Resumption Facilitates L1-Koreans' L2 Production of English Relative Clauses

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1. Introduction

This study looks at resumptive relative clause (RC) dependencies, a linguistic phenomenon that is often observed in second language (L2) production even when it is ungrammatical in both the first language (L1) and the target language (TL). In resumptive RCs, a pronoun or other nominal occupies the gap position in what would otherwise be a filler-gap dependency. The example in (1), featuring a resumptive pronoun (RP) in a subject RC (SRC), was produced by an L1-Korean L2 learner (L2er) of English even though subject RPs are generally thought to be ungrammatical in both English and Korean.

(1) Sometimes I typed an article, a noun, an adjective, or an adverb that I thought (*it) would fit into the context.

Interlanguage (IL) phenomena of this type are one of the most interesting areas of L2 research because they cannot be traced to either L1 transfer or TL input, thus offering us a chance to learn more about basic properties of the language system. The current study is part of a larger dissertation project investigating whether L2 resumption in RCs reflects IL grammar representations and/or stems from a strategy for managing processing load during sentence production and comprehension. Here, we present the results from a pilot study focusing on processing in a production context; a series of tasks were administered to L1-Korean L2ers of English and to L1-English controls to probe the processing and acceptability of gaps and RPs in direct object RCs (ORCs).

2. Background

Filler-gap dependencies like the RC in (2a) involve a constituent called a *filler* associated with a phonetically empty position called a *gap*, the latter being

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the filler's typical syntactic position. Resumptive RC dependencies like that in (2b) look like their filler-gap counterparts except that a pronoun or other nominal that is coreferential with the RC head occupies the foot of the dependency.

(2) a. the man$_i$ [that I saw $\_\_{}_i$]
b. * the man$_i$ [that I saw him$_i$]

Some languages have grammatical resumption in a variety of syntactic positions and dependency types (e.g., Asudeh, 2004; McCloskey, 2002). For example, Hebrew can optionally take an RP in ORCs, as shown in (3).

(3) ha-ʔiš$_i$ [še-raʔiti (ʔoto$_i$)]
the-man that-saw.1S him
'the man that I saw'

(adapted from Shlonsky, 1992, p. 444, (1))

Other languages, such as English and Korean, are less amenable to grammatical resumption. Examining data from about 50 languages, Keenan and Comrie (1977) found that languages vary widely in where gaps and RPs are permitted to occur. Table 1 presents their findings for English and Korean—the languages of interest in the current study—as well as Hebrew, for comparison.

Table 1. Distribution of gaps (−), RPs (+), and unrelativizable positions (0) in single-clause RCs (adapted from Keenan & Comrie, 1977, p. 93, Table 2).

Language	SU	DO	IO	OBL	GEN	OCOMP
English	−	−	−	−	−	−
Korean	−	−	−	−	+	0
Hebrew	−	−/+	+	+	+	+

Keenan and Comrie argued that the relativizability of syntactic position is systematic. Their Noun Phrase Accessibility Hierarchy (NPAH) ranges from subject ("easiest") to object of comparison ("hardest"): subject (SU) > direct object (DO) > indirect object (IO) > oblique (OBL) > genitive (GEN) > object of comparison (OCOMP). Underpinning their argument is the observation that if a language allows gaps in one position on the NPAH, it will also allow them in all higher positions. They also noticed that when RPs are permitted, they tend to occupy the space between positions allowing gaps and those disallowing relativization, suggesting that resumptive RCs may be "easier" in some respects than gap RCs, perhaps because they overtly mark the foot of the dependency (p. 92). Depending on the language, RPs may also provide information about case, gender, number, etc. that helps to establish coreference with the RC head.

J. Hawkins (1999) proposed that the motivation behind the NPAH has to do with the size of the *filler-gap domain* (FGD), computed in terms of (essentially) the number of dominating syntactic nodes in the dependency (i.e., depth of embedding). Using the accepted syntax of the time, he demonstrated that subjects

have a minimal FGD of five nodes (i.e., [S [NP [N]] [VP [V]]]), direct objects a minimal FGD of seven nodes (i.e., [S [NP [N]] [VP [V] [NP [N]]]]), and lower positions on the NPAH even larger FGDs. Other ways of increasing FGD size, such as extracting from a complement clause, can also increase processing difficulty. Support for this proposal comes from the experimental literature on native-speaker sentence processing: Dependencies with deeper embedding incur higher processing costs, both within clauses (e.g., Just & Carpenter, 1993) and across clause boundaries (e.g., Frazier & Clifton, 1989).

