Is English resumption different in appositive relative clauses?

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Abstract

Resumptive pronouns are produced in English in unguarded speech in restrictive relative clauses and appositive relative clauses. However, numerous studies have found that resumptive pronouns in restrictive relative clauses are not acceptable. To our knowledge, no studies have examined the acceptability of resumptive pronouns in appositive relative clauses, despite hints in the literature that they may be more acceptable in appositive than in restrictive relative clauses. This article fills that gap. We found that resumptive pronouns were rated as more natural in appositive relative clauses than in restrictive relative clauses. These findings may be due to *which* currently undergoing a reanalysis from a relative pronoun to a solely connective word, as has been suggested in the literature. A small-scale corpus search also reveals that appositive relative clauses with resumptive pronouns are increasing in American English.

Keywords: resumptive pronouns, appositive clauses, experimental syntax, syntactic reanalysis

Résume

Dans le langage familier, les pronoms résomptifs se manifestent, en anglais, dans des clauses relatives restrictives et des clauses relatives appositives. Cependant, de nombreuses études ont révélé que les pronoms résomptifs dans les clauses relatives restrictives ne sont pas acceptables. À notre connaissance, aucune étude n'a examiné l'acceptabilité des pronoms résomptifs dans les clauses relatives appositives, bien que certains auteurs laissent entendre qu'ils sont plus acceptables dans les appositives que dans les restrictives. Le présent article comble cette

lacune. Nous avons en effet constaté que les pronoms résomptifs sont perçus comme étant plus naturels dans les clauses relatives appositives que dans les restrictives. Ce phénomène pourrait s'expliquer si, comme le veulent certaines études, *which* est en voie de réanalyse, devenant un mot purement conjonctif au lieu d'un pronom relatif. Une recherche de corpus à petite échelle révèle également que les clauses relatives appositives avec pronom résomptif sont en croissance dans l'anglais américain.

Mots clés: pronoms résomptifs, clauses appositives, syntaxe expérimentale, réanalyse syntaxique

1. INTRODUCTION

English restrictive relative clauses (RRCs)[1] and appositive relative clauses (ARCs) both exhibit resumptive pronouns (RPs) in unguarded, natural speech. Resumptive pronouns are pronouns that occur in relative clauses where a gap would otherwise occur (McCloskey 2006). A naturally occurring example of an RP in each clause type is given below. The relative clauses are indicated with brackets, and the resumptive pronouns are in bold:

(1) She got a couch at Sears [that **it** was on sale]. (RRC)   (Cann et al. 2005: 1554)

(2) My name is Pan, [which I don't like **it** so much]. (ARC)   (Loock 2007: 72)

Speakers tend to judge such sentences as unacceptable, placing them in agreement with grammarians (Biber et al. 1999: 622, Huddleston and Pullum 2002: 1091n) who assert that English syntax prohibits resumption. Yet, speakers produce such utterances, which has led a number of linguists to explore whether RPs perform a repair function in English when uttered in structures with illicit movement (e.g., out of islands), as has been observed in languages like Hebrew (e.g., Ross 1967, Chomsky 1977, Sells 1984, Prince 1990, Shlonsky 1992). These efforts have produced a consensus that RPs are not acceptable in English RRCs, even in islands (McDaniel and Cowart 1999, Ferreira and Swets 2005, Alexopoulou and Keller 2007, Heestand et al. 2011, Keffala 2013, Polinsky et al. 2013, Beltrama and Xiang 2016, Ackerman et al. 2018); however, there is no body of research on the acceptability of RPs in English ARCs, in or outside of islands. This article fills this gap by reporting on the first study, to our knowledge, on the acceptability of resumption in English ARCs.[2]

Though there is no empirical research on RPs in ARCs, there are at least four instances in the literature where it is hinted that they are more acceptable in non-restrictive clauses than in restrictive clauses. The earliest comes from Sells (1985: 305), who, in an aside, suggests that "*which* is apparently undergoing a change in many American dialects and being reanalyzed as a different type of subordinator than a relative pronoun, like *though* or *as*". Loock (2007) adds to this conversation

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[1]The following abbreviations are used: RRC: restrictive relative clause; ARC: appositive relative clause; RP: resumptive pronoun.

[2]No references to resumption hereafter are meant to generalize beyond English.

when he suggests that although relative-pronoun *which* typically serves both a connective and an anaphoric role, there is also a non-standard *which* that serves only a connective function.

Another hint that RPs behave differently in ARCs than in RRCs comes from Prince (1990), who found that, overall, RPs are more frequent in ARCs and RRCs that do not intervene in the construction of the reference of the NP with which they work. If speakers are more likely to use RPs in nonrestrictive contexts, it may be that they are more acceptable in such contexts.[3]

Finally, most recently, Polinsky et al. (2013: 352–353) offer that the success of resumption is greater in ARCs (and in RRCs that can be interpreted as ARCs) than in RRCs. They stress that this is an informal intuition, however, noting that "the role of the restrictive/appositive difference in the distribution of resumption needs to be examined further."

We would like to add to these hints our own intuitions that these constructions are at least somewhat acceptable and possibly becoming more frequent – to the point that they are now even occurring in formal writing, in contrast with the written quotes of spontaneous speech that populate our own collection of RP examples and with Loock's (2007) suggestion that RPs in ARCs are strictly an oral phenomenon, found in writing only when featured in fictitious dialogues. Consider this example from a 2014 article in the *New Yorker*, which presumably passed before an editor's and/or copyeditor's eyes:

(3) In 1952, he was convicted of "gross indecency" and sentenced to a probation that involved undergoing an extensive regimen of chemical castration, [which **that** caused him to gain weight, become lethargic, and grow breasts].   (Rockmore 2014)

The article is structured as follows. First, we summarize the research on RPs in RRCs and ARCs. We then discuss our methods and the results of our study: RPs were rated as more acceptable in ARCs than in RRCs, although RPs in ARCs were not rated as acceptable as gaps in ARCs. We follow this with a discussion of a reanalysis of *which* as a change in progress, and conclude by offering suggestions for further research.

2. BACKGROUND

The purpose of this article is to explore the possibility that English resumption is more acceptable in ARCs than in RRCs, as is hinted in the literature. RPs are produced in ARCs frequently enough for Loock (2007) to conclude that they are not mere performance errors, and our own collection of examples has over 200 entries, many drawn from the radio, videos, and conversations around us. Nonetheless, as has been shown in the research on resumption in RRCs, the mere occurrence of RPs in unguarded speech does not mean that speakers find the constructions

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[3]See Morgan and Wagers (2018) for a recent discussion of how acceptability and production of RPs are connected in RRCs.

acceptable. Below we provide a short review of relevant research on RPs in RRCs, followed by a discussion of the literature that hints that RPs may be more acceptable in ARCs.

2.1   Resumption in Restrictive Relative Clauses

In light of observations that English speakers produce resumptive pronouns in spontaneous, unguarded speech, researchers (e.g., Ross 1967; Langendoen 1970; Chomsky 1977, 1991; Kroch 1981; Prince 1990; Rizzi 1990; Erteschik-Shir 1992; Shlonsky 1992) posited that resumption serves to ameliorate island violations, as in examples (4) and (5), and to assist in processing otherwise grammatical long dependencies, as in (6) (presented without grammaticality judgments).

