L2 comprehension of English relative clauses: Resumption mitigates processing strain

Handout:

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Gapping vs. resumption in relative clauses (RCs)

Gapping (foot = unpronounced element) gap

The only class [that I'm thinking about dropping ___]
HEAD   FOOT
gapped RC dependency

Resumption (foot = overt nominal) resumptive pronoun (RP)

*The only class [that I'm thinking about dropping it]
HEAD   FOOT
resumptive RC dependency

Common in RCs produced by L2 learners (L2ers)

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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, Korean, Spanish

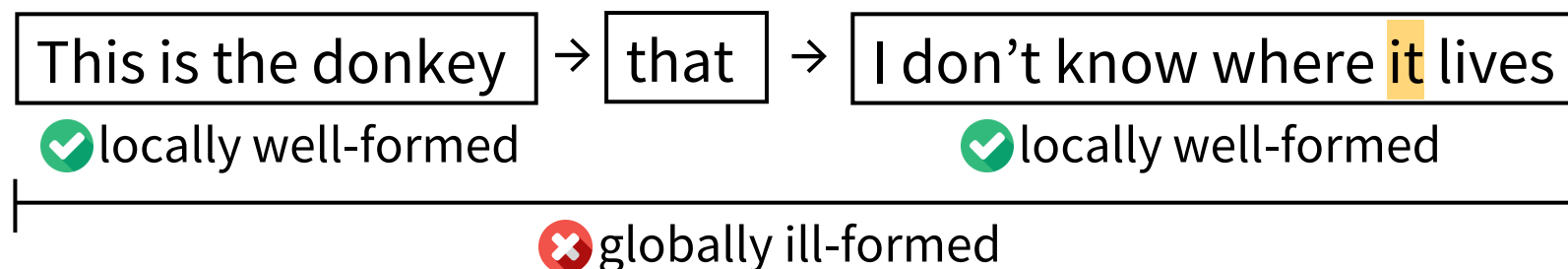(see Asudeh, 2004; McCloskey, 2017; Meltzer-Asscher, 2021; Sells, 1984)

Resumption facilitates processing by…

- offering a means of establishing coreference when a gapped RC dependency breaks down

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

- ensuring local well-formedness, even if they cannot repair the global well-formedness of the sentence

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

This is the donkey → that → I don't know where it lives

✅ locally well-formed   ✅ locally well-formed

❌ globally ill-formed

(adapted from Asudeh, 2004, p. 315, (8.32))

Distribution of gapped and resumptive RCs

direct object RCs (ORCs)

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

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

Experimental research on adult L2 resumption

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

<div align="right">(e.g., Gass, 1979; Hyltenstam, 1984; Pavesi, 1986)</div>

- Production rates for resumptive RCs are higher in environments thought to be harder for relativization

<div align="right">(e.g., Algady, 2013; Gass, 1979; Hyltenstam, 1984; Maghrabi, 1997)</div>

Taken as evidence that…

- Participants' interlanguages permit resumptive RCs

<div align="right">(e.g., Algady, 2013; Eckman, 2004; Gass, 1979; Hyltenstam, 1984; Pavesi, 1984)</div>

⚠️ Assumes that performance patterns reflect representations licensed by the grammar

- Resumption facilitates L2 processing of RCs

<div align="right">(e.g., Algady, 2013; Eckman, 2004; Hyltenstam, 1984; Maghrabi, 1997)</div>

⚠️ Has not been tested for real-time comprehension

Experimental research on adult L1 English resumption

- **Acceptability Judgment Tasks:**
  Ratings for RPs low across conditions, suggesting that resumption is not a licit option for relativization

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

- **Self-Paced Reading Tasks:**
  Reading times (RTs) following RPs faster than those following gaps under processing strain, suggesting that resumption may facilitate real-time RC comprehension

  (e.g., Hammerly, 2022; Hofmeister & Norcliffe, 2013)

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

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

Syntactic environments and processing difficulty

- **SU > DO > IO > OBL > GEN > OCOMP**

(Keenan & Comrie, 1977)

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

  o **Short-Distance:**
     the man [that these detectives arrested ___]

  o **Long-Distance:**
     the man [that I think [these detectives arrested ___]]

  o ***Wh*-island:**
     *the man [that I wonder [which detectives arrested ___]]

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

Table 3. 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

Scope of the current project

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 (RQs)

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

RQ1: Do RPs facilitate real-time ORC comprehension?

