



John J. McCarthy and Joe Pater (eds.): *Harmonic grammar and harmonic serialism*. London: Equinox, 2016. Pp. viii-436.

This volume contains chapters that explore and extend advances in formal investigations of grammar that employ violable constraints in the analysis of individual languages, the study of linguistic typology, and the learnability of grammars. Initial investigations in a generative framework that employs violable constraints took place in Optimality Theory (OT) (Prince & Smolensky, 1993/2004). It is worth noting that although “representational constraints had of course long existed as a means of formally expressing restrictions on linguistic structures, [...] the notion that one constraint could compel the violation of another had never been given much attention before OT” (p. vii). The violable constraints in OT are strictly ranked with respect to one another, preventing the possibility of multiple violations of lower-ranked constraints accumulating and ‘ganging up’ on higher ranked ones. Harmonic Grammar (HG) is an alternative version of a grammar model that employs violable, ranked constraints (as is commonplace in OT) which uses weighted constraints in place of strictly ranked ones. Pater (this volume) highlights two potential advantages that an HG may have over an OT-model: Firstly, as initially noted by Prince (2003), there are asymmetric trade-offs on gang effects (based on the fact that the weighted constraint violations in HG can lead to gang effects of lower weighted constraints under certain circumstances), which are simply not possible in OT. Secondly, “the promise of weighted constraint theories of Universal Grammar derives from the ability of HG to generate attested patterns that fall out of the reach of OT using the same sets of constraints” (p. 2). Here Pater points to previous research (in particular, Flemming, 2001) that shows the difficulty that OT has in establishing compatibility with scalar constraints. This potential issue purportedly receives a more straightforward account in HG. The inclusion of weighted constraints permits new theories concerning which constraints (CON) exist. Initially, analyses in OT assumed a parallel theory of candidate generation and evaluation. There is no reason, however, that single iterative applications of the generation (GEN) and evaluation (EVAL) of candidates cannot replace parallel evaluations. Harmonic Serialism (HS), see McCarthy (this volume) for a detailed introduction, combines the inclusion of weighted violable constraints in serial evaluation of candidates. The contributions in this volume consist of studies that show the advantages and challenges associated with current research within the HG and HS models.

The volume consists of three sections; Part I serves as an introduction to HG and HS, Part II contains individual studies dedicated to the analysis of individual studies, and Part III focuses on learning algorithms in HG and HS. As mentioned above, Part I consists of two chapters – one by Joe Pater (‘Universal grammar with weighted constraints’) and the other by John McCarthy (‘The theory and practice of Harmonic Serialism’) – which establish the basics of HG and HS applied in the contributions throughout the rest of the volume (especially those found in Part II). Part II begins with John McCarthy, Joe Pater, and Kathryn Pruitt’s contribution (‘Cross-level interactions in Harmonic Serialism’), which takes a closer look at the analysis of cross-linguistic interaction (CLI) phenomenon from an HS-perspective. McCarthy, Pater, and Pruitt make the case that although CLIs have traditionally been presented as crucial evidence for parallel evaluation (as is the case in OT), these forms also receive a straightforward analysis HS. Minta Elsmann (‘Parallelism vs. serialism, or constraints vs. rules? Tongan stress and syllabification revisited’) offers an HS-treatment of Tongan stress and syllabification that challenges traditional analyses conducted in OT (which rely on a parallel evaluation of candidates). Robert Staubs’s chapter (‘Serial restrictions on feature/stress interactions’) investigates the interactions between segmental features and stress, and shows “that in Harmonic Serialism, positional markedness constraints yield desirable interactions between segments and stress such as sonority-driven stress and vowel reduction but do not yield certain pathological languages predicted by Optimality Theory” (p. 154–5). Karen Jesney (‘Positional constraints in Optimality Theory and Harmonic Grammar’) focuses on constraints “that govern patterns of feature licensing – i.e., patterns where a given marked feature surfaces only in special phonological context” (p. 176). In her treatment, she compares OT-type analyses according to which positional faithfulness and positional markedness constraints are applied in this context versus HG-type approaches, which only requires the latter constraints (and crucially not the former). Wendell Kemper (‘Positive constraints and finite goodness in Harmonic Serialism’) revisits the *Infinite Goodness* problem (Prince, 2007), i.e., “for any structure favored by a positive constraint, an infinite number of instances of that structure can be epenthesized, and there ceases to be an optimum” (p. 221). Kemper argues that this problem is obfuscated in HS-approaches, given that the generator (GEN) is significant constraint, and can perform only one operation at a time. Claire Moore-Cantwell (‘Contexts for epenthesis in Harmonic Serialism’) takes a closer look at the ‘too-many-solutions’ problem (i.e., multiple repair strategies to address conspiracies) through the lens of HS. With an empirical focus on