(4) This is a donkey [that I wonder [where **it** lives]].   (Ferreira and Swets 2005: 271)

(5) I'd like to meet the linguist [that Mary couldn't remember [if she had seen **him** before]].
                                                                              (Sells 1984: 11)

(6) This is the girl [that Peter said [that John thinks [that yesterday his mother had given some cakes to **her**]]].   (Erteschik-Shir 1992: 89)

Despite the theoretical claims of an ameliorating effect for resumption, subsequent experimental work has offered only limited evidence to support this position. Stimuli targeting object position of islands revealed that RPs are rated equal to or worse than gapped equivalents regardless of embedding, though the penalty for resumption was reduced slightly with depth of embedding (Alexopoulou and Keller 2007, Heestand et al. 2011, Polinsky et al. 2013). Subject RPs in islands received slightly higher acceptability ratings than equivalent gaps (McDaniel and Cowart 1999, Han et al. 2012, Keffala 2013), but low ratings for all stimuli targeting island subjects led to consensus that the results serve as evidence of the cumulative effect of the penalties that island-subject gaps incur, not as evidence of any saving effect achieved by resumption. Taken as a whole, the body of research on the acceptability of resumption shows that RPs in RRCs exhibit near-uniform low ratings across a variety of structures and that only the combination of violations for subject gaps in islands incurs a penalty strong enough for speakers to rate a gap worse than an RP.[4]

   These findings have challenged researchers to explore other explanations of why speakers utter sentences with RPs, even in experimental settings (Ferreira and Swets 2005). On the listener/reader side, Hofmeister and Norcliffe (2013) found that resumption improves reading comprehension in difficult-to-process contexts (though not enough to produce acceptability judgments higher than gapped equivalents), and Beltrama and Xiang (2016) found that participants asked to judge ease of understanding rated sentences with RPs in islands higher than sentences with

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[4]Notably, most of these psycholinguistic studies were done using a Likert scale or Magnitude Estimation task. Ackerman et al. (2018) found that in forced binary-choice tasks, speakers prefer RPs in object position of islands over their gapped counterparts. We discuss the significance of this work in section 5.

equivalent gaps, leading them to conclude that RPs can indeed "'rescue' syntactic islands" but only at the level of sentence comprehension.[5]

On the speaker side, Ferreira and Swets (2005) showed that speakers are equally likely to produce utterances with RPs whether or not they face pressure to respond quickly, which calls into question claims that English resumption is the product of speaker attempts to salvage poorly planned utterances (e.g., Kroch 1981, Prince 1990, Heestand et al. 2011, Polinksy et al. 2013). Building on this finding (among others), Asudeh (2012: 4) describes RPs not as the result of poor planning but as a product of the incremental production of locally well-formed structures at the potential expense of global well-formedness. In the case of island structures, constraints prevent integration of a filler and make a locally well-formed structure impossible without an RP. Incremental production favors the inclusion of an RP, as it allows for local well-formedness at each stage. Only at the global level do such sentences fail, due to the grammar's general prohibition on resumption. If Asudeh's model is correct, it amounts to a definitive account of why speakers produce RRCs with RPs in islands yet consistently judge them unacceptable.

Asudeh also addresses RPs uttered in difficult-to-process contexts, noting that although empirical work has not shown any evidence of RPs improving the acceptability of long-distance dependencies, his model predicts that RP sentences can be globally well-formed, providing that the sentence is otherwise well-formed (e.g., the RP is in a position where the grammar licenses a gap) and the complexity is great enough to surpass memory limitations. He notes that the depth of embedding explored in Alexopoulou and Keller's (2007) influential work was not sufficient to meet the latter condition. More recent experiments that also include embedding as a variable (e.g., Hofmeister and Norcliffe 2013, Beltrama and Xiang 2016) found that the unacceptability of those sentences, once again, is consistent with a prediction that three levels of embedding is not sufficient strain on memory to produce a globally well-formed RP construction, even when it is evident that the RP assists readers with processing.

2.2 Resumption in Appositive Relative Clauses

Resumptive pronouns also occur in appositive relative clauses in unguarded speech in English. Below are two examples of RPs in ARCs from a search of the Corpus of Contemporary American English (the results of which are detailed in section 5.1):

(7) … if he terminates my client's parental rights, he's going to immediately have the foster parents adopt the child in the same proceeding, [which **that** is unheard of in the law].
(Attorney on CBS *This Morning,* 1992)

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[5]It is difficult to say how much we can infer from these findings. Beltrama and Xiang's request for judgments of ease of understanding is not the rigorous measure of processing that comprehension questions, response/reading times, or eye tracking would provide. Yet, it is noteworthy that participants who judged sentence comprehensibility preferred sentences with RPs, and participants who judged sentence acceptability preferred sentences with gaps.

(8) We called the Democratic congressman, Lacy Clay, from his Missouri, his office, [who
     he had it placed after some sort of contest was won].

(Eric Bolling on Fox *The Five,* 2017)

There is some suggestion in the literature that ARCs may tolerate RPs more than
RRCs due to a use of *which* that contrasts with its standard relative pronoun use.
Sells observed in 1985 that *which* was being reanalyzed in American English dialects
as a subordinating conjunction, "like *though* or *as*" (305).[6] Daalder (1989), on the
other hand, posits that *which* can take on a role of a coordinating conjunction. And
lastly, Loock (2007) leaves the conjunctive role unspecified between subordinator
and coordinator, stating that while relative pronouns serve both connective and ana-
phoric functions, "non-standard *which*" is reduced to solely its connective function.
In (9), he substitutes conjunctions for the original *which* to illustrate that it seems
capable of serving as either coordinator or subordinator.

(9) My name is Pan, {which/but/although} I don't like it so much.

(Loock 2007: 79)

While these assertions about the role of *which* suggest a greater acceptability of
resumption in ARCs than in RRCs, they do so by introducing the possibility that
some ARCs with RPs are actually best not analyzed as relative clauses. If *which*
can function like *and, but, though, because,* etc., then the embedded pronoun in
those instances is not truly resumptive, since there would be no gapped counterpart.
Speakers who use *which* in this manner would presumably accept some sentences
that appear to feature ARCs with RPs—but they would actually be accepting sen-
tences with conjunctions followed by regular, non-resumptive pronouns.

It is important to note that non-standard *which*, whether emerging or long estab-
lished, presumes the existence of a standard form, which implies that some speakers
have two forms of *which* in their lexicons: a standard form with connective and ana-
phoric properties and a non-standard form with only connective properties.
Furthermore, the above analyses are not necessarily transferable to ARCs in
general, as they identify only *which* as having this conjunctive form and not non-
restrictive relative pronouns in general. And while Loock (2007: 81–82) does not
suggest that *which* alone can serve this connective, non-anaphoric role, he does
offer that it stands to reason that *which* would do so more than other relative pronouns
because *which* can take a greater variety of antecedents, even sentential antecedents
that fill an entire paragraph.

While the above line of research on ARCs focuses on a non-standard use of
which, Loock makes clear that ARCs present puzzles beyond RPs and the role of
which: "ARCs have long been a problem for syntacticians, seeming to be on a
border between coordination and subordination, and having a syntactically and
semantically ambiguous behavior" (2007: 72). A variety of proposals have been
made concerning the behavior of ARCs in contrast to RRCs, both at the syntactic

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[6]Potts (2002) offers evidence that *as*-clauses are less tolerant of resumption than relative
clauses, which casts some doubt on Sells' assertion that *as* is among the conjunctions that
the reanalyzed *which* mimics.

and semantic level (e.g., Emonds 1979, Fabb 1990, Demirdache 1991, Espinal 1991, Arnold 2004, Del Gobbo 2007), and a small number of these analyses (e.g., Demirdache, Del Gobbo) suggest that *wh*-movement in ARCs is not necessarily the true operator-variable movement that occurs in RRCs. Importantly, a lack of true movement would predict that RPs could be as acceptable as gaps in ARCs. Though a good deal of evidence has been presented to argue against these analyses (see Arnold 2007), they are not without influence. In fact, Polinsky et al. (2013) connect a lack of movement to their intuition that RPs are more acceptable in ARCs than in RRCs.