→ Extends previous L2 research by probing comprehension and by looking at a novel processing hierarchy

→ Contributes to L1 English research by directly testing for accurate RC interpretation

RQ2: If so, does this hold for individuals who do not consistently accept RPs?

→ Tests the traditional L2 assumption that performance patterns reflect representations licensed by the grammar

RQ3: Does L2 English proficiency affect ratings for RPs?

→ Investigates whether L2ers can become sensitive to English's disallowance of resumption in RCs

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Participants

🇺🇸 Adult English native speakers (ENSs)

🇰🇷 Adult L1-Korean L2ers of English (KLEs)

🇹🇼 Adult L1-Mandarin L2ers of English (MLEs)

Table 4. Participant information (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

Self-Paced Reading Task (SPRT)

Probed the processing of gaps vs. RPs during real-time ORC 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)

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

Table 3. 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

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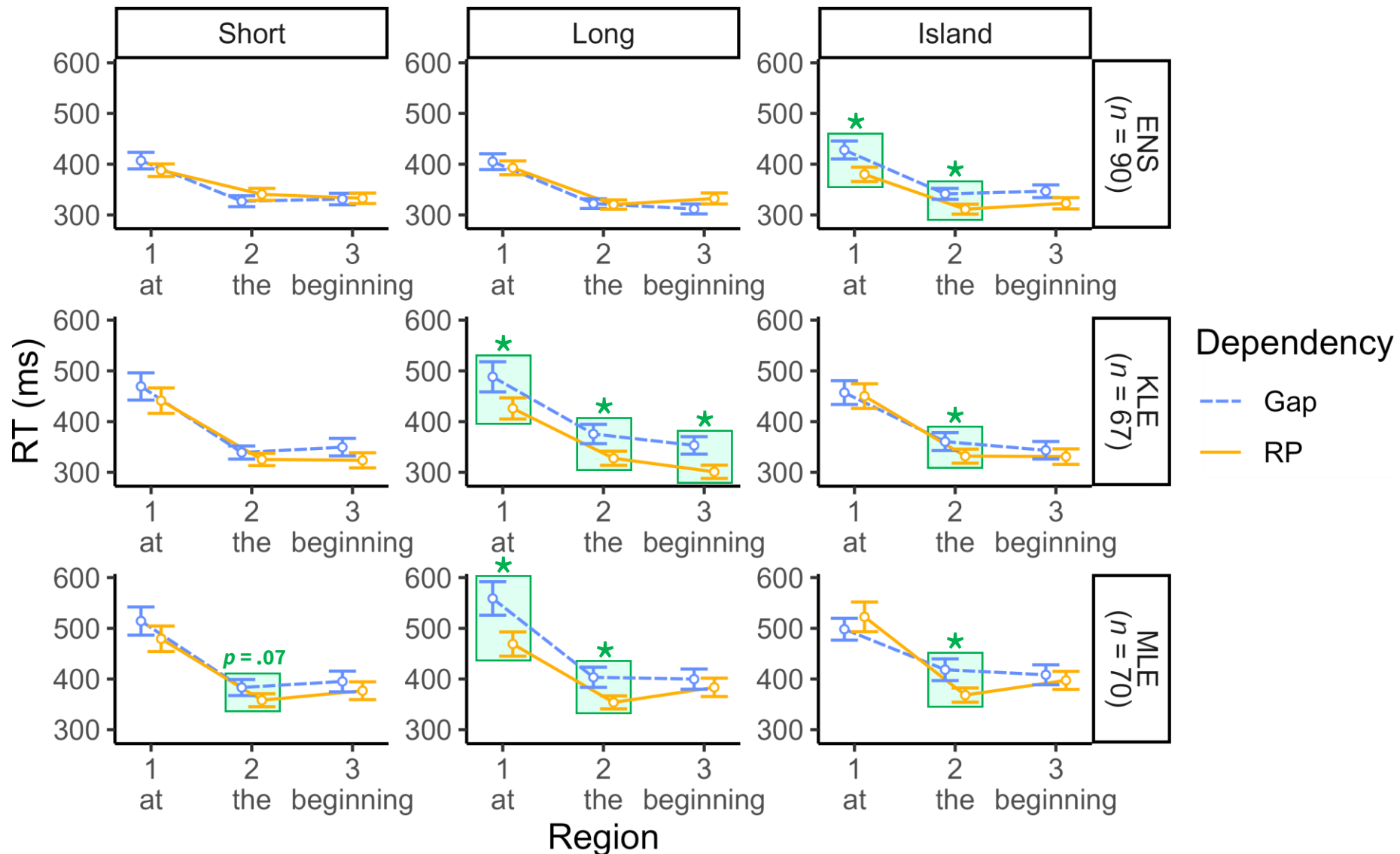
Note. Error bars are 95% *CI*s; Region 1 model formula: Log RT ~ Dependency * Environment * Group + (1 + Dependency + Environment | Participant) + (1 + Dependency + Environment + Group | Item)