The distribution of gaps and RPs for Korean in Table 1 aligns very well with the judgments of our language consultants but is not without dissent. In fact, there has been considerable debate about which syntactic positions allow RPs in Korean. Kwon (2008) claimed, albeit without experimental evidence, that resumption is possible in both the OBL and GEN positions for single-clause RCs and in all relativizable positions for long-distance RCs. By contrast, Song (2003) maintained that Korean only allows resumption in a narrow subset of genitive RCs. Han (2013) provided experimental data showing that L1-Korean speakers tend to reject RPs in SRCs and ORCs formed from simple and single-level embedded clauses as well as from syntactic islands. This lack of consensus underscores the need for further experimental research on resumption in Korean.

The question of whether English may allow RPs in certain types of long-distance dependencies has also been debated. Some researchers, such as Ross (1967), claimed that resumption is "perfectly grammatical" (p. 432) in environments that are inaccessible to gaps (i.e., syntactic islands), as in (4).

(4) I just saw [that girl who [Long John's claim [that *__/she was a Venusian]] made all the headlines].

(adapted from Ross, 1967, p. 432, (6.154a))

However, experimental research (e.g., Alexopoulou & Keller, 2007; Han et al., 2012; Heestand, Xiang, & Polinsky, 2011; Keffala & Goodall, 2011; McDaniel & Cowart, 1999) consistently shows that L1-English speakers assign low ratings to resumptive dependencies both in non-islands and in islands, which casts doubt on claims that English allows RPs in these environments. Even if resumptive RCs formed from islands are ungrammatical, though, it is undeniable that they occur in the spontaneous speech of L1-English speakers (Asudeh, 2004; Cann, Kaplan, & Kempson, 2005; Prince, 1990). It has been suggested that such utterances are produced not because they are acceptable but because they facilitate processing (e.g., Asudeh, 2004)—a kind of resumption sometimes called *intrusive* (Sells, 1984) to distinguish it from grammatical resumption in languages like Hebrew.

3. Previous research on the processing of resumption in L1 English

There is a growing body of research showing that intrusive resumption, while unacceptable, can still facilitate the real-time production and/or comprehension of difficult-to-process RCs in L1 English (e.g., Beltrama & Xiang, 2016; Ferreira & Swets, 2005; Hammerly, 2021; Hofmeister & Norcliffe, 2013).

An early study in this line of research by Ferreira and Swets (2005) involved a pair of production tasks with critical items eliciting relativization from positions in *wh*-islands; for these, participants produced resumptive RCs (e.g., "This is a donkey that I don't know where it lives.") at high rates: 67% for the untimed version of the task and 56% for the timed version of the task. In a follow-up offline acceptability judgment task (AJT), participants tended to reject trials with RPs in islands and to accept trials with gaps in non-islands. These results suggest that resumptive RCs, despite being ungrammatical in English, still have a processing advantage over gap RCs when speakers are induced into relativizing from islands.

In another production study, Morgan and Wagers (2018) elicited relativization of subjects and direct objects from a variety of environments, namely singly embedded non-islands (Emb 1), doubly embedded non-islands (Emb 2), *wh*-islands (*Wh*-), object complex NP islands (CNPC Obj), subject complex NP islands (CNPC Subj), and adjunct islands (Adjunct). An example of a target sentence containing an ORC formed from a *wh*-island is shown in (5).

(5) There's a prince that the ogre doesn't care if the troll slayed *__/*him.

Results showed steady increases in RP production rates across conditions in the following order: Emb 1 > Emb 2 > CNPC Obj > *Wh*- > CNPC Subj > Adjunct.

