The processing and acceptability of gapped vs. resumptive relative clauses in first and second language English

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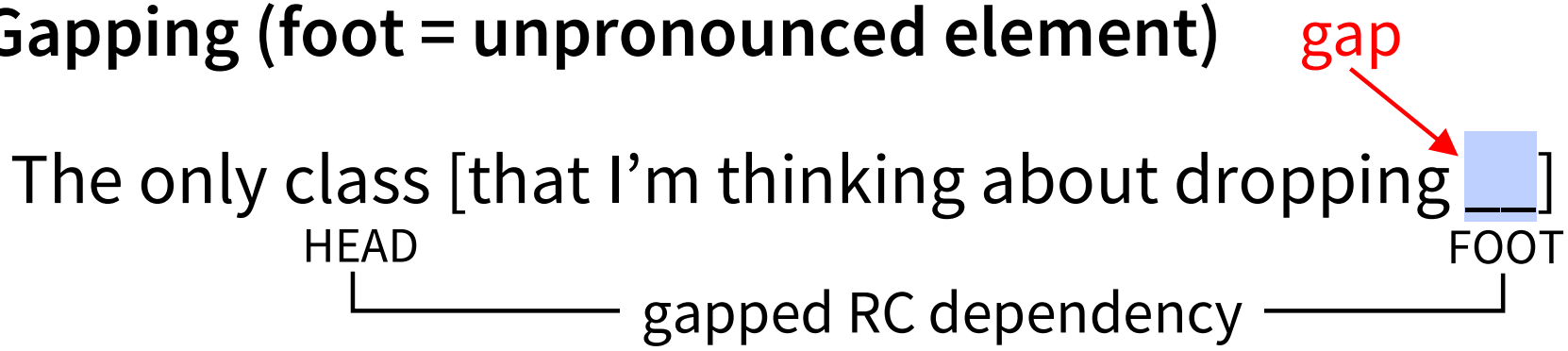
Fred Zenker (fzenker@hawaii.edu)
Department of Second Language Studies
University of Hawai‘i at Mānoa

Dissertation Defense

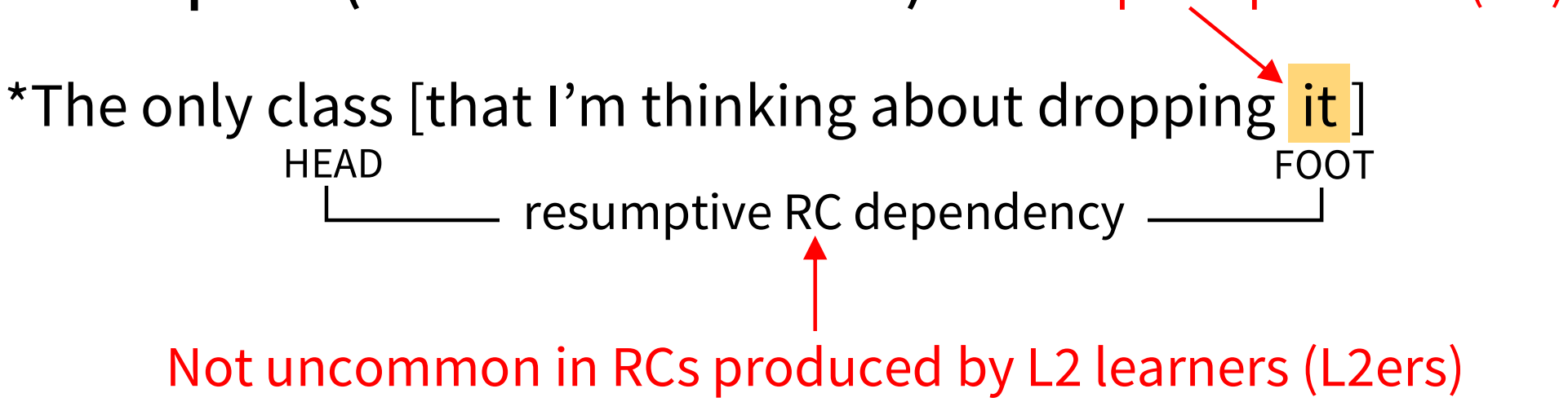
10 May 2024

Gapping vs. resumption in relative clauses (RCs)

Gapping (foot = unpronounced element)



Resumption (foot = overt nominal)



Grammatical resumptives vs. processing resumptives

Grammatical resumptives

- Licensed by the grammar
- Arabic, Cantonese, Hebrew, Irish, Mandarin, Persian, etc.

Processing resumptives

- Not licensed by the grammar
- Decreases processing load in difficult RC dependencies
- English, French, Italian, Spanish

(see Asudeh, 2004; McCloskey, 2017; Meltzer-Asscher, 2021; Sells, 1984)

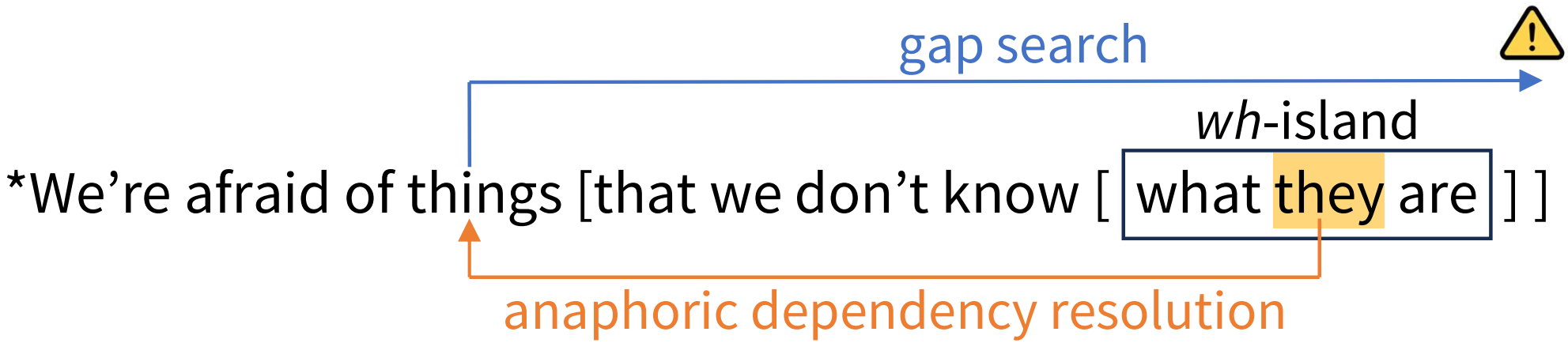
Resumption facilitates processing by…

- explicitly marking the foot of the dependency, thereby making it easier to locate

  (Beltrama & Xiang, 2016; J. A. Hawkins, 1999; Hofmeister & Norcliffe, 2013)

- providing a means of establishing coreference when gapped RC dependencies break down

  (Asudeh, 2004, 2011, 2012; see also Morgan & Wagers, 2018)



Distribution of gapped and resumptive RCs

Table 1. Distribution of grammatical gapping (−), resumption (+), and unrelativizable positions (0) in single-clause RCs

