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Jon Sprouse & Norbert Hornstein (eds.), *Experimental Syntax and Island Effects*. Cambridge: Cambridge University Press, 2013. Pp. x + 421.
doi:10.1017/S0332586514000316

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Even though dependencies in language are often very local, some types of dependencies can span infinitely many clauses. One such type of dependency is filler–gap dependencies. A filler–gap dependency is the dependency we find between a *wh*-word, or any other fronted constituent (the filler) and its thematic position (the gap), as in: *Which book did Mary say that Liz claimed that Emma read* ___. At least since Ross (1967), it has been known that there are certain structures into which filler–gap dependencies cannot so easily be formed. These structures are called islands. The present volume consists of 16 chapters on various aspects of island phenomena. The book is divided into two parts. The first part, ‘Global issues in the investigation of island effects’ (Chapters 2–6), is concerned with the two main approaches to islands. One approach is to see island effects as a consequence of (universal) syntactic constraints. The other approach is to view the effects as a consequence of an overload of general processing processes (such as working memory). The second part, ‘Specific issues in the investigation of island effects’ (Chapters 7–16), consists of chapters dealing with mostly previously published studies that have made use of controlled acceptability judgements. There is not enough space in this review to treat every chapter in detail, but the chapters from Part I are treated somewhat more extensively since they deal with more general matters than the chapters in Part II.

In Chapter 1, ‘Experimental syntax and island effects: Toward a comprehensive theory of island effects’, Jon Sprouse & Norbert Hornstein state that the aim of the present volume is to examine what experimental syntax can tell us about island effects. The term effect refers to the difference in acceptability rating of sentences containing dependencies into islands and sentences with dependencies into

https://doi.org/10.1017/S0332586514000316 Published online by Cambridge University Press

non-islands. As pointed out by Ross (1967), there seem to be exceptions to all types of islands, both in English and in other languages. In fact, some languages seem to lack certain island constraints completely. In a table of cross-linguistic variation of island effects, Sprouse & Hornstein list five island constructions (*Wh*-questions, Complex NPs, Subjects, Adjuncts and Relative Clauses) and nine languages. Out of these nine languages, only one (English) shows island effects for all five constructions and one language family (Scandinavian) shows no effects for any of the five constructions. Although Sprouse & Hornstein do not mention it, Icelandic is claimed to show island effects, and thus only the Mainland Scandinavian languages seem to lack island effects. The rest of the chapter is an *exposé* of other types of long distance dependencies, such as resumptive pronouns and parasitic gaps.

In Chapter 2, 'Deriving competing predictions from grammatical approaches and reductionist approaches to island effects', Jon Sprouse, Matthew W. Wagers & Colin Phillips investigate the claim that island effects are a consequence of processing overload. The chapter builds on Sprouse, Wagers & Phillips (2012). By comparing acceptability judgements from islands and non-islands, and embedded and non-embedded sentences, they come to the conclusion that an account where processing costs for different structures are added cannot explain the 'superadditive' function, i.e. the processing cost of an island violation is higher than the processing cost of extraction and island (without extraction) together. According to Kluender & Kutas (1993), a superadditive effect is the result of the total resources of the system being exceeded by the demand of the parsing processes involved. In this chapter, the authors argue that an increase in the capacity of total resources should therefore result in better acceptability judgements. The capacity is measured by working memory (WM) tests (serial recall and n-back). However, they find no relation between WM and acceptability. The authors' conclusion is that the superadditive effect must be due to a syntactic constraint. Hofmeister, Staum Casasanto & Sag (2012), and part of Chapter 3 (see below) provide a detailed criticism of Sprouse et al.'s (2012) study and point out among other things the difficulties in relating acceptability judgements and WM processes. Moreover, since the authors rely so heavily on the superadditive effect in their argumentation for syntactic constraints, they should have addressed Kluender & Gieselman's (Chapter 8) finding that even grammatical sentences may show superadditive effects between conditions. In Chapter 3, 'Islands in the grammar? Standards of evidence', Philip Hofmeister, Laura Staum Casasanto & Ivan A. Sag discuss the methodological problems that one faces in experimental syntax. They scrutinize experimental results that have been taken to show evidence of a syntactic constraint on islands. The first type of evidence is that few, if any, psycholinguistic studies show that a relation is formed between the filler and its gap position (the verb which the filler is an argument of) in island constructions. The claim is that this lack of dependency formation is because the parser is prohibited by an 'island constraint' to form the relevant structure. Hofmeister et al. point to several studies

