

1.0 Introduction

Ross (1967) presents a taxonomy of syntactic domains, dubbed *islands*, opaque to movement operations. Subsequent work suggested explaining island effects as by-products of more general principles of Universal Grammar (Chomsky 1973, 1977, 1986; Cinque 1990; Huang 1982; Manzini 1992; Rizzi 1990; Stepanov 2007). Importantly, these principles were intended to reflect fundamental properties of the Faculty of Language and so were expected to apply universally. Learnability considerations relating to islands buttressed this expectation: given the complexity of the data required to permit parametric variation, it is unlikely to be part of the Primary Linguistic Data available to the child, and it is thus unclear how a child could learn that islands are only selectively enforced. The conclusion: island effects should be uniform across all grammars.

This reasoning proved largely accurate. Subsequent work distinguished *strong* from *weak islands*, the latter permitting some cross-linguistic variation, the former being largely uniform (for a review, see Szabolcsi & den Dikken 2003). We say 'largely' because there was one observed serious counter-example; some apparent cases of extraction from relative clauses. This remains a serious challenge for four reasons: (i) relative clauses are the canonical *strong* island. Though it is possible to alter some assumptions so as to allow extraction out of weak WH-islands (e.g. by adjusting the number of exits a clause offers, or to relativize bounding nodes to particular languages à la Rizzi 1978; Torrego 1984), extraction out of strong islands is harder to accommodate without neutering the accounts entirely. (ii) the extraction data seem to be systematic, reliable and replicable. This argues against a "performance" analysis of the data. (iii) The relative clauses that permit extraction are structurally restricted. Thus, even when a grammar allows violations of the Complex NP constraint, it does not allow it across the board. Rather, the violations are restricted to a subset of relative clauses. This suggests that what we are witnessing are *exceptions* to an otherwise operative prohibition against movement out of relative clauses. (iv) If the facts are as described in (iii) then it is a mystery how the child could have learned to exclude just these relative clauses from the general island effects. In particular the relevant data would involve extraction from structures with three levels of embedding. It is doubtful that such examples are ubiquitous in the primary linguistic data, or that the stray cases that might appear would be usable by the child. In concert these considerations lead to one conclusion: the cited violations must all be apparent.² This paper aims to make good

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² Recent work on apparent RC-Island violations in Korean and Japanese has taken a similar tack. Han and Kim (2004), Hsu (2006), Ishizuka (2009) and Sakai (1994) have all argued that apparent extraction from RCs in these languages employ

on that conclusion. In particular, we here propose that what are claimed to be violations of the Complex NP Constraint reflect the possibility of analyzing some relative clause complements as Small Clauses (clausal complements), and thus not islands at all.

Our plan is as follows: First, we review the basic data and then describe where relative clauses appear to permit extraction. Second, we provide experimental evidence that shows that the same factors determining the acceptability of apparent RC-Island violations in Swedish produce partial amelioration of comparable constructions in English. Finally, we present an account for the observed amelioration effects in English and discuss the implications of our findings for Universalist accounts of islands.

1. The Data

Extraction from (apparent) RCs in Scandinavian languages illustrates the problem. (1a-c) are Swedish examples from Engdahl (1997). (2) is a Norwegian example from Taraldsen (1982).

- (1) a. Garagedörren₁ var det bara Kalle [_{RC} som kunne öppna *t*₁.]
Garage-door.DEF was it only Kalle that could open
(Lit.) 'The garage door, it was only Kalle who could open.'
'It was only Kalle who could open the garage door.'
- b. Det språket₁ finns det många [_{RC} som talar *t*₁.]
The language exists it many that speak
(Lit.) 'That language, there are many who speak.'
'There are many people who speak that language.'
- c. De blommorna₁ känner jag en man [_{RC} som säljer *t*₁.]
The flowers know I a man that sells.
(Lit.) 'Those flowers, I know a man who sells.'
'I know a man who sells those flowers.'
- (2) Rødspirit₁ slipper vi ingen [_{RC} som har drukket *t*₁] inn.
Red-spirit let we no-one that has drunk in
(Lit.) 'Redspirit, we don't let anyone who has drunk in.'
'We don't let anyone who has drunk redspirit in.'

Similar data have been reported in other Northern Germanic languages, such as Danish (Erteschik-Shir 1973; Paulsen 2008) or Icelandic (Mailing & Zaenen 1982). In fact, such examples are not restricted to Scandinavian languages. There are

language-particular syntactic constructions (Double Nominative Construction) to circumvent creating a syntactic island.

analogous acceptable English sentences (Chung & McCloskey 1983; Cinque 2010; Kuno 1976; McCawley 1981, among others).³

- (3) a. Isn't that the song that Paul and Stevie were the only ones who wanted to record?
b. This is a paper that we really need to find someone who understands.
(Chung & McCloskey 1983, p. 708)
c. This is the child who there is nobody who is willing to accept.
(Kuno 1976, p. 423)
d. Then you look at what happens in languages that you know and languages that you have a friend who knows ...
(McCawley 1981, p. 108)

These data suggest two conclusions. First, the effects first observed for the Scandinavian languages also occur in languages like English where RC islands are strongly attested. In fact, English and the Scandinavian languages are similar in this regard as well. Swedish bans extraction from RCs in many of the same environments where they are illicit in English.

- (4) **Vilken bok_i gav du [mannen som läste t_i] ett förstoringsglas?*
Which book gave you man.DEF RP read a magnifying glass
'Which book did you give the man who read a magnifying glass?'

Second, whatever is going on in these cases needs a principled explanation for it seems that where RC islands obtain in English, they also are manifest in Scandinavian, and where they are attenuated in Scandinavian, they also are problematic in English. In other words, both the island effects and exceptions to them appear systematic and thus require a principled account. Furthermore, given that the relevant counterexamples are unlikely to be observed in the Primary Linguistic Data, the correct account of why certain structures are more porous than others must be based on grammar internal considerations.

The viability of this line of explanation clearly depends on the extent to which the constructions parallel one another in the various languages. We next report experimental studies that show that the same factors that govern the acceptability of the Swedish examples determine the (relative) acceptability of the English cases.

1.1 Factors Determining Acceptability

³ Most of such sentences appear in the literature without a '*' or '?'. Though this might suggest these sentences should be given full grammatical status, we will show that such sentences are, on the whole, still only marginally acceptable in English.

There appear to be two key structural factors that allow RC-island violations in Scandinavian languages: (i) subject RCs allow extraction while object RCs do not (Engdahl 1997), and (ii) choice of embedding verb seems to matter. The former restriction is shown in (5).

- (5) a. *Den här teori₁* finns det ingen lingvist₂ som t₂ tror på t₁.

This here theory exists it no linguist that believes in

‘There is no linguist that believes in this theory.’

- b. **Den här lingvisten₁* finns det ingen teori₂ som t₁ tror på t₂.

The here linguist exists it no theory that believes in

‘There is no theory that this linguist believes in.’

(Engdahl 1997)

Examples of apparent island violations in English and other languages (see Cinque 2010 for some examples) also exhibit this Subject Restriction. In the past, previous authors have supposed that this Subject Restriction was the only fact relevant to explaining the examples. Chung and McCloskey (1983), Chomsky (1986) and Platzack (1999) all assumed that relative operators in subject position need not raise, leaving an ‘escape hatch’ open, thereby permitting extraction of the object. All such accounts predict porosity to be a general property of all subject RCs, but this prediction is not borne out in (6).

