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Dimensions of phonological stress (*DOPS*) is a collection of eleven contributions on the analysis and acquisition of linguistic prominence, along with a short introduction. Although its contributors were drawn from presenters at the Conference on Stress and Accent at the University of Delaware, its genre is not conference proceedings: The chapters are mostly journal-length (averaging 29 pages) and journal-quality, having undergone peer review by two or three anonymous referees as well as the three editors. The success of the conference and vetting is evident not just from the consistently high level of argumentation but also from authors' frequent written responses to referees and other members of the project. One gets the impression of a more collective effort than is typical of collections.

DOPS follows upon a similarly conceived volume, van der Hulst (2014), though each stands on its own. These volumes contain some of the most important articles on stress in the last decade. Indeed, since only a few articles on stress appear in major journals each year, eleven such papers in one place is significant. Any linguist interested in metrical phenomena should have this book on hand. While *DOPS* is geared towards specialists, several chapters begin with accessible summaries of their areas. For example, Keij and Kager summarize fifty years of protocols for investigating rhythmic preferences in infants; Dresher gives a crash course on grid operations; and so forth. Unlike the denser articles one might find in proceedings, one is ushered more kindly into less familiar territory here.

Most of the contributors, like the editors, are well-known senior scholars, with only a few junior scholars joining their ranks. The editors are also known for their collaboration on StressTyp2, a typological database of stress patterns. Nevertheless, StressTyp2 receives no mention or use in *DOPS* after the first page. This is a missed opportunity, given how excellent a resource it is (see van der Hulst 2014 for more background on the project).

In terms of the coverage, most of *DOPS* concerns theoretical phonology and generally follows mainstream conventions such as Optimality Theory (OT)[1] and metrical grids parsed into feet.[2] Acquisition also features prominently, being the focus of four chapters, if one construes it broadly to include learnability and infant-directed speech. Beyond these acquisition chapters, a few chapters are empirically oriented, using phonetic or experimental evidence to establish default stress patterns (as in Greek and Mandarin) or to test a functional hypothesis. Serial OT and stratal OT are found in one chapter each (Topintzi's and Buckley's, respectively). Readers will find little Harmonic Grammar (HG) or related maxent or connectionist frameworks.[3] In general, *DOPS* focuses on categorical phonological patterns. Variationist phonology — gradience, free variation, analogy, exceptionality, biases,

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[1] Among the theoretical chapters, Dresher's is an exception on this point.

[2] Hyde's chapter, for one, does not employ feet or constraints, but also does not reject them. Gordon, a sometime proponent of a foot-free approach, uses them here.

[3] Jarosz's chapter on learnability features stochastic OT and noisy HG. All of the target grammars in this chapter are categorical, but the methods would apply equally well to variable grammars.

and so forth — is underrepresented vis-à-vis the broader field.[4] This is not a fault. Eleven chapters cannot do it all; on the contrary, a book stands to benefit from some thematic cohesion. In what remains, I discuss each chapter.

1. Matthew Gordon. "Metrical incoherence: diachronic sources and synchronic analysis." A language exhibits metrical incoherence when different metrical phenomena diagnose inconsistent metrical structures. For example, in Nganasan, segmental alternations imply left-to-right trochees (e.g. prenasalized stops lose their prenasalization in odd-numbered syllables, to oversimplify somewhat). But primary stress ignores this structure, following an unrelated weight-sensitive rule that can leave it in either position of the foot, while the segmental alternations remain unaffected (e.g. $(ˌhɨ.a)(ˈɟə\text{-}^{n}tə)(nu)$ vs. $(kuˈbu)(\text{-}tənu)$). The chapter analyzes similar cases from Uralic (Eastern Mari), Muskogean (Chickasaw), and Iroquoian (Cayuga and Seneca), in addition to briefly treating several others. Examining the historical evidence in each group, Gordon shows that incoherence often arises from an innovative, phrase-based system being superimposed on a conservative, word-level pattern. Interestingly, the innovative system does not always win this tug-of-war; in some cases, such as in Iroquoian, the synchronic grammar resolves the competition through compromise. Synchronically, Gordon argues that incoherence usually, if not always, reflects separate word and phrasal processes. This clearly holds for some cases, such as Chickasaw; it is predicted to hold also for others, such as Nganasan, pending probative data.[5] Gordon's typological predictions therefore differ somewhat from word-based accounts of incoherence (e.g. Vaysman 2009). For instance, Gordon's proposal predicts that incoherence should not be cross-iterative (i.e. feet iterating from opposite sides of the word), though he notes a possible case in Jarawara.