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

SU = subject; DO = direct object; IO = indirect object; OBL = oblique; GEN = genitive; OCOMP = object of comparison; adapted from Keenan & Comrie, 1977, p. 93, Table 2

Experimental research on adult L1 English resumption

- **Acceptability judgment tasks**

  Resumptive RCs receive low ratings across conditions

  → Resumption is not a licit option for relativization in English

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

- **Elicited production tasks**

  Higher rates of resumption in complex syntactic environments

  → Resumption eases processing during RC production

  (Ferreira & Swets, 2005; Morgan & Wagers, 2018; Zukowski & Larsen, 2004)

- **Self-paced reading tasks**

  Reading times (RTs) following RPs faster than those following gaps in complex syntactic environments

  → Resumption may ease processing during RC comprehension

  (Hammerly, 2022; Hofmeister & Norcliffe, 2013)

  ⚠ Faster RTs can also indicate abandonment of the parse, so it is important to check for accurate RC interpretation (Morgan et al., 2020)

  ⚠ Almost no studies have done this, and those that have did not find that RPs improve accuracy (Hammerly, 2022; Morgan et al., 2020)

Claim: Resumption is only helpful in production and not in comprehension

(Ferreira & Swets, 2005; Heestand et al., 2011; Morgan et al., 2020; Polinsky et al., 2013)

⚠ Requires further testing

Experimental research on adult L2 resumption

- L2ers produce resumptive RCs even when ungrammatical in both the L1 and the target language

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

- Rates of production and acceptance for resumptive RCs are higher in environments thought to be harder for relativization

  (e.g., Algady, 2013; Gass, 1979; Hyltenstam, 1984; Maghrabi, 1997; Marefat & Abdollahnejad, 2014; Pavesi, 1986; Solaimani et al., 2023; Tezel, 1998)

- L2 performance is at least partly dependent on the L1

  (e.g., Alosaimi, 2021; Gass, 1979; Hyltenstam, 1984; Maghrabi, 1997; Solaimani et al., 2023; Tezel, 1998)

- More advanced L2ers typically show a closer approximation of native-speaker performance

  (e.g., Alosaimi, 2021; Maghrabi, 1997; Marefat & Abdollahnejad, 2014; Solaimani et al., 2023)

Assumption: Performance patterns faithfully reflect representations licensed by the interlanguage grammar

(e.g., Algady, 2014; Eckman, 2004; Hyltenstam, 1984; Marefat & Abdollahnejad, 2014; Pavesi, 1986)

⚠ Requires explicit testing

Research questions (RQs)

For adult L1-English controls and L1-Korean and L1-Mandarin adult L2ers of English…

RQ1: Does resumption ease both production and comprehension of RCs under processing strain?

RQ2: Do at least some L2ers treat resumption as a licit option for English relativization?

RQ3: Does L2 English proficiency have an impact on ratings for RPs?

RQ4: Must L2ers consider RPs acceptable to derive a processing benefit from them?

Scope of the current project

2 Sub-Studies (with separate groups of participants):

1. Direct Object RCs (ORCs)
2. Subject RCs (SRCs)

4 Main Tasks (in the following order):

1. Elicited production task (EPT) – in English
   Processing during English RC production
2. Self-paced reading task (SPRT) – in English
   Processing during English RC comprehension
3. Acceptability judgment task (AJT) – in English and Korean/Mandarin
   Acceptability of the sentence types in the EPT and the SPRT
4. English proficiency C-test

Testing L2ers in both the L1 and the target language in the AJTs allows us to check our assumptions about the acceptability of the relevant sentence types in the L1

A three-way contrast in processing difficulty

Short-Distance > Long-Distance > *Wh*-Island

- **Short-Distance:**
  the man [that these detectives arrested ___]
- **Long-Distance:**
  the man [that I think [these detectives arrested ___]]
- ***Wh*-island:**
  *the man$_1$ [that I wonder [which detectives$_2$ ___$_2$ arrested ___$_1$]]

(Hawkins, 1999, 2004; Morgan & Wagers, 2018; O'Grady, 2012, 2022)

Table 2. Expected distribution of gapping (−) and resumption (+) and unrelativizable positions (0) in the relevant ORC environments

Language	Short-Distance	Long-Distance	'*Wh*-Island'
English	−	−	0
Korean	−	−	−
Mandarin	±	±	±

Based on judgments of Korean and Mandarin language consultants; for English, see also Ross (1967); for Korean, see also Han (2013); for Mandarin, see also Pan (2016)

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)

 Adult L1-Korean L2ers of English (KLEs)

 Adult L1-Mandarin L2ers of English (MLEs)

Table 3. Participant information in the ORC dataset (means and ranges)

Group	*n*	Age at Testing	C-test Score	Age of Onset	Years in Anglosphere
ENS	90	26.98 (18–71)	42.79 (22–50)	—	—
KLE	69	26.29 (18–41)	32.64 (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)

50-item C-test (Zenker, in prep.) used to measure English proficiency

Elicited Production Task (EPT)

→ *Processing during RC production*

Experimental design

- 3 conditions (short-distance vs. long-distance vs. *wh*-island)
- 15 critical items (6 conditions × 5 tokens, Latin-squared) and 15 fillers eliciting short-distance RCs

Table 4. Critical conditions in the EPT

Environment	Target Response with Gapping vs. Resumption
Short	the man [that the officers arrested {___/*him} last week]
Long	the man [that Mary thinks [the officers arrested {___/*him} last week]]
Island	the man [that Mary wonders [which officers arrested {*___/*him} last week]]

Example trial in the Island condition

Mary wonders which officers arrested this man last week.

Lisa wonders which officers arrested this man last week.

Which man is this?

Lisa wonders which officers arrested this man last week.

Recording...