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that show that dependency formation is dependent, at least in part, on factors such as probabilistic and predictive processing and level of complexity, and is not simply determined by syntactic structure. The second type of evidence concerns the fact that acceptability judgments for grammatical structures improve with exposure, and the claim that they do not for unacceptable structures (Sprouse 2007). Hofmeister et al. show in two experiments that clearly ungrammatical structures do get better judgements, and that extremely complex grammatical structures (double center embedding) fail to show any amelioration effects. Their conclusion is that the fact that island violations (in some) experiments fail to elicit higher acceptability ratings over time does not have to be an indication of illicit syntactic structure, but can be an effect of extreme processing load. The third type of evidence is the relation between WM and acceptability. The authors stress the fact that there are no studies that actually test the relation between these two factors. In an experiment, they show that working memory capacity (WMC) only shows interaction with acceptability for mildly complex sentences, but surprisingly no interaction for highly complex (but still grammatical) sentences. According to the authors, the result shows that the lack of interaction between WMC and acceptability does not necessarily need to be caused by a syntactic constraint, as claimed in Chapter 2. The fourth type of evidence concerns claims about overgeneration (Phillips 2013). The claim is that if a structure can be processed and understood, but is still judged to be unacceptable, then a grammatical constraint must be the reason. Hofmeister et al. point to a study where semantically equivalent sentences of different complexity (left-branching and right-branching structures) score almost the same accuracy for comprehension, but vary considerably in acceptability (left-branching structures are rated lower than right-branching). According to the authors, processing load is the reason for this variation, since the two structures are equally grammatical. The chapter ends with a general discussion of cross-linguistic differences, acquisition, and some of the weaknesses of a processing account. Of these weaknesses, the most important one is the fact that there is no precise model of relevant factors, their processing costs, and how these costs combine.

In Chapter 4, ‘On the nature of island constraints. I: Language processing and reductionist accounts’, Colin Phillips reviews different kinds of evidence from psycholinguistic research and what it can tell us about the nature of island effects. Phillips identifies four approaches to island effects: (i) syntactic accounts, (ii) reductionist accounts: resource based, (iii) reductionist accounts: semantic and pragmatic accounts, and (iv) grounded accounts. Grounded accounts assume that resource-based limitations have grammaticalized into syntactic constraints and this approach is empirically indistinguishable from syntactic accounts. Phillips concentrates on (i) and (ii), and his conclusion is that most available evidence is compatible with both accounts. The chapter includes a thorough overview of different island types and some cross-linguistic differences. Chapter 3 addresses

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some of Phillips' claims about the problems which reductionist approaches encounter. Phillips' approach to islands as a universal phenomenon is somewhat puzzling given the cross-linguistic differences presented in the table in Chapter 1 (see above). Phillips claims that Scandinavian languages have robust relative clause islands and that only some relative clauses can be extracted from. In support of his claim, Phillips refers to Engdahl (1997). But Engdahl, on the contrary, shows that extraction from relative clauses is not syntactically restricted and that unacceptability in extractions is due to other factors, such as *that*-trace effects or implausible pragmatics. Phillips claims that there is a difference in extraction possibility among main clause verbs (we will return to this below, in the discussion of Chapter 11). He gives the following Swedish example of a verb that does not allow extraction (with no indication of what the source of the example is) (example (26b) on page 75): *Den här teori* [sic]*, finns det ingen som tror på* 'this here theory, is there nobody who believes in', which is wrongly glossed as 'that theory, one finds nobody who believes in'. But, as Engdahl (1997) shows with several acceptable examples of similar sentences, Phillips' claim is not correct (and not even the Swedish sentence of the English gloss is unacceptable).

In Chapter 5, 'Computational models of acquisition for islands', Lisa Pearl & Jon Sprouse present a model for how syntactic constraints on extractions can be learned. The model is trained on parsed texts from the CHILDES corpus, and the authors' conclusion is that it is not necessary to postulate island constraints as part of an innate grammar. One serious problem with the model is that it cannot distinguish between unacceptable structures and very rare structures. Because the 'acceptability' is based on the probability of each syntactic node in a sentence, it appears that long sentences, which are rare in the input, but fully acceptable, will be seen as more unacceptable than a short sentence with a syntactic violation.

