Telling fortis and lenis apart in English obstruent clusters

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Like French or Hungarian, English has two sets of obstruents. The phonetic and phonological properties of these two sets are different in English and French/Hungarian.

Phonetic voicing is much less relevant for the two sets in English than in French or Hungarian. The primary acoustic correlate of the contrast between /pen/ and /ben/ in English is aspiration (not voicing). The primary correlate of the contrast between /mop/ and /mob/ is the length of the vowel (not voicing). Voicing is the main correlate only for obstruents that are between two sonorants. A lenis obstruent or a cluster of lenis obstruents is voiced in this position: /habit/, /lizbən/ (*Lisbon*). To avoid confusion, we use the terms *fortis* (e.g., /p s tʃ/) and *lenis* (e.g., /b z dʒ/) for the two sets in English.

The contrast between fortis and lenis obstruents is neutralized when this obstruent is adjacent to another obstruent which is fortis. That is, while the last consonant after a sonorant may be either fortis or lenis: /pens/≠/penz/ (*pence, pens*); the last consonant after a fortis obstruent cannot contrast: /preps/=/prepz/. The vowel(+sonorant) in /pens/ is shorter than in /penz/, but the vowel in /preps/ or /prepz/ is short in both, since it is followed by a fortis obstruent /p/ (also cf. Jones 1967:§171ff). This means that the last consonants are not different acoustically (and consequently, perceptually).

We find the same situation word initially, too: the word *spin* could either be /spin/ or /sbin/ (Twaddell 1935). Since the voiceless plosive is not aspirated in *spin,* /b/ is the default choice for its representation.

We make the following two assumptions:

1. Let us suppose that two fortis plosives may not occur next to each other within a morph or at the end of a word. That is, even though the two plosives at the end of *packed* are not within the same morph they may not both be fortis because they are at the end of a word.
2. Let us also suppose that fortisness (and lenisness) is stable across allomorphs. That is, if an obstruent is fortis (or lenis) in one allomorph, it will remain so in another allomorph of that morpheme. (There are lexical exceptions, like *wife* vs. *wive-s.*)

Our two assumptions have a number of consequences. A "ft" cluster in which the plosive is not aspirated is now analysed as /fd/: *after* /afdə/. A "ft" cluster in which the plosive is aspirated is now analysed as /vt/: *lieutenant* /levtenənt/. The voicelessness of the other member of the cluster follows from the distribution stated above: lenis obstruents are only voiced when between sonorants, but not next to a fortis obstruent.

It also follows that the past tense suffix has only two allomorphs: /id/ after /t/ and /d/, and /d/ elsewhere. (The plural, genitive, and 3sg.pres suffix are similarly reanalysable, cf. *preps* above.) The suffix is voiceless in *packed* /pakd/ because it is not between two sonorants. This analysis conforms to allomorph stability, our assumption (2), too: the verb stem is /pak/, the suffix is /d/, neither alternate. The verb *act* could also be /akd/; however, the adjective *active*

or the noun *activity* must be /agtiv/ and /agtivitij/, since the /t/'s in these words are aspirated. Therefore, (2) suggests that *act* should also be analysed as /agt/.

In this talk, we will argue for the theoretical assumptions in (1) and (2), and will also investigate whether the phonological difference we posit between *packed* /pakd/ and *act* /agt/ is phonetically real.

We will present the results of a production experiment that looks at the acoustic differences between forms such as *pack(ed)* /kd/ vs. *act* /gt/ vs. *bagged* /gd/ in pre-pausal (i.e., absolute word-final) and prevocalic position. The experiment will measure the following acoustic correlates of voicing contrast: the phonetic voicing of the plosive, the duration of the pre-plosive vowel, the duration of the plosive itself, and the duration ratio of the vowel and the plosive (e.g., Stevens & Blumstein 1981; Port & Dalby 1982; Docherty 1992; Kingston & Diehl 1994; Maddieson 1997; Yu 2011). In the prevocalic position (e.g., *active*) we will also measure voice onset time to see if the plosive can be regarded aspirated or not. The speech data will be collected from speakers of current standard British English by using a web-scraping method from YouGlish (youglish.com).

If the phonological representations we assume are correct, the durational correlates are expected to be consistently different in the three forms: the vowel ought to be the longest in *bag(ged),* the shortest in *pack(ed),* and of an in-between value in *act.*

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