

L2 comprehension of English relative clauses: Resumption mitigates processing strain

Handout:



tinyurl.com/gasla2024



Fred Zenker (fzenker@hawaii.edu)
Department of Second Language Studies & LAE Labs
University of Hawai'i at Mānoa

GASLA-17
5 May 2024

Helpful Regardless of Acceptability

Resumption Eases Comprehension of Difficult-to-Process Relative Clauses
in the L2 English of L1-Korean and L1-Mandarin Speakers



Fred Zenker (fzenker@hawaii.edu) & Bonnie D. Schwartz

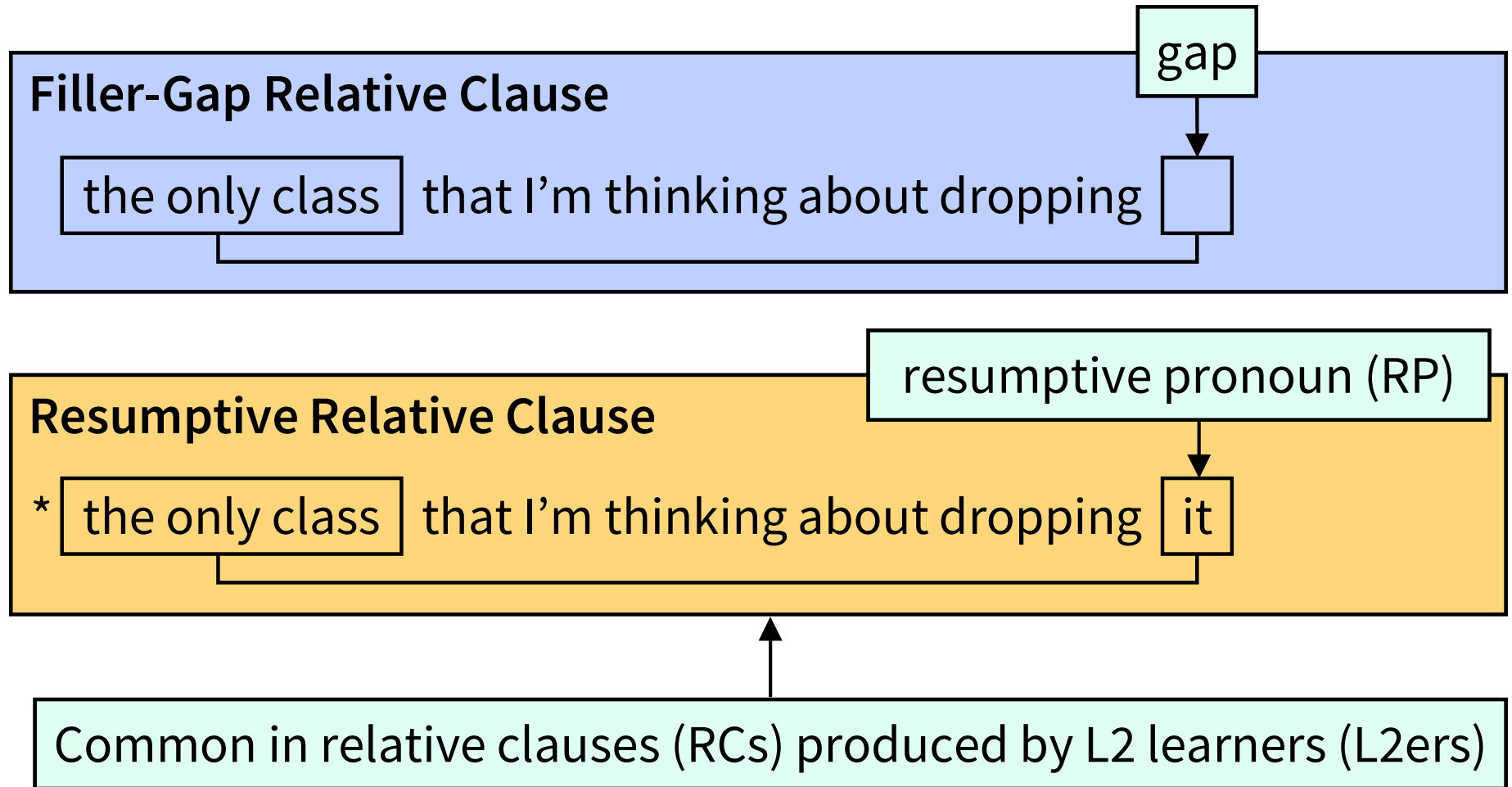
Department of Second Language Studies & LAE Labs

