PERSPECTIVES

Challenges for a theory of islands:
A broader perspective on Ambridge, Pine, and Lieven

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Subjacency characterizes a set of phenomena whose acquisition must be explained by any proposal for human language learning. We take a broader perspective than previous responses to Ambridge, Pine, and Lieven (2014), arguing that they have not shown that this UG principle is 'redundant' because their proposed alternative does not take into account firmly established constraints on A-bar dependencies. We illustrate a range of challenges for theories hoping to reduce subjacency to independently motivated, primarily nonsyntactic constraints: they must include a way to account for attested crosslinguistic variation in island effects, the cross-construction generality of island effects, and the effects of resumption and of WH-in-situ on island behavior.

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1. INTRODUCTION. In their target article, Ambridge, Pine, and Lieven (2014; AP&L) claim that an innate UNIVERSAL GRAMMAR (UG) has not been shown to provide any help to a child trying to acquire language, and therefore lacks a raison d'être. This has inspired interesting and valuable discussion. The ensuing commentaries in *Language* (issue 90.3) can be classified, in terms of their overall message, into three groups. First, there are those who agree with the general claims that AP&L make, but suggest that their criticisms of UG-based approaches should be extended in various directions, or can be strengthened by additional argumentation, or should lead to more fundamental changes in how we study language learning: Behme (2014); Beekhuizen, Bod, and Verhagen (2014); and Owen Van Horne, Hall, and Curran (2014). Second, there are those who focus on the need for ALL proponents of learning mechanisms to provide explicit computational models that will allow their claims to be rigorously tested (also advocated by Beekhuizen and colleagues), and suggest that the outcome of such testing is likely to be that some UG-based proposals (perhaps not the ones targeted by AP&L) could turn out to be part of successful learning systems, and that some usage-based proposals could as well: Soderstrom (2014) and Pearl (2014). Third, in addition to pointing out promising UG-based learning proposals, Pérez-Leroux and Kahnemuyipour (2014) stand alone in showing that AP&L's particular attempt at providing a usage-based account of facts for which UG proposals have been put forward (in the domain of SUBJACENCY) is based on vague and inconsistent uses of linguistic concepts and false empirical generalizations, with the consequence that AP&L actually have no counterproposal for characterizing the end state of learning, and hence no proposal for how this grammatical subsystem could be learned.

We strongly endorse the second group's appeal for computational modeling; indeed, one of the authors of this article (Sprouse) was the collaborator on the project described by Pearl. We also believe that Pérez-Leroux and Kahnemuyipour's critical scrutiny of AP&L's proposal is correct and important, and that such scrutiny applied to their other proposals (for instance, in the domain of BINDING) would yield the same negative conclusion. But we do not pursue those avenues here. Like Pérez-Leroux and Kahnemuyipour, we focus on subjacency, but the purpose of our contribution is to consider at

a broader level the nature of subjacency as a set of phenomena whose acquisition must be explained by any proposal for human language learning.

2. CHARACTERIZING AP&L'S CLAIMS. AP&L argue that positing innate knowledge of subjacency and binding constraints as part of UG 'suffers from the problem of redundancy: learning procedures that must be assumed by all accounts—often to explain counterexamples or apparently unrelated phenomena—can explain learning, with no need for the innate principle or constraint' (p. e54). In the context of their article, this statement encompasses a sequence of three distinct claims.

> (i) The principles of subjacency and binding theory as traditionally character-ized in generative syntax are not sui generis (contra most work since the 1960s), but, rather, their empirical effects are reducible to more general con-straints that have independent motivation.
>
> (ii) The relevant constraints are not syntactic in the narrow sense, but rather are constraints on information structure and/or discourse well-formedness.
>
> (iii) These constraints evidently come to be part of adult linguistic knowledge somehow.[1]

Therefore, by Occam's razor, subjacency and binding theory should be removed from the theory of human language, because all of the work they were intended to do (both in capturing the linguistic knowledge of adults and in helping to explain how that knowl-edge can be acquired) is accomplished by more general components of human linguis-tic knowledge. For simplicity of exposition, we henceforth limit the discussion to subjacency (AP&L §5), but most of what we say carries over straightforwardly to bind-ing (AP&L §6).

