

## Perceptually repairing illegal clusters: Is there an early faithful representation?

Pierre Hallé

CNRS UMR 7018 *Laboratoire de Phonétique et Phonologie LLP/ Paris 3, Sorbonne Nouvelle*

[pierre.halle@univ-paris3.fr](mailto:pierre.halle@univ-paris3.fr)

Many Laboratory Phonology studies, especially those using the OT framework, propose accounts of “misperception” of speech inputs that do not follow the phonological system of the listener’s native language, whereby the speech input *in its veridical form* is converted into an acceptable output with respect to the listener’s language phonological constraints ([1], [2]). This approach implicitly suggests that listeners’ perception unfolds from an initial stage of “faithful” perception in terms of the input language’s phonology. Paradis and colleagues (e.g., [3]) have made a similar assumption in their research on loanword adaptations.

The goal of this short study is to review some arguments from the psycholinguistic literature supporting or not the view that the very initial stage of listeners’ speech perception is faithful to the phonetic content of the input speech. Sections (a-b) review arguments supporting the veridical perception view, whereas (c-d) review contrary evidence.

(a) Hallé and colleagues ([4]) showed that French listeners most often perceive [tl, dl] as (French) /kl, gl/. This finding has been replicated in [5] using Hebrew /tl, dl/ stimuli: native speakers of French or English, which both ban \*/tl/ and \*/dl/ word-initially, perceptually repaired these stimuli as /kl/ and /gl/, whereas native speakers of Hebrew, which allows #/tl, dl/, perceived /tl, dl/ faithfully. [4] included a “phonetic gating” experiment, in which French participants had to transcribe fragments of increasing duration from items such as *tlobda*. The shortest fragments only contained the item-initial stop closure and release burst and the longest ones extended up to the first vowel. Participants’ transcriptions for the shortest gates were *faithful* to the speaker’s intention in that, for example, they responded “t” vs. “k/c” for the shortest gates of /tlobod/ vs. /klabod/. (They were switching to “kla/cla” transcriptions for the longest gates.) Although the phonetic gating experiment in [4] was intended to control for the speaker’s productions at the phonetic level, the authors proposed that the phonetic gating data reflected “snapshots” of listeners’ perception as it unfolds over time. However, it can easily be argued that listeners’ transcriptions of short fragments might not reflect the time course of perception of the corresponding complete utterances.

(b) Breen et al. [6] conducted an intramodal audio–audio priming experiment with, in particular, /gla/ targets preceded by /gla/, /kla/, or /dla/ primes (identical, different, and critical priming conditions). English listeners had to rate prime–target similarity and their ERPs were collected for the target stimuli. On the behavioral side, they rated /dla-/gla/ pairs as very similar, contrary to /kla-/gla/ pairs, thereby confirming the \*/dl, tl/ to /gl, kl/ phonotactic repair. However, the ERP data rather yielded similar patterns for /dla-/gla/ and /kla-/gla/, both differing from the pattern obtained for /gla-/gla/, suggesting priming (in the form of reduced positivity in the 200-350 ms range) in the latter but not in the former priming conditions. The authors concluded that there should be a perception stage whereby /dla/ is perceived as different from /gla/, that is, presumably, is perceived “veridically.”

(c) Dehaene-Lambertz et al. [7] used a straightforward cross-linguistic design, whereby the behavioral and ERP responses to speech contrasts such as /igumo-/igmo/, legal in French but not in Japanese, were directly tested. French listeners showed a clear MMN response to the /igumo-/igmo/ contrast. This is the earliest ERP component reflecting presumably non-conscious detection of a phonetic difference. Japanese listeners showed no sign of such an early ERP response, suggesting that phonotactic repair is not preceded by faithful perception.

(d) We finally present some new ERP data on the /tl-/kl/ contrast, with young infant and adult French listeners. We used a similar habituation-dishabituation paradigm to that in [7],

with three habituation precursors followed by a dishabituation target. The target was always /tla/ and the precursors could be /tla/ (no-change), /pla/ (clear-change), or /kla/ (critical-change). The ERP data, obtained in a passive listening condition, show that French 7-month-olds but not adults respond to the /kla-/tla/ contrast, suggesting that the robust deafness to this contrast is learned. After French listeners have attuned to their native language, there is no sign, in their ERP data, of a response to this contrast (Figure 1).

We further discuss the issue of a faithful perception stage, considering the possibility that this stage has become integrated with phonotactic repair within a language-specific first stage of perception. Indirect evidence may be the increased time-cost found in some studies (e.g., [8]) during the non-conscious processing of phonotactically illegal inputs.

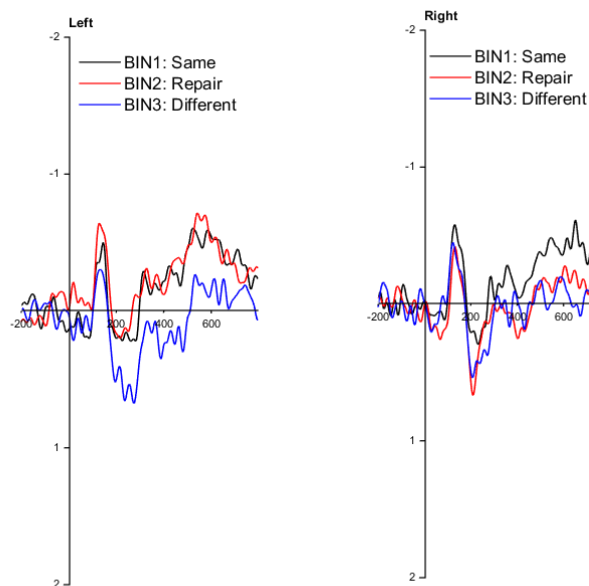


Figure 1. ERP responses to /tla-/tla/, /kla-/tla/, and /pla-/tla/, pre-central frontal sites, 1st half of experimental session. On the left sites, /tla-/tla/ and /kla-/tla/ did not differ, (repair of \*/tl/ into /kl/), whereas /pla-/tla/ induced a P300-like response to change.

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