University of Hawai'i at Mānoa

Boston University Conference on Language Development

5 November 2022

Filler-Gap vs. Resumptive Relative Clauses



Crosslinguistic Variation in Grammaticality of RPs

Table 1. Distribution of gaps (–) and RPs (+) in single-clause RCs

Language	SU	DO	IO	OBL	GEN	OCOMP
English	–	–	–	–	–	–
Korean	–	–	–	–	+	0
Mandarin	–	±	+	+	+	+

(adapted from Keenan and Comrie, 1977, p. 93, Table 2)

Today's focus

Ongoing debate about the exact distribution of RPs in RCs for Korean (see Han, 2013; Kwon, 2008; Song, 2003) and for Mandarin (see Hitz & Francis, 2016; Pan, 2016)

Experimental Research on L2 Resumption

- Frequent in L2 production

(e.g., Algady, 2013; Gass, 1979; Hyltenstam, 1984; Kim, 2013; Pavesi, 1986)

- More common in positions that are difficult for relativization

(e.g., Algady, 2013; Gass, 1979; Hyltenstam, 1984)

- Occurs even when ungrammatical in both L1 and target language (TL)

(e.g., Hyltenstam, 1984; Pavesi, 1986)

Hyltenstam (1984)

L2ers systematically produce resumptive RCs even when ungrammatical in both L1 and TL

Claims regarding L2 resumption:

1. Licit option for relativization in interlanguage (IL) grammar
2. Facilitates L2 processing of RCs

Missing: thorough testing using psycholinguistic methods

Experimental Research on Adult L1 English Resumption

Use offline judgment tasks and online processing tasks in tandem to tease apart representational phenomena from processing phenomena

- **Acceptability Judgments:** Uniformly low ratings for RPs
(e.g., Han et al., 2012; Heestand et al., 2011; Keffala & Goodall, 2011)
- **Elicited Production:** More RPs in difficult-to-process RCs
(e.g., Ferreira & Swets, 2005; Morgan & Wagers, 2018; Zukowski & Larsen, 2004)
- **Self-Paced Reading:** Reading times following RPs faster than those following gaps, at least for difficult-to-process RCs
(e.g., Hammerly, 2022; Hofmeister & Norcliffe, 2013; Zenker & Schwartz, 2021)

↑
Controversial (cf. Morgan et al., 2020)

Conclusion: RPs are ungrammatical but can still facilitate processing

Scope of Project

Today's focus

```
graph TD; A[Today's focus] --> B[Direct Object RCs (ORCs)]; A --> C[4 Main Tasks (in the following order)];
```

2 Sub-Studies

- Direct Object RCs (ORCs)
- Subject RCs (SRCs)

4 Main Tasks (in the following order)

1. Elicited Production (English) → processing (production)
2. Self-Paced Reading (English) → processing (comprehension)
3. Acceptability Judgment (English & Korean/Mandarin) → acceptability
4. C-test (English) → proficiency

Testing L2ers in both the L1 and the TL is important because the exact distribution of RPs in Korean and Mandarin is still not well understood

(see Zenker & Schwartz, 2017)

Research Questions

For L1-Korean and L1-Mandarin adult L2ers of English...

RQ 1: Is resumption a licit option for ORC formation?

RQ 2: Does resumption facilitate real-time comprehension of ORCs?

RQ 3: Does proficiency influence the acceptability and processing of resumptive vs. filler-gap ORCs?