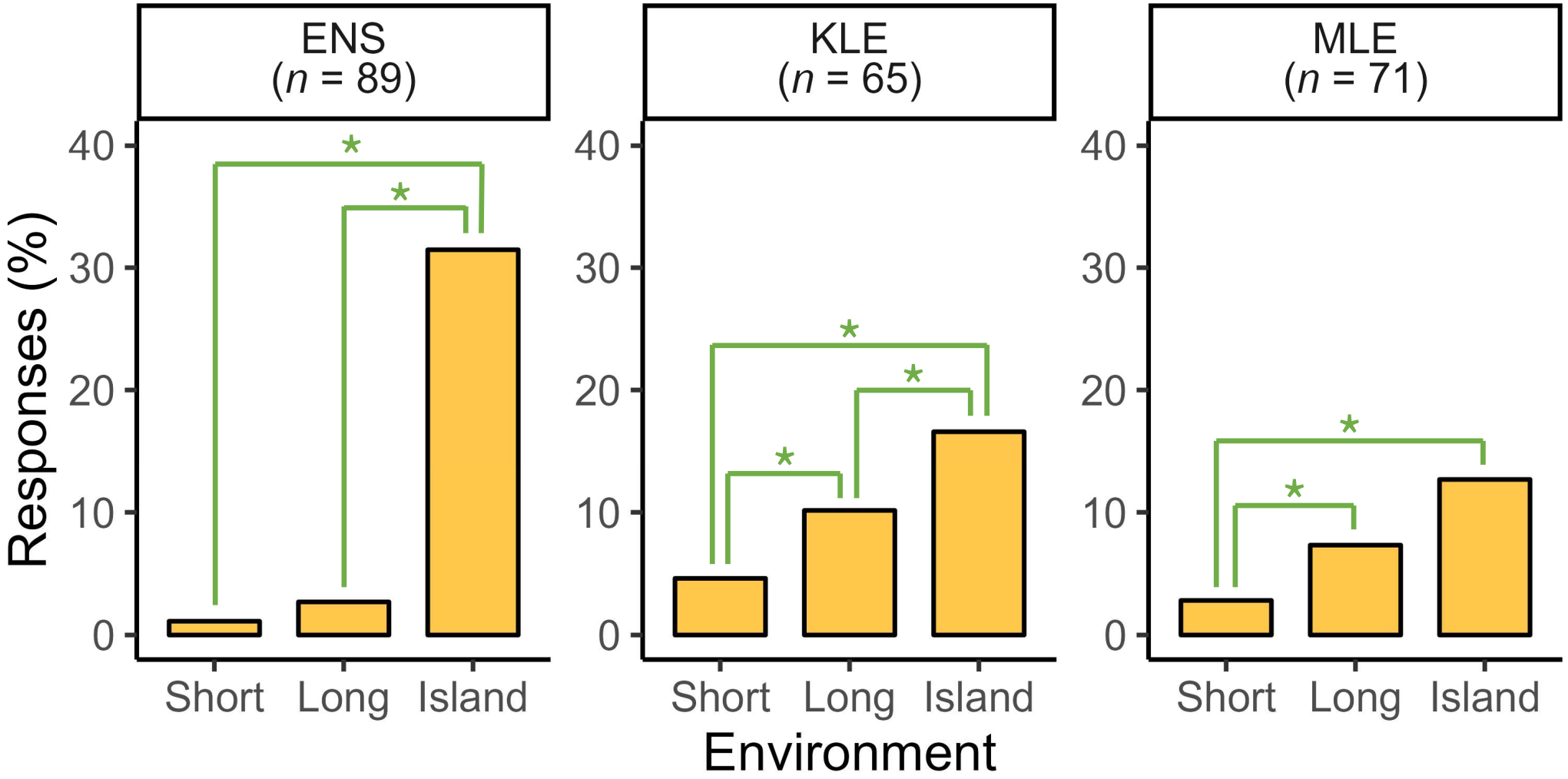
See Ferreira and Swets (2005) for a similar procedure

"the man [that Mary wonders [which officers arrested {___/him} last week]]"

RQ1: Does resumption ease both production and comprehension of RCs under processing strain?

→ *Examine how rates of resumption responses vary across conditions*

Fig 1. Resumption rates in the EPT



Model formula: Resumption ~ Environment * Group + (1 | Participant) + (1 + Environment + Group | Item)

Self-Paced Reading Task (SPRT)

→ *Processing during RC comprehension*

Experimental design

- 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)