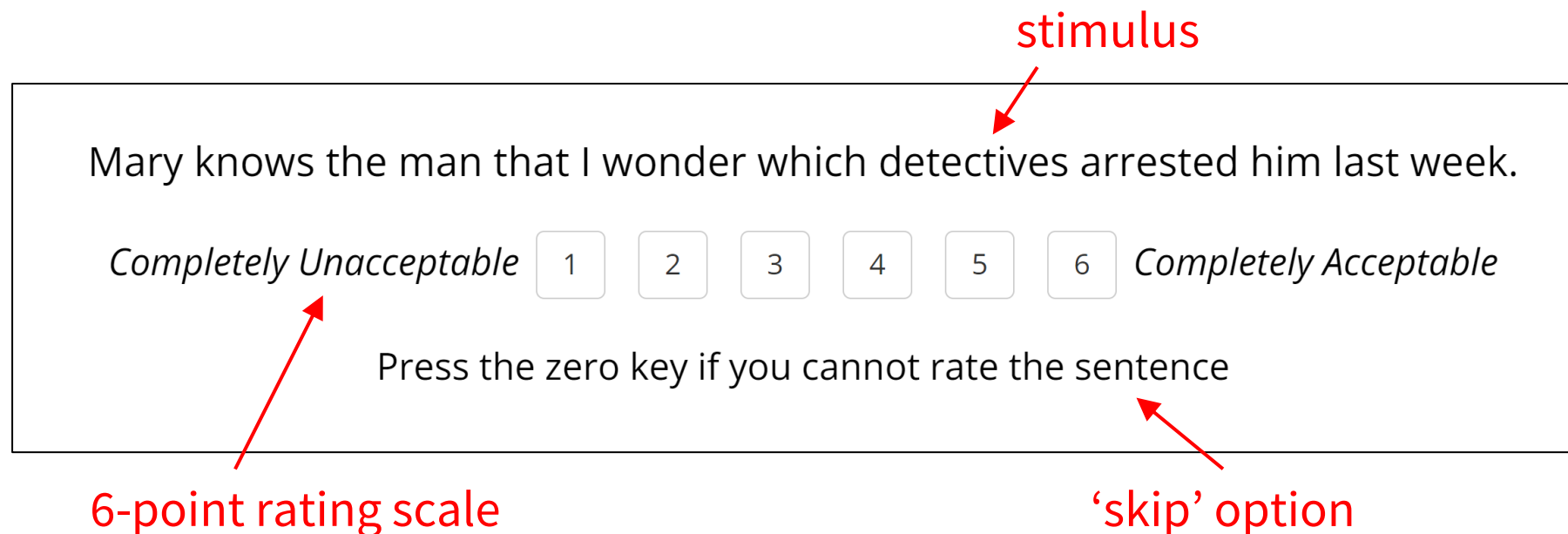16

Fig 2. Comprehension-question accuracy in the SPRT
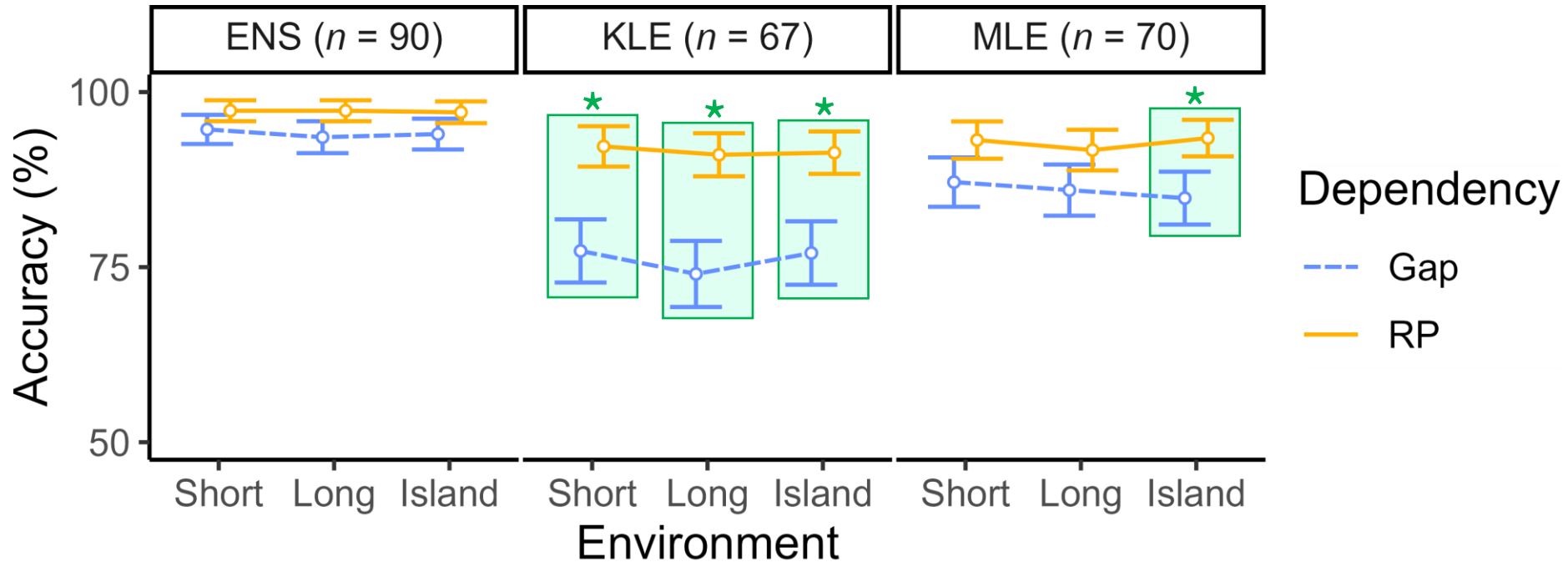
Note. Error bars are 95% CIs; model formula: Accuracy ~ Dependency * Environment * Group + (1 + Dependency + Environment | Participant) + (1 + Dependency + Environment + Group | Item)

Acceptability Judgment Task (AJT)

*Tested the offline acceptability
of gaps vs. RPs in ORCs*

Experimental design

- Same design as self-paced reading task

- 30 critical items (6 conditions × 5 tokens, Latin-squared) and 42 fillers (28 grammatical; 14 ungrammatical)

- English, Korean, and Mandarin versions

stimulus

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

6-point rating scale

'skip' option

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. ← 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