- (6) a. De blomorna₁ ser jag en man [_{RC} som vattnar t₁.]

The flowers see I a man that waters

(Lit) ‘The flowers, I see a man who is watering.’

‘I see a man who is watering those flowers.’

- b. *De blomorna₁ talar jag med en man [_{RC} som vattnar t₁.]

The flowers speak I with a man that waters

(Lit) ‘The flowers, I talk with a man who waters.’

‘I talk with a man who waters/is watering those flowers.’

(adapted from examples in Allwood 1982, p. 24)

The minimal pair in (6) illustrates that whether an RC allows an extraction or not is conditioned by the type of verb which the complex NP is a complement of. Call this second restriction the Predicate Restriction. Though there is no exact specification of the relevant verb classes, Engdahl (1997) argues that the embedding verbs that license this kind of extraction are often ‘presentational’ or ‘existential’, while

Allwood (1982) shows that certain verbs tolerate extraction more easily than others, though he gives no overall explanatory account of the observed data. These authors explicitly avoid casting their analyses in syntactic terms. In fact, they contend that a syntactic characterization of the relevant verbs cannot be given (for a related proposal, see also Erteschik-Shir 2007).

Kush (2011) notes that these observations cohere under a unified syntactic characterization, namely, that all the embedding verbs allow small clause (SC) complements. Specifically, Kush (2011) proposes the Small Clause Hypothesis (SCH):

(7) SMALL CLAUSE HYPOTHESIS (SCH)

Verbs that select for SC complements (either 'thetic' or 'categorical')⁴ permit extraction from subject RCs in complement position.

English equivalents of these SC types are given in (8) and (9), respectively.

(8) a. John saw_[SC Mary eat cheese].

b. John found _[SC Mary eating cheese].

(9) John considers _[SC Mary a big idiot].

Note that these small clause complements are not islands and they freely permit extraction. So, if some RCs can be analyzed as SCs then their tolerance for extraction should increase.

(8') a. What_{t₁} did John see Mary eat *t₁*?

b. What_{t₁} did John find Mary eating *t₁* ?

(9') [How big an idiot]_{t₁} does John consider Mary *t₁* ?

The English analogues of the Swedish examples appear subject to the same restrictions as their Swedish counterparts. Chung and McCloskey (1983) note that extraction from Object RCs is unacceptable in environments similar to those that permit extraction from subject RCs.

(10) a. *Isn't that the song that Paul and Stevie were [the only ones]_{t₁} that George would let *t₁* record?

b. *This is a paper_{t₂} that we really need to find someone_{t₁} that we can intimidate *t₁* with *t₂*.

⁴ This terminology is taken from Basilico (2003). The two SC types perform two distinct types of predication. For more on this distinction, see Basilico (2003), Cardinaletti and Guasti (1995), Den Dikken and Naess (1993), and Raposo and Uriagereka (1990).

In addition to the Subject Restriction, none of the cited examples in the English literature appear to deviate from the Predicate Restriction, although the predicate type effect has not been empirically investigated. The informal judgments for sentences in (11) illustrate that the Predicate Restriction is indeed active in English.

(11) a. EXISTENTIAL PREDICATE (SC ENVIRONMENT)

?This is the battle₁ that there were many historians who studied *t*₁.

b. PERCEPTION VERB (SC ENVIRONMENT)

?This is the battle₁ that I saw many historians who studied *t*₁.

c. CATEGORICAL COMPLEMENT (SC ENVIRONMENT)

?This is the battle₁ that I knew many historians who studied *t*₁.

d. NONSC-SELECTING PREDICATE

*This is the battle₁ that I met many historians who studied *t*₁.

The acceptability contrast between the existential predicate (11a), the perception verb (11b), and verbs, like *know*, that license categorical complements (11c) on the one hand and the Non-SC-selecting predicate (11d) on the other suggests that extraction out of English subject RCs is only possible when the complex NP is a complement of a verb that can select for a small clause. This is exactly what is expected if apparent RC-Island violations with this class of verbs is a more general cross-linguistic phenomenon tied to the SCH.⁵

However, we must exercise caution in interpreting the observed acceptability contrasts in (11) for two reasons. First, the difference between “?” and “*” is fairly subtle. Moreover, the existence of the Predicate Restriction in English may appear questionable once we consider the fact that manipulation of the Predicate Restriction yields a much clearer contrast in Scandinavian languages (6). In other words, though *relative* acceptability looks to be improved in the English cases, the extractions are still not perfect. This contrasts with the Scandinavian examples where the reported judgments are that the extractions are highly acceptable.

⁵ It is important to get clear what the claim is: as a matter of Universal Grammar no language allows extraction from relative clauses. Where there are apparent extractions from relative clauses (e.g. in English, Swedish etc) this must be because the extraction is not from a relative clause but from a structure that UG does not classify as an island and from which extraction is licit in that language. Small clauses in English and Swedish are porous to movement in both English and Swedish. In fact, so far as we know UG does not proscribe movement from small clause complements. Thus, to the degree that apparent relative clauses can be analyzed as small clauses to that degree extraction from these structures are predicted to be acceptable.

In order to provide a more rigorous empirical test of the Predicate Restriction in English, we conducted four controlled acceptability judgment studies with a 7-point scale. A virtue of this methodology is that it is useful for revealing more finely graded acceptability ratings when compared to informal traditional methods which ask for binary grammaticality judgments (for discussions, see Clifton, Fanselow & Frazier 2006; Featherston 2005; Schütze 1996). This method is therefore suitable for testing the accuracy of the informal judgments reported in (11). The results below demonstrate that unlike in Swedish, the amelioration observed does not render the English analogues fully acceptable (contra the judgments reported in Chung & McCloskey 1983 and elsewhere), but that there are indeed reliable amelioration effects that track the embedding verb's ability to license SC complements.

2. The Experiments

We conducted four controlled acceptability judgment experiments to examine the acceptability of English sentences in (11). The results described below demonstrate that the acceptability reported in (11) are correct: Experiments 1a and 1b show relative amelioration of apparent RC-Island violations in the complement position of existential *be*, but not from the complement of *meet*. These effects stand independent of complexity factors shown to influence the processing of filler-gap dependencies. Experiments 2 and 3 show that this amelioration effect extends to other SC environments, namely the complement position of *see* and *know*.⁶

2.1 Experiment 1a

Participants

22 self-reported native English speaking students from the University of Maryland community participated in the study for monetary compensation or course credit.

Materials

The first experiment had a 2×3 Factorial design manipulating EmbeddingVerb and QuantifierType. Existential constructions were chosen as the initial test case for the SCH. As mentioned above the complement of existential *be* has been analyzed as a SC complement (whether it be simply vP or of another category, see Lasnik 1992;

⁶ Adele Goldberg (p.c.) rightly points out that the experiments reported here do not necessarily rule out the possibility that the effects observed are specific to the predicates *be*, *see* and *know*, rather than the set of SC-selecting verbs. Though we do not report the results fully here, we note that further studies have been conducted in the lab that replicate the amelioration effect in the complement of the verb *notice*, a SC-selecting verb not attested in the Swedish examples.

