

Dating the new open TRAP sound change in South East England

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Abstract

The new open TRAP sound change was reported in the 1980s, in Received Pronunciation. The earliest example found by Fabricius in 2007 was born in 1926, still Received Pronunciation. Jones and Gimson reported only the earlier closer TRAP. The earliest regional example of new open TRAP, born in 1866 in Kent, was reported by Wood in 2017. Four groups of informants were studied, RP and regional. The earliest RP speaker found with new open TRAP was born in 1857, one hundred years before it was noticed. This raises questions like how did Jones manage to miss it? (or ignore it?). Suggested explanations include inadequate vowel theory (the Bell vowel model) and experimental methods (feeling the Bell vowel locations).

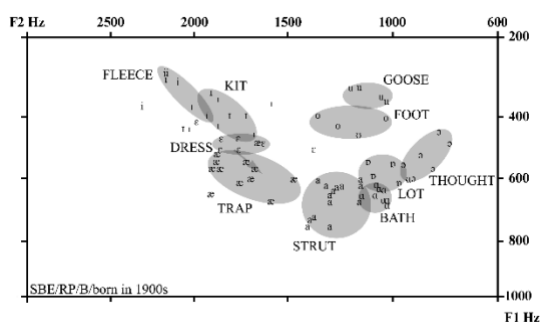


Figure 1. A selection of RP vowels by informant B, illustrating the earlier closer TRAP with lower F1 at 489-682 Hz, DRESS and KIT compressed towards FLEECE.

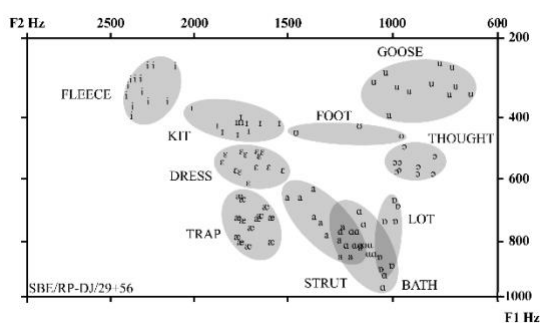


Figure 2. A selection of RP vowels by Daniel Jones (1881-1967), analysed from Jones (1929, 1956), illustrating the new open TRAP (higher F1 668-825 Hz, no compression of DRESS and KIT).

The Problem

This article is concerned with the recently observed sound change in south-eastern England

that opened¹ TRAP² pronunciation both in non-regional Received Pronunciation³ (RP) and in regional accents. The timbre of the earlier closer

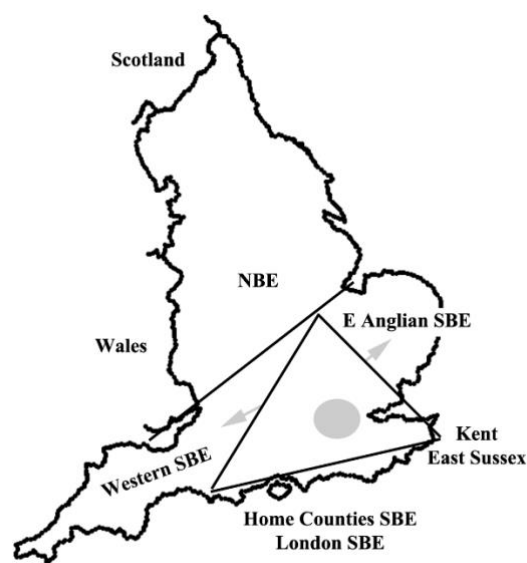


Figure 3. The stylized isogloss between Northern British English (NBE) and Southern British English (SBE). Four regiolects of SBE: East Anglian, London, Home Counties (triangle) and Western.

