Constraints in phonological acquisition (review)

Ellen Broselow

➡ *For additional information about this article*
https://muse.jhu.edu/article/262991

tics. Overall, this book showcases not only the diversity of languages and dialects found in these states, but also the diversity of approaches to describing and understanding that diversity. Of course even in this project, there remain gaps. For example, a contribution on Michigan's thriving Arabic-speaking communities (noted on p. iv) would have been welcome. The success of this project should certainly encourage those in other states and areas to pursue similar work, and the book provides a very useful model. Ultimately, as Hirvonen points out, 'At the grassroots level there is more linguistic diversity in the Upper Midwest than meets the eye' (239).

REFERENCES

SISSON, RICHARD; CHRISTIAN ZACHER; and ANDREW CLAYTON (eds.) 2006. *The American Midwest: An interpretative encyclopedia*. Bloomington: Indiana University Press.

Center for the Study of Upper Midwestern Cultures
901 University Bay Dr.
University of Wisconsin
Madison, WI 53705
[jsalmons@wisc.edu]

Constraints in phonological acquisition. By RENÉ KAGER, JOE PATER, and WIM ZONNEVELD. Cambridge: Cambridge University Press, 2004. Pp. 428. ISBN 9780521829632. $129 (Hb).

Reviewed by ELLEN BROSELOW, *Stony Brook University (SUNY)*

This volume is an indispensable contribution to the literature exploring the connections between formal grammar and learnability. All of the papers in the volume approach acquisition from the perspective of optimality theory (OT), in which research on the description of adult grammars has proceeded in tandem with the development of explicit computational models of grammar acquisition. Taken together, the papers exhibit a level of coherence and complementarity that is rare in collections of this sort, and give a clear picture of both the strengths and shortcomings of this approach at a particular point in its development.

Rather than taking each chapter in order of appearance, I discuss the chapters (or portions of chapters) according to their themes and goals. I begin with the two introductory chapters, which are primarily concerned with situating OT acquisition research within a historical context. I then turn to foundational papers, which outline and develop the framework, and conclude with papers that are primarily case studies of the data of specific developing grammars.

The first two chapters, the editors' 'Introduction: Constraints in phonological acquisition' and 'Saving the baby: Making sure that old data survive new theories' by LISE MENN, situate the OT approach within the history of acquisition research in generative phonology. The introduction traces the emergence of various assumptions that have gained wide currency in acquisition theory: that while children's surface representations are typically impoverished, their lexical representations closely approximate adult surface forms; that children move from more restrictive to less restrictive grammars on the basis of positive linguistic evidence; and that each intermediate grammar developed during the acquisition process corresponds to a possible adult grammar. In the OT model, learning a grammar involves working out the correct balance between sometimes antagonistic (but violable) constraints: markedness constraints, which penalize various surface structures, and faithfulness constraints, which enforce the faithful realization of lexical contrasts. The editors take pains to trace continuities between the OT approach and earlier research, particularly claims by Roman Jakobson and David Stampe that child grammar reveals preferences for less marked structures. They also point out, however, differences between OT and earlier theories of acquisition. In rule-based approaches, the child's tendency to simplify adult forms to a smaller inventory of surface structures is expressed as a result of simplification rules that are not present in the adult grammar, with the result that a child's grammar could be significantly more complex

than the adult's. In OT, in contrast, children's and adults' grammars differ only in the ranking of constraints. For example, a child who simplifies adult CVC to CV has ranked the universal markedness constraint NO-CODA over faithfulness constraints, while the grammar of an adult who faithfully produces CVC syllables has the opposite ranking. This definition of the learning process as a matter of ranking constraints, rather than setting values of parameters, allows even low-ranked constraints to continue to play a role in language. For example, in many languages syllables with codas are permitted in all morphemes except reduplicative morphemes, which contain only open syllables. In OT, the imposition of greater markedness on reduplicative morphemes is accomplished by allowing the NO-CODA constraint to dominate the constraints demanding identity between reduplicant and base (McCarthy & Prince 1994). In contrast, setting a no-coda parameter to 'off' predicts that the language should show no effects of a preference for open syllables.

