Synchronic Versus Diachronic Explanation and the Nature of the Language Faculty

Stephen R. Anderson

Department of Linguistics, Yale University, New Haven, Connecticut 06520-8366;
email: sra@yale.edu

Abstract

The nineteenth-century conception that linguistic structure was to be ex-
plained by recourse to the histories of languages was largely abandoned with
the rise of synchronic theories in the twentieth century, but has recently re-
turned to prominence. Whereas traditional generative theories of language
have tended to attribute crosslinguistic regularities to constraints imposed
on the class of possible grammars by the human Language Faculty, some
scholars have argued that this is often a mistake: that there are no (or at
least very few) real substantive universals of language, and that the regu-
larities in question arise from common paths of diachronic change having
their basis in factors outside of the defining properties of the set of cogni-
tively accessible grammars. This review surveys evidence for that position,
primarily in phonology but also in morphology and syntax. I argue that in
phonology, there are at present no convincingly demonstrated substantive
universals governing the set of possible regularities, and that the generaliza-
tions we find should be attributed to a combination of contingent historical
developments and biases in the learning algorithm that relates available data
to the grammars learners acquire. In morphology and syntax, I argue that
some apparent generalizations are indeed the product of diachronic change
rather than synchronic constraint.

1. INTRODUCTION

The nature of the scientific study of language has been subject to a variety of interpretations over time, and the places linguists have looked for explanatory principles have varied accordingly. For example, the Neogrammarian revolution in the 1870s brought a focus on the systematic description of historical change, especially sound change, and with that came the claim that the only genuinely scientific study of language is historical (Paul 1880, p. 20) and a concomitant search for explanation in the regularities of diachrony.

With the shift of attention to synchronic systems in the early years of the twentieth century that is generally associated with de Saussure [1916 (1974)], the locus of potential explanation shifted from the ways linguistic patterns arise over time to the properties of those patterns themselves. For much of the first half of that century, however, the linguist's tasks were taken to be the careful recording and analysis of the external manifestations of language: sets of sounds, words, sentences, and texts in as wide a variety of individual languages as possible. Categories developed in the course of this endeavor, such as those of phonemes, morphemes, and immediate constituent analyses, were taken to be those of the linguist's analysis, validated to the extent that they helped elucidate the structure of the texts under consideration. Calling the linguistics of the period "descriptive" should be taken quite literally: The aim of the field was to develop complete and accurate descriptions of the observable facts of the world's languages rather than explanations of those facts.

With the so-called Cognitive Revolution of the latter half of the twentieth century came a major shift of the object of inquiry from the external manifestations of language to the systems of knowledge and the cognitive capacity that underlies the ability of someone who knows a language to produce and understand linguistic objects. Accompanying this change was a shift from the desire to provide maximally accurate descriptions of the observable data in particular languages to the effort to understand the fundamental nature of the cognitive faculty of language, and to explain why the systems we find are as they are and not otherwise.

Given the centrality of the cognitive underpinnings of this emerging conception of language, it made sense to think of the search for explanations of linguistic structures and regularities in terms of the study of the Language Faculty itself. Explanatory accounts were to be developed through a precise characterization of "Universal Grammar,"[1] the cognitive endowment of *Homo sapiens* that supports our capacity to acquire and use particular systems of natural language.

Beginning in the 1980s, however, and acquiring momentum in the early years of the new millennium, proposals were made that in a way that marked a return to the Neogrammarian view: the suggestion that, in fact, much of what we find in particular languages is the product not of necessary constraints imposed by the Language Faculty but rather of the contingent outcome of the historical paths by which these languages have developed over time. The tension between the search for explanations of the regularities we find in systems of language across the world, on the one hand in the nature of human cognitive organization and on the other in paths of historical development, is the subject of this review. Because much of the discussion in the literature has focused on properties of the sound systems of languages, this emphasis is reflected below, but it is important to note that the basic issue of synchronic versus diachronic explanation is in principle just as relevant to other domains of linguistic structure, as I attempt to illustrate for morphology and for syntax in Section 4.

---

[1]I avoid use of this term in this review because it has taken on a wide range of diverse interpretations and connotations in the literature that might give rise to confusion.
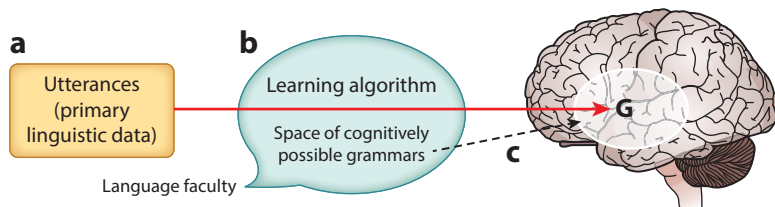
Figure 1

Grammars and their sources. (*a*) Only languages consistent with the evidence of the primary data can be acquired. (*b*) Only languages accessible via the available learning procedure can be acquired. (*c*) Only cognitively possible grammars can be acquired (Anderson 2008).

2. SOURCES OF THE PROPERTIES OF LINGUISTIC SYSTEMS

Our evidence for the nature of language, of course, comes from the observed properties of particular languages and from the inferences we can make about the grammars (in the sense of systems of knowledge) underlying these. When we investigate the foundations of the particular properties we observe, however, there are several distinct potential loci of explanation to consider. **Figure 1** illustrates the factors determining the content of particular grammars.

Grammars arise in the individual on the basis of the learner's experience with utterances in the surrounding community. Regarding input to the process of acquisition, the Primary Linguistic Data should not be identified with the brute physical facts of these utterances but must also take into account the filtering role of the perceptual systems through which these are presented to the mind for interpretation. The work of John Ohala, in particular (e.g., Ohala 1981, 1993), has stressed the extent to which properties of the perceptual system operating on speech data are crucial to an understanding of the ways sound systems can be altered in transmission across generations, a point that will be important for the discussion below.

The Primary Linguistic Data are mapped onto a specific grammar by some learning algorithm characteristic of human cognition. Because the grammar that results is not simply a registration of the perceptually processed utterances that gave rise to it, some nontrivial principles of inference must be involved. The output of this process must fall within the space of grammar systems that are cognitively possible for humans. The two aspects, the character of the space that is the range of the learning algorithm and the nature of that algorithm itself, are frequently conflated in the notion of the human Language Faculty, but they are distinct: It is logically possible that there are some outputs of the learning algorithm that would lie outside the space of possible grammars (and must thereby be rejected or adjusted), and also that there are some grammars that, while cognitively possible, are not accessible from any data on the basis of the learning algorithm. The distinctive role of the learning algorithm takes on special significance below, but in general I refer to the Language Faculty as a unified notion.

The question of the existence of a Language Faculty in this sense is often conflated with that of the domain specificity of its components, but this is not logically necessary. There is no question that the ability to acquire and use natural languages is a species-specific property of *Homo sapiens*, grounded in the biology of our species. Whether or not some—or even all—of that ability derives from broader aspects of human cognition that are applicable in other domains beyond language is, strictly speaking, irrelevant to the point that such a capacity exists and that its properties can be the object of scientific inquiry.

We can view the Learning Algorithm as a system of inference that maps a particular collection $\mathcal{D}$ of Primary Linguistic Data onto some specific (cognitively possible) grammar $\mathcal{G}$. With regard to the source of any particular property of $\mathcal{G}$, we can identify at least three possibilities: (*a*) It might reflect regularities in the input data $\mathcal{D}$; (*b*) it might be introduced as a consequence of the way the Learning Algorithm manipulates the data; or (*c*) it might be something that is cognitively necessary, in the sense of being constitutive of Language in general and, thus, definitional for members of the set of possible grammars.