Fig 3. Mean ratings by group in the AJTs
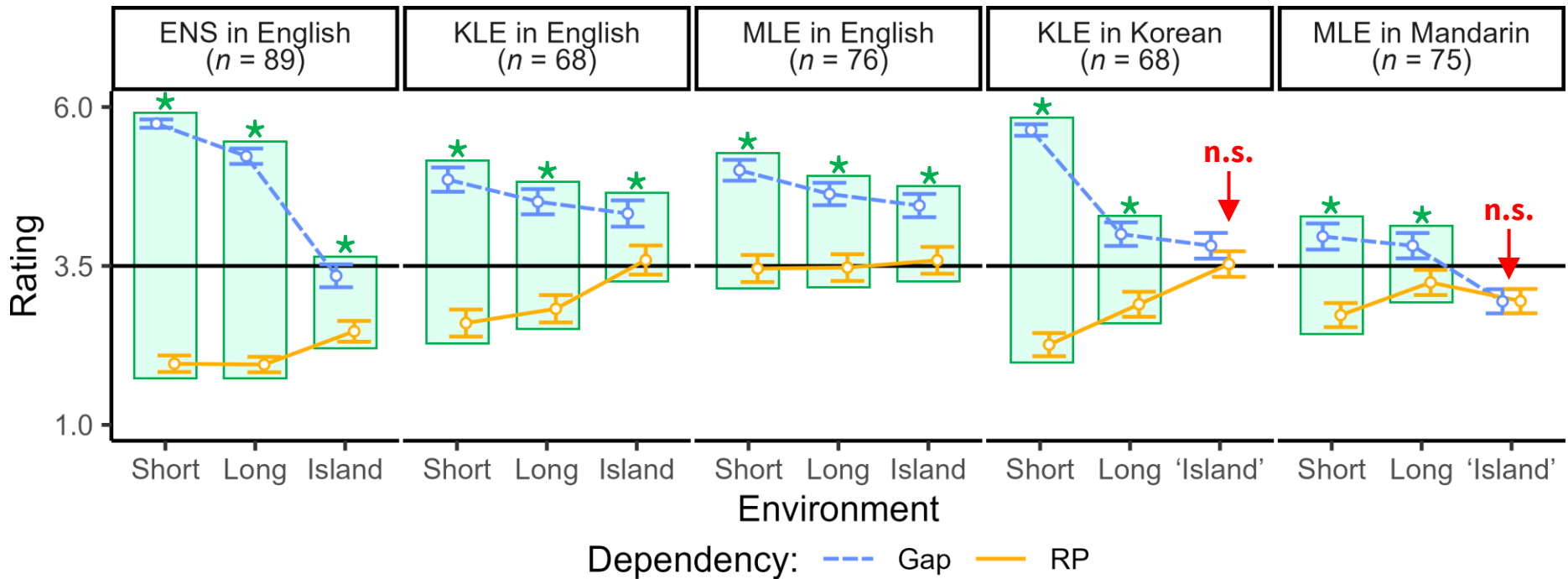
Note. Error bars are 95% *CI*s. Center line represents midpoint on rating scale; model formula: Rating ~ Dependency * Environment * Group + (1 + Dependency + Environment | Group) + (1 + Dependency + Environment + Group | Item)