epenthesis, Moore-Cantwell maintains that a Harmonic Serialist-approach to this problem constrains “the set of possible repairs to a marked structure [...] the only repairs which can resolve the marked structure are those which can do so in a *harmonically improving* fashion” (p. 237). Emily Elfner (‘Stress-epenthesis interactions in Harmonic Serialism’) advances an HS-analysis of stress and epenthesis in languages like Dakota, and shows that this approach has particular advantages of those found in traditional OT. Francesc Torres-Tamarit (‘Compensatory and opaque vowel lengthening in Harmonic Serialism’) follows suit by providing a HS-analysis of compensatory lengthening compared with traditional parallel OT approaches. Matthew Wolf’s (‘Cyclicality and non-cyclicality in Maltese: Local ordering of phonology and morphology in OT-CC’) concludes Part II of this volume, where he argues that ‘cyclicality’ (the application of certain phonology before certain morphology) is not something that is hard-wired into the overall modular architecture of a language’s grammar, but is instead simply a particular type of ordering relation between phonological and morphological processes which a language may select for some forms but not for others” (p. 328). The final section of the volume, Part III, includes two contributions from Robert Staubs and Joe Pater (‘Learning serial constraint-based grammars’) and Paul Boersma and Joe Pater (‘Convergence properties of a Gradual Learning Algorithm for Harmonic Grammar’) that focus on the method for learning grammars in HS and the convergence of a general learning algorithm in HG respectively.

As a whole, this volume is successful in illustrating the potential advantages of HG and HS in the formal study of human grammars. The chapters by Pater and McCarthy that appear at the beginning of this volume are especially helpful in clarifying key concepts, differences, and similarities with OT before the reader engages with the individual applications of HG/HS in the second section. Although this volume makes a strong case for HG and the validity of its application in the study of linguistic typology and the acquisition of (dynamic) systems, there are some noted weaknesses. First, the two contributions in Part III (*Learning*) assume a background in mathematics that might extend beyond the common readers’ abilities. Admittedly, an edited volume is not a textbook, however, those potentially interested in applying HG in their research would benefit from such materials and references in the future. Second, this book is a reflection of current research in HG/HS and, as a result, the empirical focus of this book is strictly on phonological aspects of grammar. The inclusion of contributions investigating other domains of grammars, e.g., syntax, semantics, or pragmatics, would have further strengthened this volume given the resurgence

in interest in OT-analyses of these areas (see e.g. Legendre et al., 2016). Third, and related to the previous point, the addition of research on semantics and pragmatics leads to the question of how weighted constraints may interact in models that advocate bidirectional optimization across form-meaning pairs. Finally, research on bi/multilingual grammars seems an ideal domain of inquiry for HG/HS and its absence from this volume is unfortunately noticeable. Beyond these issues, this volume collectively represents a bold step forward in demonstrating the conceptual advantages and empirical applications of HG/HS in formal and experimental phonology. Looking forward, the next step in the evolution of this research program will involve comparison with Gradient Symbolic Computation (GSC; Smolensky et al., 2014; Goldrick et al., 2016; Putnam & Klosinski, 2017), which shares many affinities with HG. In summary, for those with a background in OT, this book serves as a very good introduction into HG/HS.

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