This analysis of the sources of grammatical properties allows us to formulate the tension between modes of explanation referred to above. In particular, if a specific property follows from the nature of the Language Faculty, either as a characteristic of the space of cognitively possible grammars or as a consequence of the way the learning algorithm operates, we can say it receives a synchronic explanation, though it may be necessary to distinguish two varieties of such explanations. By contrast, to the extent the property in question merely reflects contingent regularities in the input data $\mathcal{D}$, we must seek the source of those regularities outside of the characteristics of the Language Faculty. To the extent we can relate the regularity in question to the way linguistic change has operated in the history of the language to shape $\mathcal{D}$ in specific ways, the explanation of this observed property of $\mathcal{G}$ is a diachronic one, and as such logically external to the properties of the Language Faculty itself.

Among the characteristic properties of all possible grammars $\mathcal{G}_\rangle$ (so-called universals of language), it is traditional to distinguish two sorts. Formal universals are architectural properties of grammars, such as the structure of various significant representations and their interrelationships, the form and structure of the principles (rules, constraints, etc.) that operate over these representations, the internal organization of the sets of such principles that constitute grammars, and the like. In contrast, substantive universals concern inventories of elements that may figure in such representations, assertions about possible (and impossible) patterns of alternation, and the like. For instance, a claim that assimilation of nasals to following obstruents can be formulated as a matter of redrawing association lines in an autosegmental structure involves an appeal to formal universals, whereas the claim that the labiality of a nasal segment can assimilate to the labiality of a following obstruent, but not to its value for voicing, is grounded in a set of substantive universals of phonological form. The distinction between these two sorts of properties as reflected in the inner workings of the Language Faculty is significant for the discussion below.

3. SYNCHRONIC VERSUS DIACHRONIC EXPLANATION OF PROPERTIES OF SOUND SYSTEMS

The dominant approach to phonology (the study of sound patterns in language) from the 1960s through the end of the century was that of Chomsky & Halle (1968) and its various descendants (see Anderson 1985, chapters 12 and 13). The goal of this program was a theoretical framework for phonological description that would accommodate all and only the systems of possible languages: in other words, to characterize explicitly the space of cognitively possible grammars (**Figure 1**). The notion of explanation invoked was thus purely synchronic in the sense being developed here: Any regularity considered to be characteristic of language in general was to be incorporated into the definition of possible grammar.

The shift from rules to constraint-based formulations of phonological regularities with the rise of Optimality Theory (Prince & Smolensky 2004) made this synchronic basis of explanation even more explicit. Grammars of this sort were to be represented as rankings among a set of universally given constraints. Whereas classical Generative Phonology had attempted to characterize linguistically significant generalizations primarily by constraining the formal character of

the rules and representations appearing in particular grammars, Optimality Theory went further in incorporating into the theory the substance as well as the form of these generalizations.

3.1. Explanatory Bases for Sound Patterns

An important challenge to theories of this sort was posed by Juliet Blevins's program of "Evolutionary Phonology" (Blevins 2004, 2006a). The targets of this research program are the nature and status of regularities in synchronic phonological systems. Generative Phonology, including Optimality Theory, aims to incorporate all such regularities into the theory. To the extent we find that languages do such and such, and do not do some other thing, the theory on this view should make it possible to formulate grammars of the first sort and impossible (or at least fiendishly difficult) to formulate grammars of the second sort.

In these matters, Blevins advocates what is in effect a return to the Neogrammarian position: What does or does not happen should not be understood in itself, but rather in terms of how it came to be. Instead of accounting directly in the theory of grammar for regularities in the segment inventories of languages, and differences between rules that we find, find often, or do not find at all, this perspective substitutes the goal of accounting for these things in terms of what historical change can produce, or is especially likely to produce, or could not produce at all. The theory of the Language Faculty is intended to be an account of a human cognitive capacity; Blevins argues that the substantive content of grammars is not well accounted for in terms of such a specialized cognitive capacity, but only by taking into account what historical development produces as well as general properties of human cognition.

Blevins notes that when we find similarities between languages, these might be due to one or another of the following (largely standard) effects:

- Inheritance from a common ancestor;
- Language contact;
- Chance;
- Similar shaping effects exerted by the specific nature of linguistic change; and
- "Physical constraints on form and function" (Blevins 2006a, p. 121).

Of course, all commonalities might be the result of common inheritance of accidental properties of a single common ancestor of all existing languages ("proto-World"), but that cannot be the case to the extent they also appear in signed languages, which clearly do not derive from proto-World as they are in general of demonstrably quite recent origin. Borrowing is probably responsible for some things, but not everything, and in her study of final devoicing Blevins shows that some languages develop this regularity without being in contact with other languages that have it. Chance resemblances occur—the Mbabaram word for "dog" was *dog*, not a borrowing but the product of regular sound change from original **gudaga* (Dixon 1991, pp. 361–63)—but in most cases that is not satisfying as an explanation.

The nature of the shaping effects of change can be studied on the basis of what takes place in the process of transmission of grammars across generations. Model speakers, on the basis of whose productions a grammar is learned, produce nonuniform and partially ambiguous outputs. Partly that is because speakers' "intentions" are realized in slightly different ways from one production to another, and partly because of inherent ambiguity and the difficulty in recovering speakers' intentions unambiguously from the surface form. When listeners correctly interpret what they hear, no change takes place. Variation is reproduced, and underlying forms stay the same. When one or another sort of misinterpretation intervenes, though, the relation between intention and realization is altered, leading to phonological change.

A vast amount has been written about the effects that are at work in this process (see Ohala 1993, Hale 2007, and Garrett & Johnson 2013, among other surveys), and it is not necessary to review that literature here in detail. Let us assume a theory that relates potential reanalyses in the course of grammar construction to moderately well understood consequences of the way speech production and perception operate. The important point is that the principles governing those systems are not in themselves part of the Language Faculty, which is presumed to be a somewhat different aspect of human cognitive organization. To the extent some regularity can be reduced to the effects of those principles, an appeal to that cognitive system is not required, and thus not justified.

If we look at the range of things that can happen within well-understood categories of sound change, we can study them in terms of the dynamics of speech production and perception to see why variation should exist and how it may be interpreted. The goal of the Evolutionary Phonology program is to show that the regularities we find across languages in the substantive content of their phonologies can be considered as the consequences of linguistic change explicable in those terms. If so, that leaves nothing as the content of a specifically phonological component of the Language Faculty.

Another possible source of similarities across languages noted by Blevins is "physical constraints on form and function." In context, that refers in part to the fact that the only things phonologies will mandate are things the vocal apparatus can produce and the perceptual system recover. It is also clear, however, that this formulation is meant to include any regularities of phonological systems that are due to general properties of human cognition. The assumption here is that there will be nothing specific to phonology (or, indeed, to language) about this, but in the absence of more specific arguments to that effect, the question is not further explored in this review.

Blevins (2006a) summarizes this theory with an extended case study, the appearance of final devoicing rules across many languages. As is well known, a great many languages have such processes (as opposed to the opposite change, final voicing), and these cannot in general be attributed to common descent or borrowing. There are also enough cases that accidental resemblance is not a plausible explanation for what is found. By contrast, there are some specific phonetic factors that are likely to favor such a change:

- Phrase-final devoicing may be a consequence of laryngeal gestures commonly accompanying the ends of phrases (spreading or constricting the glottis).
- Segments tend to lengthen in phrase-final position; lengthening a voiced stop makes it more likely that voicing will not persist through the entire segment.
- In final position, release may be absent, and in many languages releases provide essential cues to voicing contrasts.

From these observations, Blevins concludes that individual productions of final voiced obstruents are often likely to involve fully or partially devoiced variants, a state of affairs that conduces to an interpretation as final devoicing when learners acquire a grammar from such data. By contrast, there are no known phonetic effects that seem likely to favor the production of voiced variants of voiceless obstruents, so a change in the opposite direction is effectively excluded as a unitary sound change.