Another group of participants completed an AJT with sentences similar to those elicited in the production task. RPs received uniformly low ratings, while ratings for gaps varied widely across conditions. Comparing the results from the two tasks, Morgan and Wagers observed that RPs occurred most often in the positions where gaps received the lowest ratings, providing further evidence that resumption facilitates processing of difficult long-distance RC dependencies.

Asudeh (2004) suggested that resumption facilitates production of RCs because it can at least ensure local well-formedness when speakers need to relativize from positions that are inaccessible to gaps, even though it cannot restore the global well-formedness of the sentence. For example, Asudeh pointed out that each clause in the sentence "This is a donkey that I don't know where it lives" (p. 315) is locally well-formed because the verb has all the arguments it requires, even though the sentence as a whole is ill-formed due to the fact that the RP (i.e., *it*) is incapable of repairing the *wh*-island violation in the RC. By ensuring that every verb has the needed arguments, resumption helps speakers maintain coreference at times when RC dependencies break down, thereby decreasing the chances that they will have to pause and reformulate the utterance.

4. Previous research on L2 resumption

Experimental research on L2 resumption has shown that rates of production and acceptance of resumptive RCs tend to be higher in positions thought to be difficult for relativization (e.g., Algady, 2013; Eckman, Bell, & Nelson, 1988; Gass, 1979; Hyltenstam, 1984; Kim, 2013; Maghrabi, 1997). Some studies have also shown that low-proficiency L2ers produce and/or accept RPs more often than high-proficiency ones do (e.g., R. Hawkins & Chan, 1997; Kim, 2013; Maghrabi,

1997). Most interesting for the current project, though, are studies revealing that L2ers produce and/or accept resumptive RCs irrespective of their grammaticality status in the L1 and the TL (e.g., Gass, 1979; Hyltenstam, 1984; Pavesi, 1986).

Hyltenstam (1984) was the first to demonstrate that L2ers systematically produce resumptive RCs even in environments where they are ungrammatical in both the L1 and the TL. L2ers of Swedish from a variety of L1 backgrounds, only some of which have grammatical resumption in RCs, took part in an oral RC elicitation task with items targeting different positions on the NPAH. Swedish is a language which, like English, does not allow resumption in short-distance RC dependencies, regardless of the syntactic position. A key finding of the study was that at least some L2ers in each L1 group regularly produced resumptive RCs in Swedish; they were also more likely to use RPs in lower positions on the hierarchy. Based on these data, Hyltenstam speculated that L2 resumption arises in ILs as a means of reducing cognitive load when producing difficult-to-process RCs.

Hyltenstam appeared to suggest that although L2 resumptive RCs emerge for processing reasons, they can become a licit means of constructing RCs, at least temporarily, in IL grammars. This is not the only possible hypothesis, of course. It is also feasible that resumptive RCs are ungrammatical for L2ers but still produced as a subconscious strategy for reducing cognitive load (see also Schulz, 2006, 2011), just as recent studies indicate for L1 English. If the processing effects for resumption displayed by L2ers parallel those for native speakers, even if they are more pronounced, we would not take this as evidence of a *qualitative* difference between L1 and L2 processing mechanisms; instead, it could simply be a *quantitative* difference resulting from the fact that sentence processing in general requires more effort in an L2 than in an L1 (e.g., Kilborn, 1992).

5. The present study

While the idea that L2 resumptive RCs are linked to processing seems plausible enough, it has not yet undergone thorough psycholinguistic testing for both production and comprehension. Also, prior to the current dissertation project, there has been no L2 study investigating resumptive RCs in long-distance or island environments, despite research (Alexopoulou & Keller, 2007; J. Hawkins, 1999, 2004; Hofmeister & Norcliffe, 2013) showing that RCs in these environments are more difficult for native speakers to process than the short-distance RCs used in most L2 studies.

The current project aims to address these research gaps by administering a series of tasks to L1 and L2 speakers of English to probe the processing and acceptability of gaps vs. RPs in different types of RC dependencies. In light of ongoing debate about RPs in Korean, it is also important to test L2ers in both the L1 and the TL so that their patterns of results in the two languages can be compared (see Zenker & Schwartz 2017, 2021). Lastly, L2 proficiency needs to be taken into consideration. Careful attention to these points should allow us to disentangle the theoretical nexus concerning the status of resumptive RCs in L2 English, viz., grammatical representations and/or processing strategies.