Kayne 1993). Though many of Engdahl's examples containing expletive subjects were clefts rather than existentials, we chose not to use clefts so as to minimize differences in information structure across conditions. The verb *meet* was selected for comparison with existentials because it does not select for SC complements, but it bears some informational/semantic similarity to presentational verbs. For example, a new discourse participant can be easily introduced as an indefinite in the complement position of *meet*, just as with existentials. In other words, the verb *meet* allows us to create a minimal pair that differs from the existential condition mainly in terms of the verb complementation factor.

Manipulating quantifier type allowed us to test the generality of extractability. Many theorists have assumed that only subject RCs with indefinite determiners or weak quantifiers allow extraction (see, for example, Maling & Zaenen 1982), while others have discussed variable effects related to quantifier choice (Andersson 1982; Engdahl 1997, among others). Using an existential construction in the factorial design precluded testing extraction out of definite subject RCs, however, given that existentials exhibit a definiteness restriction (Milsark 1976).

A sample set of test items is given here.

(12) That was the battle that {there were | she met} many historians who researched at that college.

That was the battle that {there were | she met} no historians who researched at that college.

That was the battle that {there was | she met} a historian who researched at that college.

The SCH predicts a main effect of Embedding Verb, though not necessarily any effect of Quantifier Type (as the choice of quantifier should have no effect on the availability of a SC). Failure to produce acceptability differences between Existential and NonSC conditions would falsify the SC Hypothesis.

18 sets of test items (listed in Appendix A) were created with different lexicalizations. Test sentences were distributed across six written questionnaires in a Latin Square fashion. Two versions of each questionnaire were created such that the order of target item presentation could be varied across the two versions. These target sentences were interspersed with 36 fillers of comparable structural complexity and varying degrees of grammaticality/acceptability. Each filler sentence contained a construction with at least one level of embedding, many featuring relativization. Bad fillers contained various strong island violations (extractions from coordinate structures, from subjects, etc.) as well as sentences in which relativized DPs lacked a gap with which to be related.

Procedure

Each sentence in the questionnaire was paired with a 7-point acceptability scale. Following the instruction procedure that was developed in previous studies in our lab (e.g., Phillips 2006; Phillips, Kazanina & Abada 2005), we provided example sentences with sample judgments at the beginning of each questionnaire in order to avoid possible misunderstanding or confounds due to stylistic considerations, prescriptive norms, or the plausibility of the event described. This same procedure was used for all the experiments reported in this paper. A sample instruction set is provided in Appendix B.

Results

Below are the raw means for each condition in the experiment, grouped by Quantifier Type. The error bars in this graph and all subsequent ones indicate the standard error of the by-participant mean.

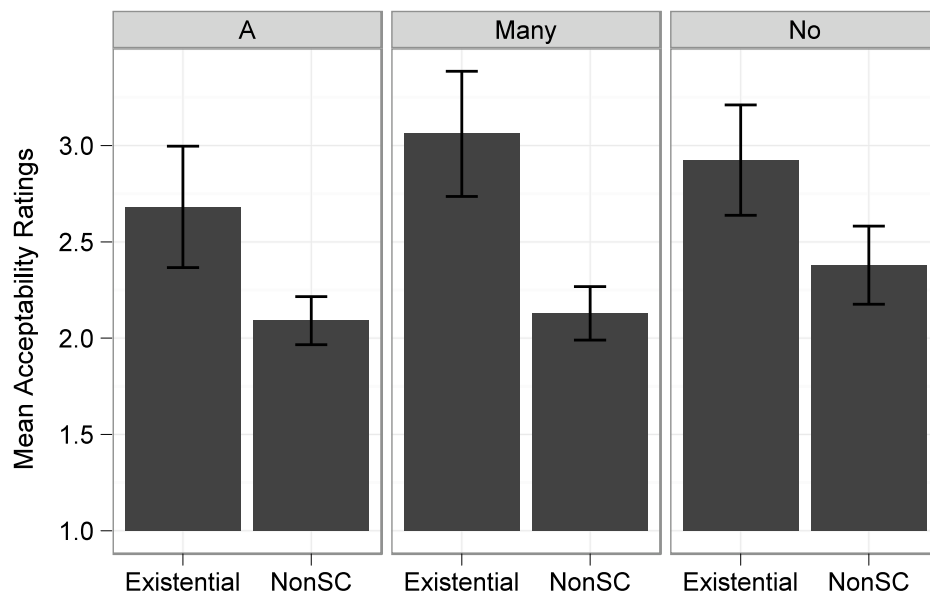


Figure 1. Average Ratings by Condition – Experiment 1a

What we observe is a clear, reliable difference between the mean acceptability rating of the existential conditions and the NonSC conditions, irrespective of Quantifier Type. A 2×3 repeated-measures ANOVA and a post-hoc Tukey test were performed to explore the consequences of the verb type and quantifier factors.⁷ The

⁷ The acceptability judgment data is ordinal and potentially non-normal, and therefore violates basic assumptions of the test. However, the ANOVA is generally

ANOVA revealed a main effect of Verb, $F(1,21) = 10.52$, ($p < .01$), but neither a main effect of Quantifier, $F(2,42) = 1.55$, nor a significant Quantifier \times Verb interaction, $F(2,42) = 1.08$. The Tukey test allowed pair-wise comparisons between all conditions. A significant effect of Verb was observed ($p < .01$), but no significant main effect of Quantifier or Quantifier \times Verb interaction.

These results show amelioration in the existential condition in comparison to the NonSC condition, but this comparison does not allow us to conclude whether the target sentences in the existential condition are ameliorated to full grammatical status, as in Scandinavian languages. In order to address this question, we compared the ratings of the target conditions to ratings of the fillers that contained grammatical long distance dependencies (i.e., good fillers), as well as the fillers that contained a violation of typical strong island constraints, such as non-ATB extraction from conjoined phrases and extractions from subjects (i.e., bad fillers). As no effect of Quantifier was observed, for this comparison we collapsed the data across Quantifier Type, yielding the results below.

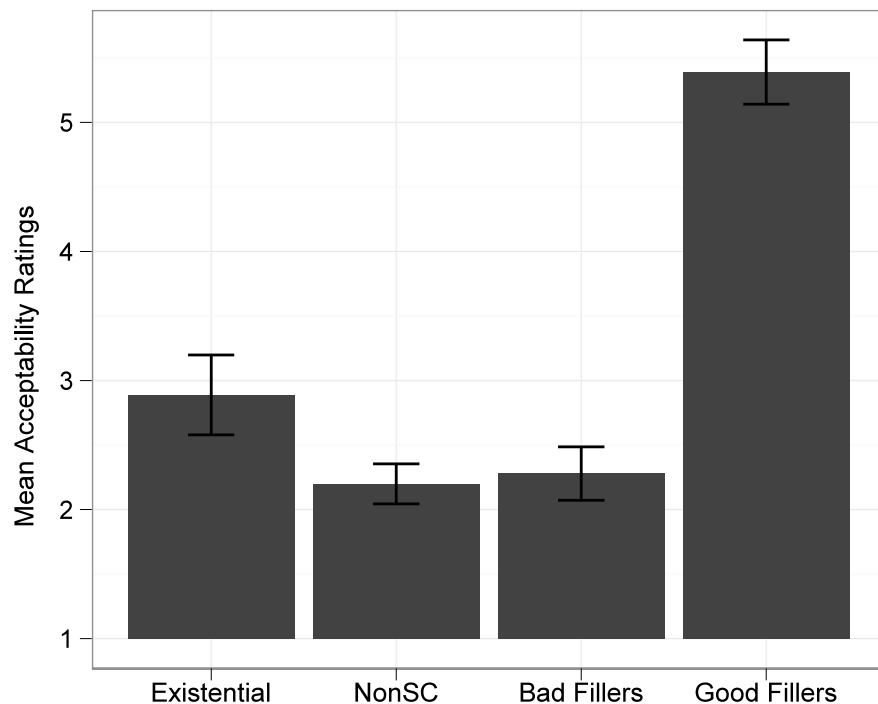


Figure 2. Average Ratings Collapsed Across Quantifier Factor – Experiment 1a

considered robust enough to withstand violations of normality (Wilcox 1997), and is commonly used for analyzing acceptability judgment data (Sprouse 2007).