Menn's chapter evaluates the successes and failures of OT in accounting for various well-established patterns in child phonology. She points out patterns—such as the variability of children's productions at any given stage and the tendency for changes to take place word by word rather than across the board—that are problematic for the model of OT outlined in the introduction (and indeed, for any model that assumes a fully categorical grammar). As she notes, some of the problems she identifies could be (or have been) addressed in modifications of the theory that have been proposed since these papers were written. This chapter could almost serve as a prospectus for a followup volume.

Two extremely influential papers, 'Learning phonotactic distributions' by ALAN PRINCE and BRUCE TESAR and 'Phonological acquisition in optimality theory: The early stages' by BRUCE HAYES, address the SUBSET PROBLEM: assuming that learners attend only to positive evidence, it is crucial that a learner construct the most restrictive grammar compatible with the data, since no positive evidence will be available to motivate a retreat from a grammar that overgenerates. In OT, the learner's task is to rank constraints, and the restrictiveness of a grammar is a function of the ranking of markedness constraints, which suppress lexical contrasts, vis-à-vis faithfulness constraints, which preserve them. The trick, then, is to ensure that, given alternative grammars that are compatible with a set of data, the learner chooses the grammar that maximizes markedness over faithfulness rankings. After an incisive review of the literature surrounding the subset problem, Prince and Tesar present a refinement of earlier constraint-ranking algorithms (see e.g. Tesar & Smolensky 1998) designed to ensure that faithfulness constraints are dominated by as many markedness constraints as possible. Hayes's paper offers a slightly different approach to the same end, in the form of a set of principles making faithfulness-constraint dominance a last resort in accounting for specific data. Each paper contains some comparison of these two approaches to enforcing ranking conservatism.

A second major focus of these two papers is the role of phonotactic vs. morphological information in acquisition. Both papers provide arguments that children can obtain much of the information they need to determine target-language rankings from access to the phonotactics of the language, even before the child is aware of morpheme alternations (or indeed, of the internal structure of words). Hayes grounds this proposal in a succinct overview of the literature surrounding the development of children's sensitivity to target-language phoneme contrasts, distributional patterns, and morphological alternations. The developmental path in which phonotactics provide the first information for grammar construction is clearly relevant to at least some of the problems of variability and word-by-word learning pointed out by Menn. For example, Hayes considers dialects in which the diphthongs [ʌɪ] and [aɪ] stand in complementary distribution, the first occurring before voiceless sounds and the second elsewhere. This pattern may be obscured by morphologically complex words like *writer*, which preserves the [ʌɪ] of the base word *write* even when the following [t] is realized as a voiced tap. Hayes points out that for an early learner, who has access to phonotactic but not yet morphological information, pairs like *writer/rider*, in which tapping of both [t] and [d] places [ʌɪ] and [aɪ] in phonetically identical contexts, appear to establish a contrast between the two diphthongs. Having once established a grammar that allows wide distribution of both diphthongs, it is difficult for the child to retreat to the grammar

restricting [ʌɪ] to specific contexts. Indeed, for many speakers diphthong quality seems to be specified word by word (e.g. *idle* with [ʌɪ] and *idol* with [aɪ]). Hayes attributes this somewhat chaotic situation to the geographical mobility that exposes many children to multiple dialects with different distributional restrictions.

