

Acoustic evidence for word-initial /s/+stop sequences as onset clusters: "perceptual bond" as a cross-linguistic predictor of prothesis

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Word-initial /s/+stop sequences have been described as different to other onset consonant clusters, because they violate the sonority pattern; sonority falls instead of rising towards the syllable nucleus. The /s/ has thus been proposed to function extrasyllabically or as a syllable adjunct (e.g. Kenstowicz 1994).

The /st/ differs from the other two /s/+stops because of its homorganicity, which I assume to be the cause of Amahl's (Smith 1973) multi-stage acquisition route for the /st/. Jongstra (2003a) finds the /st/ (and not the /sp/ and /sk/) to be variably acquired by Dutch children. Acoustically, the /st/ is unique, e.g. in that a sufficiently long period of silence inserted between the /s/ and the vowel results in a /stV/ percept, e.g. /s_a/ > /sta/ (Steffens et al. 1992). The /st/ emerges as worse than the /sp/ and /sk/ according to the Net Auditory Distance Principle (NAD) (Dziubalska-Kołodziejczyk 2009).

Cross-linguistically, unattested /s/+stop onsets tend to be prothesised rather than epenthised. It is most probably so, since anaptyxis would create "a rather salient departure from the input" (Fleischhacker 2002). Prothesis, however, maximises auditory input-output similarity in such onsets. I would like to provide a detailed acoustic explanation for this.

I hypothesise the existence of a "perceptual bond" between two onset consonants forming a cluster. The strength of the bond is inversely proportional to the ease of breaking the bond by an anaptyctic (or quasi-anaptyctic) vowel. The easier to break the bond, the stronger the need for the two consonants to stand together, which is facilitated by prothesis, as evidenced cross-linguistically.

The linguistic material in my experiment consists of a Polish word *syta* ('satiated') and *kyra*, a nonsense word disallowed by Polish phonotactics. The high front-centralised vowel /i/ is cut shorter in the subsequent stages of /syta/-/sta/ (10 stages) and /kyra/-/kra/ (12 stages) continua, beginning with a full vowel (ca. 70 msec for the former and ca. 90 msec for the latter) and ending with the /sta/ and /kra/.

In an informal pilot study conducted by the author on himself, surprisingly, the quasi-anaptyctic vowel is still perceived at the last-but-one stage (with ca. 5 msec of the /i/), and /sta/ is only heard at the last stage with no vocalic portion between the /s/ and the /t/. For /kyra/-/kra/, however, ca. 30 msec of the vowel suffices for its perceptual disappearance, resulting in a /kra/ percept. The perceptual threshold for the quasi-anaptyctic vowel between the /s/ and the /t/ (probably located between 5 and 0 msec) is much higher than for the other pair of consonants. The vowel between the /s/ and the /t/ causes a more dramatic departure from the input than between the /k/ and the /r/. The "perceptual bond" between the /s/ and the /t/ is broken more easily and, I believe, hence the cross-linguistic tendency for leaving them together by prothesis. I argue that this fact speaks for /s/+stop onsets as clusters rather than adjunct-onset sequences.

References

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