3. EXPERIMENT

The study reported on here directly compares the acceptability of resumptive pronouns in RRCs and ARCs.

3.1 Design: Considerations for Comparing Resumption in RRCs and ARCs

The body of experimental work on acceptability identifies subject position of an island in an RRC as the condition under which participants will judge an RP more acceptable than a gap, and, for this reason, we manipulated islandhood and position in our study. This design is not only consistent with previous research, it also avoided any risk of artificially deflating the acceptability ratings of the RRC sentences in favor of the ARC sentences, whose acceptability idiosyncrasies have not been established by prior experiments. In other words, we felt that an appropriate comparison required that we present RPs in RRCs in their most acceptable contexts. This design does not come without costs, however, as it creates a high number of independent variables, which make it difficult to interpret some interactions. Indeed, it is for this reason that we did not also include a variable for depth of embedding. This is the other factor associated with resumption in the literature, but since it has not been shown to make RPs more acceptable than gaps, we did not prioritize in this experiment.

    The constraints of controlled experimentation also presented challenges. Appropriate comparison requires that stimulus sentences differ only in their relative clause properties, restrictive or appositive. It is difficult to create dozens of main clauses that equally accept RRCs and ARCs; inevitably, the pragmatics of some main clauses seem to invite an ARC more naturally, while others seem to invite an RRC. We strove to not privilege one clause type over the other in our stimuli and thus accepted this constraint. Consistency of stimuli also encouraged us to focus on a single relative pronoun alternation, *that* versus *which*. This provides a morphological marker between RRC and ARC not present in RRC/ARC pairs introduced by the same relative pronoun (e.g., *who*), which risked being too nuanced to ensure distinct readings.[7] Moreover, our intuitions and observations were in agreement with

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[7]Admittedly, *which* can be used to introduce both RRCs and ARCs, but its use paired with appropriate comma intonation is unambiguously a non-restrictive relative pronoun. In contrast,

Loock's (2007) suggestion that non-standard uses of *which* are more common than such uses of other relative pronouns.

3.2 Methods

Fifty-six participants[8] completed an online naturalness survey administered through a paid institutional version of Qualtrics. Eighteen participants were men ages 18–66 (M = 34.74, SD = 14.62), 36 participants were women ages 18–53 (M = 28.97, SD = 11.52), and two participants did not report their demographic information. Undergraduate students at Oklahoma State University were offered extra credit for participation, and they make up roughly half of the participants.[9] Alternative extra credit opportunities were offered. All participants were native speakers of English.

Stimuli were developed using a 2×2×2×2 factorial design: (i) embedded clause type (restrictive relative clause or appositive relative clause), (ii) resumption (resumptive pronoun or gap), (iii) position of resumption or gap (subject or direct object), and (iv) islandhood (with or without an embedded *wh*-island). Here are some examples of our stimuli, the entire set of which is given in the Appendix.

(10) **Subject Position**

    a. This is the new law firm {, which/that} (I wonder how) {__/they} finished the report last night.

    b. Here is the bakery {, which/that} (I wonder how) {__/they} made the cake with such short notice.

(11) **Object Position**

    a. This is the report {, which/that} (I wonder how) the new law firm finished {_/it} last night.

    b. Here is the cake {, which/that} (I wonder how) the bakery made {_/it} with such short notice.

Stimuli were presented in the form of videos, each featuring a voice recording of the sentence with an accompanying written text on screen (see Figure 1). Sentences were delivered randomly, one at a time, above an 11-point sliding scale with instructions to

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clauses that begin with the relative pronoun *who* rely more heavily on comma intonation, since the relative pronoun must remain the same for RRCs and ARCs.

[8]There were originally 58 participants, but we excluded two outliers: a 31-year-old woman who gave exceptionally high judgments and a 47-year-old woman who gave exceptionally low judgments.

[9]We categorized participants as OSU students if they reported typical undergraduate ages and origins of Oklahoma or neighboring states. However, some OSU students who were offered the survey are from California and some are not of typical age, so this breakdown is not perfectly precise.

Please watch the video below and rate it for naturalness using the scale beneath it. 1 is very unnatural. 11 is very natural. A natural sentence is one that you could imagine yourself saying.
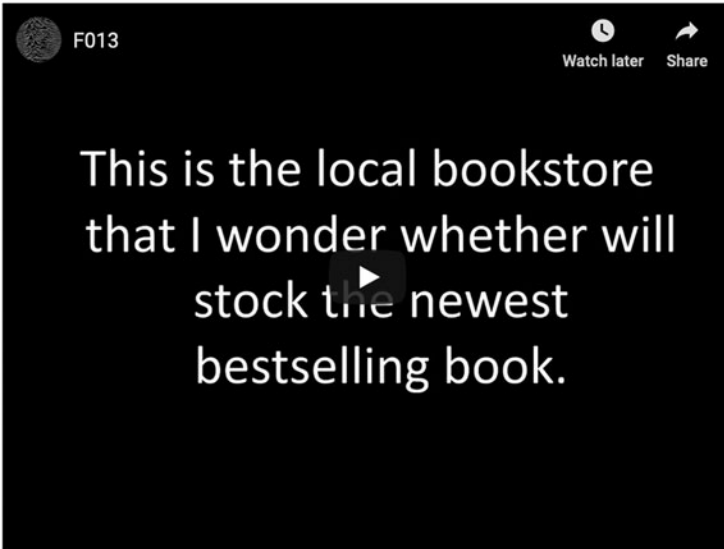

Figure 1: Example of a Stimulus

rate them for naturalness. Detailed written directions at the beginning of the survey instructed participants that a sentence is natural (a high number) if they thought they were likely to say it and unnatural (a low number) if they thought that they were unlikely to say it. We felt that if RPs are more acceptable in ARCs due to a new and/or non-standard use of *which* or due to a secondary interpretation of independent clause properties, as non-standard or secondary forms, speakers might be more resistant to deeming them acceptable rather than natural. An anonymous reviewer cautions that these directions might confound plausibility or frequency of the scenario with the kind of naturalness we are asking for. While we agree that this is possible, it was important to us to avoid ideas of prescriptive acceptability for this study and focus more on naturalness and/or self-reported use since we were exploring a non-standard form. Therefore, we adapted Henry's (2005)

methods for conducting syntactic research on a non-standard dialect, as a "could you say" model produced the best results for the researchers.

Sentence prosody was a significant concern in recording our stimuli, as we felt that an unnaturally long pause between intonation units in the ARC sentences would risk skewing speaker judgments by inappropriately pushing them to interpret *which* as a conjunction. Care was taken to employ comma intonation (Emonds 1976, Demirdache 1991: 113, Potts 2005, Loock 2007) in a manner that produced the natural prosody contrast indicated by the punctuation in (12a) and (12b). Care was also taken to avoid an additional pause after *which*, as represented by the punctuation in (12c). Loock (2007) observed this pause in ARC utterances, as have we, but we felt that such an intonation break would risk inappropriately encouraging speakers to interpret *which* as a false start followed by a new independent clause.