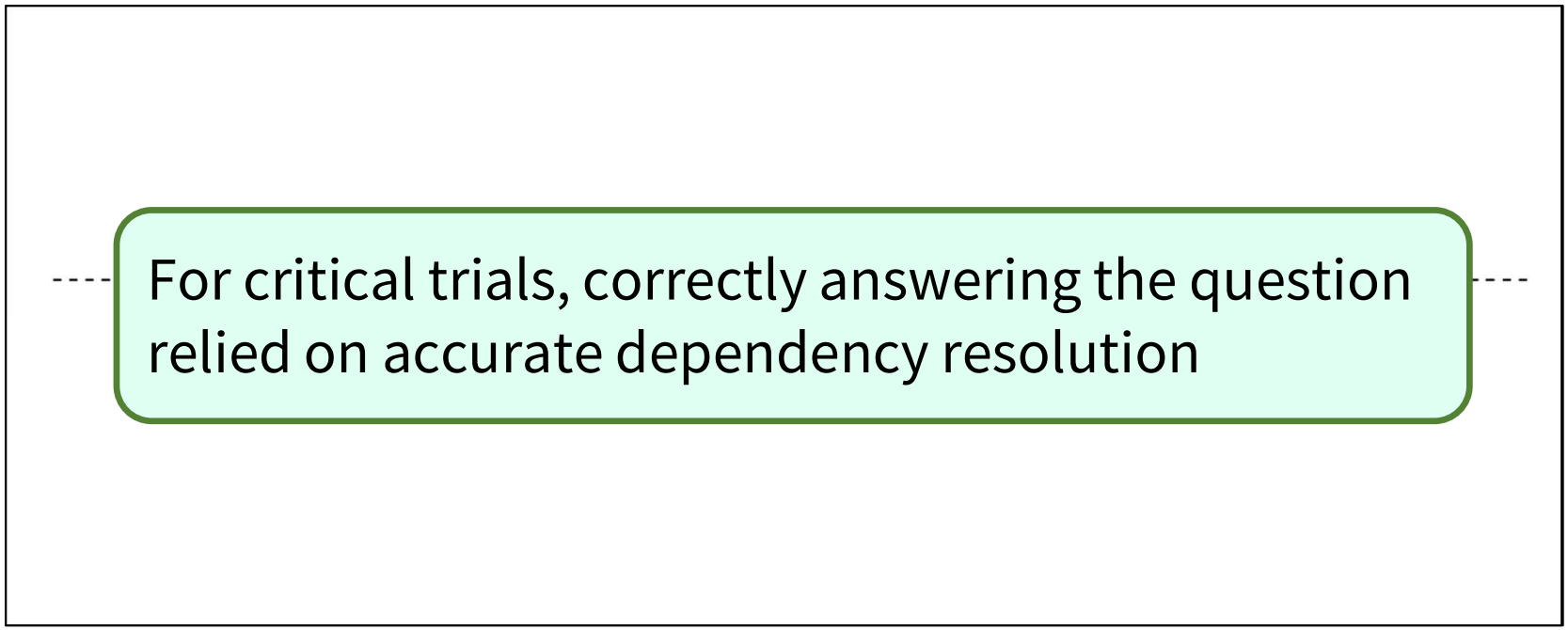


Table 5. Critical Conditions in the Self-Paced Reading Task

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

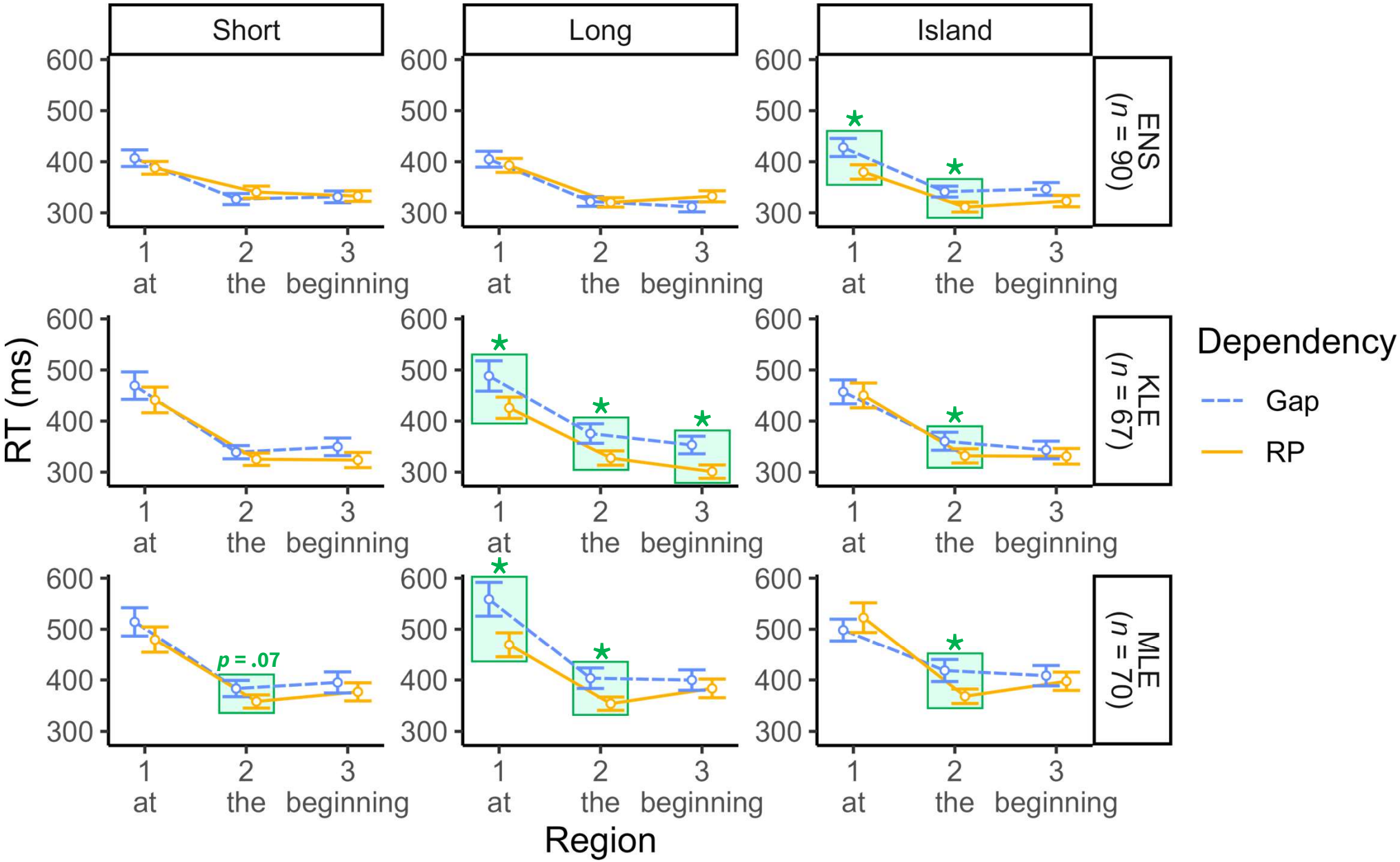
(cf. Hammerly, 2022; Hofmeister & Norcliffe, 2013)

Regions of interest

RQ1: Does resumption ease both production and comprehension of RCs under processing strain?

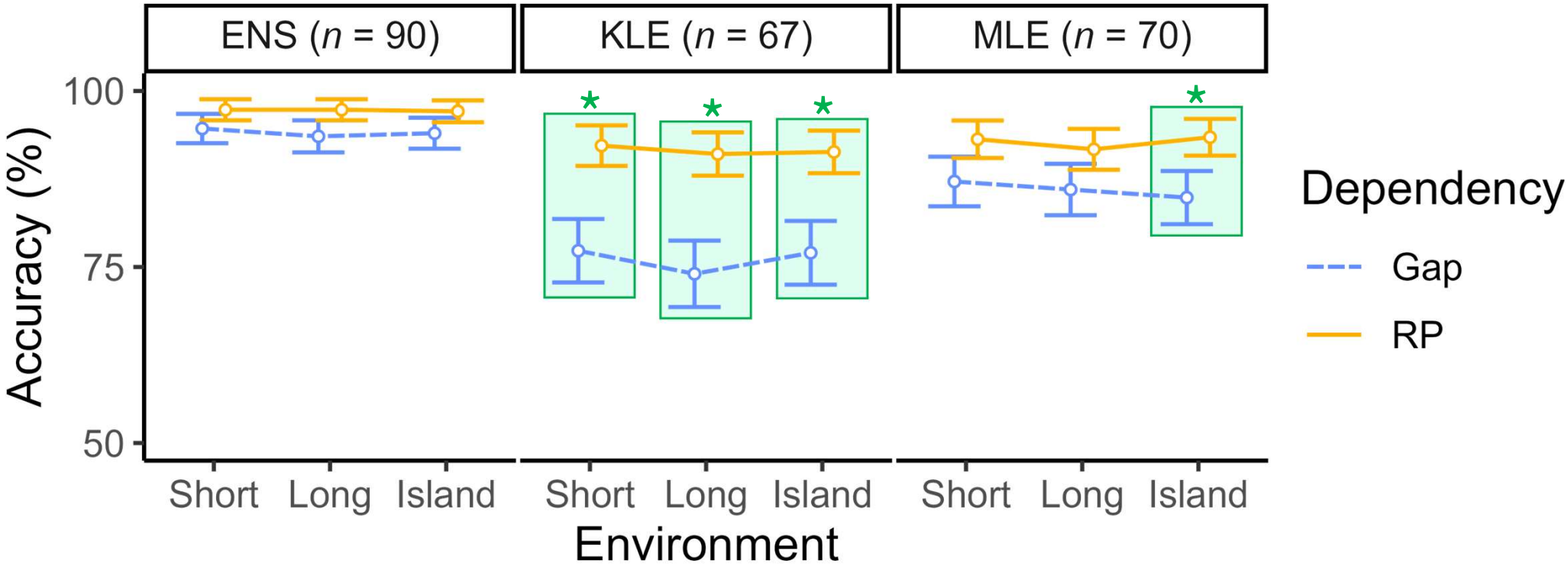
→ *Examine how gapped RCs and resumptive RCs compare in terms of reading times (RTs) and comprehension-question accuracy scores*

Fig 2. Mean RTs in the SPRT



Note. Error bars are 95% *CI*s; Region 1 model formula: Log RT ~ Dependency * Environment * Group + (1 + Dependency + Environment | Participant) + (1 + Dependency + Environment + Group | Item)

Fig 3. Comprehension-question accuracy in the SPRT



Note. Error bars are 95% *CI*s; model formula: Accuracy ~ Dependency * Environment * Group + (1 + Dependency + Environment | Participant) + (1 + Dependency + Environment + Group | Item)

Acceptability Judgment Task (AJT)

→ *Offline acceptability of gaps vs. RPs in RCs*

Experimental design

- 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)
- English, Korean, and Mandarin versions