Including both L1-Korean and L1-Mandarin participants allows us to observe how having an L1 with vs. without grammatical resumption in the relevant environment affects performance

Participants

- Adult English native speakers (ENSs)
- L1-Korean adult L2ers of English (KLEs)
- L1-Mandarin adult L2ers of English (MLEs)

Table 2. Participant information (means and ranges)

Group	<i>n</i>	Age at Testing	C-test Score	Age of Onset	Years of Residence
ENS	90	27.14 (18–71)	42.79 (22–50)	—	—
KLE	69	26.29 (18–41)	30.64 (7–46)	9.35 (8–15)	0.32 (0–7)
MLE	76	28.14 (18–45)	28.83 (7–49)	9.71 (8–14)	0.04 (0–1)

Note. 50-item C-test used to measure English proficiency.

Self-Paced Reading Task

Self-Paced Reading Task

Probed processing of gaps vs. RPs during real-time sentence comprehension

- 2 × 3 design crossing DEPENDENCY (gap vs. RP) and ENVIRONMENT (short-distance vs. long-distance vs. *wh*-island)
- 30 critical items (6 conditions × 5 tokens, Latin-squared) and 42 fillers (28 grammatical; 14 ungrammatical)

For critical trials, correctly answering the question relied on accurate dependency resolution

Critical Conditions

Increasingly difficult relativization environments

Table 3. Critical Conditions in the Self-Paced Reading Task

Environment	Example Stimulus
Short	I think Mary knows the man that these detectives arrested { <u> </u> /*him} <u>at</u> <u>the</u> beginning of the week.
Long	Mary knows the man that I think these detectives arrested { <u> </u> /*him} <u>at</u> <u>the</u> beginning of the week.
Island	Mary knows the man that I wonder which detectives arrested {* <u> </u> /*him} <u>at</u> <u>the</u> beginning of the week.

Regions of interest

(cf. Hofmeister & Norcliffe, 2013)

Data Analysis and Predictions

- **Reading times:** Residual reading times (RRTs) at the two regions of interest analyzed using separate linear mixed-effects regression models

→ Under processing strain, faster reading times in RP trials than in gap trials

- **Comprehension question accuracy:** Binary accuracy data analyzed using a mixed-effects logistic regression model

→ Under processing strain, higher accuracy in RP trials than in gap trials

- **Proficiency effects:** Reading time and comprehension question accuracy analyses repeated for L2ers with proficiency as continuous fixed effect

→ Under processing strain, negative relationship between proficiency and size of the RP advantage over gaps

(Standard data cleaning performed prior to analysis)

Results: Reading Time Data

Regions 1–2 are the RP region



Figure 1. Summary of findings for reading time data. Region 0 is the gap/RP region; error bars are 95% confidence intervals; dashed rectangle indicates regions of interest.

Results: L2 Proficiency Effects for Reading Time Data

Positive relationship between proficiency and reading times

- As proficiency increased, reading times got slower
- Driven by KLE data from RP trials

No significant DEPENDENCY × PROFICIENCY interaction

- No relationship found between proficiency and strength of RP advantage in reading times