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Fig 4. Accuracy data with RP acceptors removed
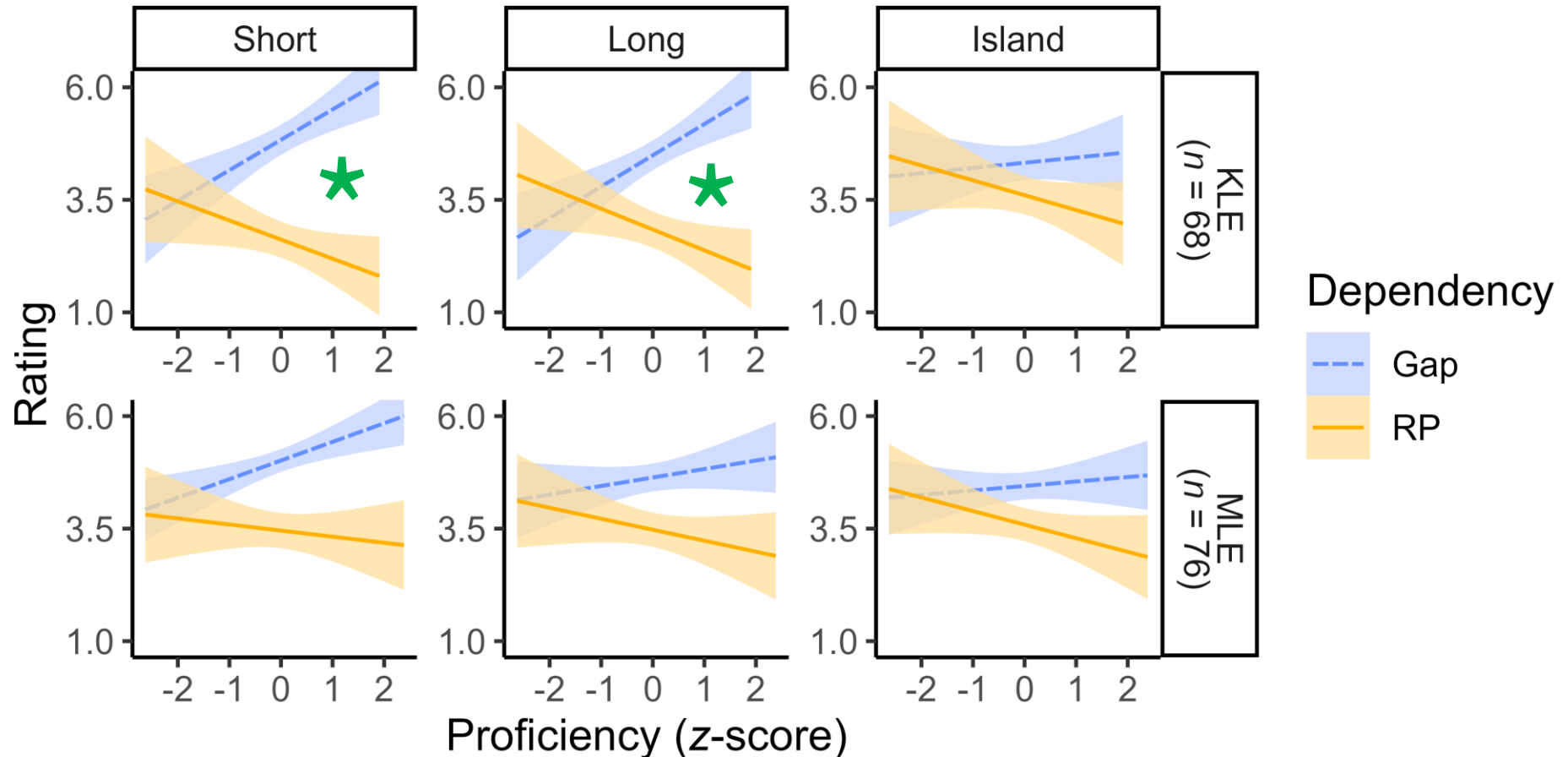
Note. Error bars are 95% *CIs*; model formula: Accuracy ~ Dependency * Environment * Group + (1 + Dependency + Environment | Participant) + (1 + Dependency + Environment + Group | Item)
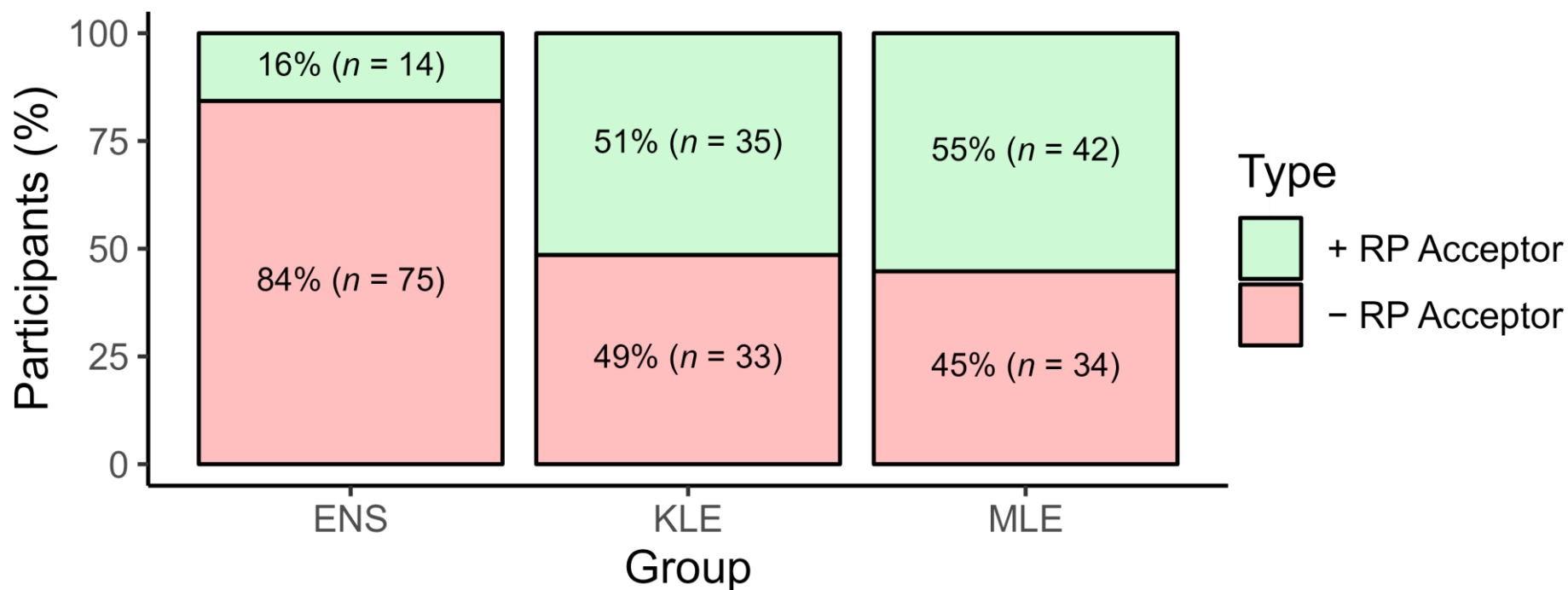
Reanalysis of the SPRT data