In Blevins's view, the phonetic factors invoked above explain the occurrence (and frequency) of final devoicing patterns in language, and nothing more is needed. She opposes this explanation to an account that says final devoicing occurs because it is a possible rule, whereas final voicing is not; or because voicelessness in obstruents is promoted by a markedness constraint, which excludes the opposite; or something along similar lines. All of these explanations localize the phenomenon in the theory of grammar, rather than the external data, and are thus synchronic explanations in

the present sense. But as Blevins sees the matter, once we have found a reason for a given pattern (such as the prevalence of final devoicing rather than voicing) in the processes of historical change, that is sufficient, and there is nothing further to be said and no need to invoke any aspect of the Language Faculty.

Kiparsky (2006) responds to Blevins's presentation with a rather more nuanced story. His view is that what we find in individual grammars is the product both of what change can produce and of what the theory of grammar allows (or perhaps encourages; this may depend on the extent we want the theory to say something about frequency effects). We certainly want to pursue analyses such as the one Blevins offers, but that does not mean that such historical accounts should be expected to exhaust the phenomena.

Kiparsky makes passing reference to a possibility that should probably be taken quite seriously: the notion that, if recurrent change shapes grammars so that they will usually conform to some regularity, that regularity could profitably be incorporated into the learner's expectations (and thus into the Language Faculty) as a bias in the learning algorithm that would facilitate the rapid and efficient learning of the languages likely to be encountered. This is an instance of the Baldwin Effect in evolution (Weber & Depew 2003), arguably essential if we are to believe that the Language Faculty has much specific content. Such content is unlikely to be explicable in terms of direct selectional advantages (why does adhering to Subjacency enhance one's likely reproductive success?), except to the extent it facilitates the learner's entry into a surrounding community of language users. If this is a reasonable view, the linguist's life will be difficult: Many aspects of the Language Faculty will closely track phenomena for which functional or historical explanations are also available, and teasing the two apart will not be easy (Anderson 2008).

In the particular case of final devoicing, Blevins observes that a constraint in phonological theory allowing final devoicing and prohibiting final voicing says that final voicing is not only rare but nonexistent, whereas the historical account makes a less categorical prediction. In fact, it has long been observed that languages often contain "crazy" rules: regular alternations that do not appear to have a basis in phonetic phenomena of the sort that might lead to their introduction, or to conform to generally observed patterns. Bach & Harms (1972) explored the possibility that, over time, sets of regularities that are individually perfectly natural could be collapsed ("telescoped" and/or "inverted") through reanalysis to produce unnatural seeming results; also see Anderson (1981). Absolute prohibitions against such regularities would be predicted to block such a result, whereas Blevins's historical analysis would permit it.

Much of the argument put forward by Blevins (2006a,b) is devoted to arguing that final voicing rules do in fact exist, a point that implies that the much greater predominance of final devoicing cannot be due to a limitation on phonologically possible regularities. Without going into the details of the proposed examples, it appears that Kiparsky (2006) is successful in showing that in most of them Blevins has misinterpreted (or overinterpreted) the phonetic facts, and they do not in fact involve a rule of final voicing.

Kiparsky therefore wishes to maintain that phonological theory does indeed contain a substantive prohibition against final voicing rules, as there are various scenarios that might be expected to yield a "crazy rule" of this sort, and yet we do not seem to find them. There is, however a major exception in the facts of Lezgian, in which data from Haspelmath (1993), together with a close analysis by Yu (2004), do seem to warrant positing a rule of final obstruent voicing.

Lezgian, a Northeast Caucasian language of Dagestan, has a four-way laryngeal contrast in stops, distinguishing voiced, voiceless unaspirated and aspirated, and ejective segments. In monosyllabic nouns that show a final voiceless unaspirated segment when followed by a vowel, that segment is voiced when it appears in coda position, hence *ʧep-edi* but *ʧeb* 'day,' *gat-u* but *gad* 'summer,' *qap-uni* 'box-obl' but *qab-mab* 'boxes and similar things,' *xp-er* 'sheep-PL' but *xeb-mal*

'animal-cattle,' and so on. This behavior contrasts with that of nonalternating voiced obstruents, as in *dad-uni*, *dad* 'taste,' *zarb-uni*, *zarb* 'quickness,' and so forth. These facts appear to support the neutralization of voiced and voiceless unaspirated stops as voiced in coda position.

Kiparsky (2006, 2008) suggests that the voiceless unaspirated stops are actually voiced geminates, and that these devoice and degeminate in noncoda position while simply degeminating in codas. On that view, there is no final voicing rule but only degemination of voiced stops. This analysis cannot account for all of the facts, however, because we find similar alternations involving the ejectives: *q'ep'-ini* but *q'eb* 'cradle,' *q^{h}yt'-yz* but *q'yd* 'winter,' *t^{h}p'-er* but *t'ib* 'owl,' and so on. Because both the apparent voiceless unaspirated stops and the ejectives are neutralized with voiced stops in codas, the geminate analysis of the former does not suffice to eliminate the final voicing rule.

The account Yu (2004) offers of this phenomenon is historical:

- The alternating stops were originally voiced, and this is preserved in final position.
- The suffixes in the alternating items were stressed after monosyllabic nouns.
- Voiced obstruents became voiceless geminates pretonically.
- The resulting geminates were later degeminated (while remaining voiceless).
- Where the initial C of a noun was an ejective, glottalization spread to a following voiceless unaspirated stop (with glottalization being replaced by aspiration when the vowel between is lost).
- Other words with nonalternating final voiced obstruents are borrowings introduced after these developments.

Kiparsky's attempt to refute this analysis does not succeed, and we must conclude that Lezgian really does have a (synchronic) rule of final voicing of obstruents and, thus, that such rules are not absolutely prohibited by the theory of the Language Faculty.

In fact, as Blevins (2006b) acknowledges, both she and Kiparsky accept that apparent generalizations across languages may be due either to common paths of historical change or to constraints inherent in the content of the Language Faculty. They differ primarily in which of these is considered the primary locus of explanation. Blevins is concerned primarily with stressing the role of diachrony in yielding common effects across languages and does not discuss ways to distinguish the two types of explanation, but Kiparsky (2006, 2008) does. He suggests that "true universals" (i.e., generalizations grounded in the Language Faculty) can be distinguished from "typological generalizations that are by-products of tendencies of change" (Kiparsky 2006, p. 220) in several ways:

- Universals should have no exceptions; typological generalizations are in principle <u>tendencies</u>.
- When multiple paths of change converge on the same result, this reflects the effects of a universal.
- The effects of true universals emerge spontaneously in language change, without need for prior exemplars (so-called TETU effects).
- Universals are manifested in child language as constraining effects, whereas typological generalizations need not be.
- Universals provide the pathways for analogical change.
- Universals are structurally encoded within grammars, whereas typological generalizations stand outside of the individual grammars that conform to them.

Some of these principles may be valid but somewhat difficult to apply. For example, it is simple enough to show that a regularity does have exceptions (consider the example of coda voicing discussed above), but it is rather harder to show that some regularity which holds for all languages that have been examined does not admit exceptions in principle. It is also rather difficult to demonstrate noncircularly that some regularity really is part of grammar $\mathcal{G}$ and not an external generalization about the linguistic forms $\mathcal{G}$ admits.

Others of these principles are probably not generally applicable. As discussed in Section 4.1, below, multiple paths can in fact converge on a common result without that being a necessary consequence of a universal principle. Analogy is often based on principles that are exquisitely language particular, and not universal: A standard example is the restoration of the -s- in the sigmatic aorist of vowel stems in Greek. The relevant basis for this is a rule that requires the addition of -s to form the aorist stem. Surely this is not a universal. The principles governing consonant harmony in child language are significantly different from those found in adult grammars (Levelt 2011), suggesting that these do not represent true universals in the sense Kiparsky intends.

de Lacy & Kingston (2013) pursue an approach similar to Kiparsky's. While accepting that some crosslinguistic generalizations are due to common paths of diachronic development, they maintain that there are some constraints imposed by the Language Faculty on phonological development, such that where historical change might be expected to give rise to a phonological rule that is contrary to such a constraint, this is blocked.