Claims (i) and (ii) are logically independent: on the one hand, subjacency—that is, (a subset of) island constraints—might be derivable from independently motivated prop-erties of the grammar (e.g. phases) or 'interface constraints', under MINIMALISM. On the other hand, even if they are sui generis, it is possible that the best formulation of the constraints will make reference to semantic/pragmatic/discourse notions rather than just properties of (syntactic) tree structures. Both claim (i) and claim (ii) are plausible, and each is an area of active research within generative grammar. What makes AP&L's po-sition stronger, and worthy of challenge, is the claim that (i) and (ii) are BOTH true, which they cash out by suggesting particular constraints of the sort in (ii) that are claimed to cover (virtually) the same empirical ground for which subjacency was pro-posed. (In fact, they suggest that slightly better empirical coverage is achieved.)

We obviously find the application of Occam's razor valid, given the premises, and we agree that it provides an appropriate basis for theory development. Indeed, the same logic has been applied within generative grammar since the earliest days: for example, generative syntactic theories do not posit a (UG-based) restriction on the depth of cen-ter-embedding, because working-memory limitations, which manifest themselves in many domains, already plausibly predict listeners' very restricted ability to deal with such structures. However, we contend that AP&L have not successfully carried out their argument, for two reasons: one involving claim (iii), which we mention briefly, and one involving the conjunction of claims (i) and (ii), which is our main focus.

With regard to (iii), it relies on two implicit assumptions, neither of which AP&L provide any evidence for. First, it requires that the general constraints can 'come to be

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[1] This wording is deliberately neutral among various possibilities: for example, that those constraints are innate, that they are the result of innately programmed maturation, or that they are learned based on input from the environment.

known' without access to anything equivalent to innate UG constraints; otherwise, the superfluousness of the latter could not be maintained. (In the passage quoted above, AP&L seem to presuppose that explicit learning procedures for these constraints have actually been proposed, but in their concluding remarks they concede that 'we have proposed no alternative to [UG-based] accounts' (p. e81)). Second, (iii) predicts that in the course of acquisition there cannot be a stage when children conform with (the constraints previously referred to as) subjacency but do not conform with the more general constraints from which the effects of subjacency purportedly follow.[2]

Returning to the conjunction of claims (i) and (ii), we abstract away from the specifics of AP&L's proposed constraints in order to lay out a set of four desiderata for any proposals of this general form, that is, attempts to reduce subjacency to independently motivated constraints that are primarily nonsyntactic in nature[3] (which would include processing-based explanations—see Sprouse, Wagers, & Phillips 2013 for extensive discussion). The desiderata as a group amount simply to this: such proposals must take into account the numerous basic findings concerning (subjacency-type) constraints on A-bar dependencies that have been firmly established over the last fifty years in generative syntax, that is, the facts that theories of subjacency are intended to capture. We outline a representative sample of these findings here, in order to highlight the challenges that each poses for reduction to more general nonsyntactic constraints. (Although we use some of AP&L's suggestions to illustrate our points, our contribution is meant to spell out what ANY proposal of this sort should be expected to accomplish.)

The desiderata (which are not intended to be exhaustive) are as follows.

- A way to account for the attested crosslinguistic variation in island effects (without being so liberal that no bounds can be placed on this variation)
- A way to account for the cross-construction generality of island effects
- A way to account for the effect of resumption on island behavior
- A way to account for the effect of WH-in-situ on island behavior

We briefly discuss each of these in the remaining sections. Space restrictions prevent us from doing justice to the vast literature on these matters,[4] but a few examples will allow us to illustrate the challenges involved.

3. CROSSLINGUISTIC VARIATION IN ISLAND EFFECTS. Work from the early 1980s suggests that English, Italian, and Swedish provide an interesting pattern of crosslinguistic variation with respect to WH-islands and complex NP islands: English shows both island effects, Italian shows only complex NP island effects, and Swedish shows neither island effect.

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[2] AP&L seem to be aware of this concern in the following passage (p. e73): 'Also uncontroversial is the claim that children will have to learn about information structure in order to formulate even the most basic utterances … Although young children are often assumed to have poor discourse-pragmatic skills, it has been demonstrated experimentally that even three-year-olds overwhelmingly use pronouns rather than lexical NPs to refer to a discourse topic established by an interlocutor'. Of course, the latter finding does not entail full acquisition of the discourse-pragmatic notions required to implement AP&L's account of subjacency effects.

[3] The hedge 'primarily' reflects the fact that AP&L's proposal still seems to make critical use of some syntactic notions, such as predicate phrase and constituent.

[4] In our opinion the amount of such literature belies Behme's (2014:e101) suggestion that '[n]ativists may wish to sidestep the "crosslinguistic dilemma" by conceding that many or even all EARLY language acquisition tasks can be accomplished by domain-general mechanisms' (emphasis added). On the contrary, in UG-based acquisition research it is argued that the setting of several of the parameters proposed by syntacticians happens extremely early (e.g. Wexler 1998, Sugisaki 2005).