While Prince and Tesar demonstrate that the markedness-over-faithfulness bias must be active throughout the acquisition process, two other papers argue for this bias as a property of the initial-state grammar. 'Markedness and faithfulness constraints in child phonology' by AMALIA GNANADESIKAN proposes that children begin with all markedness constraints dominating all faithfulness constraints, and the first section of 'The initial and final states: Theoretical implications and experimental explorations of richness of the base' by LISA DAVIDSON, PETER JUSCZYK, and PAUL SMOLENSKY reports on a set of experiments designed to probe the nature of the initial-state grammar. Using a head-turn preference procedure, infants of 4.5 months were exposed to sequences of syllables and syllable combinations such as *in…po…impo*. The latter sequence is assumed to violate a faithfulness constraint (*impo* is not a faithful realization of *in…po*), but to better satisfy markedness constraints preferring that nasal-obstruent sequences be homorganic. The infants displayed a preference (defined by longer looking time) for less marked over more marked structures, and for faithful over unfaithful structures. Furthermore, infants preferred structures that violate faithfulness over structures that violate markedness (e.g. *in…po…impo* was preferred to *in…po…inpo*), supporting the claim that their grammar ranked markedness over faithfulness constraints. While one may question whether the experimental task actually probes the ranking of faithfulness constraints, one cannot help but admire the audacity and ingenuity of the attempt to provide direct experimental support for initial-state constraint rankings. The paper also reports on parallel experiments (Jusczyk et al. 2002) with older infants, in which the preference for sequences obeying markedness constraints over those obeying faithfulness constraints persisted in infants of ten and twenty months, but not in infants of fifteen months. The authors speculate that the fifteen-month-olds had begun to admit the possibility of morphological complexity, for example, treating *in* as a prefix to *po*, with the attendant possibilities of nonassimilation admitted by English prefixes such as *un*. By twenty months, however, the children's lexicons had developed to the point where they recognized that the stimuli were not actual words. The attentive reader will at this point turn back to Hayes's discussion of the timetable of morphological acquisition; Hayes cites documentation of the mastery of the Turkish accusative at fifteen months, but provides evidence that children as old as four years seem not to have mastered the complexities of English or Hebrew morphology, although he does note that these tests measure productive rather than receptive competence, which likely develops earlier.

The development of children's lexical representations is the focus of 'Bridging the gap between receptive and productive development with minimally violable constraints' by JOE PATER. Pater surveys evidence supporting the proposition that children may perceive an acoustic contrast but still fail to incorporate that contrast into their lexical representations. For example, when distinct objects were paired with auditory stimuli [bɪ] vs. [dɪ], fourteen-month-olds failed to respond to a switch in the pairing, although they did react to the [bɪ]-[dɪ] change when the stimuli were not paired with a recognized object (e.g. Pater et al. 2004). Pater proposes a grammar module governing the mapping from adult surface representations to the child's lexical representations; as in the production grammar, faithfulness constraints—here, constraints demanding faithfulness to adult surface forms—are initially dominated by markedness constraints, leading to impoverished lexical representations. Just as the move to more adult-like surface representations is modeled by increasing dominance of lexical-to-surface faithfulness constraints, the development of grammars allowing richer lexical representations can be modeled as increasing dominance of the surface-to-lexical faithfulness constraints. To illustrate, Pater discusses truncation of initial unstressed syllables, which appears to occur even among children who perceive the deleted syllable. For a child at this stage, the adult surface form *garage* is mapped to a lexical representation [gáʤ] by a grammar in which the surface-to-lexical faithfulness constraints are dominated by markedness constraints stipulating that a word must be a trochaic foot. This approach raises a number of interesting questions. For example, the rankings required to choose [gáʤ] as the

best match for *garage* over other logically possible trochees such as [gráʤ], [ráʤ], and [gáraʤ], and even less marked forms such as [gá], will go beyond simple markedness over faithfulness; what is the source of these rankings?

The individual case studies in this volume provide perhaps the most convincing demonstration of the strength of the OT model: its predictions are explicit enough that we can see precisely where the model must be refined or augmented.