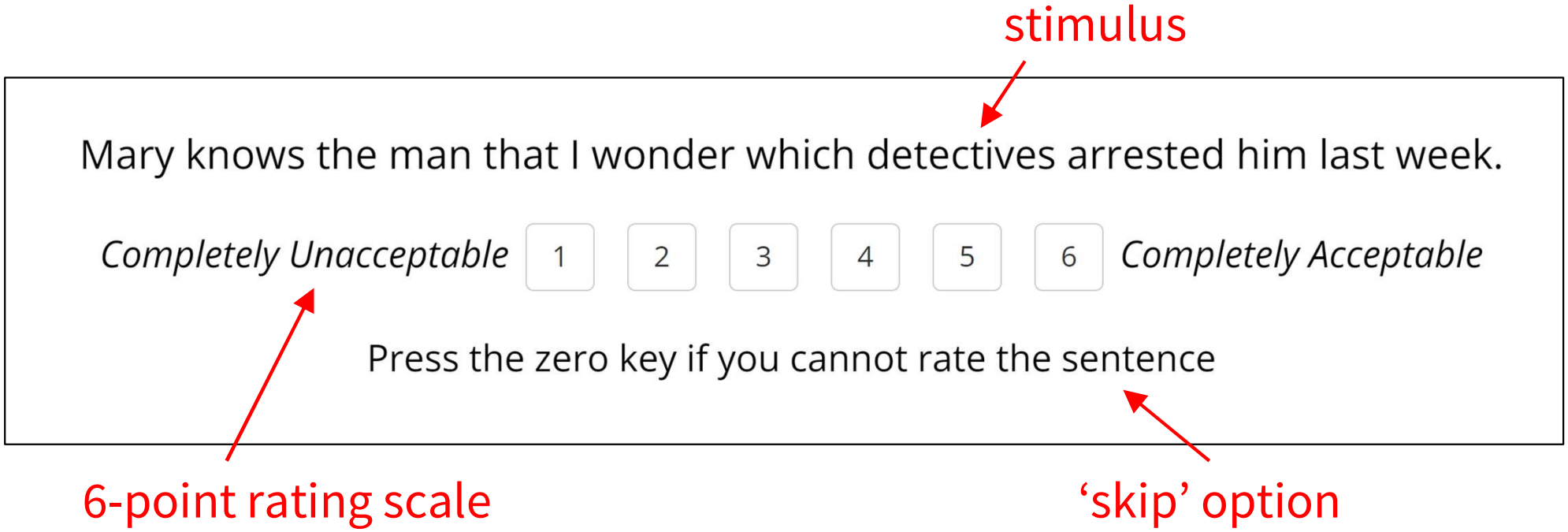


Table 6. Critical Conditions in the English Acceptability Judgment Task

Environment	Example Stimulus
Short	I think Mary knows the man that these detectives arrested {___/*him} last week. ← Shortened time phrase
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.

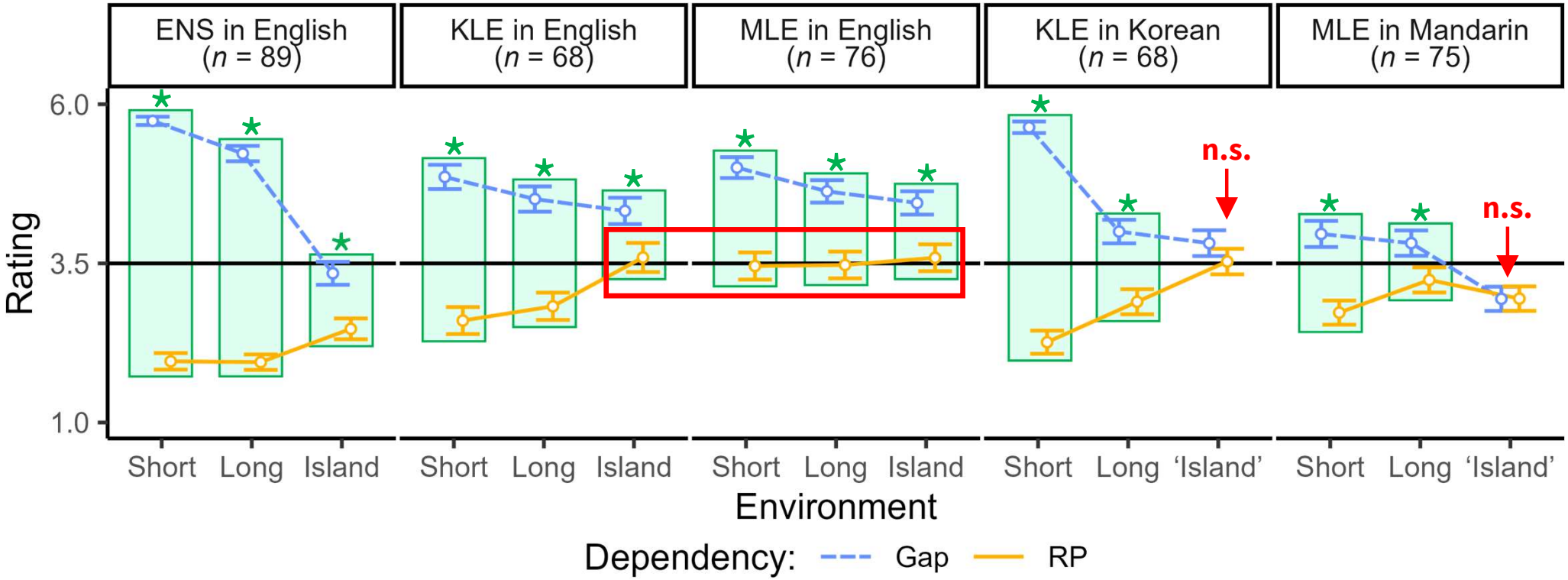
Korean and Mandarin AJTs:

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

RQ2: Do at least some L2ers treat resumption as a licit option for English relativization?