ENGLISH: Chomsky 1973 (and many others)
(1) WH-island
*What$_i$ do you wonder <who directed t_i>?
(2) Complex NP island
*What$_i$ did you make <the claim that John directed t_i>?
ITALIAN: Rizzi 1982:50–51
(3) No WH-island
Tuo fratello, a cui   mi   domando [che storie abbiano
your brother to whom to.myself wonder.1SG what stories have.SBJV.3PL
   raccontato __ __], era molto preoccupato.
   told   was very worried
  'Your brother, who(m)$_i$ I wonder what stories$_j$ they told t_i t_j, was really
  worried.'
(4) Complex NP island
*Questo incarico, che non sapevo <la novità che avrebbero
 this   task   that not knew.1SG the news that have.COND.3PL
   affidato __ a te>, …
   assigned   to you
  ('This task, which$_i$ I didn't hear the news that they may have assigned t_i
  to you, …')
SWEDISH: Engdahl 1980, p.c.
(5) No WH-island
Vilken film kunde du inte minnas [vem som regisserat __]?
which film could you not remember who C   directed
  'Which film$_i$ could you not remember who directed t_i?'
(6) No complex NP island
Vilket fängelse finns det [föga hopp att man kommer helskinnad
which prison   is   there little hope that one gets.out alive
   från __]?
   from
  'Which prison$_i$ is there little hope that one could get out of t_i alive?'

Any theory of islands has to account for crosslinguistic variation in islandhood. The-ories in which island effects are the result of a constraint on movement operations (e.g. subjacency) can encode this variation by allowing parameterization in the constraint it-self (e.g. in what counts as a bounding node, as AP&L mention). The challenge for re-ductionist approaches is that the other property that islands are tied to must show the same variation as the island effects. Conversely, that property must be oblivious to the many properties of parts of sentences that can vary without affecting islandhood at all.

As a concrete example, AP&L's only suggestion for how a discourse-based approach to subjacency could handle variation is found in a footnote (n. 14, p. e73):

> Backgroundedness is a graded notion; hence, different languages are free to 'choose' the extent to which a constituent may be backgrounded and still permit extraction. For example, Russian permits extraction from main clauses only (Freidin & Quicoli 1989), while Swedish has been described as showing no is-land constraints (Allwood 1976, Andersson 1982, Engdahl 1982).[5]

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[5] AP&L's idea sounds very much like a parametric approach to variation, where the universal principle is (derivatively): 'No extraction is permitted from constituents that are backgrounded to a degree greater than x', and the parameter settings are values of x over some unspecified range that apparently includes 100% (for

(The full veracity of these claims is controversial, but orthogonal to our point.) Presumably AP&L would have to treat Italian the same way.[6] But this proposal falters when it comes to the aforementioned obliviousness: the backgroundedness of a constituent is NOT fixed for a given sentence; rather, it is a property of the containing discourse. However, island constraints are not affected by the discourse. (See Pérez-Leroux & Kahnemuyipour 2014:e122, ex. 17.)

4. THE CROSS-CONSTRUCTION GENERALITY OF ISLAND EFFECTS. One of the most striking aspects of island effects is that they arise in a range of syntactic configurations that are substantially different in semantic contribution and discourse function from WH-interrogation (the only kind of example that AP&L discuss). Here is a partial list for English, illustrated with WH-islands.[7]

(7) Relative clause formation
    a.   I would pity a man who_i Sue knows [that she should dump t_i].
    b. *I would pity a man who_i Sue wonders <whether she should dump t_i>.

(8) 'Topicalization'
    a.   I think that John likes most of these cars, but THAT car_i, I think [that John LOVES t_i].
    b. *I wonder whether John likes most of these cars, but THAT car_i, I wonder <whether John LOVES t_i>.

(9) Adjectival *though*-preposing
    a.   (?)$Humiliated_i$ though I suspect [that Jane might be feeling t_i], I'm still going to call her.
    b. *$Humiliated_i$ though I wonder <whether Jane might be feeling t_i>, I'm still going to call her.

(10) Clefting
    a.   Please don't tell me again that it is Judy who_i you think [that John should marry t_i].
    b. *Please don't tell me again that it is Judy who_i you wonder <whether John should marry t_i>.

(11) Pseudo-clefting
    a. $What_i$ I think [that John should buy t_i] is a sports car.
    b. *$What_i$ I wonder <whether John should buy t_i> is a sports car.

This pattern can be replicated with all of the island types that could fall under subjacency.

