LIFESPANS & STYLES
Undergraduate Working Papers on Intraspeaker Variation

Volume 2, Issue 1 Article 3

2016

Sixty Years of Speech: A Study of Language Change in Adulthood

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ISSN: 20571720 doi: 10.2218/ls.v2i1.2016.1427

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Hosted by The University of Edinburgh Journal Hosting Service: http://journals.ed.ac.uk/

Abstract

Research on language change has been complicated and hindered by the problem of obtaining quality data. In many cases, the large volume of time required to collect recorded speech at different intervals, as necessary in lifespan studies, is prohibitive. Researchers further risk having participants drop out, leading to a limited pool of data. One way to avoid this is to use recordings available in the public domain that have been recorded for other purposes.

The BBC broadcaster Sir David Attenborough is one of the few people who have had occasion to be recorded regularly over a great span of their lives. In this study, a selection of clips from wildlife documentaries that he has narrated furnishes the data for a glimpse into the possibilities of language change in adulthood.

Received Pronunciation, the accent that Attenborough commands, is in the spotlight in this study. Two features of speech, namely, the presence and degree of t-glottalisation and the TRAP/STRUT vowel distinction, are examined in Attenborough's speech against a background of known changes in the general usage of Received Pronunciation. The aim of the study is thus to see if language change occurs within the speech of an adult individual, particularly one whose speech is almost iconic. His narration from the 1960s is compared with narrations from the 1980s and 2000s in a dataset spanning nearly 60 years with the aim of discerning any trajectories of change. Some patterns in his formant values for several vowels across the three year groups are also discussed to provide an idea of what sort of changes can occur in the course of nearly 60 years.

The study ultimately finds limited change in level of t-glottaling and only a slight movement of his TRAP/STRUT vowels towards each other between the narrations of the 1960s and the 1980s, with no perceptible change thereafter. The changes in community use of Received Pronunciation seem to affect him little. In terms of the overall vowel space, the trend seems to be towards a centering of most of the vowels, particularly the front vowels. Some plausible explanations for the limited amount of change are discussed in the article, which include Attenborough being seen as a steward of the accent as well as its utility to him in his position as a renowned broadcaster. The article also brings up the need for more research into the interface of gerontology and sociolinguistics, as the quite pronounced centering of the vowels may suggest natural age-related pronunciation effects.

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1 Introduction

1.1 Background

Language change is a well-known linguistic fact, but the processes that lead to it and affect the degree and rate of change are still not fully understood. It is a complicated issue shaped by many factors, not all of which are easily identifiable. Wagner (2012:371) writes that "[h]uman languages arise through a combination of universal shared capacities (Chomsky 1957) and the social interactions of individuals and communities". The shared capacities sometimes amount to tendencies in the direction and shape of language change, which linguists have determined by looking at historical data of language change. While these linguistic factors tell us why language might change, they cannot themselves explain its processes, nor how these changes occur in real time, for which social factors may be more responsible.

Some social parameters such as social class, speaker age, and gender are recognized to have some bearing on change: they are generalizable to an extent, and may predict the course of change. Social class is perhaps one of the most well-known factors affecting language use. William Labov (2006 [1966]), in his famous study conducted in departmental stores in New York, isolated a connection between social class and usage of a more prestigious versus less prestigious variety. While not directly related to language change, which is our focus, the study established a connection between social class and language use as well as notions of register that continue to be key in any study of sociolinguistics.

In terms of age, it is generally accepted that change in the individual's speech is much more common and even expected in youth than in adulthood, where it is seen to stagnate or even fossilize. We now know that this is not definite, through research such as Raumolin-Brunberg's (2005) study of letters written by historical persons of various ages, in which most of the subjects exhibited some increased use of the variant under study over their lifetimes.

In many studies a gender effect has been found, although the effect seems to relate to how gender is socially constructed and understood within specific community settings. Deborah Cameron has tracked some developments in the understanding of gender effects on language change in linguistic research, coming to the conclusion that "[i]n recent years, researchers working on various aspects of gender and language change have been challenged to engage with the argument that gender, too, is a form of social and symbolic practice" (Cameron 2003:196). If gender — an aspect of social and personal life that the average person may expect to be apparent and stable — affects language use at the same time as being continually constructed by it, we are drawn to question what else might have more complex relationships with language change than might be apparent on the surface.