(12) a. **Intonation produced in our recordings for RRCs:**
         This is the new law firm that I wonder how they finished the report last night.

   b. **Intonation produced in our recordings for ARCs:**
         This is the new law firm, which I wonder how they finished the report last night.

   c. **Intonation avoided in our recordings for ARCs:**
         This is the new law firm, which, I wonder how they finished the report last night.

Each condition was lexicalized 16 times, yielding a total of 256 experimental items (16 conditions x 16 lexicalizations) that were split using a Latin square design into 16 semi-randomized, counterbalanced lists, each containing 32 experimental sentences and 32 filler sentences for a total of 64 sentences per participant. Thus, individual participants did not see all stimulus sentences. Filler sentences included some subject-contact relative clauses. Stimuli in each block were randomized. Participants were presented with two sentences of each condition via two stimuli from each lexicalization group. An example of a stimulus is above in Figure 1.

4. RESULTS

Naturalness ratings were converted to Z-scores prior to statistical analysis in order to normalize the data. We used a linear mixed-effects regression, fitted using the analysis package lme4 in the software package R (Bates et al. 2015), to analyze the naturalness ratings of resumption, clause type, position, and islandhood, with participant and item as random effects. We ran a model with main effects for resumption, clause, position, and island and interactions of: (i) clause and resumption; (ii) island and resumption; (iii) island and position; (iv) clause and island; (v) position and resumption; (vi) clause, island, and resumption; and (vii) island, position, and resumption.[10]

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[10] Here is the code for the analysis: lmer (Zscore ~ Resumption + Clause + Position + Island + Clause*Resumption + Island*Resumption + Island*Position + Clause*Island + Position*Resumption + Clause*Island*Resumption + Island*Position*Resumption + (1|ParticipantFactor) + (1|Item))

	Estimate	Standard Error	Z	t	p
Intercept	0.88	0.08		11.49	<0.0001
Resumption (Pro)	−1.4	0.09	0.48	−16.17	<0.0001
Clause (RRC)	0.31	0.07	−0.05	4.41	<0.0001
Island (Yes)	−1.23	0.09	−0.23	−14.2	<0.0001
Position (Subj)	0.08	0.07	0.08	1.09	=0.27

Table 1: Main Effects

P-values were manually calculated by R, revealing main effects for resumption, clause, and islandhood, which are detailed in Table 1 and plotted in Figure 2.

Here we see that sentences with ARCs are, overall, rated as more natural than sentences with RRCs, while sentences with RRCs have a wider range of naturalness ratings. We also see, as expected, that sentences with gaps are rated as more natural than those with RPs and that sentences without islands are rated as more natural than those with islands.

All 2-way interactions except position and resumption were significant, as illustrated in Table 2. Relevant interaction plots are given in Figure 3.

Some noteworthy observations can be made from these 2-way interactions:

  i. RPs are rated as more natural in sentences with ARCs (dotted line) than in sentences with RRCs (solid line), across position and islandhood (plot 1).

 ii. Island violations are rated as more natural in sentences with ARCs (dotted line) than in sentences with RRCs (solid line), across position and islandhood (plot 2).

iii. As expected, sentences with RPs in islands are rated better than sentences with RPs without islands (solid line); however, RPs are never as acceptable as gaps across positions and sentence type (dotted line; plot 3).

 iv. Subject dependencies (solid line) are rated as more acceptable than object dependencies (dotted line) across islandhood conditions, clause types, and resumption level (plot 4).

Finally, both 3-way interactions were significant, as illustrated in Table 3 and in Figure 4.

Some noteworthy observations can be made from these 3-way interactions:

  i. RPs are more natural in ARCs (dotted line) than RRCs (solid line) in both sentences without islands (plot 1a) and sentences with islands (plot 1b).

 ii. Sentences with islands and gaps in subject position (solid line) are rated better than sentences with islands and RPs in subject position, across clause types (plot 2a).

iii. Sentences with islands and RPs in object position (solid line) are rated not statistically different from (in fact numerically higher than) sentences with islands and gaps in object position, across clause types (plot 2b).

Observations (ii) and (iii) are quite unexpected. As detailed in section 2.1, previous research on RRCs has identified the cumulative penalties on subject extraction in islands as the sole context that produces higher acceptability ratings for RPs than
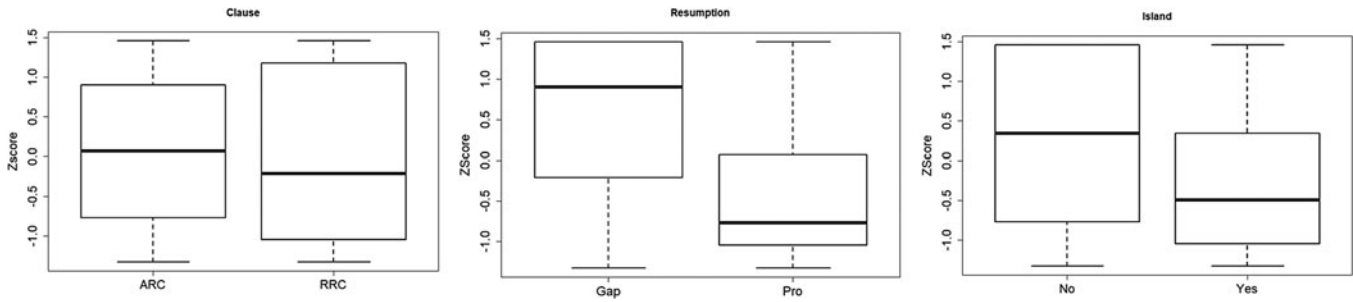
Figure 2: Boxplot Representations of Means by Condition

	Estimate	Standard Error	t	p
Intercept	0.88	0.08	11.49	<0.0001
Resumption (Pro) x Clause (RRC)	−0.55	0.1	−5.5	<0.0001
Resumption (Pro) x Island (Yes)	1.63	0.12	13.36	<0.0001
Island (Yes) x Position (Subj)	0.53	0.1	5.3	<0.0001
Island (Yes) x Clause (RRC)	−0.44	0.1	−4.38	<0.0001
Resumption (Pro) x Position (Subj)	−0.03	0.1	−0.31	=0.75

Table 2: 2-way Interactions

gaps. Furthermore, object RPs in islands have been consistently rated marginally worse than or nearly equal to equivalent gaps – never higher – in Likert scale judgments or Magnitude Estimation tasks (though, notably, Ackerman et al. (2018) did show preference for object RPs in forced-choice tests). Looking at means by clause type offered little answer as to why our results differ from patterns reported in the literature, as island-subject gaps in RRCs averaged + 0.127 compared to -0.590 for RPs, and island-subject gaps in ARCs averaged + 0.264 compared to -0.232 for RPs. There was little difference in mean scores for the various object conditions.