→ *Examine the rating patterns in the AJT data*

Fig 4. Mean ratings by group in the AJTs

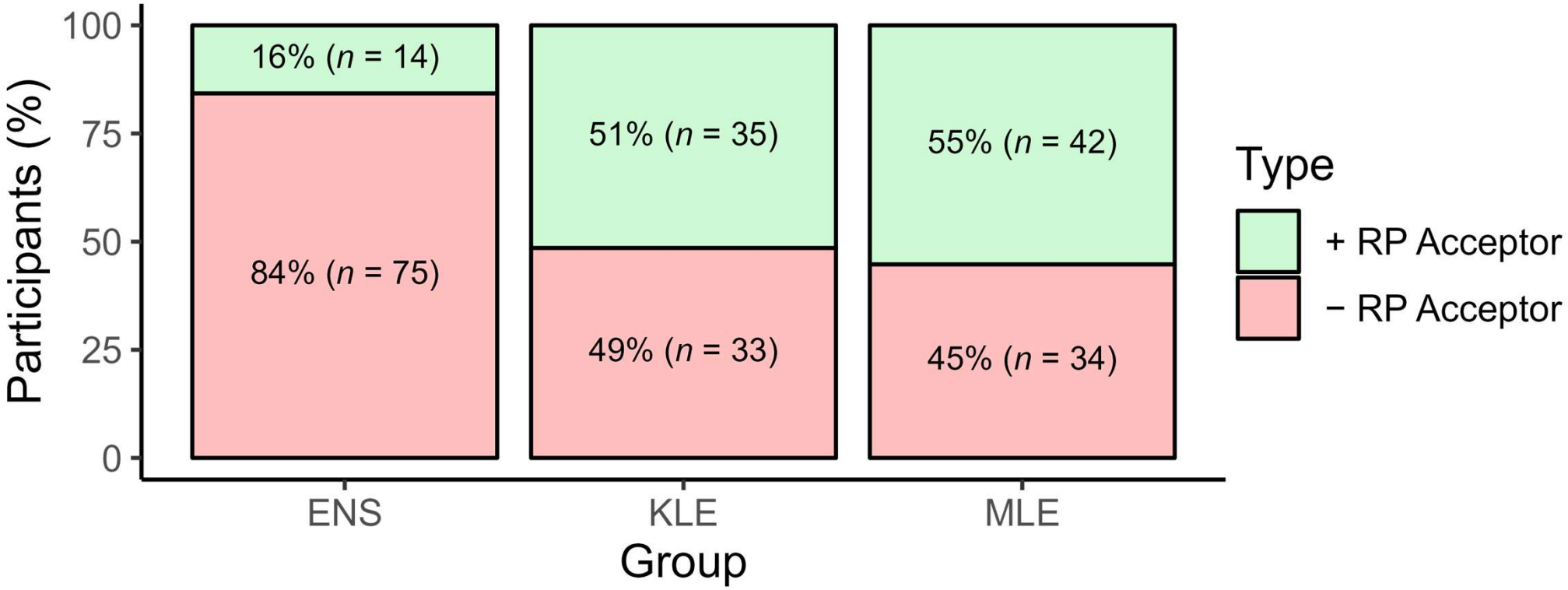


Note. Error bars are 95% *CI*s. Center line represents midpoint on rating scale; model formula: Rating ~ Dependency * Environment * Group + (1 + Dependency + Environment | Group) + (1 + Dependency + Environment + Group | Item)

Identification of consistent RP acceptors

→ Participants who gave “acceptable” ratings (4, 5, or 6) to ≧ 80% of RP trials in at least one condition

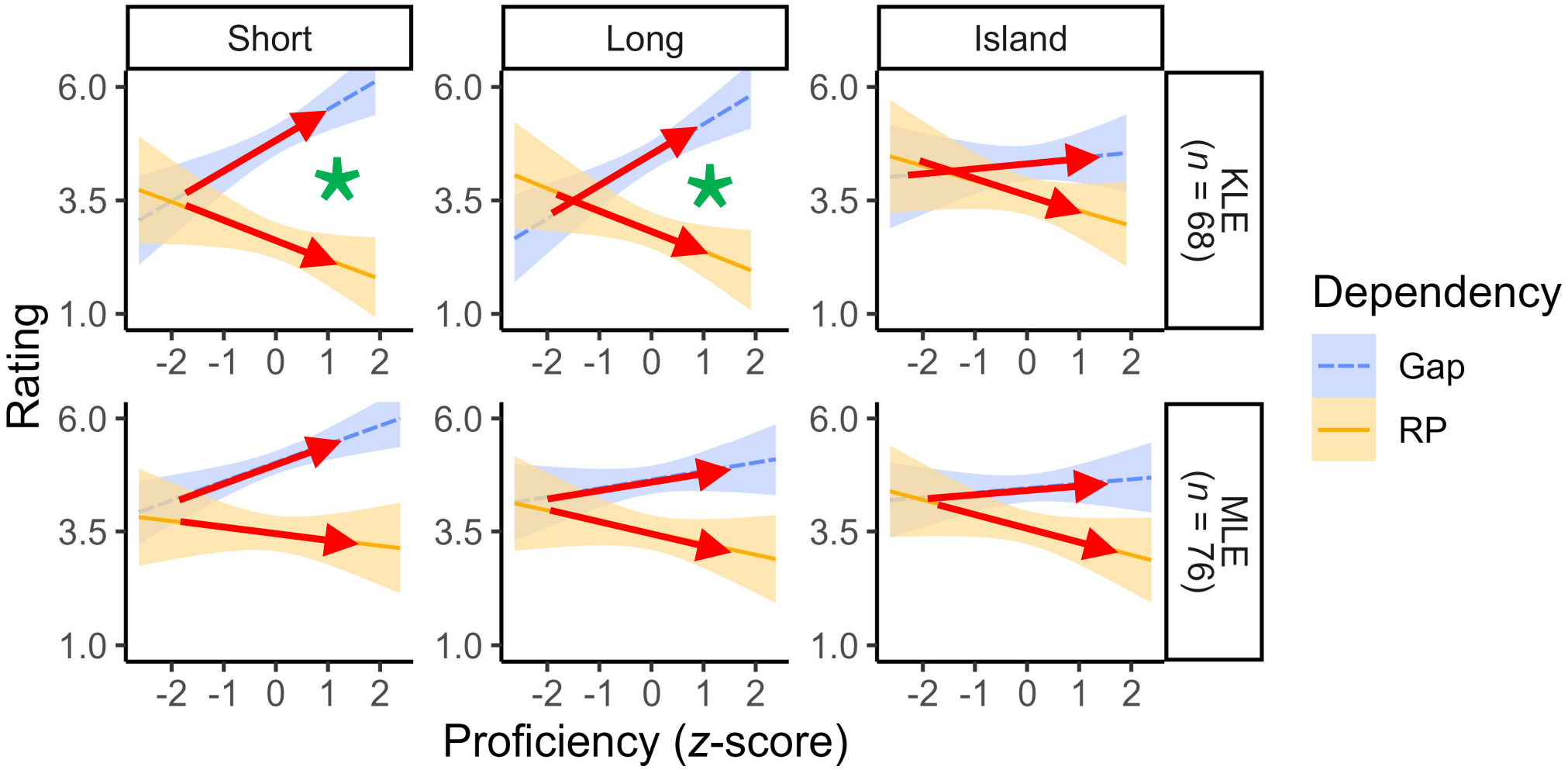
Fig 5. Proportion of RP acceptors in the English AJT



RQ3: Does L2 English proficiency have an impact on ratings for RPs?