TRAP was IPA [æ]⁴ (Fig. 1), while new open TRAP is open [æ] (Fig. 2). The criteria for distinguishing new open TRAP (F1 higher than about 600 Hz and no compression of DRESS and KIT towards FLEECE), are defined in §3). The regional Kentish TRAP sound change had commenced by the 1860s (Wood, 2017). It was also spreading through the home counties (the region surrounding London and bounded by East

Sussex, Hampshire and Northamptonshire, Fig. 3). It has been noticed in RP since the 1980s (Wells, 1982), while the earliest RP speaker with open TRAP reported by Fabricius (2007) was born in 1926. Did Fabricius catch it starting in RP during the 1920s, or was it already in progress? Figure 2 suggests it was (Daniel Jones, phonetician, professor, born in 1881). Early examples like this are considered controversial, born long before anyone showed any awareness of this sound change in RP. Jones never mentioned this sound change himself, always describing only the earlier *closer RP* TRAP timbre (1908, 1918, all editions to the 1960s). An additional recording of Jones has recently been analysed by Przedlacka & Ashby (2019). Their vowel diagram (their Fig. 1) also shows Jones' open TRAP at high F1. Controversial as they may be, it was examples like this, together with regional examples from SE England, that first prompted doubts about the dating of this sound change. The status of new *open* TRAP in earlier RP was investigated by analysing the spectra of TRAP instances taken from recordings of RP speakers in two sequences preceding Fabricius' confirmation: (i) an RP-speaking group born in 1850-1899 (the controversial period), and (ii) a second RP group born in 1900-1930 (the non-controversial period up to Fabricius' dating). For comparison, published formant data from regional Kentish SBE speakers born in 1860-1895 (Wood, 2017), and recordings of six speakers of 20th century Home Counties SBE (HCSBE) born in 1900-1960 were also included.

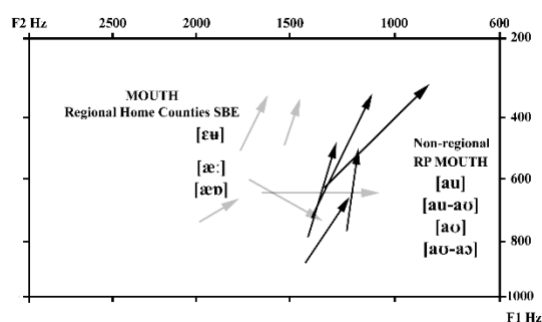


Figure 4. Pronunciations of the MOUTH diphthong in S. E. England: regional accents (left) and non-regional RP (right).

Accents of S. E. England

Southern British English (SBE) is the regional dialect spoken right across southern England from Norfolk to Cornwall, south of an isogloss from the Wash to the Severn Estuary, distinguished from neighbouring Northern British English (NBE) by the TRAP-BATH split and the FOOT-STRUT split (Wales, 2006; Britain, 2012). There are several SBE regiolects, generalized by Wells (1982:§4.2-4.3) from east to south-west as East Anglian, London, Home Counties, and Western. The accent of interest here is Home Counties SBE (HCSBE). Ellis (1889) referred to the earlier dialect of Kent and East Sussex as *Eastern Southern English*, already giving way to contact with London pronunciation. For the present study, these regional accents are distinguished as Kentish SBE (19th century, transitional) and Home Counties SBE (HCSBE, 20th century) following Wood (2017).

RP and regional HCSBE are identified by referring to their respective vowel phoneme systems. RP was described by Jones (1909, 1918)), other revisions are provided by Gimson (1962) and Wells (1982). HCSBE was stigmatized until about the 1960s and very little had been published on it until Rosewarne (1984) mentioned Estuary English. Consequently, Wells (1982:§4.3.1) found little to report on home counties pronunciation. Since then this region has attracted more attention, summarized by Jansen & Amos (2020). Wood (2017) described a shibboleth that has distinguished regional HCSBE from non-regional RP at least since the late 19th century. This concerns the respective pronunciations of the MOUTH lexical set (Fig. 4) that had taken different paths through the Great Vowel Shift: the “polite educated” community (Cooper, 1687) shifted MOUTH down the back vowels to current RP [aʊ-aɔ] (Luick, 1896; Jespersen, 1909, Wolfe, 1973), while the “provincial” community shifted MOUTH down the front vowels to regional [ɛu] (Britain, 2008; Cooper, 1687), eventually to *open* [æ:~æʊ] in London and the South East (Wells, 1982; Wood, 2017), while [ɛu] still occurs in the South West. Table 1 lists some differences between RP and the non-regional accents.