Perhaps strong islands would have produced a pattern more consistent with expectations, but we note that McDaniel and Cowart (1999), Han et al. (2012), and Keffala (2013) all observed preferences for subject RPs over gaps in *wh*-islands (only Keffala also included strong relative clause islands in her stimuli, which revealed similar results). That said, our study design, and specifically our inclusion of ARC stimuli, likely also greatly affect these results.[11]

5. DISCUSSION

Speaker ratings indicate that RPs are more natural in ARCs than in RRCs (regardless of islandhood), and, interestingly, they also indicate that islands are more natural in ARCs than in RRCs. The first finding supports the hints in the literature described in this article that ARCs are more tolerant of resumption, and together, the findings support the proposal that some speakers employ *which* in a connective, non-ana-phoric manner, perhaps the product of an ongoing reanalysis. If *which* is used in this non-standard manner, there is no movement in the second clause, and if there is no movement in the second clause, the pronoun is no longer a true RP, and there can be no island effects. Compare (13) to (14a) and (14b): if *which* can serve

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[11]We also note that in ARCs, subject gaps are rated as more natural than object gaps. This is more than a little surprising, as it is the opposite of how RRCs have been shown to behave. This result may be due to ARCs behaving differently from RRCs in this respect, or it may be due in some way to how we built the subject+gap+island condition.
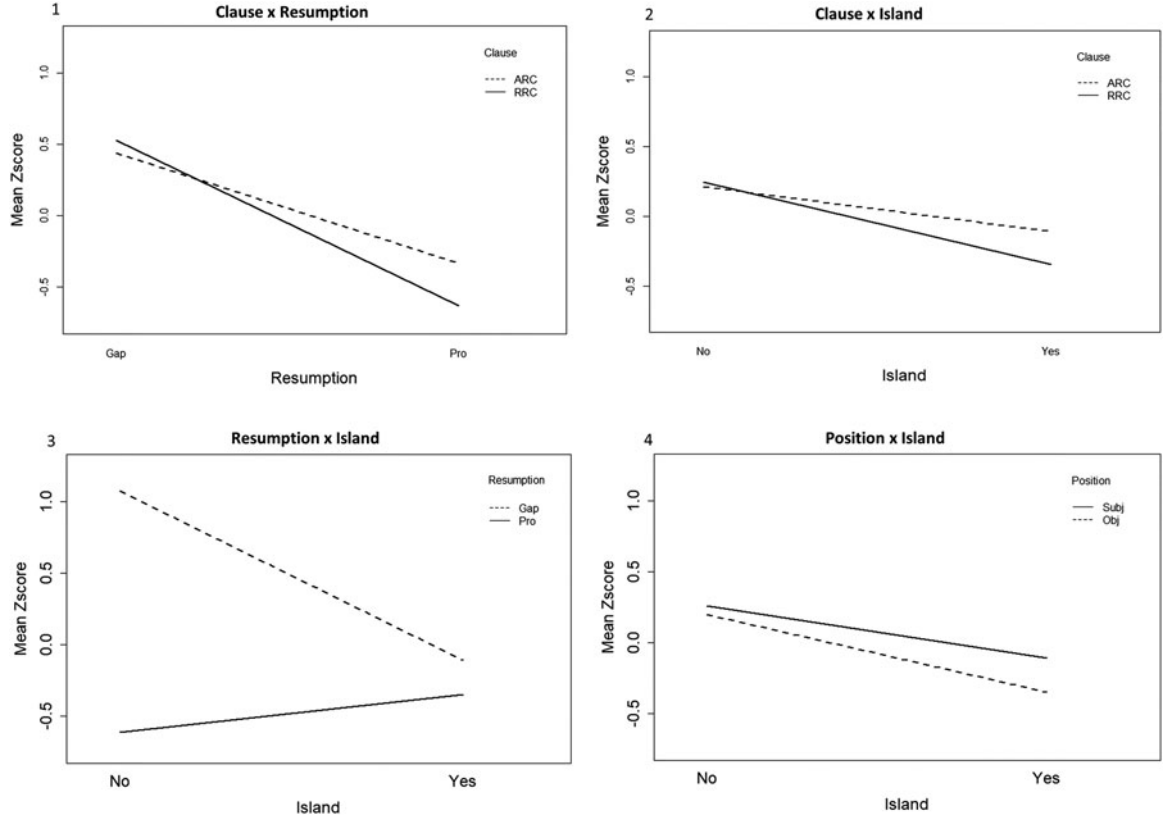
Figure 3: 2-way Interaction Plots

	Estimate	Standard Error	t	p
Intercept	0.88	0.08	11.49	<0.0001
Resumption (Pro) x Clause (RRC) x Island (Yes)	0.33	0.14	2.34	=0.02
Resumption (Pro) x Position (Subj) x Island (Yes)	−0.7	0.14	−4.94	<0.0001

Table 3: 3-way Interactions

as a conjunction for some speakers, a sentence like (13), which features an island, would be comparable to the sentences in (14), which do not.[12]

(13) Here is the bakery, which I wonder how they made the cake with such short notice.

(14) a. Here is the bakery, though I wonder how they made the cake with such short notice.

 b. Here is the bakery, but I wonder how they made the cake with such short notice.

If a connective, non-anaphoric form of *which* (henceforth, "connective *which*") is behind the higher ratings for resumption in ARCs, it must be noted that those sentences were not rated as natural as their gapped equivalents. Put another way, the naturalness ratings of RPs in ARCs were higher than the ratings of RPs in RRCs, but only moderately so; we do not see speaker ratings high enough to reasonably suggest that resumption is perfectly acceptable in ARCs. No true amelioration effect is observed, as RPs in ARCs were not rated higher than equivalent gaps in any condition. This raises the question of why we see a consistent preference for resumption in ARCs over RRCs – but a preference that is consistently so small. We offer four factors that may be in play.

One possibility is rooted in the status and use of connective *which* across speakers. If connective *which* is the product of a change currently in progress, then respondents may not exhibit the reanalysis equally. Some speakers may use connective *which* liberally, and some may not use it at all; still others may be inconsistent in their use across sentences and contexts. Importantly, a reanalysis does not necessarily mean that the standard use is being fully displaced; a non-standard use and standard use could certainly be available side by side in any individual speaker's lexicon.

We investigated whether there was evidence of a division among the participants, with some clearly adopting the change and others clearly not, but density plots of average ratings for sentences with RPs by participant reveal no obvious

