Opaque Nasalization in the Língua do Pê of Salvador, Brasil

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We demonstrate the existence of two types of opacity in the Salvador dialect of Brazilian Portuguese (BP), and argue they are best captured in multiprecedence-based representations under specific conditions of rule application. The opaque behavior of nasalization can be diagnosed through observing the results of language games, which show that the *same phonological process* exhibits two different types of opacity:

(1) a. Overapplying opacity: The result of a phonological rule R that has applied in the derivation of S can be detected, even though S does not meet the structural description of R.
b. Underapplying opacity:The result of a phonological rule R that has applied in the derivation of S cannot be detected, even though S does meet the structural description of R.

We present the results of language games Língua do Pê (LdP) and Língua do Ki (LdK), as tested with 12 native speakers of Salvador BP. LdP is an iterative infixing reduplication pattern with the syllable *-pV-*, like ubbi-dubbi in English/Hungarian (Harrison and Kaun, 2000) and Jerigonza in Spanish (Piñeros, 1999). LdK is an iterative infixation pattern with the fixed syllable *-ki-*. Both processes result in **opaque** results for nasalization. Salvador BP is known for generalized regressive vowel nasalization, which stands in stark contrast to "Standard BP", in which regressive nasalization can only affect a stressed vowel.

(2) Regressive nasalization only targets THE immediately preceding vowel:
a. /kafunɛ́/ → [ka.fũ.nɛ́], *[kã.fũ.nɛ́] 'a caressing motion'
b. /asinár/ → [a.sĩ.nár], *[ã.sĩ.nár] 'to sign'

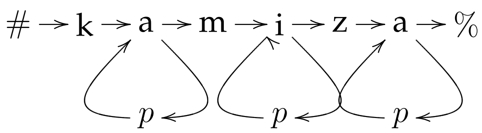
Here are the results of LdP and LdK in Salvador BP:

(3) a. /kamíza/ 'shirt' (penultimate stress)
b. [kã.mi.za] (normal Salvador BP output) (cf. Standard BP [ka.mi.za])
c. [kã.pã.mi.pi.za.pa] (overapplication of nasalization: opaque LdP output)
d. [ka.ki.mi.ki.za.ki] (underapplication of nasalization: opaque LdK output)

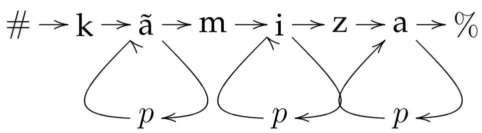
The results of (3-c) are "classic" overapplication, as has been described for Malay (Onn (1976), et. seq), and, if the data ended there, would be compatible with a wide family of analyses:

(4) [kã.pã.mi.pi.za.pa] compatible with
a. An underlying [+nasal] specification for the initial vowel (e.g. /kãmiza/), which copies in reduplication ("LEXICALIZED" analysis of nasalization)
b. A surface-oriented nasalization constraint (e.g. *ORAL-V / _ N) coupled with Base-Reduplicant Identity ("SURFACE/OT" analysis)
c. Two cycles of application for a local regressive nasalization rule: one prior to reduplication, one after reduplication ("CLASSIC LEXICAL PHONOLOGY" analysis)
d. A nasalization rule that applies to a MULTIPRECEDENCE-AND-LINEARIZATION structure (Raimy (2000a,b), et seq.) as illustrated in (5)

(5) a. LdP multiprecedence structure, where → denotes the immediate precedence relation, and #,% denotes the left and right edge of a lexical item:



b. Nasalization of (a): THE preceder-of(N), where N is [+nasal,+consonantal], becomes [+nasal]:



c. Linearization of (b):

→ k → ã → p → ã → m → i → p → i → z → a → p → a → %

Importantly, of the four analytic options in (4), (a)-(c) all fail on the data [ka.ki.mi.ki.za.ki]:

(6) a. An underlying [+nasal] specification for the initial vowel (e.g. /kãmiza/), predicts *[kã.ki.mi.ki.za.ki]

b. A surface nasalization constraint (*ORAL-V / _ N) predicts *[ka.kĩ.mi.ki.za.ki]

c. Two cycles for a local regressive nasalization rule: one applying prior to reduplication, one after reduplication/infixation, predicts *[kã.kĩ.mi.ki.za.ki]

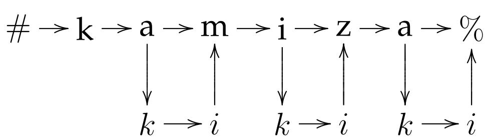
d. A nasalization rule that applies to a multiprecedence structure, however, correctly predicts [ka.ki.mi.ki.za.ki] as illustrated in (8)

There is more to say, first, however, about the regressive nasalization rule alluded to above and illustrated in (5)[b]: V→Ṽ / _N. This is formally equivalent to saying that the preceder of N must be [+nasal], which presupposes a unique preceder – i.e. THE `preceder-of(x)` is a partial function, defined only if ∃!a[precedes(a,x) =1], which returns ιb[precedes(b,x) =1]. Following an idea by William Idsardi (pers. comm, 12 Sep 2005), we propose the following parametric condition on the interpretation of structural descriptions, which holds of Salvador BP's regressive nasalization rule:

(7) Iota operator (Russell, 1905): fails to apply if there is no *unique* preceder.

This condition on rule interpretation follows the tradition of the exhaustivity condition of Hayes (1986), the geminate inalterability condition of Schein and Steriade (1986), and the uniformity condition of Raimy (2000a,b), which are necessary conditions whenever non-bijective mapping obtains in a representation: whether it be geminates (one-to-many timing-slot-association relations) or multiprecedence structures (one-to-many immediate precedence relations).

(8) a. Língua do Ki multiprecedence structure:



b. Nasalization rule (5)[b] fails to apply due to (7): there *is* no *unique* preceder

c. Linearization of (a), faithfully realizing all input segments:

→ k → a → k → i → m → i → k → i → z → a → k → i → %

The multiprecedence-and-linearization representations thus provide the best way to model the fact that reduplication shows opaque overapplication, while infixation shows opaque underapplication. These results further contribute to the range of language game data bearing important consequences for phonological theory (e.g. Sherzer (1970); Campbell (1980); Vago (1985); Bagemihl (1995)).

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