The theory of syllable typology is one of the best developed areas in OT, and so allows the formulation of very explicit predictions for acquisition: the learning path should proceed from the most restrictive grammar (CV, which obeys all markedness constraints) to successively less restrictive grammars (as markedness constraints are demoted below faithfulness constraints), and each developing grammar should represent a possible ranking of syllable-related constraints. 'Syllable types in cross-linguistic and developmental grammars' by CLARA C. LEVELT and RUBEN VAN DE VIJVER tracks the developing syllable inventories of twelve children acquiring Dutch as a first language, as judged by their productions, in the context of a model consisting of four simple constraints: NO-CODA (codas are forbidden), ONSET (onsets are obligatory), *COMPLEX-C(ODA), *COMPLEX-O(NSET). As predicted, all of their subjects did indeed begin with only CV syllables, which satisfy all of these markedness constraints. Learners next added CVC syllables, followed in turn by V-initial syllables, suggesting that they first demoted the NO-CODA constraint, and next the ONSET constraint. Levelt and van de Vijver argue that this progression can be accounted for by assuming that more frequently violated constraints are demoted more quickly: in Dutch, syllables containing codas are significantly more frequent than syllables lacking onsets. Similarly, syllables containing complex onsets are acquired only after onsetless syllables, again reflecting the greater frequency of V(C) over CCV(C) in Dutch. Conversely, because complex onsets and complex codas appear with roughly equal frequency in Dutch, children vary in their order of acquisition of CCVC vs. CVCC. While frequency does not play a direct role in the constraint-ranking algorithm discussed in Hayes's and Prince and Tesar's chapters, there are of course alternative OT models of constraint ranking that directly connect frequency with rate of constraint demotion (e.g. Boersma & Hayes 2001).

A potentially problematic pattern emerging from the corpus study was the delayed mastery of structures that simultaneously violate two constraints, compared with structures violating each constraint individually. For example, the children surveyed uniformly produced V and CVC syllables before VC syllables. Similarly, children who could produce both CCVC and CVCC syllables (evidence that both *COMPLEX-O and *COMPLEX-C had been demoted) still failed to produce CCVCC syllables. In the simplest version of OT, once the individual markedness constraints have been demoted below faithfulness constraints, even the structures that violate both constraints should surface faithfully. The mechanism of constraint conjunction (Smolensky 1993), however, adds to the constraint set conjunctions such as *COMPLEX-O & *COMPLEX-C, which are violated only when both members of the conjunct are violated simultaneously. The possibility of conjoined constraints increases the number of predicted language patterns. While the authors do find an adult language that exemplifies the V, CVC, but *VC inventory, they are unable to find a language exemplifying the CCVC, CVCC, *CCVCC pattern. The implications for learnability of adding constraint conjunction to the formalism are potentially significant, and a more satisfying explanation of these patterns may be found in developmentally based difficulties in the processing and/or programming of speech sequences. Regardless of the ultimate analysis of the data, this lucid paper is an ideal introduction to the way in which OT attempts to connect typology and acquisition.

Two papers in the volume focus on the mechanisms by which children simplify complex onsets. Gnanadesikan's 'Markedness and faithfulness constraints in child phonology' focuses on complex and intriguing data from the author's child, while 'Input elaboration, head faithfulness, and evidence for representation in the acquisition of left-edge clusters in West Germanic' by HEATHER GOAD and YVAN ROSE surveys patterns of children acquiring Dutch, English, and German. Gnanadesikan's child reduces complex onsets to the lowest-sonority single consonant; a labial articulation in onset is preserved, as in the coalescence of [sw] to [f] in *sweater*, except