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[12]Analyses that suggest that there is no operator-variable movement in ARCs (e.g., Demirdache 1991) or that suggest that the movement of *which* is vacuous (e.g., Del Gobbo 2007) would also predict that there are no island effects in ARCs. But ARCs may not be completely free of such effects: while our stimulus sentences with islands in ARCs were rated as more natural than those with islands in RRCs, ARC sentences without islands were rated even higher.
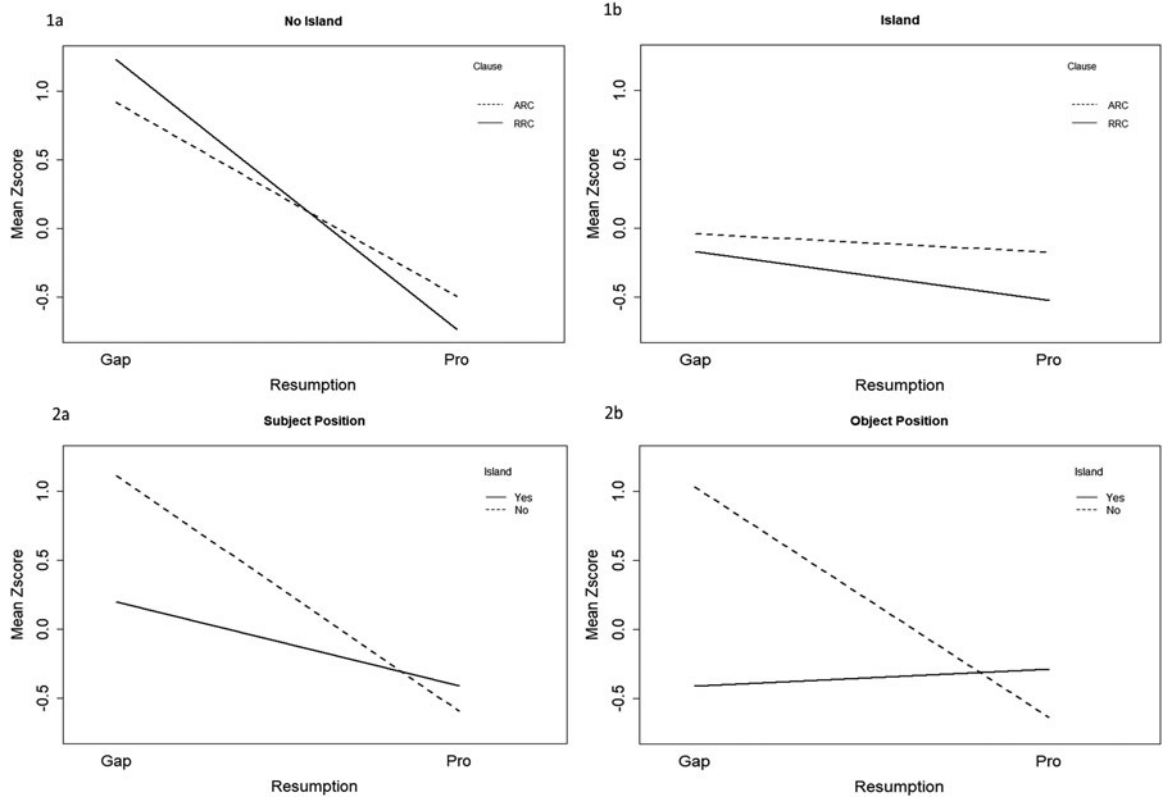
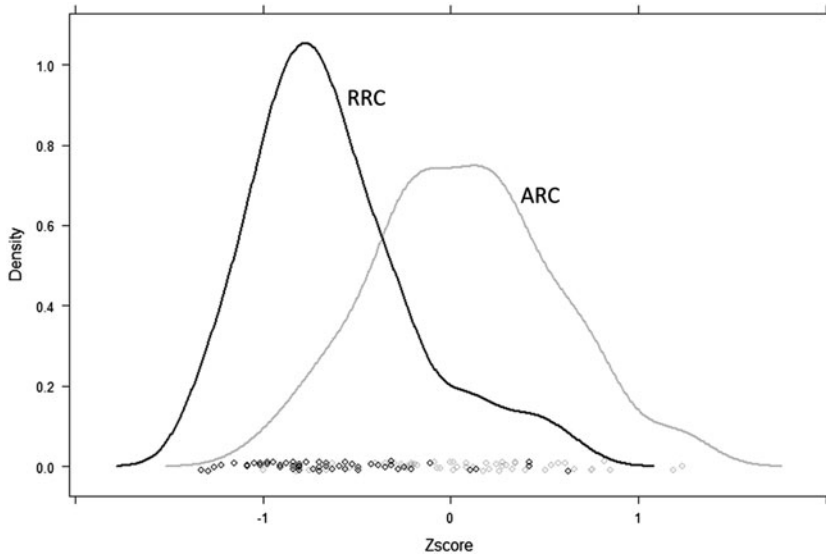**Figure 4:** 3-way Interaction Plots

Figure 5: Average Rating of Sentences with RPs by Participant

bimodal distribution of the ARC stimuli ratings (Figure 5), though there were two participants who consistently rated RPs in ARCs as highly natural.

On average, sentences with RPs in RRCs and ARCs are rated fairly differently. The resumptive RRC sentences are clearly ill-formed, but more of the resumptive ARC sentences were rated on the more natural side than on the less natural side, and there is more variation in those ratings overall.

As to the extent of the reanalysis, two possible reasons come to mind as to why so few participants seem to treat these sentences as occurrences of connective *which*. First, the formal setting of an academic study could make speakers less likely to interpret a sentence as featuring a non-standard use, even if they employ such uses of *which* in their own informal speech, especially when the standard relative pronoun use of *which* is obviously prevalent across dialects and speakers. Second, connective *which* may have a prosodic pattern that is more like other connective words than like that of a non-restrictive relative pronoun. This is hinted at by Loock (2007: 84), who notes that while ARCs, as a whole, have an intonation pattern that includes a pause before the relative pronoun, sometimes the pause unexpectedly occurs *after* the relative pronoun. He further suggests that this unexpected prosody likely pairs with connective *which*. Unfortunately, Loock has no recorded examples of atypical relative clauses with such an intonation pattern, as these tokens are very difficult to collect. Dehé (2009) also observes that in some parenthetical ARCs in her study, the pause occurred after, rather than before, the relative pronoun. She further notes that this pattern has also been found for connective words such as *and* and *as* in other studies, as parenthetical clauses (e.g., Dehé 2007) and as root clauses (e.g., Barth-Weingarten 2007). These observations do not constitute direct evidence that

connective *which* has a unique intonation pattern from relative pronoun *which*, but they suggest that it is not unlikely. If this is so, we sent participants a mixed signal with our stimuli, which may have affected acceptability judgments. The syntax of the stimuli indicated a connective *which*, but the prosody may have indicated a standard *which*. This mixed signal may have led participants to classify our stimuli as standard, which, in turn, led to lower naturalness ratings.

A second factor that may have influenced the results is discourse context. Similar to uses of RPs in general, non-standard uses of *which* are primarily a feature of spoken language (Loock 2007), and thus the limitations inherent to the presentation of stimuli outside of discourse context are relevant. Beltrama and Xiang (2016) offer that RPs in RRCs are most likely to appear (and be greeted as acceptable) in dialogic interactions, and, therefore, presenting them with no surrounding context removes them from their natural setting and encourages low naturalness ratings. In their investigation of RP assistance in comprehension, they found that such effects were strongest when the antecedent was made more salient via a context sentence preceding the target sentence.[13]

Granted, the pitfalls that accompany the presentation of stimuli in isolation apply to the presentation of RPs in both ARC and RRC contexts, but we cannot say with certainty that they apply to both contexts equally. The dependence on context of connective *which* might be even greater than that of resumption in RRCs, especially if the formal experimental setting is feeding prescriptive resistance to non-standard usages with which participants are nonetheless familiar. That is, appropriate discourse placement might be necessary for some speakers to recognize an alternative use of *which* that they actually find quite natural.

A third element relevant to this discussion concerns the constraints of our experiment design. As stated earlier, in order to isolate an alternation between restrictive and appositive clauses, we strove to create main clauses that accepted ARCs and RRCs equally. As a result, our stimuli feature the existential frames, "here is the X that…," "this is the Y, which…," etc., which do not always support the smooth substitution of a conjunction that correlates with a connective *which* interpretation. Consider (15) and (16), where we have replaced the relative pronoun in two of our stimulus sentences.

(15) This is the report {though/and} (I wonder how) the new law firm finished it last night.

(16) Here is the bakery {though/and} (I wonder how) they made the cake with such short notice.

In the absence of discourse context, the substitution of *and* for *that* and *which* in the versions presented to our participants is awkward, and the substitution of *though* is worse still. That some of these substitutions sound pragmatically odd could have had a negative effect on the perceived naturalness of a form of *which* that serves the same connective function as a conjunction. We suspect that main clauses that

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[13]In fact, the RP benefit to comprehension was lost when they repeated the experiment without context sentences.

better lend themselves to the substitution of a conjunction would have produced higher ratings.