Results: Comprehension Question Accuracy Data

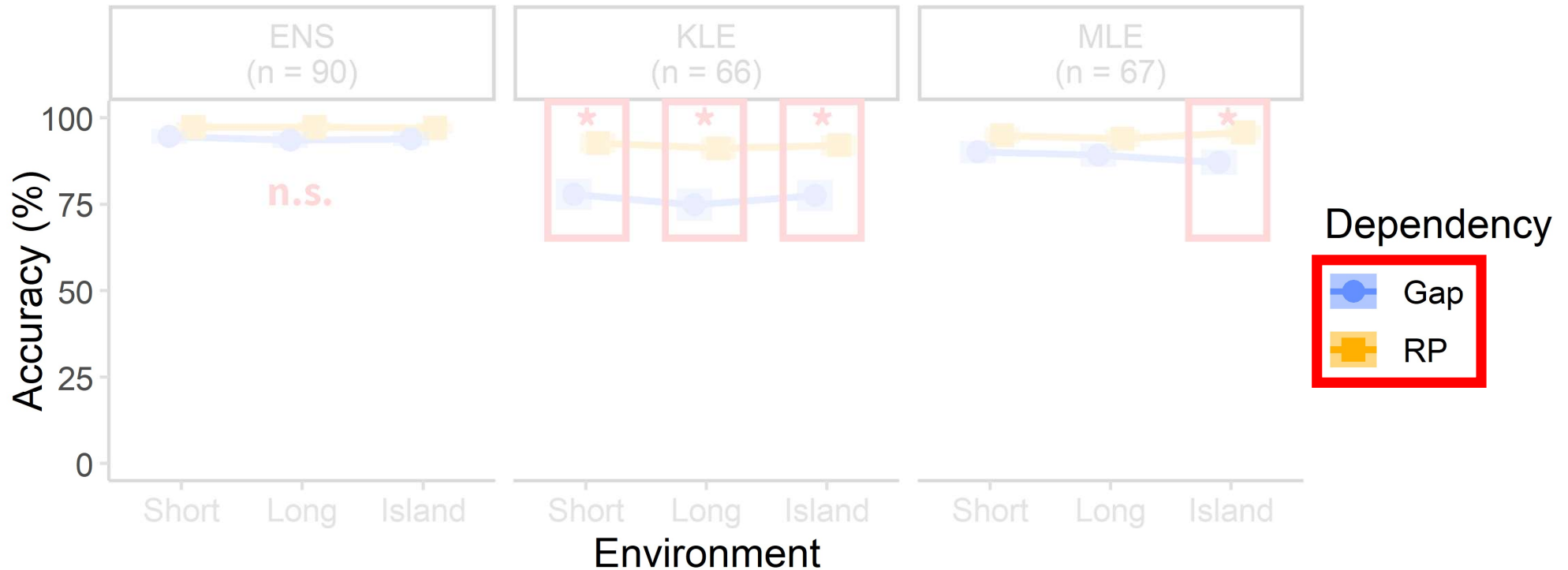


Figure 2. Mean accuracy rates on comprehension questions in the self-paced reading task. Error bars are 95% confidence intervals.

- Accuracy higher for RPs than for gaps
- Accuracy lower for KLEs than for ENSs or MLEs

Results: L2 Proficiency Effects for Accuracy Data

Positive relationship between accuracy and proficiency

→ As proficiency increased, accuracy increased

No DEPENDENCY × PROFICIENCY interaction

→ No relationship found between proficiency and strength of RP advantage in accuracy rates

Acceptability Judgment Task

Acceptability Judgment Task

Tested offline acceptability of sentence types from self-paced reading task

- Same design/stimuli as self-paced reading task
- 30 critical items (6 conditions \times 5 tokens, Latin-squared) and 42 fillers (28 grammatical; 14 ungrammatical)
- English, Korean, and Mandarin versions
- 1–6 scale with additional I-don't-know option

Mary knows the man that I wonder which detectives arrested him last week.

Completely Unacceptable

1

2

3

4

5

6

Completely Acceptable

Press the zero key if you cannot rate the sentence

Critical Conditions

Shortened time phrase

Table 4. Critical Conditions in the English Acceptability Judgment Task

Environment	Example Stimulus
Short	I think Mary knows the man that these detectives arrested { /* him } last week.
Long	Mary knows the man that I think these detectives arrested { /* him } last week.
Island	Mary knows the man that I wonder which detectives arrested {* /* him } last week.