→ *Test for L2 proficiency effects in the English AJT data*

Fig 6. L2 proficiency effect on ratings

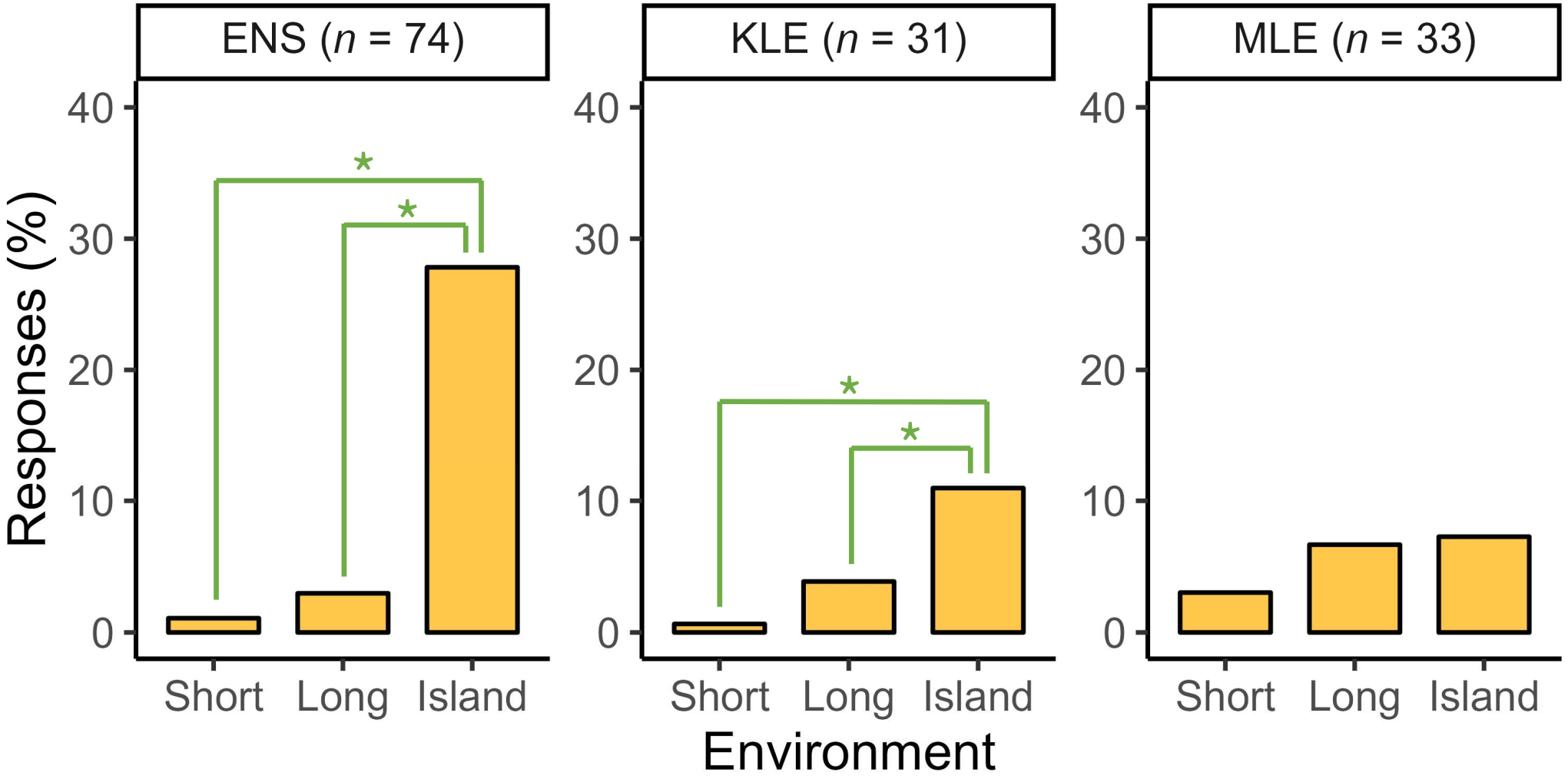


Note. Error bars are 95% *CI*s; model formula: Accuracy ~ Dependency * Environment * Group + (1 + Dependency + Environment | Participant) + (1 + Dependency + Environment + Group | Item)

RQ4: Must L2ers consider RPs acceptable to derive a processing benefit from them?

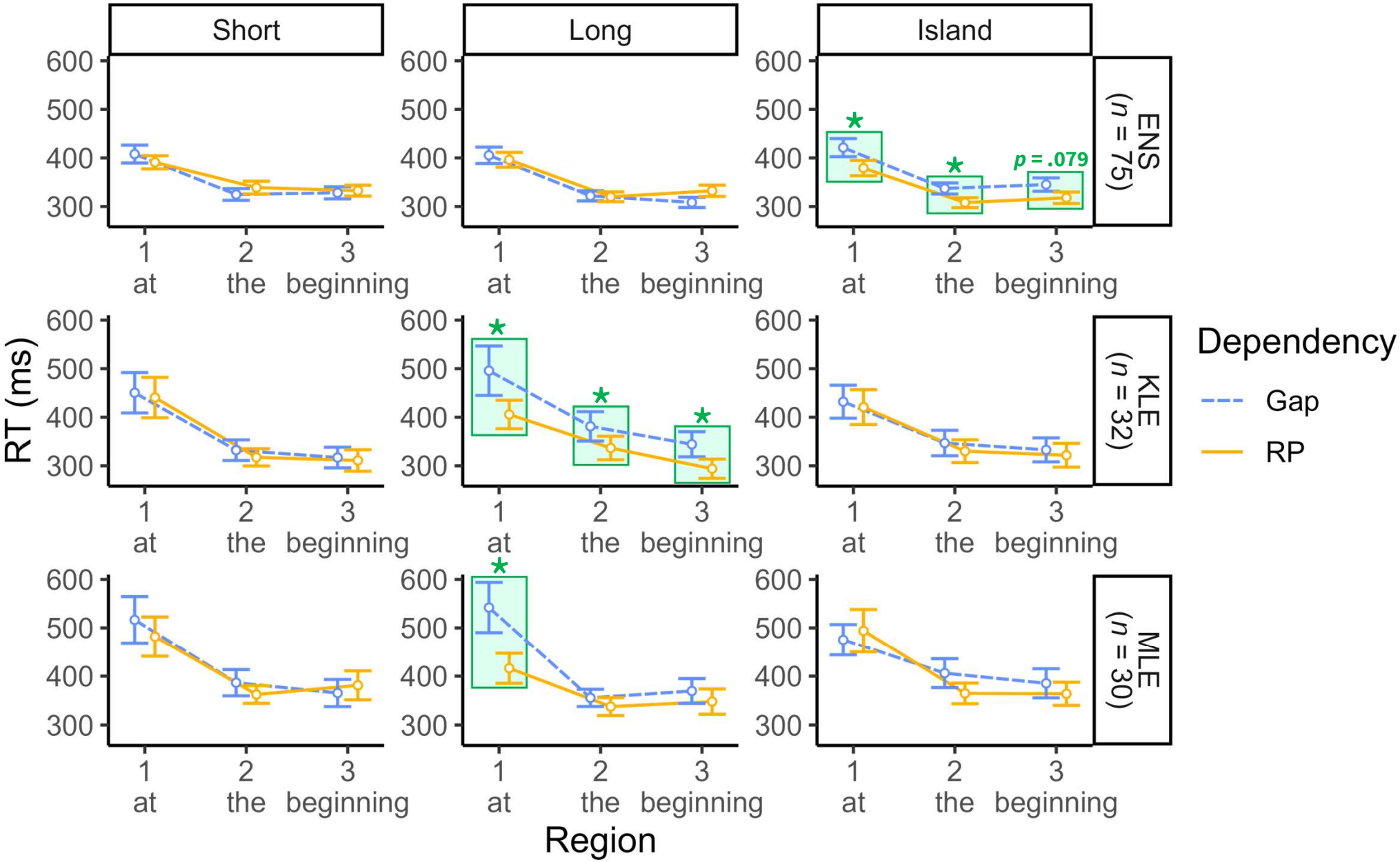
→ *Reanalyze the EPT and SPRT data with consistent RP acceptors from the English AJT removed*