Table 1. Some pronunciation differences between accents of South East England ('x>y' reads 'x becoming y').

| Accent | TRAP | BATH | LOT | THOUGHT | GOAT | MOUTH |
|--|---------------|------|-------|---------|---------|---------|
| 19 th , 20 th c RP | close (open?) | [ɑ:] | [ɒ] | [ɔ:] | [ou>əʊ] | [aʊ>aʊ] |
| 19 th c. Kent | close or open | [ɑ:] | [ɑ>ɔ] | [ɔ:>o:] | [ou>aʊ] | [ɛu>æɹ] |
| 20 th c. HCSBE | open | [ɑ:] | [ɔ] | [o:] | [aʊ] | [ɛu>æɹ] |

Criteria for open TRAP

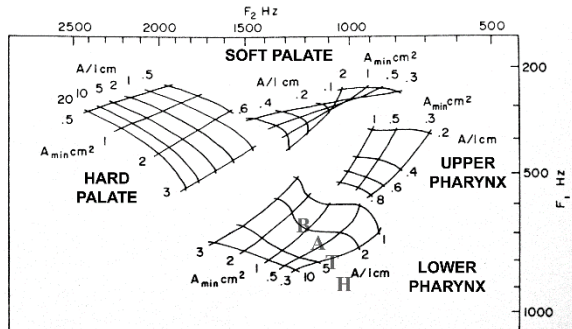


Figure 5. Vowel F1 and F2 frequencies obtained by varying the degree of constriction (A_{min}) and degree of mouth opening (A/l) at each of four constriction locations. Superimposed: Daniel Jones' open back BATH vowel zone. Adapted from Wood (1979).

Essner (1947) and Joos (1948) would have expected high F1 for open vowels. But how high? Figure 5 shows that a vowel timbre designated as *unrounded open* (Jones' [ɑ:]-like BATH) would be articulated with a low pharyngeal constriction together with a large mouth opening, yielding F1 higher than about 600 Hz. This means that open is an extended zone, with F1 varying from about 600 to 800 Hz or beyond. The actual frequency of the boundary appears to vary both between and within individual speakers (not illustrated here). Between-speaker variation might reflect differences of vocal tract size, shorter vocal tracts yielding higher boundary frequencies. Within-speaker variation might reflect varying speaking style with varied degree of mouth opening yielding continuous dynamic variation of the boundary.

The first criterion, then, for open TRAP is F1 higher than about 600 Hz

The timbre of the earlier close TRAP was IPA [æ]. Four phonemes had to share the non-open front region since close TRAP encroached on the

F1 region around 500 Hz, with consequent compression of DRESS and KIT towards, and even alongside, FLEECE. However, F1 of close TRAP also extended into the open F1 region above 600 Hz (clearly seen in Fig. 6, with the majority of TRAP instances having F1 within 500-600 Hz while about 25% extend into the open region at 600-700 Hz). Similar mixes of closer and open instances have been found for other recordings of old closer RP TRAP, including the linguist J R Firth described by Przedlacka & Ashby (2019), easily seen in their diagram.

A second criterion for open TRAP is, consequently, no compression of DRESS and KIT towards FLEECE.

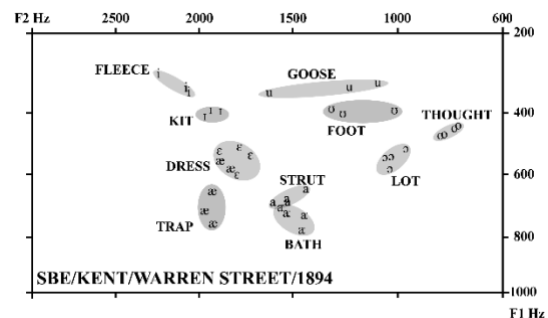


Figure 6. Late 19th c. Kent: new open TRAP, and the last example of [ɑ:]-like BATH.

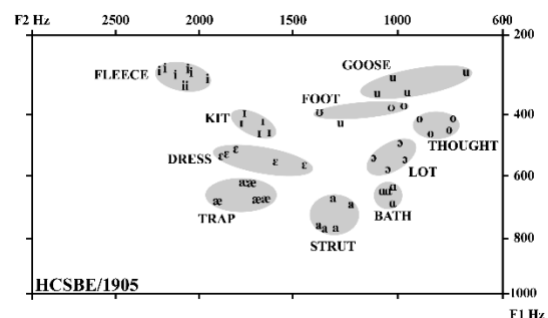


Figure 7. 20th c. HCSBE: new open TRAP, and the earliest regional example of [ɑ:]-like BATH.