The case on which these authors focus is that of consonantal epenthesis, generally seen as providing onsets to otherwise vowel-initial syllables. In most languages in which this occurs, the segment inserted is either a laryngeal ([h] or [ʔ]) or a semivowel ([w] or [j]). In a few cases, however, a stop is inserted. Where this occurs, the segment in question has no correspondent in the input (in Optimality Theoretic terms), so its identity must be determined by general conditions of markedness, on the view of de Lacy and Kingston. Given that coronals (e.g., [t,d]) are universally considered less marked than velars (e.g., [k,g]) or labials (e.g., [p,b]), such an epenthetic consonant must always be a coronal. Thus, de Lacy & Kingston (2013) suggest, we should find instances of epenthetic [t,d] but not of [k,g]. Even though it is possible to envision a series of historical changes as a result of which a velar stop comes to function to provide required onsets, no rule directly implementing this effect should be possible.

As with the question of whether coda voicing rules are allowed in phonologies, the force of this argument depends on the available data. Although de Lacy & Kingston (2013) claim that rules of *t*-epenthesis exist, it is not clear that the examples they point to are valid. In particular, they discard any rule with grammatical conditioning as not a valid instance of phonological epenthesis, but the cases they rely on fall into this category. Epenthesis of [t] in Axininca Campa, the most widely cited example of this type in the phonological literature, is subject to grammatical conditions: In particular, Payne (1981, p. 110) makes clear that *t*-epenthesis applies only in the case of suffixation to a verbal root: "[T]he epenthesis process would not apply to strings constituting the suffixal morphology of nouns or adverbs, nor could it apply with prefixes [to words of any category]." The other example, Odawa Ojibwa, is even more circumscribed: In this language, as in other languages of the Algonquian family, [t] is inserted precisely between a person-marking prefix and a following vowel-initial verb term or possessed noun. This is actually the inverted reflex of an original process of *t*-deletion in initial position, except where protected by a prefix. In any event, neither of the instances of supposed epenthetic [t] cited by de Lacy & Kingston (2013) appears to be valid in their terms.

By contrast, at least one instance of general epenthesis of a velar does appear to exist. In standard Halh ("Khalkha") Mongolian (Svantesson et al.2005; also see Vaux 2002 and Staroverov 2014), a consonant is inserted to break up vowel sequences; it is [g] in words of the "nonpharyngeal" vowel harmony class, and [G] in words of the "pharyngeal" class. The environments for *g*-insertion include a variety of affixes and stems of various categories, and cases of contrast with corresponding elements containing an underlying consonant /g/ or /G/ (see the examples provided by Staroverov 2014, pp. 145ff). We must conclude that a phonological regularity involving epenthetic stops other than coronals is not in fact excluded by any general principles of the Language Faculty.

It appears, therefore, that no absolute constraints on the content of phonological regularities attributable to the Language Faculty have thus far been demonstrated. Although that suggests

that there are no substantive universals in this domain, it is not the only possible conclusion. Hansson (2008) surveys a range of work on the apparent phonetic naturalness of most phonological regularities and discusses an apparent contradiction. On the one hand, crosslinguistic typological generalizations show that the regularities incorporated into particular grammars are strongly biased in fairly specific ways. On the other hand, as discussed above, there appear to be no such generalizations that are clearly exceptionless, such that they could be regarded as absolute constraints (substantive universals) imposed by the Language Faculty. Purely synchronic theories of phonological explanation fail to accommodate all observed grammars, whereas purely diachronic ones fail to provide sufficient bases for clear biases.

At least at present, diachronic views such as that of Evolutionary Phonology go only part way toward building in the observed asymmetries of regularities that we find. Consider the example of coda devoicing, for example. It is undeniable that, whereas counterexamples such as the Lezgian case discussed above exist, coda devoicing of obstruents is overwhelmingly preponderant over coda voicing. The phonetic explanations provided, however, leave some important questions:

- Why should devoicing affect fricatives as well as stops? At least some of the aerodynamic effects Blevins invokes depend on a closed cavity, but in fact we do not find rules devoicing stops but not fricatives in final position.
- How does phrase-final devoicing generalize so easily to word-final or even syllable-final devoicing? Again, the relevant aerodynamic and acoustic effects invoked do not obviously generalize from phrase-final position.
- If the phonetic cues lead to ambiguity between voiced and voiceless obstruents in final position, as argued, why do we never find speakers interpreting the result as evidence for final voicing of voiceless obstruents (hypercorrection in the terms of Ohala 1981)?

An alternative considered briefly by Hansson (2008) is the notion that, whereas the Language Faculty does not impose absolute constraints on the regularities that can be incorporated into grammars, the learning algorithm does incorporate some substantive biases. Thus, while a variety of patterns may well be learnable in principle, the algorithm may privilege some hypotheses over others. A similar point is made by Morley (2015) in the context of a computational simulation of a learning problem. She notes that, given the uncertainties inevitable in our theories of historical change and of grammar learning, it is probably impossible in principle to demonstrate that any particular typological asymmetry across languages must be due to constraints imposed by the Language Faculty.

We might suggest, then, that the Language Faculty does indeed contain substantive universals, but that these are (*a*) biases toward certain systems and (*b*) located in the learning algorithm, rather than in the boundary conditions for cognitively accessible grammars depicted in **Figure 1**. This view would be consistent with the proposal briefly noted above: To the extent that certain properties of grammars are likely to arise in particular languages through the operation of (phonetically natural) historical change, the Baldwin Effect suggests that it would be advantageous to incorporate a bias toward such properties into the procedure by which such systems are learned, because that enhances the speed and efficiency of learning.

3.2. The Bases of Distinctive Features

Discussion of the tension between synchronic and diachronic explanations for phonological patterns has largely been concerned with substantive rather than formal universals. It has generally been assumed that such principles as the overall architecture of a grammar; ways in which rules

or constraints can interact; and the role of general principles such as disjunctive application, the Obligatory Contour Principle (McCarthy 1986), and so on are constitutive of the space of grammars rather than being acquired contingently from the primary data and thus subject to shaping by linguistic change. There is one part of phonological theory that might at first glance appear to be of this sort, however, whose nature as a universal of grammar has recently been brought into question: the feature system that provides the basic vocabulary of phonological description.

The notion that there is a single set of distinctive features that characterizes phonological forms in a uniform way across languages has been a staple of phonological theory at least since work such as that of Trubetzkoy (1939) and Jakobson et al. [1952 (1963)]; although the identity of the specific features was a matter of some discussion in the theory of Chomsky & Halle (1968) and its immediate descendants, the notion that there was such a universal set was largely unquestioned. The internal organization of this set and the relations among the features were the subject of discussion in work on Feature Geometry (for a review, see McCarthy 1988) in the 1980s and 1990s.

Potentially universal theories of features are presumed to respond to several distinct requirements (McCarthy 1994, p. 191):

> An adequate theory of phonological distinctive features must meet four criteria: (*a*) it must have a
> relatively consistent and direct relation to the phonetic properties of speech sounds; (*b*) it must be able
> to describe all and only the distinctions made by the sound systems of any of the world's languages;
> (*c*) it must be able to characterize all and only the natural classes of sounds that recur in the phonological
> phenomena of different languages; and (*d*) it must correctly characterize the sub-groupings of features
> by recurrent phonological phenomena. The third criterion is the most important one and probably the
> hardest to achieve.