Korean and Mandarin AJTs

- Closely-translated versions of the English stimuli
- ‘Island’ conditions not assumed to be syntactic islands

Data Analysis and Predictions

- **Acceptability ratings:** Raw 1–6 ratings analyzed using a mixed-effects cumulative link regression model

→ Low ratings for RP trials

→ Higher ratings for gaps than for RPs (where gaps are grammatical)

- **Proficiency effects:** Analysis of English-task data repeated for L2ers with English proficiency as a continuous fixed effect

→ Positive relationship between proficiency and strength of gap preference (where gaps are grammatical)

(2 participants with strong yes-biases removed)

Results: Judgment Data

Midpoint of scale

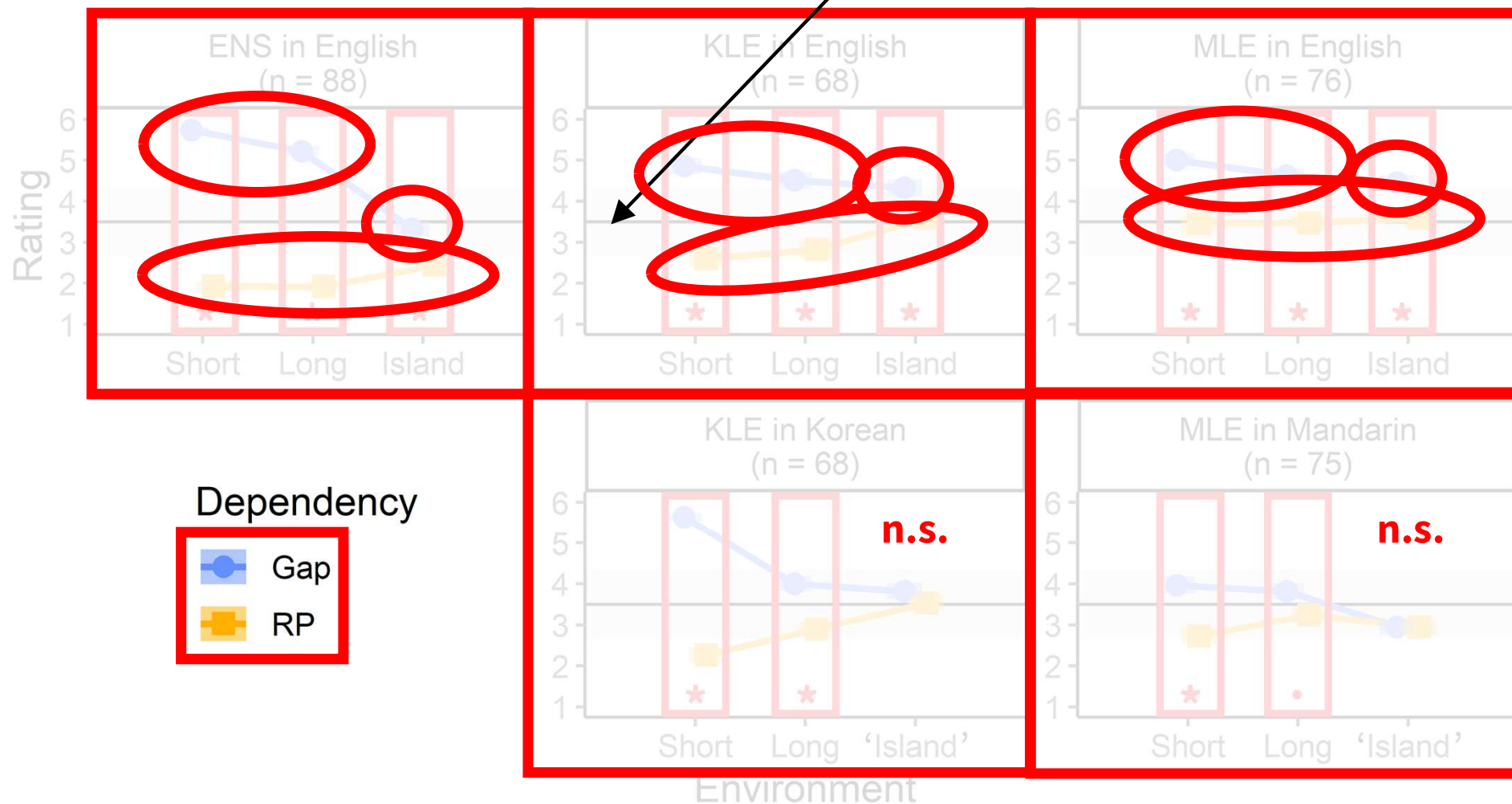


Figure 3. Mean ratings from the acceptability judgment task. Error bars represent 95% confidence intervals. Shaded region is middle third of scale.