Remove consistent RP acceptors to test whether processing effects depend on RP acceptance
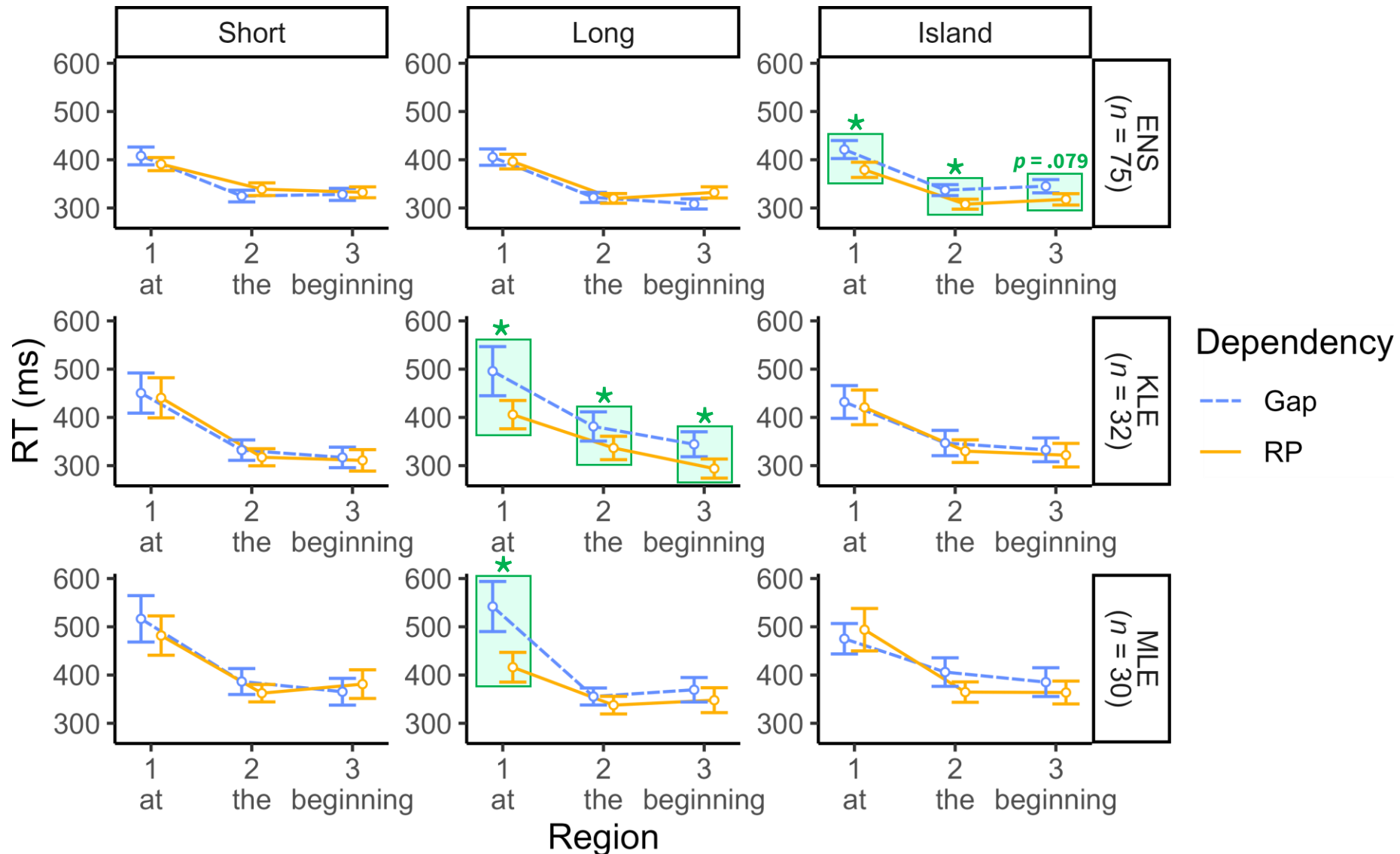
Identification of consistent RP acceptors

