p. 448, the Dutch morpheme *aarts-* is said to be an adverb; however, it is a prefix instead, and the Dutch discontinuous affix mentioned on p. 452 is not *ge-t*, but *ge- te*.

In conclusion, this volume is a welcome addition to the growing number of morphology handbooks; it provides useful information and guidance concerning phenomena and analytical issues in the domain of derivational morphology.

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Contiguity theory. By NORVIN RICHARDS. Cambridge, MA: MIT Press, 2016. Pp. 400. ISBN 9780262034425. $38.

Reviewed by DENNIS OTT, *University of Ottawa*

This book can only be described as a tour de force. In *Contiguity theory*, Norvin Richards juggles a mind-boggling amount of data from a diverse variety of languages and develops a complex theoretical framework with far-reaching implications for the theory of grammar. The result is by no means an easy read: the theory is elaborate and unconventional, and fully appreciating the dense discussion requires proficiency in syntactic and phonological theory.

R's point of departure is the observation that current syntactic theory 'offers no real answer to the question of why … movements are distributed as they are among languages' (1). He rejects the common practice of invoking formal features as 'triggers' of movement, which 'have no detectable properties other than their ability to trigger overt movement' (1) and hence offer little in the way of explanation. Whatever one's evaluation of the theory that unfolds over the following 300+ pages, R is to be applauded for addressing head-on this glaring gap in current theorizing, while much work in syntax—ironically self-identifying as 'minimalist' in many cases—continues to content itself with restating generalizations about surface word order in terms of ad hoc features and phrase-structural templates, with little concern for the adverse implications of this rank growth of stipulations for the theory of universal grammar (Chomsky et al. 2017).

R's book is an attempt to overcome this unsatisfying state of affairs. The central idea is that 'apparent syntactic differences between languages are always the consequence of more funda-

mental phonological and morphological parameters' (2), so that 'a complete description of a language is also a complete description of its syntax' (344). The theory developed in this book, dubbed *Contiguity theory* after one of its central notions, is based on the assumption that prosodic structure and syntactic structure are built cyclically and in parallel; certain kinds of phonological information are visible to the narrow syntax and can effect displacement and other operations where required to derive a well-formed prosodic representation.

Chs. 2 and 3 are the central pillars of the monograph. Ch. 2 attempts to derive classical 'EPP' (extended projection principle) effects from principles of phonology that require affixes to be prosodically supported: the requirement AFFIX SUPPORT demands the presence of a metrical boundary in the direction in which an affix attaches. In languages such as Italian and Spanish, verbal stress reliably provides such a boundary to the immediate left of the suffixal tense morpheme. This is not the case in languages like English and French, R argues, which only compute the metrical structure of the verb once it is inflected; consequently, affix support must be satisfied by merging some XP to the edge of T. R shows how affix support allows for a reduction of EPP effects to independent parameters: head-directionality, the morphological status of T, and the presence or absence of metrical boundaries between T and the verb. For instance, in a head-initial language with prefixal T (e.g. Greek), no EPP effects obtain, since nothing is required to precede T. By contrast, in a head-initial language with suffixal T (e.g. French), EPP effects will obtain unless verbs provide the relevant metrical support (e.g. Spanish). A head-final suffixal T, like final heads in R's model generally, requires 'untethering' (delinearization) of T and vP, which abrogates the metrical support for T otherwise provided by vP. This, R argues, motivates EPP effects in Japanese.

Ch. 3 turns to WH-movement and develops a theory of its crosslinguistic distribution, modifying earlier proposals in Richards 2010. The core idea is that WH-phrases must be prosodically CONTIGUOUS to the clause-typing C, such that the WH-phrase and its associated C-head must be contained within a single phonological phrase, within which the WH-phrase is placed adjacent to a prosodically active edge. Contiguity can be established in different ways, depending on the directionality of active edges in a language and the placement of C relative to the WH-phrase. Languages such as head-final Japanese and head-initial Chichewa, whose active edges are on the opposite side of the WH-phrase from the C-head, can establish contiguity by means of prosodic manipulation (a GROUPING operation) alone; consequently, WH-phrases remain in situ. By contrast, in languages such as Tagalog and English, contiguity can only be achieved by moving the WH-phrase to a position adjacent to the complementizer, which removes active edges of phonological phrases intervening between the two elements. R also discusses how languages with optional and nonperipheral WH-movement can be accommodated by this model.