In Chapter 6, 'On the nature of island constraints. II: Language learning and innateness', Colin Phillips comments on the model presented in the previous chapter. Phillips is critical of Pearl & Sprouse's model and instead advocates innate constraints. However, since there is no exact formulation of these constraints, it is difficult to see how they can account for cross-linguistic data, and different islands in the same language. If nothing else, the table in Chapter 1 shows that it is not the case that all languages obey the same island constraints, which seems to be what Phillips claims.

Part II, 'Specific issues in the investigation of island effects', starts with Chapter 7, 'Memory mechanisms for *wh*-dependency formation and their implications for islandhood'. Here Matthew W. Wagers provides a model of how long-distance dependencies are understood in real time and how they interact with working memory. Wagers claims that there are basically two processes that tax working memory, the maintenance of the filler and its retrieval at the gap site (the subcategorizing verb). According to Wagers, experimental evidence suggests that the cost of maintenance is very low, since most of the filler's features are not maintained at all. The cost of

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retrieval is higher, but there are no studies that indicate that this cost would be so high as to incur unacceptability in the case of island structures. Wagers' conclusion is that there must be a syntactic constraint rather than memory load that causes the parser to fail to integrate a filler in a gap in an island structure.

In Chapter 8, 'What's negative about negative islands? A re-evaluation of extraction from weak island contexts', Robert Kluender & Simone Gieselman argue that negative islands can be accounted for by a processing approach. Admittedly, there is a superadditive effect when combining extraction and negation (see Chapter 2 above). However, the authors argue that this is not an indication of a syntactic constraint, as do Sprouse et al. in Chapter 2, since all extraction Kluender & Gieselman examine would be considered acceptable under existing syntactic and semantic accounts. Though exactly what causes this effect, they leave as a topic for future research.

In Chapter 9, 'On the structural nature of island constraints', Brian Dillon & Norbert Hornstein compare extractions from event-denoting noun complement constructions (e.g. *Mary heard the sneaky burglar's attempt to open the door*) and naked infinitive constructions (e.g. *Mary heard the sneaky burglar clumsily attempt to open the door*). The superadditive effect they find for extraction from complement, compared to extraction infinitive, is according to the authors the effect of the complex NP constraint, and a processing account is dismissed without providing any arguments. Surprisingly, the authors fail to mention that extractions from NP complements are also possible under certain conditions, as shown by Davies & Dubinsky (2003).

In Chapter 10, 'Backgrounded constituents cannot be "extracted"', Adele E. Goldberg presents results from an acceptability study comparing extractions from complement clauses embedded under different verbs. Whether the content in the complement clauses is presupposed or not is also tested. According to Goldberg, the results show that island status can be accounted for by information structure. In fact, all island condition can be accounted for by appealing to information structure, in her view. The crucial point in Goldberg's account (basically identical to Erteschik-Shir 1973) is that only parts of asserted constituents can be extracted. This hypothesis seems to work well for English (but see discussion and data in Boeckx 2012), but there are no references to work on other languages. As is clear from Erteschik-Shir (1973), Allwood (1976), Engdahl & Ejerhed (1982) and others, extraction from relative clauses is possible in Mainland Scandinavian, and relative clauses are no less asserted in these languages than in English, which obviously makes a purely information-structural account of island effects cross-linguistically untenable.

In Chapter 11, 'Microvariation in islands', Dave Kush, Akira Omaki & Norbert Hornstein argue, on the basis of acceptability judgements in English, that since extraction is possible from small clauses, extraction from relative clauses in Mainland Scandinavian is possible because the relative complementizer *som* 'that' is

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misinterpreted as a small clause predicational operator *som* 'as'. The paper shows a surprising disregard for the data that exist in the cited literature on Scandinavian. In addition, the authors' view on how the parser works has no support in the psycholinguistic literature. In addition they fail to take into consideration that extraction from Danish relative clauses with the relative pronoun *der* 'who' are as acceptable as those with the relative complementizer *som* 'that' (Christensen & Nyvad 2014). The claim that verbs that take small clauses, such as perception verbs, are better for extraction cannot be verified by more thorough studies of Danish (Christensen & Nyvad 2014) or of Swedish (Müller 2014).

