italicized in the sample but not in the experiment.

Figure 1. Sample Coherence Task Trial.


Kim learned to bake several tasty pastry recipes when she lived in Paris for a year. She loves the flaky layers and sometimes puts cheese or chocolate in the middle. 🥐

How well does the emoji fit with the passage?

Not well at all	Slightly well	Moderately well	Very well	Extremely well
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Figure 2. Sample Recognition Task Trials.


Did you see this emoji before?



Old

New

Did you see this emoji before?



Old

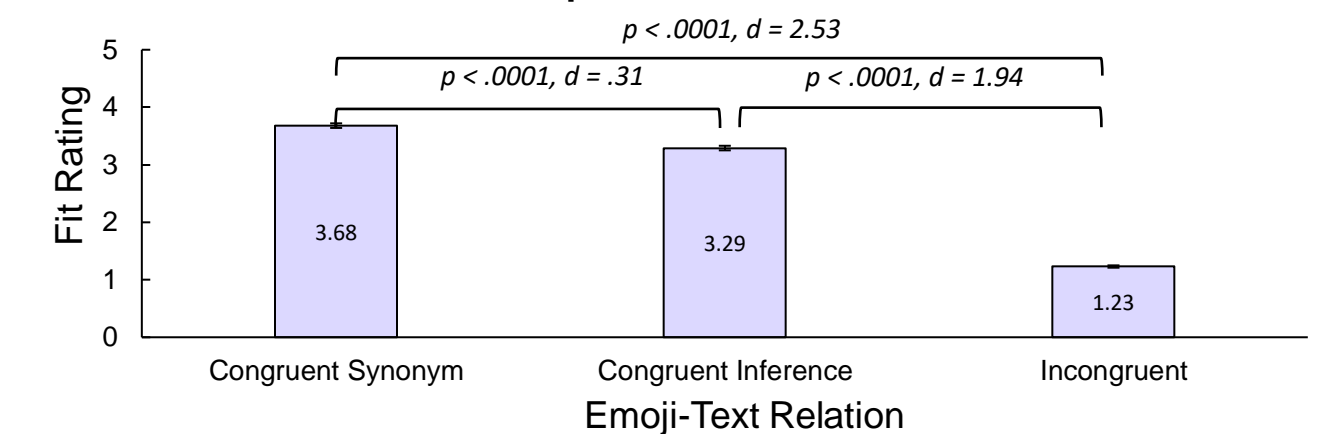
New

Data Analyses

- Cleaning:** Data from 33 participants with low recognition accuracy (< 60%) were removed. Final dataset consisted of data from 109 participants
- Mixed Models:** A linear mixed effects model was built in R using the lme4 package (Bates et al., 2015) to examine the effect of emoji-text relation (Congruent Inference, Congruent Synonym, Incongruent) on coherence (fit) ratings. A logistic mixed effects model was built in R using the lme4 package (Bates et al., 2015) to examine the effect of emoji condition on recognition accuracy.

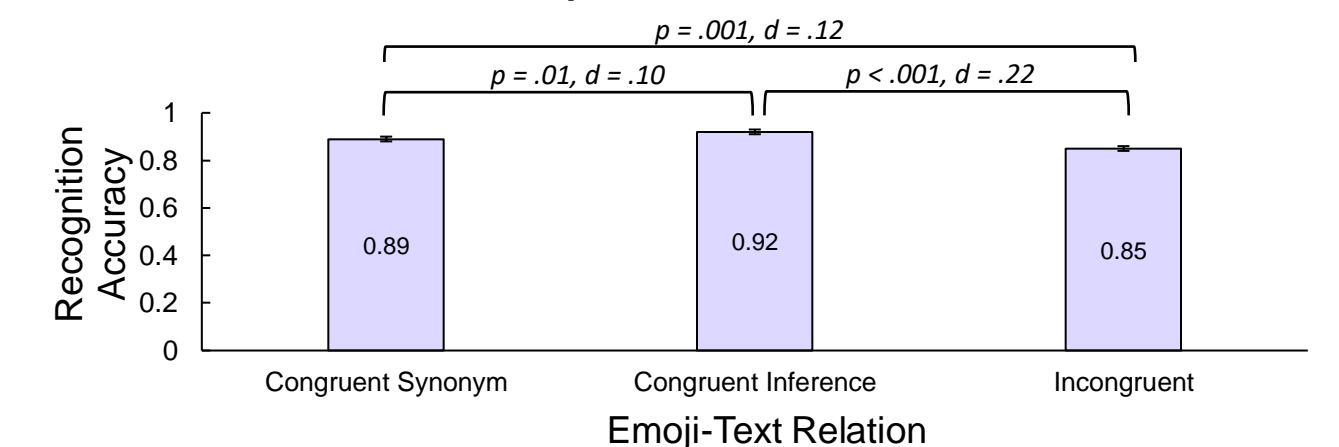
Results – Emoji Coherence (Fit) Ratings

Figure 3. Average emoji-text coherence (fit) ratings as a function of emoji function in text. Error bars depict standard error.



Results – Emoji Recognition Accuracy

Figure 4. Average emoji recognition accuracy as a function of emoji function in text. Error bars depict standard error.



Conclusions

Semantic Congruency Effect for object emojis arises not only in online processing (Barach et al., 2021) but also in fit ratings and recognition

- Demonstrates **parallels between emoji and word processing**
- Higher fit ratings for synonym emojis (requiring **lower-level word access**) than incongruent emojis (replicating Barach et al., 2021) and inference emojis
- Higher fit ratings for inference emojis (requiring **higher-level integrative (perhaps slower?) processing**) than incongruent emojis (extending on Barach et al., 2021)

More accurate recognition when emojis permit integration than simply word-level processing consistent with stronger memory traces in the **Levels of Processing Framework** (Craik & Lockhart, 1972)

- Higher recognition accuracy for congruent (inference and synonym) emojis than for incongruent emojis
- Higher recognition accuracy for inference emojis than synonym emojis

References

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