where the word already contains a labial consonant (thus [bin] 'green' but [go] 'grow'—[r] consistently patterns as labial). Gnanadesikan argues that a rule-based analysis is problematic, while a constraint-based analysis is capable of accounting for the full range of data. She argues, furthermore, that each of the child's patterns—preference for low-sonority onsets, avoidance of repetition of a single place of articulation within a word—finds parallels in phenomena of adult languages in areas such as reduplication and phonotactic restrictions, and can therefore be accounted for using already-established constraints. The child's data also provide striking support for the claim that misproduction does not necessarily reflect misperception: all initial unstressed syllables are replaced by [fi], but a labial consonant may emerge in a later syllable, as in [fibun] 'balloon'. Gnanadesikan points out that use of a fixed string of segments is familiar from reduplicative morphology (as in *theory-shmeory*, where the *shm* can be analyzed as a morpheme; Alderete et al. 1999), though a morphemic analysis is not obviously applicable to this phenomenon. (However, Roksolana Myhaylyk (p.c.) suggested to me that perhaps [fi] could represent the child's misanalysis of the definite determiner.) In any case, as [fi]-replacement does not obviously improve the prosody of the form, this pattern provides an interesting challenge for Pater's analysis of unstressed syllable deletion as a function of well-established markedness constraints. Gnanadesikan's paper was perhaps the first detailed examination of child language within an OT framework, and the data are rich and intriguing; it is unfortunate that she provides no information on the methodology of data collection so that the reader might judge the extent to which individual examples are representative.

Goad and Rose's paper identifies two patterns of onset simplification: the SONORITY PATTERN, in which children (like Gnanadesikan's child) reduce onset clusters to the lowest-sonority consonant ([pl] > [p], [sp] > [p], [sl] > [s]), and the HEAD PATTERN, which differs in its treatment of fricative-sonorant onsets, in which the lower-sonority fricative is deleted ([pl] > [p], [sp] > [p], but [sl] > [l]). In contrast to the approach of the other papers, in which developing grammars are described in terms of reranking of constraints, the proposal of this paper is that the deletion patterns reflect the development of increasingly elaborated representations. The authors argue that initial fricatives are first analyzed as part of the onset; only later do children analyze these fricatives as an extrasyllabic constituent. The evidence that would trigger this reanalysis is based on asymmetries between [s]-initial and obstruent-sonorant onsets. For example, the authors argue that true onsets are subject to a restriction that they may not contain consonants with identical place specifications, to rule out onsets such as *[tl] and *[pw], while the occurrence of coronal-coronal sequences such as [st] and [sl] would constitute evidence motivating the child to posit a different structure for such onsets. This approach involves a more complex interaction between data and grammar than is assumed in an error-driven constraint-demotion algorithm underlying most OT acquisition work, and one might ask why the occurrence of coronal-coronal onsets would not simply motivate the child to demote the constraint forbidding onsets with identical place specifications. (Readers may wish to consult Pater & Barlow 2003 for an alternative analysis that dispenses with the representational machinery of Goad and Rose's analysis.) One interesting discrepancy between this paper and Gnanadesikan's is that because [r] occurs in branching onsets with both labials and coronals ([pr], [tr]), Goad and Rose must assume that [r] is placeless, while for Gnanadesikan's child, [r] was clearly labial, as demonstrated by the fact that a reflex of its labial articulation was always maintained (as in the pronunciation of *green* as [bin]).

The pronunciation of novel complex onsets by adult speakers is the focus of the second part of Davidson, Jusczyk, and Smolensky's paper, which reports on monolingual English speakers' pronunciations of visually presented Polish words. While the Polish words contained various illegal clusters, all presumably equally novel for English speakers, subjects exhibited significantly greater accuracy on some clusters (e.g. *zm*, *zr*) than on others (e.g. *vn*, *vz*, *dv*). The authors consider the possibility that the differential difficulty of the novel cluster types reflects 'hidden rankings' of constraints in the adult grammar. Possible explanations of the source of these hidden rankings range from innatist (they represent the default initial-state rankings) to data-driven (these rankings reflect the frequency with which illegal cluster types arise in the native language as a result of fast-speech reduction processes). In addition, the authors consider an explanation based

on the interaction of articulatory coordination and perceptual factors: English speakers produce a lag between the first and second consonants that is more likely to be perceived by listeners as an inserted vowel in some contexts than in others. An explanation along these lines receives support in subsequent work by Davidson (e.g. Davidson 2006).