It is by no means obvious that it will be possible to satisfy all of these logically distinct demands simultaneously in a way that generalizes to all languages, and the difficulty of this project is clear from the literature.

On various occasions, phonologists have suggested that the project of a universal features system in this sense was unrealizable, but a major challenge to that project was presented by Mielke (2008). On the basis of a survey of phonological patterns in more than 600 languages, Mielke suggested that a single set of features grounded in substantive properties of the Language Faculty is inappropriate. Different languages require different natural classes of segments in mutually incompatible ways. Mielke's proposal was that rather than being given a priori, the distinctive features relevant to the phonology of each language emerge as a contingent by-product of the acquisition of the language's phonological regularities. The fact that many generalizations about the necessary features are largely valid across languages results from the fact that similar substantive phonetic phenomena influence the historical development of all languages, so that the regularities that emerge (and, thus, the featural apparatus necessary to support them) will be broadly similar— though not identical.

As is to be expected from a survey of so many languages, a review that is necessarily quite superficial in most cases, a number of Mielke's proposed counterexamples to the applicability of standardly assumed feature systems do not stand up under close examination. The general point has been widely accepted, though, and most of the papers in a recent collection investigating the sources of distinctive features (Clements & Ridouane 2011; see especially the summary paper by Cohn 2011) conclude that feature systems should in fact be treated as emergent, rather than as substantive universals provided by the Language Faculty as properties of the set of cognitively accessible grammars.

Without resuming these arguments in detail, it is possible to bring this emerging consensus about the source of distinctive features into line with the remarks above about the locus of explanation for apparent substantive universals in phonology. Cowper & Hall (2014) and Dresher (2014) argue explicitly that features emerge through the properties of the learning algorithm that allow learners to identify and correlate contrasts. If some properties are more likely than others to emerge as the basis of features in particular languages, this is because the learning algorithm may involve biases as to which hypotheses to consider first, not because it imposes absolute constraints on hypotheses.

We can conclude that the search for the bases of substantive universals of phonological phenomena is miscast as a binary choice between synchronic and diachronic explanations. On one hand, pathways of historical change surely do shape some regularities we find in particular languages, most obviously in the case of unnatural or "crazy" rules. The broad applicability of general typological patterns, on the other hand, should be considered as following not from absolute constraints on the content of cognitively accessible grammars but rather from the coincidence of phonetically guided historical change and corresponding biases in the learning algorithm by which grammars are induced from the Primary Linguistic Data available to the learner.

4. SYNCHRONIC VERSUS DIACHRONIC EXPLANATION BEYOND PHONOLOGY

The tension between diachronic explanations of observed linguistic phenomena and explanations relying on presumed properties of the Language Faculty has been attended to primarily in the domain of phonology, but very similar issues can be argued to arise in other areas of grammar. Section 4.1 is devoted to accounts of morphological phenomena in terms of historical paths of development, and Section 4.2 explores some related issues in syntax.

4.1. Diachronic Explanation in Morphology

An example of a property of morphological systems that has been claimed to represent a substantive universal of grammar is the correlation between case marking and tense/aspect in "split-ergative" languages in which the split is based on the latter category. In such languages, the familiar pattern in which subjects of both transitive and intransitive verbs are treated alike (marked as "nominative"), as opposed to the direct objects of transitive verbs (marked as "accusative"), is found only when the verb is in certain tense/aspect categories. In other categories, the subject of intransitives and the direct object of transitives are formally the same (marked as "absolutive"), as opposed to the subjects of transitive verbs (marked as "ergative").

It has been observed that in all familiar cases of such a split, nominative/accusative marking is found in clauses where the verbal tense/aspect is imperfective (or continuative, progressive, etc., or some tense form that is a reflex of such an aspect at an earlier stage), whereas ergative/absolutive marking is found in clauses with perfective aspect or some tense form descended from that. It has been widely assumed (Delancey 1981, Dixon 1994, Tsunoda 1985) that this should be treated as a substantive universal of grammar, representing this link between ergativity and perfectivity on the one hand, and accusativity and imperfectivity on the other, as a constraint on possible grammars.

There is reason to believe, however, as argued in earlier work (Anderson 1977), that the observed generalization about a link between case marking and tense/aspect is actually the result of the accidental convergence of a number of logically independent paths of historical development.

This argument can only be sketched below; for further discussion, see Anderson (2004), from which some of the discussion below is derived, and references cited there.

The developmental paths in question produce change in a language that is consistently either nominative/accusative or ergative/absolute in its morphology. When such a language undergoes change that results in an innovative aspectual category, this may yield either a new perfective or a new imperfective, depending on the language. As it happens, common sources for a new perfective, on the one hand, and for a new imperfective, on the other, converge on similar patterns of split ergativity, although they are quite unrelated to each other.

One source of historically innovative perfective forms, studied by Benveniste (1952) in several branches of Indo-European, is the reanalysis of originally passive forms. The semantics of passive clauses typically includes the interpretation that the action described is a fait accompli, which facilitates their use as focusing on perfectivity. If the morphology of the passive is then reinterpreted as a signal of the perfect, the result is a construction in which the original, notional subject is marked with a special form (instrumental, or with a preposition such as English *by*) while the original, notional direct object appears in the same form as an intransitive subject.

This development is widely considered to be the source of the ergative constructions found in modern Indic languages, such as Hindi and Nepali (see Garrett 1990, Deo & Sharma 2006, and references cited therein). The subsequent development of the relevant verbal category with respect to tense/aspect significance varies from language to language, so that the perfects derived in this way may in some instances be subsequently reanalyzed as simple past tenses.

When such an innovation takes place in a language with a basic nominative/accusative system, it produces perfect or past-tense forms that have the formal characteristics of an ergative construction, whereas the (unchanged) nonperfect forms continue to be associated with an accusative construction. This is a standard sort of split-ergative system, but note that the parameters of the split are determined by the case-marking properties of the (passive) ancestor of the new perfect, not by some constraint imposed by the Language Faculty.

Benveniste (1960) documents a different source of the creation of perfects in other languages. In a great many languages, whatever verbal expression serves to express possession is also pressed into service as a marker of the perfect—for example, in English, where *have* serves both functions. The expression of possession is often a transitive verb (such as English *have*, Spanish *tener*, Latin *habeō* (not cognate with *have*). In some languages, however, a distinct prepositional construction is used, as in Russian *U menya kniga* 'At me is a book; I have a book,' or Breton *Eur velo c'hlas am eus* 'A bicycle blue at me is; I have a blue bicycle.'

If such a construction were to be employed as an auxiliary for perfect verbal forms, the consequences would be quite parallel to those given above in the case of perfects with a passive source. The subject of a transitive perfect verb would be marked with some oblique (originally locative) case, whereas the object would be marked in the same way as the subject in copular constructions: as a nominative. Once more, the result is that the new perfects are associated with what is formally an ergative construction, whereas nonperfects are associated with the original (presumably accusative) construction. Benveniste argues that this principle is illustrated in the origin of the Armenian perfect, where the subject appears in the genitive, betraying the possessive origin of the construction. He also proposes that the Old Persian form *ima tya manā krtam* 'that is what I have done' with genitive marked subject represents this same evolution of a perfect from a possessive.

Once again, the result is a split-ergative system in which the perfect is associated with ergative marking and the imperfect with accusative marking. The two developments (one from passives and one from possessive constructions) are logically quite independent, and in neither instance is the case marking of the original construction mandated by a constraint of the Language Faculty.

The two developments happen to converge, however, on systems with the same inherited, synchronically accidental correlation of case marking and verbal aspect.