Chs. 4 through 7 are overall somewhat less developed than the proposals in the core Chs. 2 and 3, and R is commendably explicit about the various issues he is forced to leave to future work. Chs. 4 and 5 generalize the theoretical notions developed in the preceding chapters. Ch. 4 attempts to show that the contiguity requirement holds for all instances of probe-goal relations, so that probes and goals (such as T and the subject and *v* and the object) must be contiguous within a given cycle (phase) of the derivation. R shows how these assumptions jointly predict a French-type language with prosodically active right edges and an English-type language with prosodically active left edges to differ in two interrelated ways: whether there is V-raising, and whether WH-in-situ is an option (yes in French, no in English on both counts). Since French has prosodically active right edges, T is required to be contiguous with the subject, but adverbs are permitted to separate verb and object. By contrast, English requires adjacency of *v* and object (achieved by an operation of CONTIGUITY-ADJUNCTION) but permits separation of T and the subject. In general, due to active right edges but initial heads, probes in French-type systems can precede their goals at an arbitrary distance, whereas left edges and initial heads require probes in English-type systems to be contiguous with their goals. Ch. 5 generalizes the contiguity requirement yet further, arguing that it holds for subjacent heads related by selection (SELECTIONAL CONTIGUITY). Taken together, the various contiguity requirements yield a notion of GENERALIZED CONTIGUITY, which requires contiguity between any two elements related by agreement or selection within a phase.

The chapter also explains the FINAL-OVER-FINAL CONSTRAINT (Biberauer et al. 2014) in terms of the last-resort character of the 'untethering' operation that gives rise to head-final orders.

Chs. 6 and 7 deal with head movement. R argues that at least some head movement, such as French-style V-raising to T and English-style *do*-support, is genuinely syntactic and driven by the same factors that motivate phrasal movement (i.e. affix support and contiguity), whereas other instances of affixation are the result of postsyntactic PROSODIC LOWERING. To make head-movement phenomena consistent with his approach, R establishes a number of nonstandard assumptions, such as the idea that auxiliaries are 'born' as affixes in need of support, and that the grammar satisfies requirements in the order of the length of the dependencies required to meet them. R shows how his theory accounts for verb placement in various languages, including English, French, Danish, and verb-initial languages. Ch. 7 discusses verb-second phenomena, movement of the verbal root to *v*, and verb placement in nonfinite clauses.

It should be obvious even from this sketchy summary that *Contiguity theory* is a highly ambitious effort. Given its broad empirical scope, R made the reasonable decision to belabor some empirical phenomena in great detail, while drawing on sweeping generalizations at other points. Does the book accomplish its declared goal of 'develop[ing] an explanatory theory of when movement takes place and when it does not' (5)? In view of the empirical and conceptual complexity of the material, answering this question is anything but straightforward. The theoretical machinery established by R in the course of the discussion is not always obviously more principled than the features it is designed to replace (but see Richards 2017), not least because the system requires a number of rather awkward assumptions at various points. Irregularity is a case in point: verbs with irregular stress patterns in languages such as Spanish behave exactly like regular verbs with regard to EPP effects; this, R argues, indicates that the syntax simply does not 'see' the irregularity and treats all verbs as exhibiting regular stress (while being generally sensitive to metrical information). He is forced to adopt the same reasoning for lexical accent on WH-phrases in Basque, a perfectly systematic property of the language that is nevertheless inaccessible to syntax as a lexical idiosyncrasy. Similar assumptions are required for null subjects in *pro*-drop languages with EPP effects and null tense affixes: to explain how *pro* can provide, and null affixes require, metrical support, R is forced to assume that the syntax is oblivious to the fact that these elements ultimately remain unpronounced (although the same cannot hold for PRO, as the discussion in connection with T-subject contiguity in French reveals).