Thus, we see five dependency types patterning alike. This is trivially explained if all of the dependencies indicated by cosubscripting can be argued to involve movement, which indeed they can be (by tests other than island sensitivity). Parsimony would disfavor a theory in which different explanations are required for each kind of depen-

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Swedish). To the extent that there might be some language-independent way to establish degree of backgroundedness without reference to (non)islandhood, this proposal makes a prediction not mentioned by AP&L: no language should have constituents that do not behave as islands that are more backgrounded than any constituent that does behave as an island.

[6] AP&L propose a separate principle to rule out left-branch extractions such as *$Which_i$ did Bill eat <t_i cake>?*: 'informational units … cannot be broken up' (p. e74, n. 15). But here again, crosslinguistic variation presents a challenge: most Slavic languages allow left-branch extractions of just this sort (Ross 1967). The only way their proposal might cope with Slavic is if it could be independently established that *which book* is an 'informational unit' in English but not in Slavic.

[7] The list could arguably be extended to *tough*-movement constructions, *too/enough*-infinitivals, comparative constructions, and others.

dency—that would make it a coincidence that all of them are sensitive to the very same set of islands.

The major challenge raised by these observations for reductionist accounts is that the nonsyntactic properties of these constructions are quite heterogeneous. We illustrate some of this heterogeneity relative to AP&L's claim about how islands can be unified: 'The functional account of island constraints … is as follows: since the WH-word is the focus, it cannot replace constituents that are not in the potential focus domain. What all island constructions have in common is that the <islands> contain information that is old, incidental, presupposed, or otherwise backgrounded in some way' (p. e73).[8] Let us examine the constructions in 7–11 alongside WH-interrogatives, as in 1 and 2.

In 7, the WH-word acting as a relative pronoun cannot be focused, and it is within an adjunct—a relative clause—whose content is not backgrounded (at least on its most natural intensional reading where such a man may not even exist).[9] In 8 the island contains a contrastively focused element, so it is not (all) backgrounded. In 9 the concessive adjunct clause is backgrounded, crucially including the displaced adjective (*humiliated*): use of this construction presupposes that the adjective is already part of the discourse.[10] In 10 the displaced element (*who*) is neither focused nor focusable: the pivot (*Judy*) is necessarily focused, while the constituent out of which the nonfocal *who* has moved is also nonfocal (as is the entire cleft, by virtue of the matrix clause).[11] Similarly, in 11 *a sports car* is the focused element; the displaced *what* is neither focused nor focusable and is extracted from a constituent that is backgrounded. Thus, 7b–11b are all wrongly predicted by AP&L's proposal not to contain island violations.[12]

5. THE EFFECT OF RESUMPTION ON ISLAND BEHAVIOR. Whereas the long-distance dependencies that we have considered so far have all involved a gap, some languages allow for a second strategy in which the would-be gap position is filled by a 'resumptive' pronoun (which always takes the same form as the standard pronouns in the language; see McCloskey 2006 for a review). There are languages in which gaps and resumptive pronouns are seemingly in free variation, with no detectable meaning difference. In a subset of these languages, exemplified here by Irish, this free variation

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[8] The crucial notion of potential focus domain is not defined in the article, but its complement domain is at least enumerated in the quoted passage; for ease of exposition we refer to that collection of properties as simply 'backgroundedness'.

[9] AP&L's suggestion that '[a]djuncts, by definition, provide background, nonfocal information' (p. e74) is not consistent with any definition we are aware of. Under the standard notion (see Pollard & Sag 1987, inter alia), it is easy to show that adjuncts can provide new information, as in the relative clause in the answer in (i).

   (i) Q: What is Sue looking for?
       A: A book that would tell her what career she should pursue.

[10] Thus, 9a would be a sensible response to the utterance in (i), but bizarre in response to just its first sentence.

   (i) Shouldn't we leave Jane alone? She's probably feeling humiliated.

[11] Although not explicit in AP&L's quoted characterization of their account, the relevance of the notion of clashing information status is highlighted in the passage they quote from Van Valin (1998:232) shortly thereafter: 'It makes no sense … for the speaker to place the focus of the question in a part of the sentence which is presupposed, i.e. which contains information which the speaker knows and assumes the hearer knows or can deduce easily'.

[12] We must therefore disagree with AP&L's claim that 'discourse-pragmatic principles … do not constitute rival explanations to those offered by UG accounts. On the contrary, they are factors that are incorporated into UG accounts, precisely because they would seem to be indispensable to any comprehensive account of the relevant phenomenon' (p. e81).