Table 2. Results for new open and old close TRAP in the four groups of south-eastern accents (§5).

| Informant | TRAP | Born | TRAP F1; F2 Hz |
|---------------------------------|---------------|-------------|-----------------------|
| 19th c. RP | | | |
| R. Baden-Powell | <i>open</i> | 1857 | 680-800; 1713-2059 |
| Stanley Baldwin | <i>open</i> | 1867 | 641-785; 1717-1994 |
| Richard Paget | <i>open</i> | 1869 | 608-812; 1722-1932 |
| W S Maugham | <i>open</i> | 1874 | 592-687; 1730-1968 |
| Daniel Jones | <i>open</i> | 1881 | 668-825; 1560-1776 |
| H. MacMillan | <i>open</i> | 1894 | 602-657; 1329-1509 |
| N. Chamberlain | <i>closer</i> | 1864 | F1 352-713 |
| RP 1901-1930 | | | |
| A | <i>open</i> | 1900-1910 | 601-708; 1516-2005 |
| C | <i>open</i> | 1900-1910 | 720-818; 1413-1749 |
| D | <i>open</i> | 1910-1920 | 612-744; 1475-1610 |
| E | <i>open</i> | 1910-1920 | 602-701; 1546-1839 |
| F | <i>open</i> | 1920-1930 | 580-728; 1507-1722 |
| G | <i>open</i> | 1920-1930 | 629-730; 1509-1814 |
| H | <i>open</i> | 1920-1930 | 565-710; 1491-1664 |
| B | <i>closer</i> | 1900-1910 | F1 489-682 |
| 19th c. Kent | | | |
| I (H. G. Wells) | <i>open</i> | 1866 | 595-727; 1849-2018 |
| L | <i>open</i> | 1880 | 601-665; 1495-1811 |
| M | <i>open</i> | 1881 | 633-680; 1442-1798 |
| N | <i>open</i> | 1881 | 633-744; 1566-1946 |
| O | <i>open</i> | 1888 | 582-713; 1443-1545 |
| P | <i>open</i> | 1894 | 562-759; 1835-1977 |
| J | <i>closer</i> | 1868 | F1 483-538 |
| K | <i>closer</i> | 1880 | F1 514-578 |
| 20th c. HCSBE | | | |
| Q | <i>open</i> | 1905 | 602-691; 1629-1930 |
| R | <i>open</i> | 1909 | 696-724; 1971-2055 |
| S | <i>open</i> | 1928 | 608-717; 1664-1756 |
| T | <i>open</i> | 1940 | 634-662; 1430-1549 |
| U | <i>open</i> | 1955 | 639-749; 1505-1576 |
| V | <i>open</i> | 1958 | 671-788; 1479-1640 |

The story of TRAP and BATH in the S. E. in recent centuries

Before the 17th century the TRAP and BATH sets were both pronounced together with the same open vowel, [a], (Wyld, 1936:196-205). Then TRAP was fronted and raised to a closer location near DRESS while BATH remained at [a]. At the same time, DRESS and KIT were displaced towards FLEECE, ensuring the spectral contrast between TRAP and DRESS. That was the TRAP-BATH split, unique to SBE in the British Isles. In some cases, such as regional London Cockney, the fronting and raising of TRAP went as far as [ɛ], still there in the 1830s-1930s (Matthews,

1938:Chapt. 1) and in the 1950s (Sivertsen, 1960:Chapt. 3.3). Since the late 19th century, TRAP has been changing again in the South East, to open [æ]. Figure 6 shows an example of new open TRAP from late 19th century regional Kentish SBE.

The BATH set, left behind at [a] after the split, was eventually lengthened to [a:] and finally retracted to [ɑ:]. This final BATH change is usually dated to the 18th century for RP (Hickey, 2020), seen in Figs. 1-2. Figure 6 shows BATH still at [a:] in late 19th century Kent, the last example in the data available to this study. Figure 7 shows the earliest HCSBE example of [ɑ:]-like BATH.

Speech samples

Speech recordings were collected for four groups of SBE informants representing the south-eastern SBE accents. They were found randomly online, often in the BBC Archive or the British Library. 19th century RP informants were prominent public figures and they are identified. Anonymity is preserved for all other informants.