Finally, the method with which we elicited judgments – Likert scale with stimuli presented one at a time – may also have contributed to the relatively low naturalness ratings observed. In an effort to further understand why psycholinguistic studies report such low ratings for RPs in islands in RRCs despite evidence that speakers use them, Ackerman et al. (2018) explored whether the disconnect between use and judgments was due to differences in how the two fields collect judgments of acceptability. In theoretical syntax, researchers typically look at minimal pairs and decide which sentence is better. In psycholinguistic research, however, sentences are often shown one at a time with a Likert scale. Ackerman et al. considered the possibility that the island-ameliorating effects of RPs are weak enough that the sensitivity of gradient acceptability-rating tasks is not sufficient to detect them. They found that RPs do improve the acceptability of sentences with islands in RRCs when they are presented as minimal pairs in forced-choice and fill-in-the-blank tasks. A similar forced-choice task with ARCs may reveal the same speaker preference for RPs over illicit gaps. An intriguing question is whether some speakers' adoption of connective *which* would reveal greater acceptability of (apparent) RPs compared to *licit* gaps in ARCs than Ackerman et al. observed in RRCs.

5.1   Implications: An increase in frequency?

To summarize our discussion thus far, (i) our study has revealed a greater tolerance in ARCs than in RRCs for both resumption and islands; (ii) this is likely due to the non-standard form of *which* detailed in Loock (2007); and (iii) we suspect that this is the product of an ongoing reanalysis of *which* identified by Sells (1985). If this reanalysis has indeed been in progress, we would expect corpora to reveal increasing occurrences of what appear to be RPs in ARCs that begin with *which*. Moreover, if, as presumed, the reanalysis is unique to *which,* we would not expect to see a corresponding increase of what appear to be RPs in ARCs that begin with other nonrestrictive relative pronouns. In order to explore this possibility, we offer, as a postscript to this study, the following compelling, though limited, corpus evidence for our assertion that this use is increasing.

A corpus search for RPs in ARCs presents significant challenges, as a search for nonrestrictive relative pronouns turns up a large number of instances, to say the very least, each of which must be examined for the presence of pronouns anywhere between the relative pronoun and the end of the relative clause. Compounding the challenge, pronouns appearing in that span are not necessarily resumptive, for instance, "who hadn't tried *that* until that morning," "which *it* affected dramatically," etc. Working within these constraints, we performed the following searches in the Corpus of Contemporary American English (COCA)[14]:

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[14]Although RPs are almost exclusively a product of spontaneous speech, we did not limit our search to just COCA's spoken corpus, as the number of returns on our corpus-wide searches was not unmanageably large. Several instances of RPs were found in the quoted speech of newspapers and magazines, so the decision proved fortuitous.

   (i) ", which" for an estimation of total occurrences of ARCs beginning with *which*;

  (ii) ", which that" for a list of *which*-ARCs with potential RPs in subject position;

 (iii) ", who" for an estimation of total occurrences of ARCs beginning with *who*; and

 (iv) ", who he" and ", who she" for a list of *who*-ARCs with potential RPs in subject position.[15]

This was a very conservative way to conduct the search, as it targets only three collocations of subject RPs amounting to two pairs, *which* + distal demonstrative pronoun[16] and *who* + human singular personal pronoun. By searching for RPs in subject position, any RPs following *who* or *which* that appear as objects of a verb or preposition are excluded. What is more, these particular collocations should be relatively rare if traditionally observed motivators for RPs in RRCs are applicable here. That is, the same need for incremental production of locally well-formed structures that Asudeh (2012) posits for the production of RPs in RRCs[17] is presumably at play in the production of ARCs, in which case, traditional expectations regarding the distribution of resumption would predict that we would see RPs inside of islands in ARCs or in ARCs with extensive embedding. This is to our advantage, however, as connective forms of *which* and *who* would not follow this distribution, since they would not be serving to introduce relative clauses. This is to say that our searches target constructions with none of the traditionally identified resumption motivators, and thus, if acceptance and use of connective-only relative pronouns is on a continuum across speakers, our search items may target utterances produced by the most ardent users.

   Despite these noted limitations, the advantage to this strategy is substantial: In exchange for such strict search criteria, the number of returns in need of analysis dropped from hundreds of thousands to mere hundreds. Below are examples of RPs we found in these searches.

   (17) …hyperbolic thoughts, [which **that**'s what Los Angeles runs on.]
                                                        (Maria Bamford on NPR, 2013)

   (18) Like, I was reading this thing from William Golding, this writer, [who **he** wrote *The Lord of the Flies*.]   (Unknown speaker on ABC's *The View*, 2016)

   (19) One of the things they have provided is these wiretaps of the brothers' mother, [who **she** seems to have been a key figure at least in encouraging the older brother in his more fervent worship].   (George Stephanopoulos on ABC *This Week*, 2013)

_____

[15]The presence of the comma in the searches was useful in eliminating instances of interrogatives, though this came at the expense of missing any ARCs that may have been transcribed without a comma.

[16]We targeted *that* over *it* because (a) ARCs with sentential antecedents are particularly easily rephrased with a conjunction in place of *which* (Loock 2007), and, (b) since demonstrative pronouns target referents that are activated but not in focus in the discourse, *that* is typically the most appropriate pronoun when the antecedent is the entire clause that the speaker just uttered, for example, "The earth is round, and that's a fact" (Gundel et al. 1993).

[17]Asudeh does not specify RRCs, but ARC examples are not present in his analysis.

Each return from the *that*, *she*, and *he* searches was analyzed in order to tally only those with what appear to be RPs. Both tallies showed increases when the corpus's earliest 10 years (1990–1999) were compared to its most recent 10 years (2008–2017). In order to control for any possible corresponding increase in instances of ARCs in general, we used a log-likelihood test to make a longitudinal comparison (again, first 10 years to most recent 10 years) of the ratios of comma + *which* + resumptive *that* to all instances of comma + *which* and of comma + *who* + resumptive *he/she* to all instances of comma + *who*. We found that instances of both *which* and *who* have been more likely to precede an RP in the last 10 years than they were in the 1990s (see Tables 4 and 5). These results are consistent with the hypothesis that *which* is undergoing a reanalysis that is increasingly being adopted, and they suggest that *who* may be undergoing a similar reanalysis.

	", which that"	", which"
1990–1999	3	161,858
2008–2017	11	178,792

$\chi^2 (1) = 4.1$, $p = 0.042$

Table 4: *Which* + RP Log-likelihood Test

	", who (s)he"	", who"
1990–1999	-	125,881
2008–2017	3	120,344

$\chi^2 (1) = 4.3$, $p = 0.038$

Table 5: *Who* + RP Log-likelihood Test

We also used a log-likelihood test to determine whether *which* and *who* were equally likely to co-occur with an RP. We expected that *which* would be the more likely of the two, as our intuitions support a reanalysis specific to *which* (Sells 1985), not all relative pronouns, and we agree with Loock (2007) that the variety of antecedents available to *which* make it particularly amenable to non-standard use. Using all instances in the latest 10 years of the corpus (2008–2017), we compared (a) the ratio of comma + *which* + resumptive *that* tokens to comma + *which* tokens to (b) the ratio of comma + *who* + resumptive he/she tokens to comma + *who* tokens. We chose the most recent 10 years since there were no non-standard uses of *who* evident in the first 10 years, and we did not want to ignore the possibility that a late-emerging reanalysis of *who* has moved quickly enough to place it on equal standing with connective *which*. The test confirmed that non-standard uses of *which* are more common than equivalent uses of *who* (Table 6).