Results: L2 Proficiency Effects for Judgment Data

Significant DEPENDENCY \times PROFICIENCY interaction

- As proficiency increased, the size of the preference for gaps over RPs increased
- Strongest for KLE group in short-distance and long-distance environments

Discussion

Summary: Self-Paced Reading Task

RQ: Does resumption facilitate real-time comprehension of ORCs?



RPs ease ORC comprehension under processing strain

- Reading time data
- Comprehension question accuracy data

RQ: Does proficiency influence the processing of resumptive vs. filler-gap ORCs?



No statistically significant relationship between L2 proficiency and strength of RP processing advantage

Support for claim that resumption can facilitate RC comprehension



- in adult L1 English (e.g., Hammerly, 2022; Hofmeister & Norcliffe, 2013)
- in an L2 (e.g., Hyltenstam, 1984)

Challenge to claim that resumption hinders comprehension

(e.g., Morgan et al., 2020)

Summary: Acceptability Judgment Task

RQ: Is resumption a licit option for ORC formation?

-  No group consistently accepted RPs
-  All groups preferred gaps to RPs in English

RQ: Does proficiency influence the acceptability of resumptive vs. filler-gap ORCs?

-  Positive relationship between proficiency and size of gap preference

Support for claim that RPs are ungrammatical in L1 English

(e.g., Han et al., 2012; Heestand et al., 2011; Keffala & Goodall, 2011)

Challenge to claim that RPs are grammatical for L2ers

(e.g., Hyltenstam, 1984)

Future Directions

RP too close to head?

- Why didn't MLEs consistently accept RPs in Mandarin?

Mandarin Stimulus in 'Island' Environment

黃	麗	認識	那	個	我	好奇	哪	些	偵探
Huang	Li	renshi	na	ge	wo	haoqi	na	xie	zhentan
Huang	Li	know	DEM2	CL	1s	wonder	which	CL	detective
上	個	星期	逮捕	{ /他}	的	男人。			
shang	ge	xingqi	daibu	{ /ta}	de	nanren			
last	CL	week	arrest	{ /3MS}	REL	man			

'Huang Li knows the man that I wonder which detectives arrested *(*him) last week.'

- Do RPs facilitate RC processing in Korean and Mandarin?

Conclusion: For all groups, resumption is ungrammatical but still eases real-time ORC comprehension under processing strain

Acknowledgments

Our sincere thanks to:

- Yu-Tzu Chang, In Ji Chun, Kamil Deen, Shin Fukuda, Theres Grüter, Haerim Hwang, Li 'Julie' Jiang, Hyunwoo Kim, Jieun Kim, Kitaek Kim, Eunsun Lee, William O'Grady, Akari Ohba, Hajime Ono, Amy Schafer, Rex A. Sprouse, Hong Ri Zenker, Jing 'Crystal' Zhong
- The Language Acquisition Research Group at the UH
- The Bilinski Dissertation Fellowship at the UH Department of Second Language Studies
- *A Language Learning* Dissertation Grant
- An NSF Linguistics Doctoral Dissertation Research Improvement Grant (Award #2141214)
- A Paula Menyuk Travel Award from Boston University
- All our participants