SBE Group 1 consists of seven RP speakers born in the 19th century.

SBE Group 2 consists of nine RP speakers born in 1900-1930, referred to as A-H. Recordings were taken from broadcast interviews made in the 1950s or 1980s.

SBE Group 3 consists of eight speakers of 19th century Kentish SBE, referred to as I to P. The recording by H G Wells is a BBC broadcast. The remaining 19th century Kentish recordings were made by the Survey of English Dialects (Orton & Dieth 1962), available online at the British Library. Their formant data is cited from Wood (2017).

SBE Group 4 consists of six speakers of 20th century HCSBE, referred to as Q to V, born in 1905-1958. The recordings were found online at university websites or in the BBC Millennium or BBC Voices collections at the British Library.

Formant analysis

Vowel formants were analysed using *Praat* (Boersma & Weenink, 2017), FFT slices from narrowband spectrograms offering the best solution for some recordings, while linear predictive formant tracking was successful for the others.

Only fully prominent exemplars of vowels were analysed, taken from focally accented syllables (to minimize spectral effects of vowel reduction). Formants were taken at the moment where the vocoid segment was least affected by adjacent consonants (to minimize spectral effects from coarticulation), determined by observing CV and VC formant transitions on spectrograms.

Results

Table 2 records the results for all informants in each group. The ratios of old close TRAP were 1 of 7, 1 of 8 and 2 of 8 in the first three groups. The earliest RP example of new open TRAP in this data set was born in 1857.

Conclusions

New open TRAP was happening in RP as early as the 1850s, a century before anyone reported it. How did they come to miss it for so long?

One possible reason is their absolute belief in the Bell vowel model (or Passy's version), that assigned the difference between open and close TRAP entirely to tongue location. They would not have been aware that F1 for pharyngeal vowels is controlled by the mouth opening and F2 by tongue location (Fig. 5).

A second possible reason is their claimed ability to feel the tongue position of the Bell vowel model (first expressed by Sweet, 1877:18). Sadly, Bell's tongue positions for vowels were just not there, waiting to be felt. Eventually, this ability to feel tongue positions for vowels was linked to the neurophysiological function of *proprioception* (for example, by Catford, 1981), although that is not how proprioception works, as any comprehensive handbook of neurophysiology, such as Siegel & Sapru (2015:253), will make clear. These authors explain that proprioception is only partly conscious, allowing awareness of some articulator positions or movements, but also partly nonconscious, precluding awareness of other articulator positions or movements. In conscious proprioception, receptors in joint capsules provide sensory information to the cerebral cortex, enabling awareness of kinesthesia. Only the mandibular joints would be relevant for speech, enabling awareness of jaw position. That had always been a parameter of the ancient model since the time of Panini. Nonconscious proprioception, however, arises from muscle spindles and Golgi tendon organs and is passed to subcortical motor centres solely for internal control of movement. Consequently, no sensations are available to the cerebral cortex from this background activity working silently and efficiently during vowel production.

Notes

¹For the present study, the terms *tongue height* and *backness* follow the usage of the past 150 years (A. M. Bell 1867:15-16, 71, Sweet 1877, D. Jones 1932, IPA 1999), but advisedly because the Bell vowel model has never been validated, but was seriously compromised on numerous occasions (Wood, 1982).

²Expressions like TRAP are keywords for what J. C. Wells (1982:§2.2) calls lexical sets

representing vowels that participated in various sound changes in English, with different outcomes in different dialects. They are more useful than phoneme notation when pronunciations are changing, or where accents differ.

³The expression *Received Pronunciation (RP)* is preferred here for the sake of continuity with earlier literature although other rival synonyms have come into use for this accent, especially *General British English (GBE)* (Lewis 1972) and *Standard Southern British English (SSBE)* (IPA 1999). SSBE is especially unsuitable as it is also increasingly being used as a nickname for regional HCSBE, the “new standard” (like Lindsey 2019:4). The phonology of non-regional RP nevertheless belongs typologically to SBE.

⁴Close [æ] refers to IPA [æ], the timbre of old close TRAP. The timbre of open TRAP was never given an IPA identity and is referred to here as open [æ].

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