The other side of the coin is supplied by cases in which a language that was originally consistent in having an ergative/absolutive system undergoes change to produce an innovative imperfective verbal category. It seems that a reasonable source for such a development would take advantage of a frequent distinction between two constructions containing a basically transitive verb. When the object of such a verb is "demoted" and treated as an oblique, a difference in interpretation results that is typified by pairs such as English *Jones* (*read* versus *read from*) War and Peace *to his wife at bedtime*, *Fred* (*shot* versus *shot at*) *my cat*, and so forth. In each of these pairs, the variant with oblique object is interpreted as an action not necessarily completely carried out, the object not completely affected, and so on. Similar pairs form the basis of comparable contrasts in a wide range of languages, as discussed by Anderson (1988). The constructions in question clearly overlap semantically with the verbal notion of an imperfective, and form a plausible source for a new verbal aspect of this type, where a semantically transitive verb is constructed intransitively, with its notional object appearing in an oblique or prepositional form, to serve as the starting point for the development of such a category.

This is what has happened in the history of Georgian, as suggested originally by Braithwaite (1973), developed by Anderson (1977), and made much more precise by Harris (1985). On this account, Georgian was originally a consistently ergative language. In the course of its history, a new series of imperfective forms developed from an "object demotion" construction similar in form to that exemplified by the English pairs above, although already systematic in Old Georgian. These forms underlie what are now called the series I tenses, in which case marking is nominative/accusative. A different set of forms, termed the series II tenses, continues the original situation.

Roughly, the division between series I and series II tenses can be considered as (originating in) a difference between imperfective and perfective forms. Again, as with the two paths of development for new perfects summarized above, the result is a split between ergative perfects and accusative imperfects. There is no need to see this split as mandated by properties of the Language Faculty, however, as opposed to an accidental consequence of the formal properties of the earlier construction on which the innovated forms—here the imperfectives—are based.

Another (quite distinct) development with a similar outcome is exemplified by some Mayan languages, including Chol (see Coon 2013, and references cited there, for discussion). These languages are in general consistently ergative/absolutive, although subordinate clauses are often constructed as nominal expressions, with subjects of all verbs in the genitive—a structure that appears to be nominative/accusative in form. Imperfectives have been innovated in some cases by treating an original matrix verb as an auxiliary while retaining the case marking of the originally embedded clause. Once more, we arrive (by a quite different route) at a state in which imperfectives appear to have nominative/accusative marking while perfective forms appear in ergative/absolutive constructions.

All of these completely independent developments happen to converge on the same kinds of data. Each results in a state of affairs in which perfective forms (or their descendents) are associated with an ergative/absolutive pattern, whereas imperfectives (or their later reflexes) are associated with nominative/accusative patterns. This is not, however, due to a substantive universal of the Language Faculty that relates case marking and verbal aspect; rather, it is an epiphenomenal regularity that emerges from a number of unrelated lines of development.

To show that the aspect/case-marking relation really is accidental, we would need to find a language in which (for whatever historical reason) the correlation goes the other way, or at

Table 1   Tsimshian case-marking clitics

	Absolutive	Ergative	Accusative
Common noun	=(a)	=da	=(a)
Proper noun	=(a)s	=dit	=(a)t

least completely fails. One candidate for such a counterexample is Coast Tsimshian (Dunn 1979, Mulder 1994). The facts are complicated, but grossly as follows. There is a set of connective clitics (**Table 1**) that precede the nominal expression but attach phonologically to the preceding word. In the present, as illustrated by the sentences in example 1*a*, we get ergative marking. In the past, however, as illustrated by the sentences in example 1*b*, we do not.

(1a)   yagwa   baa[=**a**   wan]
      PRES   run-[ABS   deer]
      The deer is running

      yagwa=**t**   niis[=**da**   ts'uu'ts][=**a**   laalt]
      PRES-3SGE   see-[ERG   bird][-ABS   worm]
      The bird sees the worm

(1b)   nah   siipg[=**a**   hana'a]
      PAST   be.sick-[ABS   woman]
      The woman was sick

      nah   t'uus[=**a**   'yuuta][(=**a**)   hana'k]
      PAST   push-[ABS   man][(-ACC)   woman(ACC)]
      The man pushed the woman

Even in the absence of a convincing counterexample, however, there is no basis for assuming a substantive universal of the Language Faculty that requires case marking and verbal aspect to correlate in the way they generally do in such split-ergative systems. The properties of individual languages are quite well accounted for in terms of the contingent properties of their sources and the existence of a variety of quite unconnected paths by which historical change can create new aspectual distinctions.

4.2. Diachronic Explanation in Syntax

There are also examples in which an apparent syntactic generalization can be shown to be grounded in patterns of diachronic development. One such case is discussed by Kiparsky (2008), who notes that a variety of authors have attempted to provide theoretical bases for the claim that "there are no Nominative anaphors." For languages in which anaphors must be bound by a subject within their clause, and in which only subjects are nominative, this claim is trivially true. It is less obvious why it should also be true in a language such as Icelandic, where nonsubjects can take nominative case with certain verbs, such as *finnast* in example 2*a*, and nonlocal subjects can bind anaphors in

embedded subjunctive clauses logophorically, as in example 2*b*, under conditions that have been much discussed (see Maling 1984, Anderson 1986, as well as much subsequent literature).

(2a)* Honum$_i$ finnst   (sjálfur)   sig/sér/sín$_i$ (vera)   veikur

     him-DAT   finds   (self-NOM)   REFL-*NOM   (to be)   sick-NOM

     He considers himself to be sick

(2b)   Hann$_i$ sagði   að   sig$_i$ vantaði   hæfileika

     he-NOM$_i$ said   that   REFL-ACC$_i$ lacked-SUBJ   ability-ACC

     He said that he lacked ability

(2c)   Jón$_i$ segir   að   hann$_i$/*sig/*sér/*sín$_i$ komi   ekki

     John   says   that   he$_i$/*self$_i$ come.SUBJ   not

     nema   þu   bjóðir   sér$_i$

     unless   you   invite.SUBJ   self

     John$_i$ says that he$_i$ won't come unless you invite him$_i$

In example 2*a*, on the one hand, a nominative form of the object is required by the verb, but Icelandic does not have a nominative reflexive, so the sentence is ungrammatical.[2] In example 2*b*, on the other hand, the subject of the embedded clause is a reflexive, but because the verb *vanta* 'lack' takes accusative case on both its subject and its object, the required reflexive form is an accusative and thus presents no problem. In contrast, because the embedded verb in example 2*c* takes a nominative subject, the only possibility is a nonreflexive pronoun. The pronouns *sig* in example 2*b* and *sér* in example 2*c* are instances of logophoric reflexives. In example 2*c*, the subject pronoun could also be a logophoric reflexive if an appropriate form existed, but because the subject here must be nominative, there is no such form. Icelandic has nominative forms of the possessive and emphatic reflexive, but no such form for the simple reflexive pronoun, and where such a form would be called for, the construction is ungrammatical. In example 2*c*, the logophoric construction is not obligatory, so the sentence is grammatical with the simple nonreflexive pronoun *hann*.

The lack of a nominative reflexive thus has syntactic consequences and requires an explanation, as there are circumstances in which such a pronoun would be required by the syntax. The absence of nominative reflexives cannot be attributed to a substantive universal of the Language Faculty, however, because some languages (e.g., Georgian, Marathi, Choctaw) do have such forms. What is different about Icelandic? When we examine the paradigms of some Icelandic pronouns in **Table 2**, an explanation suggests itself.

All the forms in **Table 2** are inherited from earlier Germanic, but because earlier forms of Icelandic did not have (or need) a nominative form of the reflexive, none has been inherited. When the syntax changed so as to provide a role for such a form, through the introduction of the possibility of long-distance reflexivization, there was really no way to create it: The inherited paradigms are suppletive, and Icelandic has no productive way of inferring the Nominative from the oblique cases of pronouns. Thus, the learner has no data that would determine such a form,

---

[2]Joan Maling points out to me that this sentence is grammatical on the intended reading with a nominative pronoun *hann*: *Honum finnst hann sjálfur vera veikur. Sjálfur* here is an emphatic reflexive, rather than a simple reflexive pronoun.