References

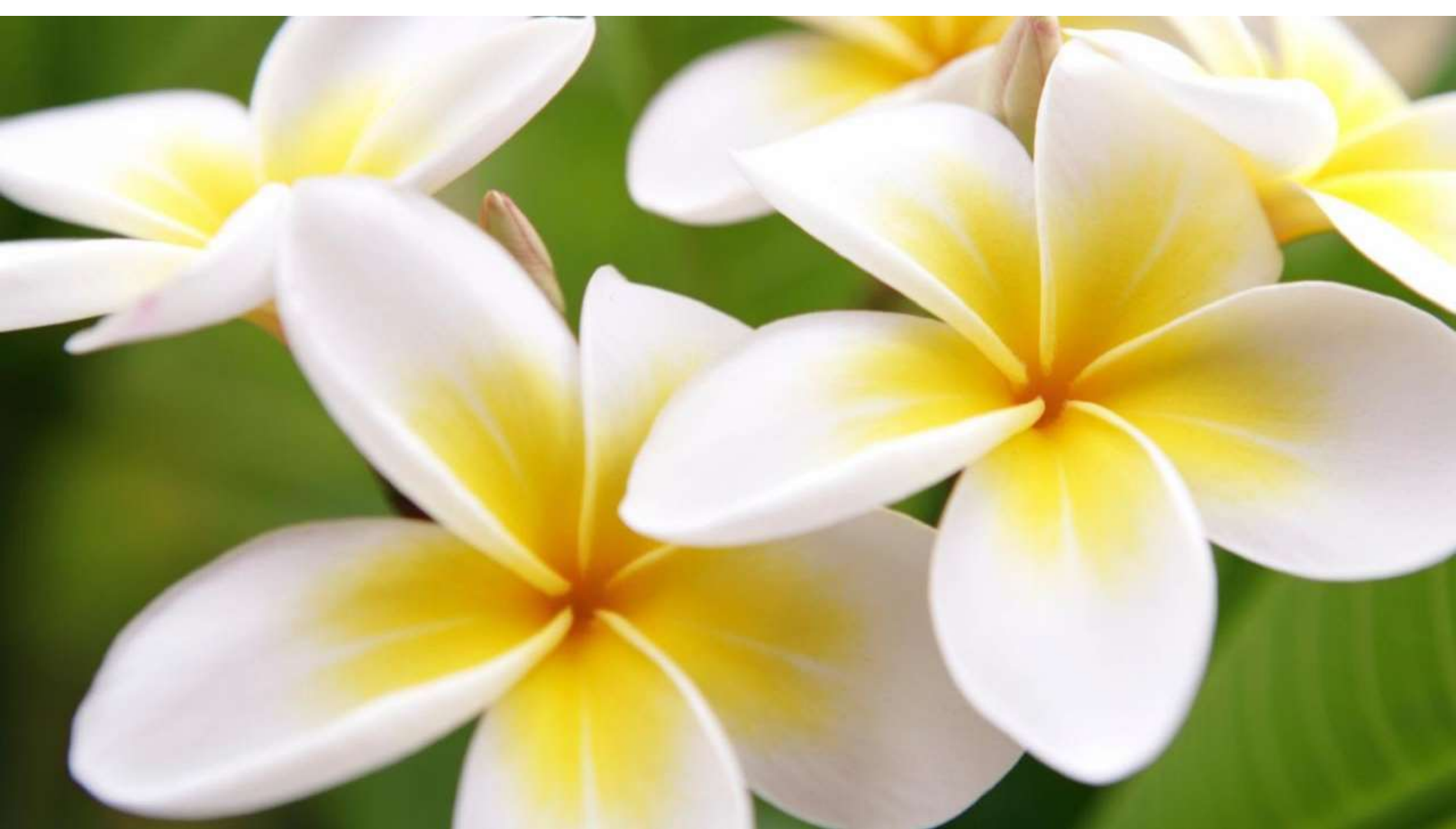
- Algady, D. (2013). *The acquisition of relative clauses: How do second language learners of Arabic do it?* Doctoral dissertation, University of Wisconsin-Milwaukee.
- Asudeh, A. (2004). *Resumption as resource management*. Doctoral dissertation, Stanford University.
- Ferreira, F., & Swets, B. (2005). The production and comprehension of resumptive pronouns in relative clause “island” contexts. In A. Cutler (Ed.), *Twenty-first century psycholinguistics: Four cornerstones* (pp. 263–278). Lawrence Erlbaum.
- Gass, S. M. (1979). Language transfer and universal grammatical relations. *Language Learning*, 29, 327–344.
- Hammerly, C. (2022). The pronoun which comprehenders who process it in islands derive a benefit. *Linguistic Inquiry*, 53, 823–835.
- Han, C. (2013). On the syntax of relative clauses in Korean. *Canadian Journal of Linguistics*, 58, 319–347.
- Han, C., Elouazizi, N., Galeano, C., Görgülü, E., Hedberg, N., Hinnell, J., Jeffrey, M., Kim, K., & Kirby, S. (2012). Processing strategies and resumptive pronouns in English. In N. Arnett & R. Bennett (Eds.), *Proceedings of the 30th West Coast Conference on Formal Linguistics* (pp. 153–161). Cascadia Press.
- Heestand, D., Xiang, M., & Polinsky, M. (2011). Resumption still does not rescue islands. *Linguistic Inquiry*, 42, 138–152.