2. Brett Hyde. "The role of phenomenal accent." Standard theories of metrical stress assume that grid structure is present only when necessitated by phenomenal (i.e. phonetically realized) prosodic events or necessary to compute the location of such events (as when stress falls only on the final even-numbered syllable of a word, counting from the left). But few analysts would posit iterative feet for, say, a language with fixed initial stress. Drawing on studies of music and psychoacoustics, Hyde argues for a different outlook. The alternating metrical grid — now conceived of as an abstract timekeeper — is ubiquitous, just as it is in music. After all, given regular, undifferentiated pulses, listeners' imputation of metrical structure is "automatic and rich," usually in ratios of 1:2 or 1:3. Phenomenal accent for Hyde serves in part to induce the percept of this regular meter, but need not coincide with every beat. On this view, words have alternating meters even in single-stress languages. Hyde suggests that "a richer metrical pattern has gone undetected or simply undescribed" in such languages (57). Of course, if such evidence were detected, standard theories would agree that it needs to be analyzed. It is unclear what would constitute direct evidence for a metrical pattern without also qualifying as phenomenal accent on Hyde's broad definition, which includes, for instance, segmental alternations (54). The chapter illustrates how the proposed metrical grids can be inferred from attested phenomenal accent patterns. In some

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[4]Jarosz, just mentioned, qualifies as quantitative phonology, as do Revithiadou and Lengeris by the end of their chapter on Greek accent. Other quantitative chapters, such as Sui's, do not represent quantitative phonology, as their goal is to relate gradient phonetic data to categorical phonological analyses.

[5]Descriptions of stress sometimes fail to deconfound word-level prominence from phrasal/intonational phenomena. Gordon sticks his neck out and hypothesizes that if Nganasan (or Mari) words were elicited non-phrase-finally, one would find initial primary stress, reflecting a purely word-based prosody (30).

cases, the principles guiding this inference are not made sufficiently explicit. For example, for a dual-stress language with fixed initial and final stress, an iambic meter is posited, with initial syncopation (i.e. metrical-phenomenal misalignment) in even-parity words (72). I am not sure what, if anything, precludes a trochaic grid with final syncopation. Furthermore, a metrical phase shift (e.g. metrical clash on the first two syllables) would also work, obviating syncopation. Hyde's rationale for not employing a phase shift is that it would create additional metrical clashes (64), but it is not explained why metrical clash is taken to be a greater sin than syncopation. As Hyde discusses, the research program seeks to restrict the repertoire of metrical representations to a handful of regular patterns. The predicted typology will ultimately depend just as much on the limits that one imposes on the mapping of phenomenal accent to this limited repertoire, limits that are not yet well defined.

3. Eugene Buckley. "Foot alignment in Spanish secondary stress." Spanish secondary stress varies between two patterns, namely, trochees right-to-left (e.g. *gramàticàlidád*) and the same except with the so-called initial dactyl effect (*gràmaticàlidád*), that is, schematically, $0(20)(20)(1) \sim (20)0(20)(1)$. The former is typically more rhetorical, the latter more colloquial. For theorists seeking to eliminate gradient alignment constraints, the colloquial pattern is problematic, as it is difficult, lacking alignment, to adjudicate between desired $(20)0(20)(1)$ and undesired *$(20)(20)0(1)$, both being equal on clash, lapse, and edge stress (nor does Lapse-at-Peak, etc. help). Buckley shows that an analysis without gradient alignment is available in stratal OT, essentially treating the phenomenon as opaque: At the lexical level, the (unproblematic) rhetorical pattern is generated. Then, at the phrasal level, a constraint favoring phrase-initial stress is promoted, overwriting the first foot, while medial feet are retained in their right-aligned positions due to faithfulness (Ft-Match). While Buckley argues that this approach is superior to Roca (1986), which treats all secondary stress as postlexical, he admits that another solution is available in terms of recursive (effectively ternary) feet (Kager 2012). Which analysis is preferable will hinge on the independent success of stratal OT vs. recursive feet.

4. Yanyan Sui. "The interaction of metrical structure and tone in Standard Chinese." Based on phonetic and phonological evidence, Sui posits a stress pattern for Mandarin words/compounds that involves leftmost primary stress and left-to-right generalized trochees (disyllabic if possible, otherwise a single heavy, where any tonally specified syllable counts as heavy). The pattern is cyclic, such that inner constituents are parsed first, though a resulting $(\sigma)(\sigma)$ is rebracketed as $(\sigma\sigma)$. Thus, toned syllables (including highs) can be unstressed on this analysis, a departure from some previous accounts. Phonological evidence includes the distribution of the neutral tone, but the main contribution of the chapter is its phonetic study of the Mandarin Broadcast News corpus, in which it is shown that tones are produced more extremely (higher highs, lower lows, steeper slopes) in the hypothesized stressed positions. Perhaps due to space restrictions, Sui only presents tonal extremity data aggregated over all tones, so the reader cannot be sure whether every tone behaves as predicted, or only certain tones drive the effect. Sui critiques stress judgment tasks on the grounds that certain tones (e.g. falling) are more likely to be perceived as being stressed due to their intrinsic shapes, not necessarily because they coincide with metrical prominence.