As unorthodox as many of R's theoretical proposals are, as conservative is his approach in other respects. For instance, he never questions the reliability of traditional diagnostics for EPP effects or V-raising, the universal reality of clausal layers projected by functional categories, or the implementation of verb-second as verb raising to C, despite the fact that many traditional assumptions of this kind are rather baroque relics of phrase-structure grammar. Subjecting these notions to minimalist scrutiny is a project that R—quite reasonably, given his focus—does not undertake.

But it would be unfair to hold any of these points against R: *Contiguity theory* is a truly innovative and comprehensive approach to ill-understood phenomena. What weighs far more than any of the questions raised by his proposals is the fact that his book represents the first serious effort to rationalize a fundamental property of natural language in a way that goes beyond a mere restatement of surface observations in technical terms. Drawing attention to this significant deficit in current theorizing and offering an entire predictive framework in response is the truly impressive achievement of this book.

At a more general level, perhaps the most interesting challenge posed by R's proposals concerns the place of morphophonology in the overall organization of the grammar. In his model, at least some syntactic operations apply in the service of constructing prosodic structure in tandem with the syntactic derivation. Phonological information such as the presence of metrical boundaries is directly accessed by the syntactic computation; the phonology does not merely impose output conditions on completed derivations. For instance, the EPP is satisfied derivationally as soon as T merges and requires support, without look-ahead to later operations. For this reason, English-type languages require support for T (e.g. by an expletive: ***There** arrived a man*), even when the latter subsequently raises to C (*Did *(there) arrive a man?*), yielding an opaque output

in which the original motivation for affix support is undone. This tight interweaving of narrow syntax and PF-mapping contrasts starkly with a recurring speculation in Chomsky's recent work (see e.g. Berwick & Chomsky 2016). Chomsky's thesis, motivated in part by evolutionary considerations, is that the mechanisms concerned with converting hierarchical structure into an externalizable form are 'ancillary' to grammar proper, and as such are the locus of much of the superficial complexity of language, including crosslinguistic variation. With regard to the latter aspect, R's work is entirely consistent with Chomsky's suggestion, deriving as it does important aspects of syntactic variation from variable phonological properties. But if R is right, the phonology is more than an ancillary mapping relating the internal computational system to articulation and perception: it is an 'active player' in syntactic computation.

Contiguity theory is a fascinating and thought-provoking attempt at making sense of the seemingly arbitrary distribution of displacement phenomena across languages in terms of a modest inventory of universal mechanisms. One can only be impressed by the way in which R tackles this Herculean task: with untiring optimism fueled by a firm belief in theory.

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Computational models of referring: A study in cognitive science. By KEES VAN DEEMTER. Cambridge, MA: MIT Press, 2016. Pp. 339. ISBN 9780262034555. $34 (Hb).

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In this book, Kees van Deemter provides a wide-ranging synthesis of work from computational linguistics on the natural language generation of referring expressions. vD has been a leading member of a highly productive research community focused on empirical and computational approaches to REFERRING EXPRESSION GENERATION (REG). Here, he places these efforts into a comprehensive theoretical and historical context, outlining a range of issues and questions important to the development of algorithms for reference generation and providing a guide for where such work is likely to go in the future. In the preface, vD characterizes reference as the 'fruit fly' of the study of language, given all the ways that researchers from many disciplines have used reference to explore various phenomena in language and communication. And indeed, this book makes a compelling case for linguistic reference as a central intellectual topic within the cognitive sciences, while at the same time illustrating how computational models, in particular, can be useful tools for exploring an assortment of thorny theoretical issues.

The volume is organized into four major parts. Part I orients the reader to some of the most relevant issues and questions related to the generation of referring expressions, and introduces so-called 'classic' approaches to modeling reference generation. 'Reference' is a large and diverse