In Chapter 12, 'Subject islands in German revisited', Johannes Jurka compares extraction from subjects and objects, and argues, on the basis of results from acceptability judgments, that the difference in acceptability depends on two syntactic factors combined: multiple spell out and freezing effects (moved constituents cannot be extracted from).

Chapter 13, 'Subject islands are different', deals with the same topic as the previous chapter. Maria Polinsky, Carlos G. Gallo, Peter Graff, Ekaterina Kravtchenko, Adam Milton Morgan & Anne Sturge investigate extraction from subjects in English and Russian, and come to the conclusion that there are no freezing effects in subject extraction and what seems to matter is verb type: unaccusative subjects are the weakest subject islands, whereas subjects of transitive verbs are the strongest subject islands.

In Chapter 14, '*What* vs. *who* and *which*: Kind-denoting fillers and the complexity of *whether*-islands, Theodora Alexopoulou & Frank Keller investigate the role of d-linking, animacy and resumption in acceptability judgements of extractions. The authors' conclusion from a series of experiments on English and Greek is that the acceptability of extraction and resumption depends on the type of *which*-phrase (*which X*/*which of X*) in both languages. In addition, there is a difference between *what* and *what X* and between *who* and *what* and their Greek counterparts. The authors attribute this to a semantic difference between reference to kind (*what*) or reference to individuals (*what X*) and non-animate (*what*) and animate (*who*). According to the authors, the island effect they find between *whether*-clauses and *that*-clauses is due to an increased complexity. This increased complexity arises because *whether*-clauses have two interactive scope domains, in contrast to *that*-clauses, in which there is only one.

In Chapter 15, 'Resumption in English', Maria Polinsky, Lauren Eby Clemens, Adam Milton Morgan, Ming Xiang & Dustin Heestand report a series of acceptability and reaction time experiments. Despite judgements from linguists and naturally occurring data, sentences with resumptives are judged as very degraded in controlled acceptability judgements. The authors' conclusion is that resumptive pronouns in English are most likely a device used by speakers to maintain coreference rather than a device to help listeners.

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In Chapter 16, 'The island (in)sensitivity of sluicing and sprouting', Masaya Yoshida, Jiyeon Lee & Michael Walsh Dickey argue on the basis of a self-paced reading experiment that the parser is sensitive to island constructions. They conclude that the results are probably due to a syntactic constraint on building structures, rather than an effect of processing complexity.

This collection of papers gives a thorough overview of island phenomena and how they can be approached. However, it is not stated anywhere what criteria have been used in the selection of the papers. As mentioned, the aim is to see what experimental syntax can tell us about island effects, but since most chapters present already published work, that aim seems to be met even without this volume. One reason for a collection such as this might be to gather the findings from the previous work into one place, but if this is the case, there is too much repetition of general issues. More or less every chapter starts with a historical overview of islands, i.e. from Ross (1967) and forward. Moreover, the papers in this volume rarely deal with languages other than English. As is well known, the Mainland Scandinavian languages show very small, or even no, island effects, but despite published work on this subject (e.g. Christensen, Kizach & Nyvad 2013), there is no study in the volume that deals with these languages directly. Be that as it may, the general impression of the volume is that the two approaches, the syntactic approach and the processing approach both have several outstanding issues that must be solved. For example, in none of the chapters that advance a syntactic account is there a detailed formulation of a syntactic constraint. And, as Hofmeister & Sag (2010) show, all constraints that have been formulated so far either have unexplained exceptions or include so fuzzy terms that they are impossible to test empirically. One problem for the processing approach, in turn, is that our understanding of how individual language processes work is very limited, and even more so when they are combined. However, on the plus side, this understanding is likely to increase and eventually we may be able to explain why we find island effects that are of varying size, both language-internally and cross-linguistically. The take-home message of this book is that the interaction between sentence processing, syntax, and information structure is intricate and, as Phillips (p. 63) says, '[p]rogress on this issue is not optional; without it, we cannot hope to come, as a field, to an informed understanding of the nature of grammar and how it is embedded in a model of sentence processing'.

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