In the current report, we present the results from a pilot study for the broader dissertation project which focused on processing effects during the production of ORCs. Our research questions (RQs) for this pilot were as follows:

(RQ1) Do L1-Korean L2ers of English produce resumptive ORCs in short-distance, long-distance, and *wh*-island dependencies (which are thought to constitute increasingly difficult relativization environments)?

(RQ2) How do they rate sentences containing the same types of ORCs in offline acceptability judgment tasks, both in their L1 and in the TL?

We probed processing effects with an English oral production task (OPT) and offline judgments with AJTs in English and Korean. Participants also completed a consent form; a language background questionnaire; a C-test (Zenker, in prep.; included as a measure of English proficiency); and an English self-paced reading task (the results of which are not reported here). Written instructions were given to participants in their native language.

Participants were tested asynchronously over the internet. The experiment was coded using jsPsych (de Leeuw, 2015) and hosted on Cognition (www.cognition.run). L1-English participants were recruited on Prolific (www.prolific.co), and L1-Korean participants were recruited on Korean university websites. Data analysis and visualization was done in R (R Core Team, 2021), and the lme4 package (Bates, Maechler, Bolker, & Walker, 2015) was used for mixed-effects modeling. When constructing our models, we used the maximal random effects structure allowed by the data, and predictors were given treatment coding to facilitate comparison to the baseline level. For more information about the materials, data, and analyses, please visit our Open Science Framework repository for this study at https://osf.io/fq7vc.

6. Participants

We tested 33 L1-English speaker controls and 33 L1-Korean L2ers of English in the current study; their mean ages, C-test scores, and ages of onset for acquiring English are provided in Table 2, with ranges shown in parentheses.

Table 2. Participant background information.

Group	*n*	Age	C-test Score (%)	Age of Onset
L1-English	33	31 (19–72)	86 (64–98)	—
L1-Korean L2ers	33	26 (18–41)	63 (16–80)	8 (3–12)

Scores from the C-test indicate that the L2ers had intermediate to advanced English proficiency. Importantly, English and Korean are both commonly thought to lack grammatical resumption in short- and long-distance ORCs.

7. English oral production task

The oral production task (OPT) was designed to test whether resumption facilitates real-time production of ORCs in English. It was the first task that participants completed after reviewing the consent form and filling out the language background questionnaire.

7.1. Design and procedure

The task had 15 critical items Latin-square distributed across three conditions eliciting short-distance, long-distance, and *wh*-island ORC dependencies, as illustrated in (6). There were also 15 fillers eliciting monoclausal and biclausal responses containing short-distance SRC dependencies (e.g., "the girl who told John that Paul arrived last week").

(6) Short: the man who Mary arrested __/*him last month
Long: the man who Tina thinks that Mary arrested __/*him last month
Island: the man who Tina wonders why Mary arrested *__/*him last month

Each stimulus consisted of two panels presented sequentially on a computer screen, as in Figure 1, which is a critical trial in the short-distance condition.

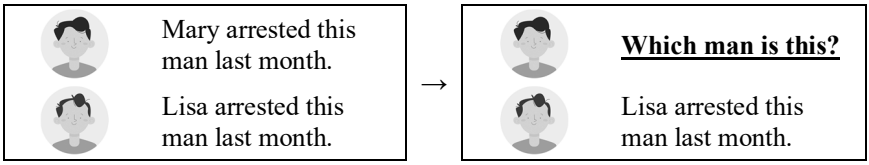

Figure 1. Critical trial from the English oral production task.

The first panel showed pictures of two people with sentences describing them; one of these was the test sentence and the other was included to create a felicitous context for relativization (see Ferreira & Swets, 2005). The position of the test sentence (top or bottom) was counterbalanced across trials. The second panel was identical to the first except that the test sentence was replaced by a question (e.g., "Which man is this?" in Figure 1). The stimuli were pseudorandomized so that no two critical items appeared consecutively. Responses were coded as "gap," "resumption," or "other," and non-RC responses were excluded from analysis.