Crucial comparisons are those between the test conditions and the fillers included in the questionnaire. While the mean ratings of both test conditions differ from the good fillers, only the existential condition differs from the mean rating of the bad fillers. This suggests that while participants are unable to distinguish the NonSC conditions from unacceptable/ungrammatical sentences, they are able to distinguish the existential sentences from unacceptable/ungrammatical sentences in spite of their unacceptability relative to truly good sentences.

The foregoing results provide preliminary support for relative amelioration effects of RC-Island violations in English. More importantly, this relative amelioration is observed in (one of) the environments where amelioration is documented in Scandinavian languages. Lack of amelioration in NonSC conditions lends preliminary support to the SCH.

Before proceeding with that demonstration, however, we will show that the effects reported in Experiment 1a were not attributable to a processing complexity confound. That is, we will show that the difference in acceptability observed is not due to the fact that existentials are inherently less complex and taxing for the parser than the NonSC sentences.

2.2 Experiment 1b

Gibson (2000) put forward Dependency Locality Theory (DLT), which offered a model of complexity to explain the difficulty associated with processing a given dependency. One of Gibson's findings is relevant to the results from the previous experiment. According to DLT the complexity of a sentence increases in relation to the number of new discourse referents that are introduced while the parser is processing a syntactic dependency. For example, (13) has *the man* as embedded subject and is expected to be more complex because *the man* introduces a new discourse referent and lies in the path between the filler *who* and the gap at the preposition *to*. In contrast, the anaphoric *he* does not introduce any new referents, and the sentence is perceived to be less complex (Warren & Gibson 2002).

- (13) John gave flowers to the woman who { he | the man } was totally devoted to.

Given that there is generally an inverse correlation between complexity and acceptability (e.g., Gibson 1998; Miller & Chomsky 1963), one could argue that the Existential conditions in the previous experiment were judged more acceptable than the NonSC conditions on grounds of complexity. Given the presence of the expletive subject *there* the former contained one less referent intervening between filler and gap. Experiment 1b addressed this concern by controlling for the number of new discourse referents between the filler and the gap.

Participants

24 native English-speaking students from the University of Maryland community participated in the study for compensation or course credit.

Materials

18 test items like (14) were created by making minor modifications to the stimuli from the previous experiment. The pronominal subject in the NonSC conditions was changed to either the 3rd-person, singular male or female pronoun, while the number of male and female pronouns were counter-balanced. Second, a clause that contained a possible referent for the pronoun was appended to the beginning of Experiment 1a's test-items.

(14) Jane said that was the battle that {there were | she met} many historians who researched at that college.

Jane said that was the battle that {there were | she met} no historians who researched at that college.

Jane said that was the battle that {there was | she met} a historian who researched at that college.

These target sentences were distributed across six lists in two different orders, and combined with 36 fillers used in Experiment 1a.

Results

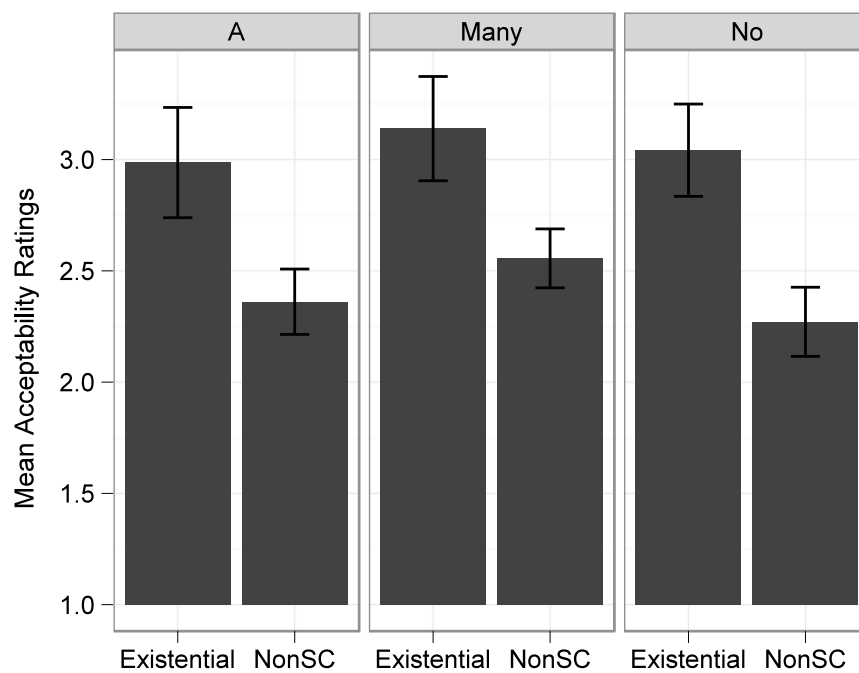


Figure 3. Average Ratings by Condition – Experiment 1b

The results of Experiment 1b align with those of Experiment 1a. The repeated measures 2x3 ANOVA revealed the same main effect of Verb, $F(1,23) = 19.98$ ($p < .001$), and no effect of Quantifier, $F(2,46) = 1.40$, and no interaction, $F(1,23) < 1$. These results permit us to conclude that potential differences in complexity between the two conditions in Experiment 1a were not the cause of the difference in average acceptability rating.

2.3 Experiment 2

Experiment 2 tested whether the complement position of perception verbs is an environment that licenses relative amelioration, or whether amelioration is limited to existential-type constructions specifically. The SCH predicts that, modulo individual semantic differences across construction types, SC environments should behave as a unified class in licensing partial amelioration of RC-island violation. Perception verb complements are not full CP complements, as evidenced by their lack of tense morphology. Once again, the verb *meet* differs from perception verbs in that it does not allow bare v/VP complements.

- (15) a. June saw Mary eat cheese.
b. *June met Mary eat cheese.

Participants

24 native English-speaking students from the University of Maryland community participated in the study for compensation or course credit.

Materials

The materials for Experiment 2 were adapted from materials used in Experiment 1. A sample item is shown in (16).

- (16) That was the bill that {there were | he met | he saw} many senators who supported in the congress.

