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A natural origin for unnatural gradient phonotactics

Phonological unnaturalness has been a subject to an ongoing debate in both the synchronic and diachronic literature. In synchronic phonology, the debate has centered on the question of how to encode unnatural alternations, i.e. alternations without any clear phonetic precursors (Hyman 2001). Diachronically, the state of the field is perhaps even more unsettled: there has been no consensus reached as to whether or not unnatural sound changes are even possible (Ohala 1993, Blevins 2004, Blust 2005). Most of the examples used in discussions of this topic are phonological alternations, phonotactic restrictions, or sound changes that operate regularly in all instances of a given phonetic environment. However, to my knowledge, there is no comprehensive treatment of unnatural *variation*. The goal of the present paper is to fill this gap: I present an unnatural development from Tarma Quechua (described in Adelaar 1977 and Nazarov 2015), which resulted in gradient phonotactics operating in precisely the opposite direction from what is typologically expected, and offer a new explanation for how such unnatural lexical variation comes into being.

Tarma Quechua (TQ) is a Quechuan I dialect, spoken in the Tarma region of northern Junín in Peru (Adelaar 1977), that has undergone a peculiar voicing of voiceless stops. As reported in Adelaar (1977), the Pre-Tarma voiceless labial and velar stops *p and *k become voiced intervocalically and in consonant clusters (including clusters with non-nasal sonorants), but remain voiceless initially and post-nasally.

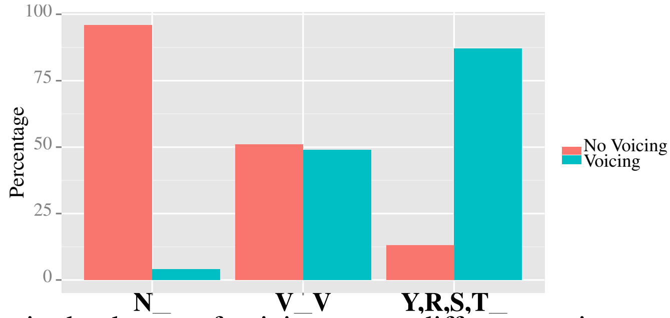
(1) a. T > D / Y,R,S,T__

b. T > D / V__V

This change is unexpected for two reasons. First, the only context that inhibits voicing in TQ is the post-nasal position. Cross-linguistically, however, post-nasal positions strongly *favor* voicing; indeed, there exist several phonetic motivations for post-nasal voicing in particular (Hayes and Stivers 2000). Second, it is highly unusual for voiceless stops to become voiced in consonant clusters, especially after another voiceless stop.

Even more surprising is the actual positional distribution of voiced stops in TQ. It is acknowledged already in Adelaar (1977) that voicing of voiceless stops does not operate regularly in all positions in this language. Nazarov (2015), in his detailed study of TQ native vocabulary, shows that voicing operates most of the time in consonant clusters, half the time (i.e., with approximately 50% of vocabulary items) intervocalically, and almost never post-nasally. This is the exact reverse trend of what is natural and expected: intervocalic positions typically favor voicing much more strongly than post-consonantal position. Furthermore, voicing almost never operates post-nasally in TQ, while cross-linguistically this environment strongly favors voicing (to a much greater degree than the post-consonantal position). The examples and graph below illustrates the distribution (from Nazarov 2015).

N__	*wampu-	wampu
V__V	*kupa-	kuba
	*kipu-	kipu
Y,R,S,T__	*takpa-	takba



In sum, TQ exhibits lexical variation in the degree of voicing across different environments. Post-nasal position has the lowest voicing rate, intervocalic position a medial rate, and post-consonantal position the highest voicing rate. How could such an unnatural, gradient phonotactic restriction come into being? If we assume that sound change can operate against universal phonetic tendency, we might posit that TQ variation results from regular sound change. In this paper, however, I argue against this analysis, instead supporting the commonly held contention that sound change cannot operate against universal phonetic tendencies.

In accounting for TQ variation, I argue that instead of one sound change, TQ underwent three well-motivated sound changes that, in combination, gave rise to unnatural stop voicing. First, voiceless stops (specifically, labials and velars) underwent fricativization almost without exception in post-consonantal position (dentals don't undergo fricativization because θ is typologically dispreferred). That post-consonantal environment favors fricativization is well motivated: fricativization is a strategy to repair undesired consonant clusters (a similar development occurred in Nivkh, Shiraishi 2006; fricativization in consonant clusters is attested elsewhere even in Quechua, Adelaar and Muysken 2004:199). Intervocalically, however, fricativization is less motivated, while post-nasally it is disfavored: this pattern directly corresponds to the distribution of TQ voicing. After fricativization was completed, TQ underwent voicing of voiceless fricatives pre-vocalically. This development is also motivated and attested elsewhere (Kümmel 2004:32). Finally, I argue, voiced fricatives underwent occlusion to stops. These three sound changes, in combination, led to the peculiar stop voicing with its unnatural variation that we see in present-day TQ. I also show that there exists phonetic evidence in favor of my proposal, since the original voiceless stops still surface as voiced fricatives in consonant clusters.

Based on the data from TQ, I develop a model for explaining unnatural alternations in which three natural sound changes operate: the output of one is the input to another and the result operates against universal phonetic tendencies. I term this model a "blurring chain".

BLURRING CHAIN	Tarma Quechua
B > C / X	T > S / Y,R,S,T__, V__V
C > D	S > Z
D > A	Z > D

I also show that alternative explanations for TQ stop voicing face several difficulties. One common strategy for explaining unnatural processes, hypercorrection (Ohala 1993, Nazarov 2015), for instance, cannot explain why devoicing targets only labials and velars, or why hypercorrection operates more regularly in post-consonantal position than intervocalically.

There are several implications that this new explanation brings: First, I show that sound change does not operate in unnatural directions. Second, I show that variation/gradient phonotactics cannot operate against a universal phonetic tendency. It can only arise by a combination of sound changes in which one of the sound changes does not operate categorically. Finally, I show that the "blurring chain" model I propose here better captures the data than explanations invoking hypercorrection and has the potential to explain other unnatural alternations.

References

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