References (continued)

- Hitz, J., & Francis, E. J. (2016). On the usefulness of formal judgment tasks in second-language research: The case of resumptive pronouns in English, Turkish, and Mandarin Chinese. *Linguistics*, 54, 1241–1280.
- Hofmeister, P., & Norcliffe, E. (2013). Does resumption facilitate sentence comprehension? In P. Hofmeister & E. Norcliffe (Eds.), *The core and the periphery: Data-driven perspectives on syntax inspired by Ivan A. Sag* (pp. 225–246). CSLI Publications.
- Hyltenstam, K. (1984). The use of typological markedness conditions as predictors in second language acquisition: The case of pronominal copies in relative clauses. In R. W. Andersen (Ed.), *Second languages: A cross-linguistic perspective* (pp. 39–58). Newbury House.
- Keenan, E. L., & Comrie, B. (1977). Noun phrase accessibility and universal grammar. *Linguistic Inquiry*, 8, 63–99.
- Keffala, B. & Goodall, G. (2011). *Do resumptive pronouns ever rescue illicit gaps in English?* Poster presented at the 2011 CUNY Conference on Human Sentence Processing, Stanford University, Stanford, CA.
- Kim, C.-E. (2013). *Asymmetries in the production of relative clauses: First and second language acquisition* [Doctoral dissertation, University of Hawai‘i at Mānoa]. ProQuest Dissertations and Theses.

References (continued)

- Kwon, N. (2008). *Processing of syntactic and anaphoric gap-filler dependencies in Korean: Evidence from self-paced reading time, ERP and eye-tracking experiments*. Doctoral dissertation, University of California, San Diego.
- Morgan, A. M., von der Malsburg, T., Ferreira, V. S., & Wittenburg, E. (2020). Shared syntax between comprehension and production: Multi-paradigm evidence that resumptive pronouns hinder comprehension. *Cognition*, 205, Article 104417.
- Morgan, A. M., & Wagers, M. W. (2018). English resumptive pronouns are more common where gaps are less acceptable. *Linguistic Inquiry*, 49, 861–867.
- Pan, V. J. (2016). *Resumptivity in Mandarin Chinese: A minimalist account*. De Gruyter.
- Pavesi, M. (1986). Markedness, discoursal modes, and relative clause formation in a formal and an informal context. *Studies in Second Language Acquisition*, 8, 38–55.
- Song, J. J. (2003). Resumptive genitive pronouns in Korean relative clauses: Distribution and explanation. *SKY Journal of Linguistics*, 16, 139–160.
- Zenker, F., & Schwartz, B. D. (2017). Topicalization from adjuncts in English vs. Chinese vs. Chinese-English Interlanguage. In M. LaMendola & J. Scott (Eds.), *Proceedings of the 41st annual Boston University Conference on Language Development* (pp. 806–819). Cascadilla Press.
- Zenker, F., & Schwartz, B. D. (2021). Resumptive pronouns facilitate processing of long-distance relative clause dependencies in second language English. *Proceedings of the Linguistic Society of America*, 6, 325–339.
- Zukowski, A., & Larsen, J. (2004). *The production of sentences that we fill their gaps*. Poster presented at the 2004 annual CUNY Conference on Human Sentence Processing, University of Maryland, College Park, MD.



Mahalo for your attention!