5. Irene Vogel, Angeliki Athanasopoulou, and Nadya Pincus. "Prominence, contrast, and the Functional Load Hypothesis: an acoustic investigation." The authors hypothesize that languages will tend to associate different phonetic cues (e.g. pitch, duration, intensity)

with different types of contrast (e.g. word stress, contrastive focus, phonemic distinctions). In this chapter, the book's most ambitious, the authors test this hypothesis for the aforementioned cues and contrasts in Greek, Hungarian, Spanish, and Turkish. They record about ten speakers of each reading dialogues in which critical words appear with and without contrastive focus, allowing them to disentangle stress from focus (unlike many previous accounts in which the two are confounded). The hypothesis is generally supported, though the cues for stress are clearer in languages in which it is unpredictable (itself a reflection of functional load). For example, in Greek and Spanish, neither of which has phonemic length or tone, stress is primarily cued by pitch and focus by duration. Meanwhile, in Hungarian, which has phonemic length, stress is realized at best weakly in the absence of focus, but the combination of stress and focus is robustly cued, primarily by pitch. In addition to its treatment of functional principles, the chapter serves as an excellent resource on the phonetics of different types of prominence in four languages based on a uniform protocol.

6. Nina Topintzi. "Iquito: the prosodic colon and evaluation of OT stress accounts." Building on Michael's (2011) suggestion that Iquito stress and tone necessitate a colon (a constituent dominating two feet), Topintzi provides a constraint-based analysis (which Michael does not), compares analytical alternatives, and marshals support for the colon from other languages (allowing that it might not be universal). Aside from the case for cola, the chapter also makes the case for serial OT, in which evaluation cycles through an OT grammar. The colon is motivated in part by the (otherwise impermissible) degenerate foot in dipodic words like ('L)('LL). A constraint requires a prosodic word to dominate at least one colon.[6] However, words like ('LL) also occur as such, not as *('L)('L). Serial OT elegantly captures that *('L)('L) is never in contention because L('L) is harmonically bounded by ('LL) in an earlier step. Topintzi also offers two possible analyses in parallel OT, but disfavors them on account of ad hocness. Beyond Iquito, the colon is supported by four-mora prosodic maxima, a fourth-mora tone docking process, and dipodic domains in English and Japanese.

7. Gaja Jarosz. "Investigating the efficiency of parsing strategies for the Gradual Learning Algorithm." Jarosz treats the Gradual Learning Algorithm for stochastic OT and noisy HG under three different treatments of hidden structure, namely, RIP (Tesar and Smolensky 1998), RRIP (Jarosz 2013), and EIP (*ibid.*). RIP (Robust Interpretive Parsing) entails that if multiple candidates match the overt form of the datum (e.g. *(baná)na* and *ba(nána)*), the learner chooses as their target the candidate that is the most harmonic under their current ranking. RRIP (Resampling RIP) recomputes the noise on the constraint weights before applying RIP, while EIP (Expected IP) selects a parse in proportion to its likelihood of being generated by the current grammar. Jarosz demonstrates that RRIP and (more so) EIP outperform RIP in learning sample grammars given a million learning iterations. However, random baselines (e.g. randomly shuffling the ranking whenever an error occurs) also learn most of the same grammars given so many trials, suggesting that one should not attend only to performance in the limit (i.e. end-state success).[7] RRIP and EIP are faster to converge than the baseline in some settings. Moreover, counting the number of grammars that are perfectly learned is just one possible metric; one might also track the mean percentage

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[6]One might instead suppose that a prosodic word must be binary (I note BinMin from Selkirk 2011) without any reference to the colon. However, as Topintzi observes, the colon also serves as the domain for a tonal cooccurrence restriction.

[7]One might also increase the complexity of the sample grammars.

of forms that are correctly produced. An algorithm that reaches near-perfection quickly but then whittles away at a few outliers is an improvement over one whose intermediate grammars are crashingly bad until it stumbles into perfection.

