

OT or not OT – is that a question?

Somebody

Somewhere

It is frequently said that with the rise of Optimality Theory, linguistics, and phonology in particular, has undergone a ‘paradigm shift’. However, Kuhn’s paradigm shifts were, by explicit postulation, genuine ‘hard science’ and above all progressive changes, such that after the shift no competent scientist could see any reason to work in the previous paradigm. One need only talk to people in conference coffee breaks to realize that this is not at all the case, even among those who do actually work in the OT framework. The shift undergone by phonology is rather more sociological (like, some would say, the shift to string theory in physics): OT has provided attractive accounts of many phenomena, and above all has provided a single framework which appears intuitively simpler than re-write rules, and which makes strong claims of universality. It has also, particularly in its initiation by Prince and Smolensky (1993), been supported by skilful rhetoric.

On the negative side, assessing the claims of OT, and thereby justifying a true paradigm shift, is not easy. The universalist claim is polemical rather than scientific, since there is no independent criterion for establishing membership of the universal constraint set. It has also often been observed that classical OT is underspecified, in that few contentful statements can be made it about in the absence of precise specifications of the form of GEN and CON. The early formalization by Eisner (1997), and its follow-up work, provided a very elegant precise and restricted version of OT, allowing formal statements of expressibility, which was said to cover ‘almost all constraints in the literature [to the date of the paper]’. However, this relied on a powerful autosegmental representation. Similarly, Frank and Satta (1998) created a different formalization to enable them to express the theorem that with suitable limitations on GEN, OT describes finite-state transductions, as is traditionally the case with phonological re-write rules.

However, the formal arguments give little insight, and as a matter of practice, almost all statements about the power of OT (whether against a traditional competitor, or against an extended version of OT) are based on a few worked examples, or even mere assertion. Because the OT formalism is powerful, with inherently non-deterministic power (Eisner 1997), it is hard for humans to understand how constraints interact. A dramatic example is given by Karttunen (2006), who shows that a thesis-length OT theory of prosody (Elenbaas 1999), as well as the related (Kiparsky 2003), supposed to account for Finnish (etc.) stress patterns, are simply wrong, as they predict the wrong stress for some words as short as six syllables (short by Finnish standards) – which was beyond the range of examples considered by the original authors. This problem arises even with such formally careful works as Potts and Pullum (2003), where it can be shown that a claimed difference in expressive power is not in fact established, simply because of an overlooked possibility. Karttunen’s answer to such problems is that OT should always be programmed up, and bigger examples considered.

We suggest that an alternative approach to dealing with the negative side of OT is for derivationalists to embrace the expressive freedom of OT, while retaining the principle of deriving output forms. Consider the first motivating example of Prince and Smolensky (1993), syllabification in a Berber dialect. The data (Dell and Elmedlaoui 1985) certainly compel one to the

view that the grammar needs to refer to the sonority hierarchy; but the claim that OT provides a more natural account than the ‘algorithm’ of Dell and Elmedlaoui (1985) rests on allowing OT direct access to a sonority comparison operator in ‘harmonic evaluation’, while denying such access to a derivational system and forcing it to ‘hard-code’ the hierarchy as Dell and Elmedlaoui (1985) do. Given such access in the notation, syllabification is easily achieved by an iterative re-write rule. Similarly, many actual presentations of OT constraint systems in phonological articles reduce to the application of re-write rules with conditionals. On this basis, we demonstrate with a range of examples from (Prince and Smolensky 1993) to the present how a broad-minded derivationalist can translate (informally) OT accounts to a derivational account, and thereby avoid the difficulties of GEN and harmonic evaluation.

It is of course a triviality that any system can be expressed by a sufficiently powerful set of re-write rules. Equally, as we have noted above, there are reasonable precise versions of OT that are equivalent to relatively modest re-write systems. There is, however, a question of aesthetic, rather than mathematical, judgement when assessing the merits of different grammars. If, as (Chomsky 1965) explicitly asserts, a grammar is purely a description of the phenomena of language, and not in any sense a model of the speaker or hearer, it is an aesthetic, not scientific, question whether to use a powerful notation that enables the concise expression of languages, or a restricted notation that can only express a computationally easy set of languages. We propose that an expressive re-write formalism, sufficient to deal with our examples, is at least as elegant as OT accounts, and provides a judicious nudge of the representation–computation pendulum back towards its rest position.

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