Quantifier type varied across items, but was not treated as a factor in the analysis, given the results of the previous experiment that Quantifier Type does not affect the acceptability of the sentences. The experiment had three conditions, each corresponding to a different embedding verb. As the referent manipulation from Experiment 1b had little to no effect on the average acceptability ratings of Experiment 1a, the items in this experiment were modeled after the less complex versions in Experiment 1a in the interest of limiting the structural complexity of the example sentences. The target items are listed in Appendix C. These test sentences were distributed across three written questionnaires in a Latin Square fashion, and two versions of each questionnaire were created to vary the order of the target sentences. These target sentences were interspersed with 36 filler sentences from the previous experiment.

Results

The mean acceptability ratings from the three test conditions and the filler sentences are shown below.

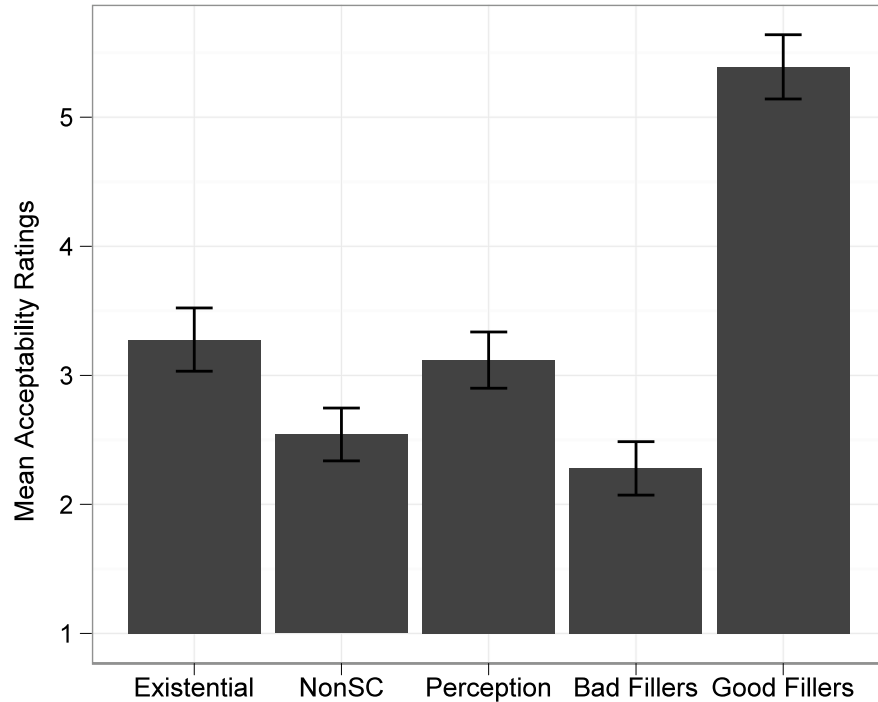


Figure 4. Average Ratings by Condition – Experiment 2

As in previous experiments there is a clear difference in the average rating for existential test sentences and NonSC sentences. NonSC sentences display a mean similar to the ungrammatical fillers. Perception verb sentences also differ from NonSC sentences in their mean rating.

Statistical analyses of the data support the predictions made by the SCH. A one-way ANOVA revealed a main effect of Verb, $F(2,46) = 10.40$ ($p < .001$). A post-hoc Tukey test showed significant differences between the NonSC condition and both the existential and perception verb conditions ($p < .001$ and $p < .01$, respectively). The difference between the mean rating of the existential condition and that of the perception verb condition was not significant.

Based on these results we can conclude that existential constructions and the complement position of SC-selecting predicates like *see* comprise a unified class with respect to RC-Island violation amelioration, to the exclusion of verbs like *meet* which do not select SCs.

2.4 Experiment 3

In a final experiment, we compared acceptability of RC-extractions under one final verb: *know*. The *know* conditions once again test the extent to which the English judgments track the Swedish examples. Many of the apparent RC-Island violations in Scandinavian languages feature extractions from RCs embedded under the verb *know*. Unlike direct perception verbs, *know* takes a predicative/categorical SC complement, rather than a bare vP event. The semantics of the categorical SC are more similar to those of a RC than the SC complements of perception verbs.

Participants

18 students from the University of Maryland community participated for compensation or course credit.

Materials

The 18 items for the experiment were identical to the previous study, save for the fact that *know* replaced *see* as the third embedding verb. The existential and NonSC Conditions remained as a baseline. Finally, the stimuli in Experiment 3 lacked the sentence final locative PP that was used in previous experiments. This change was made in the interest of shortening the sentences.⁸ The target items for Experiment 3 are listed in Appendix D. These test sentences were distributed across three written questionnaires in the same manner as in Experiment 2. The fillers used were the same as in the previous experiments.

Results

The results of the experiment are similar to those of the preceding ones. *Know* (the *categorical* condition) patterns with the existential as an embedding verb, but both are significantly different from *meet*.

⁸ Engdahl (1997) noted that the majority of naturalistic examples in Swedish featured a sentence-final gap. As our Experiment 3 demonstrates, this manipulation does not seem to have any effect on the acceptability of the sentences considered.

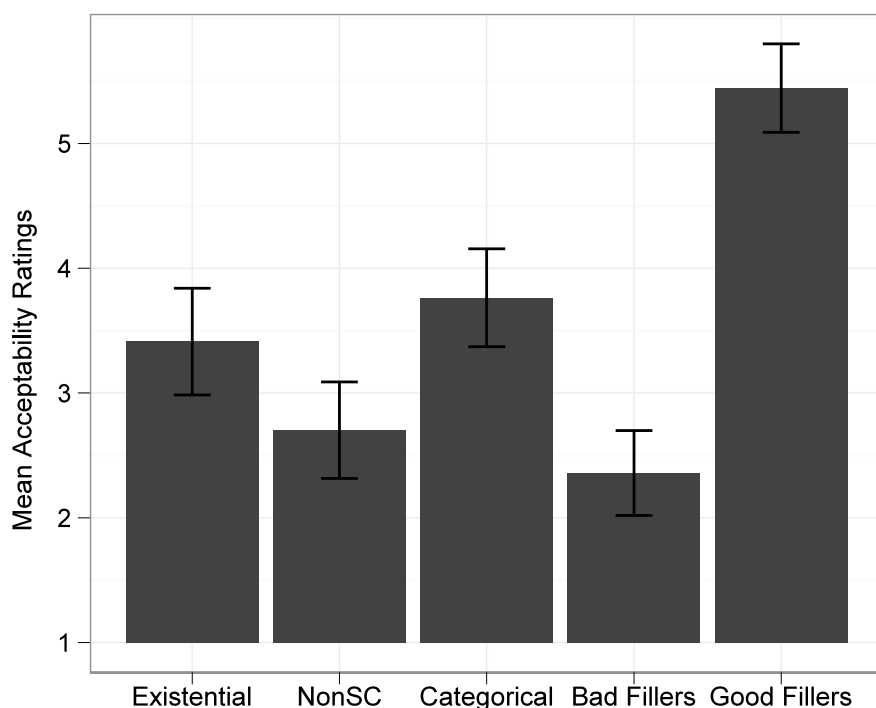


Figure 5. Average Ratings by Condition – Experiment 3

An ANOVA showed a significant effect of Verb, $F(2,36) = 10.67$ ($p < .001$). A post-hoc Tukey test showed significant differences between the average ratings of the *existential* and *NonSC* conditions, as well as the *know* and *NonSC* conditions ($p < .05$ and $p < .001$, respectively), but no detectable difference between the existential and the *know* conditions.