8. B. Elan Dresher. "Covert representations, contrast, and the acquisition of lexical accent." Dresher begins by reviewing Simplified Bracketed Grid (SBG) theory, a derivational approach to grid construction. The background is welcome, considering that SBG stands apart from the OT accounts elsewhere in the book. (Dresher makes almost no attempt to argue for SBG over OT here, which would have also been welcome.) Focus is on the learnability of lexical accent in SBG, in which learning consists of checking for cues (or triggers) in order to set crucially ordered parameters. For example, the learner first checks for quantity-insensitivity (QI): If it finds two words in its lexicon with the same number of syllables but differing in stress, it turns QI off and proceeds to the next parameter. The chapter walks through parameter-setting for a toy grammar resembling Russian in which morphemes can be unaccented, post-accenting, or accented on any syllable. The lucid discussion raises important points for any framework, though some points (e.g. "learning cannot be purely error driven") are more asserted than argued in the present context. Finally, the algorithm is a sketch; as Dresher notes, an explicit computational implementation is a desideratum.

9. Anthi Revithiadou and Angelos Lengeris. "One or many? In search of the default stress in Greek." Modern Greek accent is lexically specified within a final three-syllable window. While antepenultimate stress is often regarded to be the default, some evidence points to the penult. This chapter probes noun stress experimentally, focusing on four declensions (-*a*, -*as*, -*o*, and -*os*). Participants listen to two- or three-syllable pseudowords and indicate which, if any, syllable sounds stressed. Critical items are manipulated to neutralize the cues for stress, such that participants unknowingly report only phantom stresses.[8] In -*a(s)* nouns, penultimate and antepenultimate stress are heard at roughly equal rates, while in -*o(s)* nouns, the antepenult dominates. The authors conclude that both the antepenult in penult are defaults in -*a(s)* nouns. I note, however, that in -*a* nouns, antepenultimate stress is strongly overgenerated relative to the lexicon, while penultimate stress is undergenerated, suggesting that the antepenult is more defaultlike in that declension.[9] The authors furnish a stochastic OT analysis with two constraints indexed to -*o(s)* nouns, but it does not capture all of the significant contrasts from the experiments, which are the real interest of the chapter.

10. Brigitta Keij and René Kager. "The development of rhythmic preferences by Dutch-learning infants." Infants aged four, six, and eight months (N = 31, 41, and 30, respectively) are tested for an iambic vs. trochaic preference using an innovative eye-tracking methodology, which is more accurate than the traditional Head-Turn Preference Procedure. The study employs twenty recordings of the pseudoword /nɔldɑf/, half with initial stress (SW), half final (WS). Infants' fixation on a screen showing a female face is measured for each stress condition. Aggregating over ages, total looking time is significantly greater for SW tokens, presumably reflecting a familiarity preference for the native Dutch pattern, though the authors cannot rule out influence from a universal bias. While four-month-olds show merely a "slight tendency to prefer" SW, the preference is clear-cut among six-month-olds, consistent with other studies of Germanic acquisition. Interestingly, eight-month-olds revert

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[8]Ryan (2014) dubs this method an "auditory wug test," as distinct from ratings or comparison.

[9]That is, antepenultimate stress is OVERLEARNED in the sense of Hayes et al. (2009).

back towards a more neutral preference. Based on the time courses of fixation for each age group, Keij and Kager convincingly argue that the eight-months-olds' ambivalent behavior likely reflects their switching from a familiarity preference to a novelty preference relatively early in the trials, while the younger participants take longer to grow bored.

11. Yuanyuan Wang, Amanda Seidl, and Alejandrina Cristia. "Acoustic characteristics of infant-directed speech as a function of prosodic typology." In English and many other languages, infant-directed speech (IDS) is characterized by a slower rate, higher pitch, greater pitch range, larger vowel space, and simpler utterances than adult-directed speech (ADS). In this literature review, the authors ask whether IDS relates differently to ADS in languages of different prosodic types (namely, stress, tone, or pitch accent). While the results are inconclusive, some tantalizing hypotheses arise. For instance, pitch appears to be more malleable (e.g. higher) in English IDS than in Cantonese, Mandarin, and Thai IDS. It is unclear whether this tendency follows from prosodic type or is an accident of culture. After all, aspects of IDS can be language-specific. For example, while IDS usually involves a larger vowel space, the opposite tendency has been reported for such diverse languages as Cantonese, Dutch, Japanese, and Norwegian (but not Swedish). As the authors recognize, discrepant methodologies might be partly to blame. For example, tasks that evoke contrasts might elicit more exaggerated vowels. What's more, global measures can be misleading. For example, as Igarashi (2014) notes, pitch range might be misinterpreted as being compressed in IDS if one does not correct for its shorter utterances.

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