

## The formal properties of phonological precedence

It is standardly assumed that precedence relations are asymmetric, irreflexive, and *transitive*; [kæt] is string-wise {k<æ, æ<t, k<t}.<sup>1</sup> However, I will argue that the phonological precedence relation is *intransitive*: e.g. {k<æ, æ<t}. A major consequence of this proposal is that the phonological precedence relation is strictly local, never long-distance. This avoids a number of severe problems with transitive phonological precedence, and eliminates the need for an explicit phonological relation of adjacency.

### • *Phonetic interpretation*

From the phonetic component's point of view, a crucial condition on phonological output forms is that they provide information that can be *unambiguously converted* into temporal order. (This is essentially an empirical observation: there is no class of words in any language whose segment order freely varies). However, the unambiguity condition does not require transitivity in the phonological precedence relation (called  $p<$  from now on). An intransitive and asymmetric relation can be unambiguously converted into a total temporal order if it is 'linearly connected': every element  $x$  in the string is in a  $p<$  with some other element  $y$ , and  $x$  is not in a  $p<$  relation with any other element. For example, {k<æ, æ<t} is unambiguously recoverable as requiring the phonetic interpretation of [k] to temporally precede the interpretation of [æ], and that to temporally precede the interpretation of [t].

I will argue that an intransitive precedence relation is not a primitive, but an epiphenomenon of economy and legibility conditions.

### • *Implications*

The competing – and usual – proposal is that the  $p<$  relation is transitive. Transitivity requires an additional phonological relation of 'adjacency' (called A here) (note that A can be derived from precedence using negation, variables, and quantification – this is irrelevant here). A phonological constraint written  $*\eta k$  is formally  $*\{\eta p<k, \eta Ak\}$ . Statement of both relations is crucial: if the constraint was just  $*\{\eta p<k\}$ , it would be violated by [aŋko] as well as [ŋako], [ŋaok], and so on.

In this view, it is surprising that there are no constraints that stipulate precedence and adjacency alone. There is no constraint  $*\{\eta p<k\}$  that is violated in the way identified above. There is no constraint  $*\{\eta Ak\}$ , violated by both [aŋko] and [akŋo]; I will demonstrate that so called 'mirror-image constraints' are at least unnecessary, and at worst pathological.

An intransitive phonological precedence relation does not have these problems. Since  $p<$  is strictly local,  $*\{\eta p<k\}$  is violated by [aŋko], but not by [ŋako] – in fact, there is no formal way to devise a constraint that both forms violate. In addition, there is *no formal adjacency relation* – adjacency is an epiphenomenon of intransitivity. Consequently, there is no constraint that is violated by both [aŋko] and [akŋo].

I will identify several other benefits of having an intransitive phonological precedence relation. I will also discuss 'long-distance' conditions that seem to require a transitive precedence relation, arguing – in line with the majority of recent work – that strictly local conditions are adequate.

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<sup>1</sup> This notation is of course simplified. I take strings to involve a mapping from a subset of a denumerably infinite set of elements to phonological primes (e.g. natural numbers); precedence holds between the 'placeholder' elements, not the phonological primes.