3. Discussion

The above experiments demonstrate that relative amelioration of RC-Island violations is observed in English under the same select class of verbs as in Scandinavian. This cross-linguistic parallel suggests that a universal explanation is required; one that can explain (i) why only a select class of verbs allows the extraction from the relative clause in their complement position, and (ii) how to square the apparent island-violations with a universal account of restrictions on movement.

One fact complicates the cross-linguistic comparison: Despite amelioration being licensed in the same environments, the Swedish sentences are all judged acceptable (based on intuitions reported, as well as experimental evidence from Kush 2011), whereas English speakers rate the test sentences as marginal at best.

Kush (2011) argues that full amelioration in Swedish comes about because the relative pronoun (RP) *som* is lexically identical to the predication operator *som*. The latter was shown to be a phonetic exponent of the predication operator (Eide & Åfarli 1999), which heads SCs in Swedish.⁹

(17) a. Jag betrakter honom som en idiot.

I consider him *som* an idiot.

'I consider him an idiot.'

b. Jag ser honom som en god man.

I see him *som* a good man.

'I see him as a good man.'

c. Jag känner honom som Clark Kent.

I know him *som* Clark Kent.

'I know him as Clark Kent.'

Given this syncretism, what superficially appears to be a subject RC in Swedish is string ambiguous between two structures. One structure, the traditional fully-articulated CP version of the RC is hypothesized to be, as in English, an island. The alternative structure, the SC structure, is not an island. In the case of Swedish, this SC option is fully grammatical.¹⁰

This proposal predicts that the SC analysis is not a grammatical option in English, because, unlike Swedish, RPs in (standard) dialects of English do not exhibit any lexical syncretism with the predication head.¹¹ *That* or the wh-operators *who*, *which* cannot appear as the head of SCs, shown in (18).

⁹ For a different analysis that nevertheless links the Scandinavian RC violations to the property of relative pronouns, see Cinque 2010.

¹⁰ Adele Goldberg (p.c.) asks how the lexical syncretism account simplifies the acquisition problem for the Swedish child, given that *som* is used for both subject and object RCs, in addition to heading some SC complements. We suppose that the child, relying on innate knowledge, can rule out the SC complement analysis for object RCs since SCs are inherently 'subject-oriented'. The SC analysis of an object RC requires abstraction over an internal argument position, which is not possible with SCs. The reader is referred to Kush (2011) for further discussion of the acquisition of these structures in Swedish.

¹¹ Interestingly, there are some dialects of English where the predication head *as* functions as a RP.

(i) Well, I know one person as'll eat it.

(18) I considered him (*that/*who) the bigger idiot.

One important consequence of this approach is that we can do away with parameterizing strong islands, because the acceptability difference between Swedish and English is attributed to the differences in the lexical properties of a relative pronoun. However, this creates a new puzzle: if the structure that is responsible for the amelioration in Swedish is unavailable for English, what is the mechanism by which the partial amelioration occurs? Below, we discuss the possibility that the partial amelioration may be an instance of a partial “grammatical illusion” that is created by the parser’s attempt to repair the ungrammatical input (for discussions of related grammatical illusions caused by a reanalysis mechanism, see Phillips, Wagers, & Lau in press). Specifically, we draw insights from models of garden-path repairs, and argue that similar procedures are responsible for the partial improvement of the ungrammatical RC island violations in English.

3.1 Partial amelioration as Grammatical Illusion

Before presenting our proposal, let us first describe three important properties of the parser that are relevant for explaining the partial amelioration in English. First, we assume that the parser actively completes long distance dependencies as soon as possible using the argument structure information from the verb. For example, Stowe (1986) observes a *filled-gap effect*, i.e., a reading time slow-down at *us* in a sentence like *My brother wanted to know who Ruth will bring **us** home to*, compared to a sentence that contains no *wh*-phrase. This follows if the parser immediately associates the *wh*-phrase with the verb *bring* despite having to rescind this association when *us* is encountered. (see also Crain & Fodor 1985). Importantly, the active dependency completion can be attenuated by the subcategorization information by the verb (Boland, Tanenhaus, Garnsey, & Carlson 1995). For example, Pickering and Traxler (2001) shows that a filled-gap effect at *a few pupils* is absent in a sentence with ditransitive verbs like *persuade*, e.g., *That’s the event that the coach persuaded **a few pupils** to watch....* This can be taken to indicate that the parser projects two possible analyses upon seeing the verb *persuade*: one in which the gap is in the complement NP position, and the other in which the gap is inside the complement CP, such that the parser need only select the second analysis when the first NP-gap analysis is disconfirmed by the presence of *a few pupils*.

Second, despite the fact that the parser attempts to complete long distance dependencies as soon as possible, this procedure is constrained by grammatical knowledge, such as island constraints on long distance dependency formation. For example, Stowe (1986) demonstrates that a filled-gap effect disappears inside a

(Biber, Johansson, Leech, Conrad & Finegan 1999; p. 609)

In these dialects, *as* has a distribution very similar to that of *som* in Swedish and Norwegian. To our knowledge, no study has been done of extraction from subject RCs in these dialects. The prediction of our account would be that such dialects would display extraction patterns analogous to the Swedish ones discussed.

subject NP, and Traxler and Pickering (1996) also demonstrate that gap filling does not take place inside an RC. Thus, at least in the initial structure generation phase, the parser seems to only construct structural representations that are compatible with the grammar (for a review, see Phillips & Wagers 2007).

Third, in cases where the initial structural analyses are disconfirmed by later arriving information, the parser attempts to use various sources of information to repair the already built structure such that the parser can assign a coherent interpretation. The structural repair can be achieved by various means. For example, Staub (2007) demonstrates that garden-path repair can be achieved by retrieving previously hypothesized and abandoned structural hypotheses. On the other hand, Fodor and Inoue (1994, 1998) have observed that in some severe garden-path sentences such as *The horse raced past the barn fell*, readers often misperceive the sentence as including an illusory *and*, i.e., misperceiving the sentence as *The horse raced past the barn AND fell*. These procedures have been mostly examined in the context of garden-path sentences, but we assume here that the parser attempts similar repair strategies upon encountering an ungrammatical sentence.

These three properties of the parser are summarized in (19).

- (19) a. The parser actively completes long distance dependencies, using verb argument structure information.
- b. The active dependency completion procedure is constrained by island constraints.
- c. When the initial structural analysis fails, the parser attempts to repair the structure and assign a coherent interpretation by retrieving previously hypothesized structures, or concluding that the input was misperceived.

Given these properties of the parser, let us now discuss how this could lead to the acceptability contrast in (20), which is taken from Experiment 2.¹²

- (20) a. ? That was the bill that he saw many senators who supported at the congress.
- b. * That was the bill that he met many senators who supported at the congress.

¹² We remain neutral as to whether the parser can consider and maintain multiple parses in parallel, or whether it is restricted to serially pursuing a single parse. While we give a procedural account of the phenomenon in question, its success is not predicated on the choice between serial or parallel parsing. We use the term 'abandoned' parse, which suggests a serial parser (e.g. Frazier 1987; van Gompel, Pickering, & Traxler 2001), but this could be just as easily replaced with 'less probable' or 'lower ranked' to fit with the terminology used with parallel, constraint-based processing (e.g. Tanenhaus & Trueswell 1995).