Table 2 Icelandic personal pronouns

	1sg	**2sg**	**3sgM**	**3sgF**	**3sgN**	**3plM**	**Reflexive**
NOM	ég	þu	hann	hún	það	þeir	None
ACC	mig	þig	hann	hana	það	þá	sig
DAT	mér	þér	honum	henni	því	þeim	sér
GEN	mín	þín	hans	hennar	þess	þeirra	sín

so constructions where it would be required are blocked. Here the historical story covers all the facts without recourse to a principle of the Language Faculty prohibiting nominative anaphors.

A somewhat more general point regarding the potential for diachronic explanations of apparent synchronic generalizations was argued by Aristar (1991). He explores the observation by Greenberg (1963) that the order of modifiers with respect to their heads tends to correlate with the ordering of verbs and their arguments: Verb-final languages tend to have preposed modifiers, whereas verb-initial languages have postposed modifiers, and verb-medial languages vary between the two possibilities.

After examining and rejecting a variety of previous accounts, both synchronic and diachronic, of these asymmetries, Aristar proposes that they result from the historical origin of many nominal modifiers (genitives and relative clauses, and from these, adjectives) through what he calls a binding-anaphor strategy. This approach views the sources of modifiers as part of a construction involving an anaphoric element coreferential with the head, and Aristar argues that the relation between such an anaphoric element and the head is correlated with the difference between verb-final and verb-initial order. Later developments simplify the complex structures involved to produce structurally simpler relations between modifiers and their heads, but the original ordering induced by the binding-anaphor strategy remains as a historical relic.

I do not attempt here to examine Aristar's argument in detail, given the intricacy of the language-particular facts and the shifts in assumptions about syntax that have taken place over the past quarter-century. What is important is to note the general form of the argument: A correlation is assumed to have existed at an earlier point on the basis of particular structural relations. Whatever the basis of that correlation, it is maintained in later stages of the language, even after the relevant construction has changed so that the original structural basis is no longer present. The result is a generalization that may well be maintained across a great many languages but that has come to be supported on the basis of the Primary Linguistic Data available to learners, and not as a consequence of some synchronic principle of the Language Faculty.

Somewhat similar reasoning is followed by Newmeyer (2006) in discussing a variety of apparent crosslinguistic regularities in the order of syntactic elements. He shows that there are rather robust generalizations about languages that are quite unlikely to fall out from the logical structure of the Language Faculty. For instance, VO languages are much more likely than OV languages to have fronted *wh*-phrases, and they are much less likely to have final question particles. Among VO languages, VSO languages show these tendencies to a greater extent than do SVO languages. Purely synchronic explanations for these facts are unlikely, because the structural characteristics provided by recent versions of syntactic theory provide no obvious linkage between the features that cause the verb to move in one way or another and those that cause a *wh*-expression to move. By contrast, Newmeyer suggests that the parsing strategies associated with VO versus OV orders provide different preferences for filler–gap dependencies.

Given the range of typological tendencies that have been observed, and the limited apparatus provided by syntactic theory to accommodate such things, there is really no controversy in the

claim that functional pressures have an effect in shaping the way speakers structure their sentences. Newmeyer then appeals to the Performance–Grammar Correspondence Hypothesis of Hawkins (2004, p. 3):

> Grammars have conventionalized syntactic structures in proportion to their degree of preference in performance, as evidenced by patterns of selection in corpora and by ease of processing in psycholinguistic experiments.

This hypothesis asserts that performance preferences will be incorporated into grammars as a function of their strength in relation to alternatives.

That, in turn, provides the point of entry for historical change. Where performance effects lead to situations in which certain regularities are likely to characterize the input data for subsequent generations of learners, those regularities are likely to be incorporated into the grammars that are acquired—not because the Language Faculty requires them, but because the available data support them. Arguments along these lines suggest that languages as we find them are the complex product of a complex history, and that diachrony has shaped them in particular ways that persist beyond the effect of the original determining conditions.

5. CONCLUSION

I conclude that the nineteenth-century notion that truly scientific explanations for the properties of linguistic systems were to be sought in detailed accounts of their history was not as misguided as much twentieth-century theorizing about language presumed. In many cases, in morphology and syntax as well as in phonology, it is reasonable to suggest that things are as we find them in substantial part because that is the outcome of the shaping effects of history, not because the nature of the Language Faculty requires it. In phonology in particular, there are few if any well-established substantive universals governing the class of possible relations, whether these are described by rules or by constraints. The generalizations that we do observe seem to have a more contingent character that may usefully be attributed to biases in the way the learning algorithm constructs and assesses the hypothesis space in grammar construction, rather than to absolute limitations on the class of cognitively accessible grammars. In morphology and syntax, there is also evidence that some apparent generalizations have their origins in language history rather than in universal constraints, although the scope of that observation remains to be explored in more detail.

SUMMARY POINTS

1. Because the properties of the grammar a learner acquires are determined by a combination of (*a*) properties of the input data, (*b*) the way the learning algorithm interprets the data, and (*c*) the constraints on the class of available grammars, explanations for linguistic regularities might be grounded in any one of these.

2. The tendency in generative treatments of language has been to attribute observed regularities to constraints on the set of possible grammars. Recent work has argued, in contrast, that many if not most such regularities are actually the product of common paths of diachronic change, and thus should be considered regularities in the input data.

3. Existing arguments for absolute constraints on phonological relations are not in general successful, which suggests that crosslinguistic regularities should be considered the result of a combination of recurrent paths of historical change and inherent biases in the learning algorithm.

4. A similar point can be made for some regularities in other areas of grammar, in which absolute constraints seem not to be motivated but accounts in terms of historical development give reasonable answers.

FUTURE ISSUES

1. Although it is clear that some observed regularities have their basis outside of synchronic constraints on the class of grammars, this does not necessarily mean that there are no valid substantive universals, and the search for arguments of that form cannot be abandoned.

2. Where synchronic and diachronic accounts overlap substantially, it is not necessarily the case that only one is correct, despite the apparent duplication of explanatory effort. It may well be that (via something like the Baldwin Effect) diachronically based regularities may have been incorporated into the Langauge Faculty (specifically into the learning algorithm), so that both accounts are true.

3. Where both synchronic and diachronic accounts are potentially available, criteria need to be developed that will allow the two to be differentiated.

4. The possibility of a diachronically based explanation in morphology and syntax needs to be taken seriously and its extent explored.

DISCLOSURE STATEMENT

The author is not aware of any affiliations, memberships, funding, or financial holdings that might be perceived as affecting the objectivity of this review.