(modulo the form of the complementizer) crucially holds only as long as the dependency does not cross an island boundary.

IRISH: McCloskey 1990, 2006

(12) Gaps and resumptive pronouns vary freely outside islands
     a. an ghirseach [a ghoid na síogaí __]
        the girl   C stole the fairies
          'the girl who$_i$ the fairies stole t_i'
     b. an ghirseach [ar ghoid na síogaí í]
        the girl   C stole the fairies her
          'the girl who$_i$ the fairies stole (her$_i$)'

However, this free variation disappears when crossing an island boundary: a gap cannot appear inside an island, but a resumptive pronoun can.

(13) Only resumptive pronouns are possible inside islands
     a. teach nach n-aithneochthá   <cá   rabh sé>
        house NEG.C recognize.COND.2SG where was it
         'a house$_i$ that you wouldn't recognize where it$_i$ was'
     b. *teach nach n-aithneochthá   <cá   rabh __ >
        house NEG.C recognize.COND.2SG where was
         ('a house$_i$ that you wouldn't recognize where t_i was')

Any theory of island effects must capture the fact that they can be conditioned by the gap/resumptive-pronoun distinction. Theories in which island effects are the result of a constraint on movement operations can account for this variation by postulating two dependency-forming mechanisms: movement in the case of gaps, and something else, which is not constrained by islandhood (e.g. binding), in the case of resumptive pronouns. The challenge for reductionist approaches is that the specific property that is proposed to give rise to island effects must also somehow be sensitive to the gap/ resumptive-pronoun distinction. For information-structure approaches such as AP&L's, this requires providing an information-structure distinction in terms of backgroundedness between dependencies with gaps and those with resumptive pronouns, even though in nonisland environments these two dependencies occur in free variation with no apparent meaning distinction.

6. THE EFFECT OF WH-IN-SITU ON ISLAND BEHAVIOR. AP&L mention that the existence of island effects in WH-IN-SITU languages is a potential problem for certain reductionist theories of island effects (such as processing-based theories). But the picture is more complicated: some WH-IN-SITU languages show island effects for only a subset of WH-phrases. In Japanese, WH-adjuncts such as 'why' and 'how' show island effects even when left in situ (14), but WH-arguments such as 'who' and 'what' do not show island effects when left in situ (15).

JAPANESE: Jun Yashima and Yuhi Inoue (p.c.)

(14) Island effect with in-situ WH-adjunct extraction
      *John-wa <kare-no okusan-ga naze atarasii doresu-o katta kara>
      John-TOP he-GEN wife-NOM why new   dress-ACC bought because
        okoru-no-desu-ka?
        get.angry-NMLZ-POL-Q
       ('Why$_i$ would John get angry <because his wife bought a new dress t_i>?',
         i.e. 'What is the reason such that John would get angry because his wife
         bought a new dress for that reason?')

(15) No island effect with in-situ WH-argument extraction
John-wa [kare-no okusan-ga <u>nani-o</u>   katta   kara]
John-TOP he-GEN wife-NOM what-ACC bought because
    okoru-no-desu-ka?
    get.angry-NMLZ-POL-Q
'What$_i$ would John get angry because his wife bought t_i?'

Any theory of island effects must capture the fact that, in such WH-in-situ languages, island effects are conditioned by the argument/adjunct distinction. Theories in which island effects are the result of a constraint on movement operations can encode this variation by parametrically allowing the argument/adjunct distinction (which must already be represented to explain many other contrasts) to govern which dependencies are or are not sensitive to islands. The challenge for reductionist approaches is that the specific property that is proposed to give rise to island effects must also somehow be sensitive to the argument/adjunct distinction. For information-structure approaches, this means providing an elaborated theory of information structure that distinguishes arguments from adjuncts, for example, showing independently that WH-arguments are not focused while WH-adjuncts are focused, but ONLY in (certain) WH-in-situ languages.[13]

7. CONCLUSION. We believe that exploring alternatives to established theories should be a regular part of the scientific process. For such explorations to be genuinely fruitful, however, we believe they must acknowledge the full range of facts that have been established, and even if these cannot all currently be accounted for (after all, 'all grammars leak'), proponents of an alternative approach should at least show that their approach provides tools sufficiently powerful to capture the established facts in principle. We have sought to lay out what this would involve in the domain of subjacency.

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[13] This difference is what AP&L propose in n. 15 (p. e74) for an apparent subtle version of this contrast in English; it is unclear whether their proposal of parameterized backgroundedness thresholds could capture the fact that this difference manifests itself much more strongly in Japanese.

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