First, upon encountering the filler *the bill* in (20), the parser initiates an active search for the gap location (19a). Upon seeing the verb *saw/met*, the parser has different options: in (20a), the parser can project two analyses; one in which the direct object NP is hypothesized to be the gap, and the other in which a SC is projected, and the gap is hypothesized to be inside the SC. In (20b), only the direct object gap analysis is pursued. Upon seeing the NP *many senators*, the object gap analysis is disconfirmed. In (20a), the parser selects the alternate SC analysis, but this option is also disconfirmed by the next word, the relative pronoun *who*. For (20b), there was no SC option to consider, so the NP gap analysis is disconfirmed at *many senators*. At this point, given that the parser respects island constraints and does not project gaps inside an RC island (19b), the parser may expect to see a PP gap after the relative clause (e.g., *this is the bill that he saw/met [no senators who went to an Ivy League school] about t*), but this expectation is also not fulfilled due to the absence of such a preposition.

What should the parser do? This is the point at which the parser initiates repair strategies to explore ways of assigning an interpretation (19c). The critical difference between the two conditions is the fact that in (20a), a small clause analysis was temporarily hypothesized. Retrieving this small clause analysis allows the parser to assign a well-formed interpretation, but in order to adopt this repair strategy, the parser must also conclude that the relative pronoun must not have existed.¹³ In this way, the parser can reach a coherent interpretation, but it has to maneuver by re-adopting an abandoned structure and distorting the memory of the input in a manner that is consistent with a previous structural hypotheses. We hypothesize that this is the reason why the amelioration is only partial in English.

In (20b), on the other hand, no structural alternative was hypothesized at the point of processing the verb, *met*. Given that the parser cannot access any alternative structures or interpretations, the parser must conclude that the sentence is simply ungrammatical. This explains why the acceptability of (20b) is as bad as other strong island violation sentences.

The SC repair account of the partial amelioration makes an important prediction, namely, the degree of repair success can be modulated by how syntactically and semantically coherent the post-repair representation is. For example, in English SCs, it is grammatically required that the tense of the SC-selecting predicate match the tense of the predicate inside the RC. However, if there is a tense mismatch between these two predicates, then the parser is less likely to readopt the SC analysis as a

¹³ The relation between the type of parsing operations discussed here, which arrive at an interpretation in spite of certain syntactic violations and the ‘shallow parsing’ discussed by authors like Sanford and Sturt (2002) is a link that should be further explored. Our proposal differs from the usual discussion of grammatical illusion in that it presupposes the parser recognizes a fault with the representation it originally constructs, whereas much of the work on grammatical illusions deals with instances when the parser is hypothesized *not* to notice a syntactic violation.

repair candidate, since it would incur another grammatical violation. This prediction is borne out in the distribution of tense agreement between the SC predicate and the predicate inside the RC (21). For (21a) and (21b) where the two predicates are both marked for the same tense, our consultants judge them as marginally acceptable, whereas the sentences in (21c) and (21d) without a tense match were judged as much worse, suggesting that the SC reanalysis was not adopted in (21c) and (21d).

- (21) a. ?This is the candidate that {there were | I saw} many senators who *supported*.
 b. ?This is the candidate that {there are | I see} many senators who *support*.
 c. *This is the candidate that {there are | I see} many senators who *supported*.
 d. *This is the candidate that {there were | I saw} many senators who *support*.

Additional evidence in support of this SC repair comes from restrictions on the type of predicate that can be embedded inside RCs. Consider (22), in which the predicates inside the RCs are manipulated to be either compatible or incompatible with a small clause analysis.

- (22) a. John heard a soprano who sang the aria.
 b. John heard a soprano who wrote the aria (on his way to work).
 c. ??That was the aria that John heard a soprano who sang.
 d. *That was the aria that John heard a soprano who wrote.

The sentences in (22a) and (22b) are both acceptable, because the RC analysis is perfectly grammatical. Interestingly, when we extract an argument out of these RCs, our informants judged (22c) as more acceptable than (22d). This asymmetry in judgments is straightforwardly accommodated on the SC reanalysis story. The acceptable status of (22c) and (22d) is linked to the ease with which they can be re-assigned a SC analysis: (22c) is compatible with a thetic SC paraphrase (23a), whereas (22d) is not (23b).

- (23) a. John heard a soprano sing/singing the aria.
 b. ??John heard a soprano write/writing the aria.¹⁴

3.2 Implications and Consequences of the SC Repair Account

¹⁴ This sentence is only felicitous if the soprano is writing so furiously that her scribbling is audible.

One important consequence of this approach is that we can account for why the partial amelioration occurs in English, while we can still retain the Kush (2011) account for the grammatical status of RC violations in Swedish, namely, that the relative pronoun *som* can be analyzed as a predication operator. Thus, this analysis does not require us to parameterize strong islands, and we can account for precisely what type of syntactic and semantic environment causes partial or full amelioration of apparent island violations.¹⁵

It remains a question for future research whether our proposal, which links partial amelioration to the parser's structure repair strategy, can be extended to other cases in which ungrammatical sentences are judged to be relatively acceptable. One potential case is the violation of the *that-trace* filter, as shown in (24) (Chomsky & Lasnik 1977). (24) is an ill-formed yet interpretable sentence, and is often judged as marginally acceptable (for an acceptability judgment that confirms this, see Bley-Vroman, Felix & Ioup 1988). Here, we hypothesize that the parser can call upon its grammatical knowledge to pinpoint the locus of ungrammaticality. In the case of (24), it will identify the offending *that* and conclude that the *that* was probably only misperceived to be present.

(24) This is the historian₁ that I said *that* t₁ studied the battle.

If this line of analysis is correct, then it suggests that it becomes increasingly useful to pay attention to the detailed steps of sentence processing in order to understand acceptability judgment data, when the acceptability judgment data turn out to be inconsistent with the predictions of the grammatical theory.

4. Conclusion

In this chapter we presented evidence for partial amelioration of RC-Island violations in highly constrained syntactic environments. This amelioration occurs in English, where Islands are clearly in full effect. These environments were shown to be the same as the environments that permitted full amelioration of similar violations in Swedish. We have argued that the determining factor in deciding whether amelioration is possible is the ease with which the parser can construe the apparent RC as a SC. Swedish has a relative pronoun *som* which is form-identical to a predication operator, which allows the Swedish parser to analyze the apparent RCs as SCs in a grammatical fashion. In English, this option is not grammatically available, but the SC structure is temporarily entertained when the parser encounters SC-selecting verbs. This temporary SC structure can be later retrieved to create an 'illusion' that the input must have been compatible with the small clause analysis.

¹⁵ We should note that arguing for a syntactic explanation of the phenomenon is not incompatible with supposing that there are additional semantic, pragmatic, or discourse constraints on the constructions in question.

Finally, our findings cast doubt on proposals that have used relative amelioration effects to argue against structural accounts of islands. In fact, if the account above is on the right track, the opposite must be true. Full sense can be made of these phenomena only by directly appealing to grammatical factors. Specifically, the account proposed here relies upon a theory in which islands are syntactic objects, with universal restrictive force. Apparent exceptions arise in contexts of structural ambiguity. Clearly, if amelioration is possible insofar as apparent island-violating structures are treated as though they were anything but islands, then the amelioration effects we have surveyed support the view that the classical interpretation of islands is correct.