LITERATURE CITED

Anderson SR. 1977. On mechanisms by which languages become ergative. In *Mechanisms of Syntactic Change*, ed. C Li, pp. 317–63. Austin: Univ. Tex. Press

Anderson SR. 1981. Why phonology isn't 'natural'. *Linguist. Inq.* 12:493–539

Anderson SR. 1985. *Phonology in the Twentieth Century*. Chicago: Univ. Chicago Press

Anderson SR. 1986. The typology of anaphoric dependencies: Icelandic (and other) reflexives. In *Topics in Scandinavian Syntax*, ed. L Hellan, K Koch-Kristensen, pp. 65–88. Dordrecht, Neth.: Reidel

Anderson SR. 1988. Objects (direct and not so direct) in English and other languages. In *On Language: A Festschrift for Robert Stockwell*, ed. C Duncan-Rose, T Vennemann, J Fisiak, pp. 279–306. Beckenham, UK: Croom Helm

Anderson SR. 2004. Morphological universals and diachrony. *Yearb. Morphol.* 2004:1–17

Anderson SR. 2008. The logical structure of linguistic theory. *Language* 84:795–814

Aristar AR. 1991. On diachronic sources and synchronic pattern: an investigation into the origin of linguistic universals. *Language* 67:1–33

Bach E, Harms R. 1972. How do languages get crazy rules? In *Linguistic Change and Generative Theory*, ed. RP Stockwell, R Macaulay, pp. 1–21. Bloomington: Indiana Univ. Press

Benveniste É. 1952. La construction passive du parfait transitif. *Bull. Soc. Linguist. Paris* 48:52–62

Benveniste É. 1960. "Être" et "avoir" dans leurs fonctions linguistiques. *Bull. Soc. Linguist. Paris* 55:113–34

Blevins J. 2004. *Evolutionary Phonology: The Emergence of Sound Patterns*. Cambridge, UK: Cambridge Univ. Press

Blevins J. 2006a. A theoretical synopsis of Evolutionary Phonology. *Theor. Linguist.* 32:117–66

Blevins J. 2006b. Reply to commentaries. *Theor. Linguist.* 32:245–56

Braithwaite K. 1973. *Case shift and verb concord in Georgian*. PhD thesis, Univ. Tex., Austin. 358 pp.

Chomsky N, Halle M. 1968. *The Sound Pattern of English*. New York: Harper & Row

Clements GN, Ridouane R, ed. 2011. *Where Do Features Come From? Cognitive, Physical and Developmental Bases of Distinctive Speech Categories*. Amsterdam: Benjamins

Cohn AC. 2011. Features, segments and the sources of phonological primitives. See Clements & Ridouane 2011, pp. 15–41

Coon J. 2013. TAM split ergativity. *Lang. Linguist. Compass* 7:171–200

Cowper E, Hall DC. 2014. *Reductiō ad discrīmen*: where features come from. *Nordlyd* 41:145–64

de Lacy P, Kingston J. 2013. Synchronic explanation. *Nat. Lang. Linguist. Theory* 31:287–355

de Saussure F. 1916 (1974). Cours de linguistique générale. Paris: Payot/Tullio de Mauro

Delancey S. 1981. An interpretation of split ergativity and related patterns. *Language* 57:626–57

Deo A, Sharma D. 2006. Typological variation in the ergative morphology of Indo-Aryan languages. *Linguist. Typol.* 10:369–418

Dixon RMW. 1991. Mbabaram. In *Handbook of Australian Languages*, vol. 4, ed. RMW Dixon, BJ Blake, pp. 348–402. Melbourne: Oxford Univ. Press

Dixon RMW. 1994. *Ergativity*. Cambridge, UK: Cambridge Univ. Press

Dresher BE. 2014. The arch and not the stones: universal feature theory without universal features. *Nordlyd* 41:165–81

Dunn JA. 1979. *A reference grammar for the Tsimshian language*. Ethnol. serv. pap. 55, Natl. Mus. Man Mercury Ser. Ottawa: Natl. Mus. Can.

Garrett A. 1990. The origin of NP split ergativity. *Language* 66:261–96

Garrett A, Johnson K. 2013. Phonetic bias in sound change. In *Origins of Sound Change: Approaches to Phonologization*, ed. ACL Yu, pp. 51–97. Oxford, UK: Oxford Univ. Press

Greenberg JH. 1963. Some universals of grammar with particular reference to the order of meaningful elements. In *Universals of Language*, ed. JH Greenberg, pp. 73–112. Cambridge, MA: MIT Press

Hale M. 2007. *Historical Linguistics: Theory and Method*. Oxford, UK: Blackwell

Hansson GO. 2008. Diachronic explanations of sound patterns. *Lang. Linguist. Compass* 2:859–93

Harris AC. 1985. *Diachronic Syntax: The Kartvelian Case*. Orlando, FL: Academic

Haspelmath M. 1993. *A Grammar of Lezgian*. Berlin: de Gruyter

Hawkins JA. 2004. *Efficiency and Complexity in Grammars*. Oxford, UK: Oxford Univ. Press

Jakobson R, Fant G, Halle M. 1952 (1963). *Preliminaries to Speech Analysis*. Cambridge, MA: MIT Press

Kiparsky P. 2006. The amphichronic program vs. Evolutionary Phonology. *Theor. Linguist.* 32:217–36

Kiparsky P. 2008. Universals constrain change; change results in typological generalizations. In *Linguistic Universals and Language Change*, ed. J Good, pp. 23–53. Oxford, UK: Oxford Univ. Press

Levelt CC. 2011. Consonant harmony in child language. In *The Blackwell Companion to Phonology*, vol. 3, ed. M van Oostendorp, CJ Ewen, E Hume, K Rice, chapter 72. Oxford, UK: Blackwell

Maling J. 1984. Non-clause-bounded reflexives in Icelandic. *Linguist. Philos.* 7:211–41

McCarthy JJ. 1986. OCP effects: gemination and antigemination. *Linguist. Inq.* 17:207–63

McCarthy JJ. 1988. Feature geometry and dependency: a review. *Phonetica* 45:84–108

McCarthy JJ. 1994. The phonetics and phonology of Semitic pharyngeals. In *Phonological Structure and Phonetic Form: Papers in Laboratory Phonology III*, ed. P Keating, pp. 191–233. Cambridge, UK: Cambridge Univ. Press

Mielke J. 2008. *The Emergence of Distinctive Features*. Oxford, UK: Oxford Univ. Press

Morley RL. 2015. Can phonological universals be emergent? Modeling the space of sound change, lexical distribution, and hypothesis selection. *Language* (*Phonol. Anal.*) 91:e40–70

Mulder JG. 1994. *UC Publications in Linguistics*, vol. 124: *Ergativity in Coast Tsimshian (Sm'algyax)*. Berkeley: Univ. Calif. Press

Newmeyer FJ. 2006. *Possible and Probable Languages*. Oxford, UK: Oxford Univ. Press

Ohala JJ. 1981. The listener as a source of sound change. In *Papers from the Parasession on Language and Behavior*, ed. CS Masek, RA Hendrick, MF Miller, pp. 178–203. Chicago: Chicago Linguist. Soc.

Ohala JJ. 1993. The phonetics of sound change. In *Historical Linguistics: Problems and Perspectives*, pp. 237–78. Oxford, UK: Oxford Univ. Press

Paul H. 1880. *Prinzipien der Sprachgeschichte*. Tübingen, Ger.: Niemeyer

Payne DL. 1981. *The Phonology and Morphology of Axininca Campa*. Dallas, TX: Summer Inst. Linguist.

Prince A, Smolensky P. 2004. *Optimality Theory: Constraint Interaction in Generative Grammar*. Oxford, UK: Blackwell

Staroverov P. 2014. *Splitting theory and consonant epenthesis*. PhD thesis, Dep. Linguist., Rutgers Univ, New Brunswick, N.J.

Svantesson JO, Tsendina A, Karlsson A, Franzén V. 2005. *The Phonology of Mongolian*. Oxford, UK: Oxford Univ. Press

Trubetzkoy NS. 1939. Grundzüge der Phonologie. *Travaux Cercle Linguist. Prague*. Vol. 7

Tsunoda T. 1985. Split case-marking patterns in verb types and tense/aspect/mood. *Linguistics* 21:385–96

Vaux B. 2002. *Consonant epenthesis and the problem of unnatural phonology*. Presented at Yale Univ. Linguist. Colloq., Sept. 16

Weber BH, Depew DJ, ed. 2003. *Evolution and Learning: The Baldwin Effect Reconsidered*. Cambridge, MA: MIT Press

Yu ACL. 2004. Explaining final obstruent voicing in Lezgian: phonetics and history. *Language* 80:73–97

Contents

Errata

An online log of corrections to *Annual Review of Linguistics* articles may be found at
http://www.annualreviews.org/errata/linguistics