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On the rarity of pre-aspirated obstruents

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Pre-aspiration can be defined as a period of (often primarily) glottal friction ([h]), which can occur in sequences of sonorants and phonetically voiceless obstruents, as in Welsh English *wit* [wɪ^htʰs] and *wish* [wɪ^hʃ]. In his seminal work, Silverman (2003 [14]) provides a cross-linguistic overview of the phenomenon, which has been claimed to be rare (e.g. [8; 11, p. 147; 13, p. 30; 14-15]). This paper reviews the research done on pre-aspiration since Silverman's (2003) article, addressing the following:

- Is pre-aspiration (extremely/very) rare?
- Why should(n't) pre-aspiration be rare?

I will argue that pre-aspiration is not as rare as has been claimed by some, and not necessarily for the reasons that have been suggested to lie behind its rarity.

Whether or not pre-aspiration is phonologically relevant. Firstly, the paper will focus on the claim that pre-aspiration is rarely contrastive ([9], p. 70), which is crucial to many in determining whether a phenomenon is phonologically relevant. Drawing attention to some of the criteria used to establish contrastiveness, I will show that pre-aspiration is often one of the acoustic correlates of the fortis-lenis contrast (and/or some other contrasts) in the world's languages. Furthermore, we will see that most perceptually-oriented studies have not systematically looked into whether pre-aspiration functions as a cue to a contrast, which means that we should not rule out its potential to contribute to contrast implementation. Last but not least, different approaches to what is phonologically relevant might also provide different answers (e.g. [5, 7, 10, 16]).

Auditory explanations. The frequently embraced explanation for pre-aspiration being rare is that it is an "auditory dinosaur" ([1, p. 7]): it is difficult to perceive, which explains its rarity. In Silverman's apt description, pre-aspiration could be expected to be more difficult to perceive than post-aspiration, because it is followed (in case of plosives) by a closure, i.e. no formant transitions are available to help the listener obtain additional cues about pre-aspiration. As we will see, however, very little perceptual work has been done regarding pre-aspiration (e.g. [2-3]), and most of this work does not test the hypothesis put forward (e.g. [3, 6]), which would include a direct comparison of pre- and post-aspiration in different environments.

Practical reasons. There are also other aspects that may explain the perceived rarity of the phenomenon. Firstly, pre-aspiration is often of low-amplitude and occurs following a highly sonorous segment. Unless the recordings are of very high quality, acoustic echoing is likely to mask the presence of pre-aspiration in the acoustic signal. Secondly, researchers may expect it to be rare and not look for it. Finally, the work conducted for some languages may not be available in English (e.g. [12]).

Historical reasons. Importantly, however, there *is* a very good reason to expect pre-aspiration to be relatively rare: the most frequent historical source seems to be for pre-aspiration to innovate in anticipation of post-aspiration in VC^h environments [2, 5, 14], where V stands for a vowel and C^h for a post-aspirated plosive. It is therefore mainly languages with VC^h sequences where pre-aspiration can be expected most. And most languages do not provide these environments [4].

Word count: 514

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