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Appendix A: Materials for Experiment 1a

We illustrate all six conditions for the first item to illustrate how we manipulated the quantifier type across *many*, *a*, and *no*, but we will only present the *many* version for the subsequent items.

1a/b. That was the battle that {there were | she met} many historians who researched at that college.

1c/d. That was the battle that {there was | she met} a historian who researched at that college.

1e/f. That was the battle that {there were | she met} no historians who researched at that college.

2. That is the dialect that {there were | he met} many people who spoke in that region.

3. That is the rule that {there were | she met} many students who disobeyed during recess.

4. This is the paint that {there were | she met} many artists who used for their own work.

5. That was the medicine that {there were | he met} many doctors who prescribed to their patients.

6. That was the article that {there were | she met} many editors who reviewed before the early edition.

7. This is the bill that {there were | he met} many senators who supported in the congress.

8. That was the difficult routine that {there were | he met} many gymnasts who mastered before the games.

9. This is the recipe that {there were | I met} many chefs who recommended on the cooking channel.

10. That was the director that {there were | I met} many actors who worked with on some movie.

11. That was the candidate that {there were | she met} many celebrities who endorsed for governor.

12. That was the ruling that {there were | she met} many jurors who opposed after the trial ended.

13. This is the prototype that {there were | he met} many engineers who tested in the wind tunnel.

14. That was the painting that {there were | he met} many collectors who bid on at the private auction.

15. That was the problem that {there were | she met} many mathematicians who worked on for many years.

16. This is the stock that {there were | he met} many brokers who bought on the day it crashed.

17. This is the email that {there were | I met} many employees who forwarded to the entire office.

18. This is the policy that {there were | she met} many agents who sold to five new clients.

Appendix B: Instructions for the acceptability judgment experiments

1. For the list of sentences below, please rate whether each sentence seems like an acceptable sentence in everyday English.

- ♦ If you think that the sentence sounds acceptable and possible in English, then you should give it a high rating (6 or 7).
- ♦ If you think that the sentence does not sound like a possible sentence of English, then you should give it a low rating (1 or 2).
- ♦ Some sentences may not sound like totally impossible sentences, but are also not completely acceptable – you could give those a more intermediate rating (3-5).

2. You are *NOT* being asked to judge the plausibility of the meaning of the sentence; you are simply being asked to judge whether the sentence sounds like possible English or not.

- ♦ Example (b) below describes a highly likely scenario, but most English speakers find it unacceptable (unlike a similar sentence in (a)), and could not use it.
- ♦ In contrast, example (c) describes an implausible and outlandish situation, but if it were necessary to describe such a crazy scenario, you could use the sentence in (c) without any problem.

a. The children decorated the tree with sparkling ornaments.

(bad) 1 2 3 4 5 6 ⑦ (good)

b. The children decorated the sparkling ornaments onto the tree.

(bad) 1 ② 3 4 5 6 7 (good)

c. The purple elephant played chess with the balding porcupines.

(bad) 1 2 3 4 5 6 ⑦ (good)

3. You are also *NOT* being asked to judge whether the sentence is acceptable according to “school grammar,” i.e., the rules you may have learned in high school English, or in writing classes. You’re just being asked to judge whether the sentence sounds like natural English that you or other speakers of English might be able to use.

- ♦ For example, you might have learned not to end a sentence with a preposition. However, while the example (d) ends with a preposition, most English speakers find them completely natural, acceptable sentences.

d. The old woman hated the people who she was traveling with.

(bad) 1 2 3 4 5 6 ⑦ (good)

4. Finally: some sentences of English are perfectly acceptable, even though they are fairly long and complex. The sentence in (e) below might seem to be a little difficult at first, but you will probably conclude that it is a fine sentence of English (if somewhat long!), and rate it as a 6 or a 7. On the other hand, a sentence like (b) above is quite short, but quite clearly bad in English.

e. The president was asked to explain who the CIA thought the nation was at risk from when he appeared at a press conference in the Middle East.

Here are some more example sentences and ratings before you move on to the test:

f. Jane threw out the lemon that Rick squirted the lime and in his drink.

(bad) ① 2 3 4 5 6 7 (good)

g. I ate the chili that Mary left out on the table.

(bad) 1 2 3 4 5 6 ⑦ (good)

h. Which book do you wonder whether James read yesterday?

(bad) 1 2 3 ④ 5 6 7 (good)

Appendix C: Materials for Experiment 2

1. That was the fossil that {there was | she met | she saw} a paleontologist who dug up at the site.
2. That was the bet that {there was | she met | she saw} a gambler who placed at the racetrack.
3. That was the rule that {there was | she met | she saw} a student who disobeyed during recess.
4. That was the leak that {there was | he met | he saw} a plumber who fixed with a blow-torch.
5. That was the routine that {there was | he met | he saw} a gymnast who practiced before the competition.
6. That was the recipe that {there was | she met | she saw} a chef who recommended on the cooking channel.
7. That was the lettuce that {there was | he met | he saw} a farmer who sold at a cheap price.
8. That was the rumor that {there was | he met | he saw} an employee who spread around the entire office.
9. That was the policy that {there was | she met | she saw} an agent who sold to five new clients.
10. That was the banjo that {there were | he met | he saw} many musicians who played at the concert.
11. That was the article that {there were | she met | she saw} many editors who proofread before the early edition.
12. That was the bill that {there were | he met | he saw} many senators who supported in the congress.
13. That was the dialect that {there were | he met | he saw} many people who spoke in that region.
14. That was the candidate that {there were | she met | she saw} many celebrities who endorsed for governor.
15. That was the film that {there were | she met | she saw} many critics who reviewed very harshly.
16. That was the newspaper that {there were | he met | he saw} many people who read on the bus.

17. That was the painting that {there were | he met | he saw} many collectors who bid on at the auction.

18. That was the stock that {there were | he met | he saw} many brokers who bought on the day of the crash.

Appendix D: Materials for Experiment 3

1. That was the fossil that {there was | she met | she knew} a paleontologist who dug up.

2. That was the bet that {there was | she met | she knew} a gambler who lost.

3. That was the rule that {there was | she met | she knew} a student who disobeyed.

4. That was the leak that {there was | he met | he knew} a plumber who fixed.

5. That was the routine that {there was | he met | he knew} a gymnast who practiced.

6. That was the recipe that {there was | she met | she knew} a chef who prepared.

7. That was the lettuce that {there was | he met | he knew} a farmer who planted.

8. That was the chain-letter that {there was | he met | he knew} a teenager who passed on.

9. That was the policy that {there was | she met | she knew} an agent who sold.

10. That was the song that {there were | he met | he knew} many musicians who struggled with.

11. That was the heiress that {there were | she met | she knew} many socialites who ignored.

12. That was the bill that {there were | he met | he knew} many senators who supported.

13. That was the dialect that {there were | he met | he knew} many people who spoke.

14. That was the candidate that {there were | she met | she knew} many celebrities who endorsed.

15. That was the film that {there were | she met | she knew} many critics who hated.

16. That was the newspaper that {there were | he met | he knew} many people who read.

17. That was the painting that {there were | he met | he knew} many collectors who bid on.

18. That was the stock that {there were | he met | he knew} many brokers who bought.