Participants read the instructions for the task and completed three practice trials before proceeding to the actual experiment. For the practice trials, participants had to select an appropriate response in multiple-choice format rather than audio-recording their response. The purpose of the practice phase was to familiarize participants with the task format as well as to increase the chances that they would produce RCs in the main phase of the task. In order to proceed, they needed to get all three answers correct.

7.2. Results and discussion

The results are shown in Figure 2, where light gray bars represent the proportion of gap responses and dark gray bars represent the proportion of resumption responses.

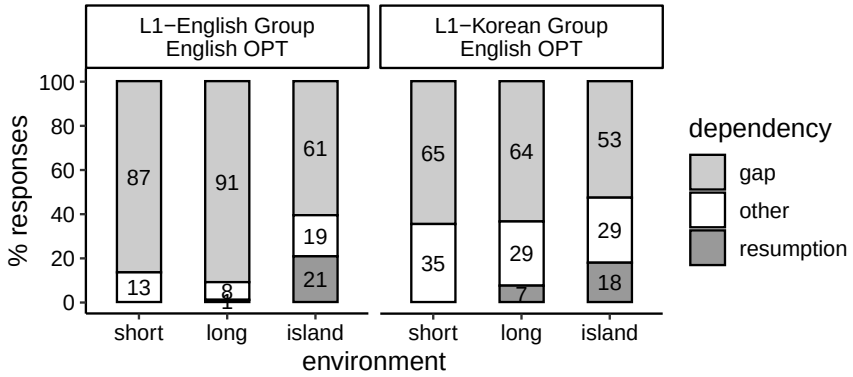

Figure 2. Response rates by type on the English oral production task.

Visual inspection of the mean response rates in Figure 2 reveals that resumptive RCs were only produced in the long and island environments. Also, both groups produced resumptive RCs more often in the island environment than in the long environment. The increase in the proportion of resumption responses from the long environment to the island environment corresponded to a decrease in the proportion of gap responses. As for "other" responses, the most common types involved modifying the structure of the RC to turn a long-distance dependency into a short-distance one (e.g., "the man that Mary arrested last month, according to Tina" instead of "the man who Tina thinks that Mary arrested last month") or to turn an ORC into a passivized SRC (e.g., "the man that was arrested by Mary last month" instead of "the man that Mary arrested last month").

Prior to analysis with inferential statistics, we removed participants who failed to produce an RC at least half the time on critical trials, which led to the removal of three participants from each group. To examine how environment influenced resumption rates, we removed responses in the short environment (where resumption was never used), recoded responses as [±resumption], and analyzed the data using a logistic mixed-effects regression model entered into R as follows: Response ~ Environment * Group + (1 + Environment | Person) + (1 + Environment * Group | Item). The results showed that there was a significant increase in the rate of resumption from the long environment to the island environment ($\beta = 8.18$, $z = 2.23$, $p = .023$) and that the L1-Korean L2ers did not use resumption significantly more often than the L1-English speakers did ($\beta = 3.85$, $z = 1.64$, $p = .101$). There was also a significant Environment × Group interaction ($\beta = 3.95$, $z = 2.01$ $p = .045$), indicating that the effect of Environment on resumption rates differed across the two groups.

Follow-up analyses examining the data from the two groups separately did not find significant increases in rates of resumption from the long environment to the island environment for either the L1-English speakers or the L1-Korean L2ers. The absence of a significant resumption-rate increase across conditions in these by-group analyses is likely a reflection of both reduced statistical power and the fact that only about a third of the participants in each group (L1-English: 33%, L1-Korean L2ers: 39%) made any use of resumption on critical trials.

Overall, we take the increasing rates of resumption from the short to the long to the island environment as evidence of processing facilitation for resumption in difficult ORC dependencies. Also, the fact that the rates of resumption were relatively low even in the island environment suggests that the *why*-islands used in this study were fairly weak islands. A separate set of simple linear regression analyses found no significant relation between participants' rates of resumption and their English proficiency scores from the C-test (all *p*s > .05), showing that English proficiency did not significantly impact rates of resumption.