The innatist approach to foreign language acquisition and the emergence of hidden rankings is defended in 'Emergence of universal grammar in foreign word adaptations' by SHIGEKO SHINO-HARA, which examines Japanese speakers' adaptation of words borrowed from French. Shinohara finds three areas where, she argues, the adaptation process reveals the effect of universal markedness preferences. First, structures that are equally novel may be adapted differently. Both [tu] and [du] are illegal in Japanese native vocabulary, but the first is adapted with affrication of the consonant (*tˢuruuzu* 'Toulouse'), the second with lowering of the vowel (*poNpidoo* 'Pompidou'). This pattern is argued to reflect the greater markedness of voiced affricates (though an alternative analysis might appeal to the fact that in native vocabulary [dz] is realized intervocalically as [z], so that transforming the [du] of 'Pompidou' to a legal Japanese structure [zu] would require a more drastic change than transformation of [tu] > [tˢu]). Similarly, a constraint that requires stem-final segments to be syllable-final as well, triggering gemination of stem-final consonants before an inserted vowel (*robbu* 'robe'), reveals the effects of a crosslinguistic preference for voiced geminate stops over voiced geminate fricatives (Kirchner 2000). While Japanese core vocabulary lacks voiced geminate obstruents of either category, French voiced stops are far more likely to be adapted as geminates than voiced fricatives (*robbu* 'robe' but *roozu* 'rose'). The constraint banning voiced geminate fricatives dominates the stem-syllable alignment constraint, ruling out *rozzu*. Still to be explained is the adaptation of 'rose' as *roozu* rather than the more faithful *rozu*, which would also constitute a legal Japanese structure. Shinohara appeals to sympathy theory, in which candidates may be evaluated based on their similarity not only to the lexical representation, but to other less successful candidates. In this case, *roozu* wins over *rozu* because the latter is more similar to *rozzu*, which satisfies the stem-syllable alignment constraint. Careful ranking will be required to rule out a candidate not discussed here, *rossu*, which satisfies markedness at the expense of faithfulness to voicing. The impact of including sympathy-theoretic constraints in the grammar on the constraint-ranking algorithms presented in the volume are not explored here, but are not trivial. The French data provide interesting fodder for the ongoing debate concerning the respective roles of phonetics and phonology in loanword adaptation. Takagi and Mann (1994) analyze the gemination in borrowings from English as a result of the discrepancies in the vowel-consonant ratios of Japanese and English, which lead Japanese listeners to perceive certain English codas as geminate. If the vowel-consonant ratios of French are similar to those of English, this would support an analysis in which gemination in both languages has its source in the mappings from the French acoustic forms to the native-language phonological representations. If the durational facts of French and English are different, however, gemination in both French and English might be best analyzed as an effect of stem-syllable alignment constraints in the production grammar.

Where the adaptation of French segmental structure reveals a preference for particular (less marked) foreign structures over other equally novel structures, the adaptation of prosodic structure reveals a preference for one among a range of legal native-language structures. While the position of accent in Japanese native vocabulary is to a large degree unpredictable, loans from French generally have accent patterns reminiscent of the Latin stress pattern, with accent on a heavy penultimate syllable (*powáNsoN* 'poinçon' ('punch'), or on the antepenult when the penult is light (*ɸiráteri* 'philatelie' ('philately'), *buráNzjuri* 'boulangerie'). Epenthetic vowels disrupt the normal accent pattern (*aburíko* 'apricot' rather than expected **abúriko*), and as epenthesis is not present in native vocabulary, Shinohara argues that the avoidance of accent on epenthetic vowels 'must arise from a constraint that is latent in the mature grammar and inherited from the initial state' (308). Shinohara argues that the Latinate accent pattern may also reflect a universal markedness preference, although the native vocabulary does provide some evidence for this as a default pattern.