Fig 7. EPT resumption rates after removing RP acceptors



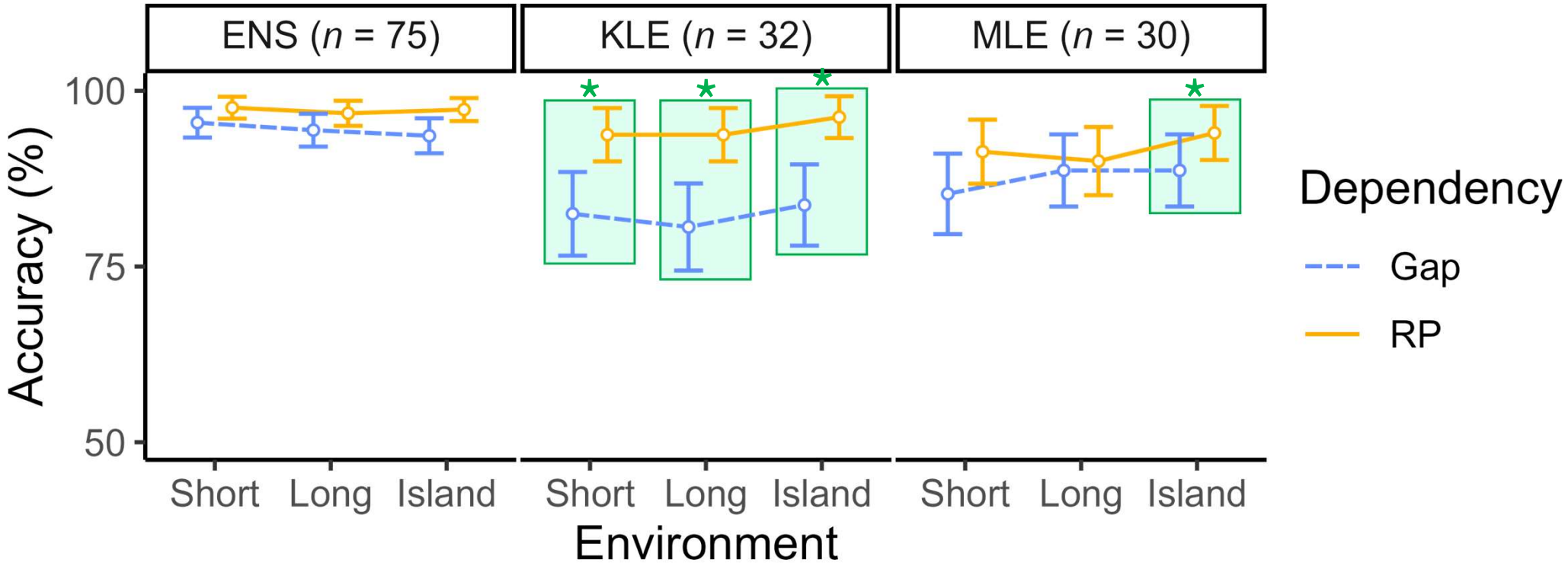
Model formula: Resumption ~ Environment * Group + (1 | Participant) + (1 + Group | Item)

Fig 8. SPRT reading times after removing RP acceptors



Note. Error bars are 95% *CI*s; Region 1 model formula: Log RT ~ Dependency * Environment * Group + (1 + Dependency + Environment | Participant) + (1 + Dependency + Group | Item)

Fig 9. SPRT accuracy scores after removing RP acceptors



Note. Error bars are 95% *CIs*; Model formula: Accuracy ~ Dependency * Environment * Group + (1 + Dependency + Environment | Participant) + (1 + Dependency + Environment + Group | Item)

Wrapping up…

RQ1: Does resumption ease both production and comprehension of RCs under processing strain?

Yes, analysis of the EPT data and the SPRT data indicated that RPs assist with both production and comprehension of RCs when there is strain on the processor

→ Challenges claims that resumption only helps with production (e.g., Ferreira & Swets, 2005; Morgan et al., 2020)

RQ2: Do at least some L2ers treat resumptive RCs as a licit option for English relativization?

Yes, a portion of the participants in each L2 group did consistently accept resumptive RCs in at least one of the English environments tested

→ Suggests that those individuals may have an interlanguage grammar that allows resumptive RCs

RQ3: Does L2 English proficiency have an impact on ratings for RPs?

Yes, higher proficiency scores were associated with lower ratings for RPs and higher ratings for gaps

→ Indicates that L2ers can become sensitive to the English prohibition on resumption in RCs

→ This sensitivity appears to develop fastest where processing is easiest

RQ4: Must L2ers consider RPs acceptable to derive a processing benefit from them?

No, there were clear signs of processing facilitation for resumption in the EPT data and the SPRT data even with RP acceptors removed

→ Suggests that for ENSs and many L2ers, resumptive RCs are purely processing resumptives

→ Challenges the traditional L2 assumption that performance faithfully reflects representations licensed by the grammar (e.g., Algady, 2014; Eckman, 2004; Hyltenstam, 1984; Marefat & Abdollahnejad, 2014; Pavesi, 1986)

Acknowledgments

My sincere thanks to:

- Ivan Bondoc, Amber Camp, Yu-Tzu Chang, Yunchuan Chen, Ann Tai Choe, In Ji Sera Chun, Nicholas Coney, Kamil Deen, Shin Fukuda, Theres Grüter, Daniel Holden, Yao Huang, Haerim Hwang, Daniel Isbell, Li 'Julie' Jiang, Hyeyoung Jung, Jennifer Kanda, Justin Kanda, John Kawahara, Hyunwoo Kim, Jieun Kim, Kitaek Kim, Kristopher Kyle, Rickey Larkin, Eunsun Lee, William O'Grady, Akari Ohba, Hajime Ono, Leeseul Park, Anu Reddy, Daniel Sato, Amy Schafer, Bonnie D. Schwartz, Ivy Sichel, Rex A. Sprouse, Yi-ching Su, Nozomi Tanaka, Shigeo Tonoike, Maziar Toosarvandani, Matt Wagers, Jue Wang, Hong Ri Zenker, Jing 'Crystal' Zhong
- The Language Acquisition Research Group at UH
- The Bilinski Dissertation Fellowship from the Department of Second Language Studies at UH
- A *Language Learning* Dissertation Grant
- An NSF Linguistics Doctoral Dissertation Research Improvement Grant (Award #2141214)
- All my participants

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Mahalo for your kind attention!

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