Alongside the more well-known socio-physical factors of social class, age, and gender are other probable factors affecting language change. Change in an individual's environment, such as movement to a new geographical location, moving from one stage of life to another, involvement in new communities with different dialects, or a change in social status are also likely to affect the acquisition or presentation of different variants from the ones the speaker learns to use in childhood. These are noticeably less simple to grade, with no clear binary boundaries, and may, as in the case of geographical movement and coming into contact with new communities, be linked — although not necessarily so. Lifespan studies utilizing at least two data points from speakers at two different stages in their lives, provide perhaps the best possible data to gain an understanding of language change across the lifespan, allowing researchers to track individual changes in usage alongside those of the community. However, studies of this kind are rare, since the resources necessary for such research are understandably prohibitive.

Such lifespan studies are becoming more plausible with advances in audio-technology and the building up of corpora of speech over long periods. Few speakers, however, have had reason to be recorded regularly over enough time for a comprehensive study of their speech changes to be conducted. One exception is the remarkable and unusual "7 and Up" series of footage recorded by Michael Apted, which has records of 14 individuals recorded at 7-year intervals across a good span of their lives. However, the data are also inevitably incomplete in some aspects: not all of the subjects have been tracked throughout their lives, and their backgrounds and life events are not recorded in extensive detail, making it difficult to relate the development in their speech to particular sets of factors. Sankoff's (2004) study of two such individuals, Neil and Nicholas, brought her to the conclusion that there were observable changes in their usage across time, but she attributes this to them both having "remarkable trajectories of individual linguistic enterprise" (Sankoff 2004:136). She thus regards them as being exceptional in the amount of language change they exhibit. She goes on to cite other

research such as Brink and Lund's (1975, 1979) studies of Danish speakers, and Sankoff et al.'s (2002) investigation of Montreal French speakers, which conclude that change is unusual and that most speakers remain stable throughout their lives (Sankoff 2004).

Differing from the more periodic nature of Sankoff's (2004) study are two that make use of data collected more regularly over a long period of time in very specific situations. A study by Harrington et al. (2000) of the Queen's Christmas broadcasts, and another by Shapp et al. (2014) of Judge Ruth Bader Ginsburg of the New York City Supreme Court make use of audio originally collected for other purposes — for broadcast or for court records — in each case analyzing the speech of a single eminent individual. Both studies relate their investigations to available information on the particular characteristics, position, and circumstances of the person in their specific situation. While such close investigation of an individual means the results cannot be easily and accurately generalized, it provides us with a much more in-depth understanding of language change on the individual level. To such ends, this study also examines the speech of another notable individual in the course of his 60-year-long career as a broadcaster, with the aim of being able to add to, and be compared against, the results of these studies.

1.2 Received Pronunciation

The Received Pronunciation (RP) accent examined in this study has, perhaps owing to its high status and visibility in the media, been the subject of many studies of language change. For a long time, it has been taken to be the "correct" or standard pronunciation in Britain and its colonies, being the variety spoken by the Queen and many other notable public figures as well as the accent of choice of the British Broadcasting Corporation (BBC) for much of its history. As a living accent in daily use it may not be immune to change from its established standards (in a prescriptive sense). Of interest in this regard is Harrington et al.'s (2000) study of the Queen's Christmas broadcasts, in which her vowel quality over three decades of broadcasts is analyzed in order to discern if this most iconic of RP speakers has been influenced by the speech of her subjects.