→ 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

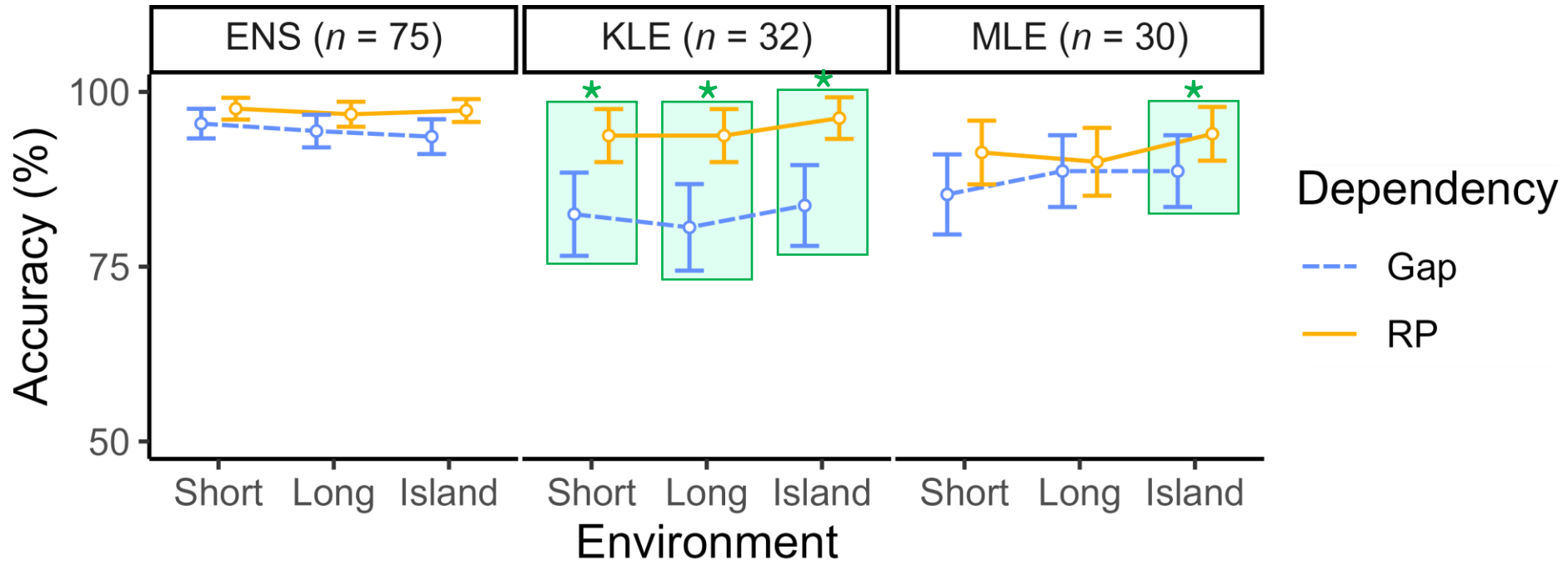# **Fig 6.** RT data with RP acceptors removed

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 7. Accuracy data with RP acceptors removed

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

Discussion

RQ1: Do RPs facilitate real-time ORC comprehension?

✅ Yes, analysis of the RTs and comprehension-question accuracy scores indicated that RPs assist with ORC comprehension under processing strain

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

RQ2: **If so, does this hold for individuals who do not consistently accept RPs?**

✅ Yes, the same general pattern of results was observed in the SPRT data even with RP acceptors removed

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

→ Challenges the traditional L2 assumption that performance reflects representations licensed by the grammar (e.g., Algady, 2013; Hyltenstam, 1984; Eckman, 2004)

RQ3: Does L2 English proficiency affect 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 English's prohibition on resumption in RCs

→ This sensitivity appears to appears to develop fastest where processing is easiest

Future directions

RP too close to head noun?

- 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?

- How does structural distance in L1 vs. target language RCs (head position, etc.) contribute to performance?

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Acknowledgments

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Mahalo for your kind attention!

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