'Child word stress competence: An experimental approach' by Wim Zonneveld and Domi-nique Nouveau reveals a similar sensitivity to an underlying default even where the language admits a variety of stress patterns. While Dutch stress is not entirely predictable (e.g. *róbot* 'robot' vs. *schavót* 'scaffold'), certain patterns are preferred. In experiments in which three-year-old and four-year-old Dutch-speaking children were asked to imitate nonsense words, children made more errors on words with stress patterns that were either prohibited or uncommon in the Dutch lexicon, and their errors were often in the direction of regularizing stimuli with irregular or prohibited stress patterns. To account for the variation in word stress patterns, the authors argue for an analysis in which the grammar includes cophonologies differing in their rankings of particular constraints, with individual lexical items associated with particular ranking patterns. This provides another case in which the data force an elaboration of the simplest model, with potential implications for the theory of learnability.

Most of the papers in this volume were written at a relatively early period of OT research, and provide a clear picture of the theory at that point. Nearly every paper is meaty, and several are destined to be classics.

REFERENCES

Alderete, John; Jill Beckman; Laura Benua; Amalia Gnanadesikan; John McCarthy; and Suzanne Urbanczyk. 1999. Reduplication with fixed segmentism. *Linguistic Inquiry* 30.327–64.
Boersma, Paul, and Bruce Hayes. 2001. Empirical tests of the gradual learning algorithm. *Linguistic Inquiry* 32.45–86.
Davidson, Lisa. 2006. Phonotactics and articulatory coordination interact in phonology: Evidence from non-native production. *Cognitive Science* 30.837–62.
Jusczyk, Peter; Paul Smolensky; and Theresa Allocco. 2002. How English-learning infants respond to markedness and faithfulness constraints. *Language Acquisition: A Journal of Developmental Linguistics* 10.1.31–73.
Kirchner, Robert. 2000. Geminate inalterability and lenition. *Language* 76.509–45.
McCarthy, John, and Alan Prince. 1994. The emergence of the unmarked: Optimality in prosodic morphology. *North Eastern Linguistic Society* 24.333–79.
Pater, Joe, and Jessica A. Barlow. 2003. Constraint conflict in cluster reduction. *Journal of Child Language* 30.487–526.
Pater, Joe; Christine Stager; and Janet Werker. 2004. The perceptual acquisition of phonological contrasts. *Language* 80.361–79.
Smolensky, Paul. 1993. Harmony, markedness, and phonological activity. Handout of keynote address, Rutgers Optimality Workshop–1, October 23. Rutgers Optimality Archive 87. Online: http://roa.rutgers.edu.
Takagi, Naoyuki, and Virginia Mann. 1994. A perceptual basis for the systematic phonological correspondences between Japanese loanwords and their English source words. *Journal of Phonetics* 22.343–56.
Tesar, Bruce, and Paul Smolensky. 1998. Learnability in optimality theory. *Linguistic Inquiry* 29.229–68.

Department of Linguistics
Stony Brook University
Stony Brook, NY 11794-4376
[ellen.broselow@stonybrook.edu]

The collected writings of Warren Cowgill. Ed. by Jared S. Klein. Ann Arbor: Beech Stave Press, 2006. Pp. lviii, 578. ISBN 0974792713. $85 (Hb).

Reviewed by Alfred Bammesberger, *The Catholic University of Eichstätt*

Warren Crawford Cowgill was born December 19, 1929, near Grangeville, Idaho, and died of cancer June 20, 1985, in New Haven, Connecticut. Other than two visiting appointments, one at the University of Illinois (1961), the other at the University of London (1966), he spent his whole professional life at Yale. More than twenty years after C's untimely death, his *Collected writings* have been made available to the discipline of Indo-European studies in an edition