In summary, our corpus search found that (i) both *who* and *which* have been more likely to co-occur with an RP in the last 10 years than in the 1990s, and

	With RP	All Occurrences
", who"	3	246,225
", which"	14	340,650

χ^2 (1) = 4.6, p = 0.032

Table 6. *Which* vs. *Who* (2008–2017) Log-likelihood Test

(ii) *which* is more likely to do so than *who*. We believe that this is evidence of a dynamic change in progress – an ongoing reanalysis of non-restrictive relative pronouns as connective words. This reanalysis may have started with *which*, as suggested by Sells (1985), possibly due to the ease with which it accepts sentential – even paragraph-length – antecedents (Loock 2007). The connective form of *which* is clearly more productive than that of *who,* suggesting that perhaps its most ardent users are expanding the reanalysis to other non-restrictive relative pronouns.

6. CONCLUSION

There are hints in the literature that RPs are more acceptable in ARCs than in RRCs, with some suggestion that *which* (at least) is undergoing a reanalysis as a connective word similar to a conjunction. Prior to our investigation, there were no empirical studies investigating resumption in ARCs at all, and this article has filled that gap by comparing RPs in ARCs to RPs in RRCs.

We asked for naturalness judgments of RPs and gaps in ARCs and RRCs in object and subject position, both inside and outside of syntactic islands. With respect to RPs and island violations, participants rated both as more natural in ARCs than in RRCs. We concluded that these results support the previous suggestion of a productive non-standard form of *which,* and we presented results from a small corpus search that not only support a theory that *which* is undergoing a reanalysis that is growing in use, but also suggest that other relative pronouns may be part of this change.

There are several possible directions for future research on resumption in ARCs. One direction is to continue applying lessons learned from previous research on resumption in RRCs. Using others' design innovations may help us better understand how RPs in ARCs differ from those than in RRCs. We suspect that applying Ackerman et al.'s (2018) forced-choice study design would reveal more dramatic preferences for RPs in ARCs over RRCs, and it could also be used to take a new look at RP/gap contrasts in licit and illicit constructions. Adding context to the stimuli in a manner similar to Beltrama and Xiang (2016) may also give us different results.

Another direction is to play with the stimuli in a way that explores the conjunctive role that *which* plays. Presenting sentences that lend themselves to *which*/conjunction alternation alongside others that do not could improve our understanding

of the reanalysis and possibly reveal greater naturalness ratings in certain structures. It could also help pinpoint the nature of *which*'s (and other relative pronouns') connective function. Is it a subordinating conjunction (Sells 1985), a coordinating conjunction (Daalder 1989), or simply any type of conjunction (Loock 2007)?

Using real audio examples drawn from news programs, reality television shows, YouTube videos, etc. is another intriguing option. Presenting speakers with uses of connective *which* captured in real-world examples could reveal markedly higher naturalness ratings. We have shown the following text to disapproving students on several occasions, only to have them declare with surprise how acceptable it sounds when they hear the audio recording.[18]

(20) When Gronk scores – it was like his eighth touchdown of the year – he spikes the ball and he deflates the ball, [which I love **that**, because like, you know, the deflated ball].
(Tom Brady, WEEI-AM, Boston, 2011)

Such recordings of spontaneous utterances could also help us understand the role of intonation and pauses in the reanalysis. We, like Loock (2007: 84), have observed that non-standard uses of *which* seem particularly prone to an accompanying pause after *which* in addition to or in place of the traditional comma intonation that precedes it. In fact, we have begun collecting an audio corpus of such examples as well as standard uses of *which* and standard uses of coordinating and subordinating conjunctions between clauses. Moreover, if there is a distinct prosody for connective *which* that is different from standard *which*, understanding these differences could lead us to produce more precise stimuli that would not send mixed signals, where the syntax supports connective *which,* but the prosody does not support that reanalysis.

Finally, if our findings are indeed the evidence of a change in progress that we suspect they are, this is also a time for sociolinguists to identify early adopters of the reanalysis. Are women more likely to embrace this mostly subconscious change, as they are for other below-the-radar changes? Are younger speakers more likely to use connective *which*? Lastly, are users of connective *which* equally likely to use other non-restrictive pronouns in this connective manner?

APPENDIX

Directions

We will show you 64 sentences. For each sentence, you will rate it for naturalness on a scale of 1–11. 1 is very unnatural; that is, a sentence you can't imagine yourself saying. 11 is very natural; that is, a sentence you could very well imagine yourself saying. There are no right or wrong answers. You will not be asked why you have rated a sentence as you did, so just go with your gut. This will take you about 20 minutes.

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[18]Listen for yourself at roughly the 3:50-mark, depending on the length of the advertisement that begins the clip. <http://www.cc.com/video-clips/gudld8/the-daily-show-with-jon-stewart-psi–new-england—pounds-per-square-inch—silly-finings-playbook>

Stimuli

Subject

1. That's the construction company {that, which} (I wonder whether) {they/_} built the new skyscraper.

2. This is the new law firm {that, which} (I wonder how) {they/_} finished the final report on time.

3. Here is bakery {that, which} (I wonder how) {they/_} made the cake with such short notice.

4. There's the local coffee shop {that, which} (I wonder why) {they/_} wants to take the caramel latte off the menu.

5. That's the auto repair shop {that, which} (I wonder how) {they/_} fixed the car.

6. This is the local bookstore {that, which} (I wonder when) {they/_} will stock the newest best selling book.

7. There's the local high school {that, which} (I wonder when) {they/_} will start using the new standardized test.

8. Here's the natural foods store {that, which} (I wonder whether) {they/_} will accept the manufacturer's coupons.

9. This is the walk-in clinic {that, which} (I wonder whether) {they/_} will prescribe the new antibiotic.

10. That's the real estate office {that, which} (I wonder when) {they/_} will sell the house.

11. That's the budget committee {that, which} (I wonder whether) {they/_} will close the pumping station.

12. Here's the History Department {that, which} (I wonder why) {they/_} proposed the new course rotation.

13. This is the new landscaping company {that, which} (I wonder when) {they/_} will cut down these dying trees down.

14. Here's the new restaurant {that, which} (I wonder how) {they/_} created that delicious waffle recipe.

15. This is the preservation society {that, which} (I wonder how) {they/_} saved the historical building.

16. That's the gaming commission {that, which} (I wonder whether) {they/_} decided to close the new race track for the winter.

Object

1. That's the skyscraper {that, which} (I wonder whether) they just reopened {it, _} last week.

2. This is the final report {that, which} (I wonder how) that new law firm finished {it/_} on time.

3. Here is the cake {that, which} (I wonder how) the bakery made {it/_} on such short notice.

4. There's the caramel latte {that, which} (I wonder why) the coffee shop wants to take {it/_} off the menu.

5. That's the car {that, which} (I wonder how) the auto repair shop fixed {it/_}.

6. This is the newest best selling book {that, which} (I wonder when) the local bookstore will stock {it/_}

7. Here is the new standardized test {that, which} (I wonder when) the local high school will start using {it/_}.

8. Here is the manufacturer's coupon {that, which} (I wonder whether) the natural foods store will accept {it/_}.

9. This is the new antibiotic {that, which} (I wonder whether) the walk-in clinic will prescribe {it/_}

10. That's the house {that, which} (I wonder when) the real estate office will sell {it/_}.

11. That's the pumping station {that, which} (I wonder whether) the budget committee will close {it/_}.

12. Here is the new course rotation {that, which} (I wonder why) the History Department proposed {it/_}.

13. These are the dying trees {that, which} (I wonder when) the new landscaping company will cut {them/_} down.

14. Here's that delicious waffle recipe {that, which} (I wonder how) the new restaurant created {it/_}.

15. This is a historical building {that, which} (I wonder how) the preservation society saved {it/_}.

16. That's the new race track {that, which} (I wonder whether) the gaming commission decided to close {it/_} for the winter.

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