8. English and Korean acceptability judgment tasks

The AJTs tested the offline acceptability of the sentence types elicited on the OPT, both with and without RPs. There were versions of the task in English and Korean; the L1-English speakers received only the English version, while the L1-Korean L2ers completed both. The English AJT was administered before the Korean AJT to minimize the effect of L1 knowledge on L2 performance.

The Korean AJT consisted of closely translated versions of the English AJT stimuli, and participants received different running lists for the two versions of the task—if a participant received the first running list for the English AJT, then he or she would receive the second running list for the Korean AJT. This was done to ensure that participants would not receive any one item in the same condition across the two versions of the task. As with the OPT, a three-trial practice phase preceded the actual experiment, and the presentation order for critical and filler trials was pseudorandomized so that no two critical items appeared consecutively.

8.1. Design and procedure

The AJTs featured a 2 × 3 factorial design crossing *Dependency* (gap vs. resumption) and *Environment* (short vs. long vs. island), as illustrated in (7).

(7) Short: Tina thinks that John is the man who Mary arrested __/*him last month.
Long: John is the man who Tina thinks that Mary arrested __/*him last month.
Island: John is the man who Tina wonders why Mary arrested *__/*him last month.

There were 30 critical items Latin-square distributed across the six conditions, alongside 40 fillers. The critical conditions were similar to those on the OPT,

except that there were gap and resumption versions of the stimulus for each environment. The fillers (25 grammatical; 15 ungrammatical) were comparable to the critical items in length and complexity; each of them was a three-clause sentence containing a short-distance SRC dependency (e.g., "Paul says that Mary is the woman who sold Emma a car last year.").

Participants rated sentences on a 6-point Likert scale with an additional I-don't-know option. The latter responses were excluded prior to analysis, leading to removal of 11 observations in total, or 0.16% of the overall dataset. Following standard practices for AJTs, the raw ratings were converted to by-participant *z*-scores to minimize scale bias (see Sprouse, Wagers, & Phillips, 2012).

8.2. Results and discussion

The AJT results for each pairing of group (L1-English; L1-Korean L2ers) and language (English AJT; Korean AJT) are shown in Figure 3; light gray points represent gap trials and dark gray points represent resumption trials.

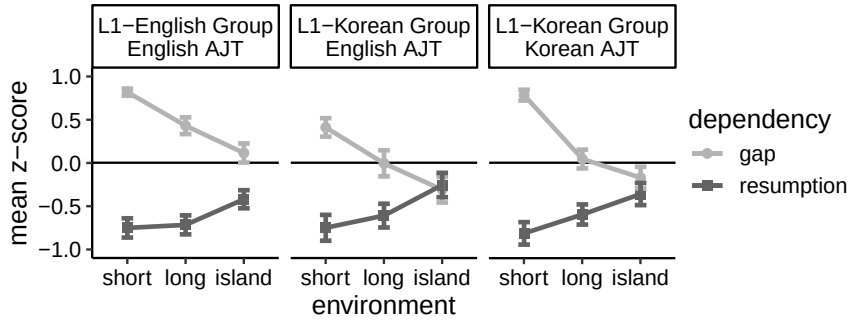

Figure 3. Mean *z*-score ratings from the English and Korean acceptability judgment tasks. Error bars are 95% confidence intervals.

The overall pattern of ratings was highly similar across all pairings of group and language. In each case, the ratings for gap trials were high in the short environment and became progressively lower in the long and island environments. Interestingly, the L1-English speakers' mean *z*-score ratings for gap trials stayed on the upper half of the distribution of ratings even in the island environment, which provides further evidence that the *why*-islands used in this study were relatively weak *wh*-islands. The ratings for resumption trials were much lower than those for gap trials in all environments except the *wh*-island environment, where the L2ers' ratings for the resumption trials were roughly on par with their ratings for the (ungrammatical) gap trials on both versions of the AJT.[1]

The mean ratings for resumption trials remained on the lower half of the distribution of ratings for all combinations of group and language, indicating that the participants did not consider resumption to be highly acceptable in any of the

[1] We observed the same general pattern of ratings for the raw acceptability judgments.

environments tested. However, the ratings for resumption trials did increase somewhat from the short to the long to the island environment.

To explore the *z*-score data further, we performed a linear mixed-effects regression analysis for each pairing of group and language using the following model formula: Rating ~ Environment * Dependency + (1 + Environment * Dependency | Person) + (1 + Environment * Dependency | Item). In each case, the results showed that gap trials were rated significantly higher than resumption trials and that there was a significant drop in overall ratings from the short environment to the long and island environments. The interaction terms were also significant. Follow-up analyses revealed that resumption trials received significantly higher ratings in the island environment than in the short environment across all combinations of group and language. Still, resumption trials were never rated significantly higher than gap trials, not even for the L1-Korean L2ers on the English AJT, where there was a slight numerical advantage for resumption trial ratings over gap trial ratings in the island environment ($\beta = 0.05$, $t = 0.28$, $p = .778$).

These results indicate that the participants tended to regard resumption as unacceptable across conditions. We view the consistent but small-scale increase in ratings for resumption trials from the short to the long to the island environment as an artifact of processing facilitation rather than as evidence that the participants considered these trials to represent an acceptable means of forming RCs.

A separate set of simple linear regression analyses found no significant relationship between the L2ers' mean ratings for resumption on the English AJT and their English proficiency scores from the C-test (all *p*s > .05). This outcome shows that English proficiency did not influence the acceptability of resumptive RCs, at least not to a degree that was easily detectable in the by-group analysis.

Finally, Figure 4 shows the mean ratings for just those who used resumption in critical trials on the OPT: 11 L1-English speakers and 13 L1-Korean L2ers. The pattern of ratings for these participants is largely the same as the one in Figure 3, and the mean ratings for resumption trials are still on the lower half of the *z*-score scale; this suggests that participants who produced resumptive ORCs were not more prone than the other participants to accept resumption trials.

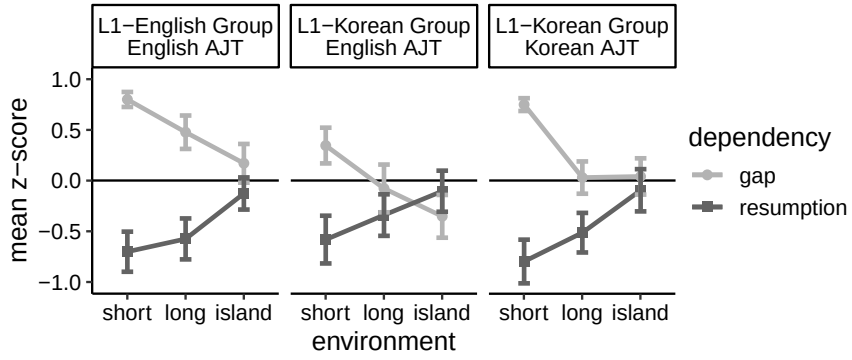

Figure 4. Mean *z*-score ratings for participants who used resumption on the oral production task. Error bars are 95% confidence intervals.

9. Conclusion

This study investigated whether L2 English resumption in ORCs can best be understood in terms of IL grammar representations and/or a subconscious strategy for reducing processing load during RC production. Our test group consisted of L2ers of English whose L1 is Korean, Korean being a language that is generally thought to disallow resumption in both short- and long-distance ORCs. A group of L1-English speakers were also included as controls. The main tasks consisted of an English oral production task and a pair of acceptability judgment tasks—one in English and the other in Korean. The L2ers completed both versions of the AJT so that their patterns of results in the two languages could be compared. Participants also completed a C-test as a measure of general English ability.

Both groups produced resumptive RCs with increasing frequency from the short to the long to the island environment on the OPT, which suggests that resumption can facilitate the production of RCs under processing strain. As for the AJTs, the participants tended to give low ratings to resumption trials across conditions for all pairings of group and language, which indicates that they did not consider resumption to be a highly acceptable means of ORC formation in any of the environments tested. Furthermore, they never rated resumption trials significantly higher than gap trials, not even in the *wh*-island environment, where gaps are commonly understood to be ungrammatical, at least in English. Taken together, these findings suggest that resumption in ORCs represents an ungrammatical processing strategy for both the L1-English speakers and the L1-Korean L2ers.

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