1.3 Aims

The present study therefore aims to contribute data toward the study of language change in adulthood and to gain insight into the processes and motivations of change from the particular circumstances of a single speaker. This is done through the transcription and analysis of certain phonological and phonetic properties of the speech of the British broadcaster David Attenborough. He has been chosen because a wealth of narrative speech data is available from his public broadcasting work over a very long period. Furthermore, as a representative of the BBC, whose career is or has been associated with his pronunciation, he is an interesting case study against the background of change that has been observed in the prestigious RP accent. His particular circumstances also make him a good subject for comparison with Harrington et al.'s (2000) study, since both of these subjects have a relationship to RP that can be considered an exaggeration of what is spoken among the general public.

2 Methodology

2.1 Speaker and Data Information

The speaker in this study, David Attenborough, is an iconic English broadcaster, naturalist, and speaker of RP. He was born in West London in 1926, but grew up on a university campus in Leicester. His career as a broadcaster began at the BBC in 1954 with his narration of the series *Zoo Quest*, and has since spanned 60 years.

The data for this project has been taken from nature-related documentaries narrated by Attenborough, all of which were produced by or in association with the BBC. Nine different documentary episodes were selected from eight different series with the aim of representing three time periods in Attenborough's career, namely the mid-1950s to mid-1960s, the late 1970s to 1990, and 2000 to the present, henceforth known as the 1960s, 1980s, and 2000s, respectively. From each of these documentaries, an excerpt averaging 7 minutes and 44 seconds was taken for a total of nine short clips.

Each clip was transcribed using ELAN (Brugman and Russel 2004) and then put through FAVE-align (Rosenfelder et al. 2011) in order to align each sound segment with the transcribed text. Vowel formant values were then obtained using FAVE-extract (Rosenfelder et al. 2011), while consonantal variables were coded impressionistically using the handCoder script (Fruehwald 2011) on Praat (Boersma and Weenink 2014). The details of the clips are provided in Table 1.

Table 1: Details of documentary excerpts

Year Group	Year	Age	Title of Documentary	Length
1960s (11 years)	1955	29	Zoo Quest to West Africa	6 min 59 s
	1961	35	Zoo Quest to Madagascar (Episode 1)	6 min 59 s
	1965	39	Adventure Zambezi: Livingstone's River	7 min 1 s
1980s (12 years)	1979	53	Life on Earth: Lords of the Air	6 min 49 s
	1984	58	The Living Planet: The Baking Deserts	7 min
	1990	64	The Trials of Life: Living Together	7 min
2000s (8 years)	2003	77	The Life of Mammals: Food for Thought	10 min 18 s
	2007	81	Life in Cold Blood: Sophisticated Serpents	7 min 18 s
	2010	84	A Living Fossil: David Attenborough's First Life	7 min 10 s

2.2 Features under Study

This paper focuses on two specific features of pronunciation, namely t-glottaling and the TRAP/STRUT vowel distinction, which are known to have shifted across time in RP. Whether the shifts can be observed in a single prominent speaker within the same time period is the question explored in this study.

T-glottaling refers to the realization of /t/ in certain environments as non-standard /ʔ/ where the standard pronunciation is /t/. The incidence of the form has been found to have increased in RP over the course of the 20th century, with glottalized /t/ having been documented as a variant since the mid-20th century in environments where /t/ preceded an obstruent or sonorant in the following syllable or word. In the late-20th century, t-glottaling was found to also occur in RP in absolute final position preceding a pause, and in word-final position even where the following segment is not a vowel. Although t-glottaling is perhaps most famous in Cockney, where it often occurs in intervocalic word-medial position, this is not a known feature of RP (Wells 1997). In this study, /t/ has been coded with respect to two variants, non-/ʔ/ and /ʔ/, in order to determine the pattern of glottalization in Attenborough's usage.

The TRAP/STRUT vowel distinction is one that has been previously found to be getting smaller in RP (Wells 1982). The vowels in question correspond to /æ/ and /ʌ/ in the International Phonetic Alphabet, and AE and AH in ARPAbet, which was the required transcription code of the software employed in this study. The two will be analyzed separately before being compared and addressed together using normalized data obtained through FAVE-extract in order to eliminate differences resulting from anything other than actual shifts in formant values. It is widely agreed that /æ/ has become more open in the 20th century (Gimson 1966, Wells 1982), while changes in /ʌ/ are less definite (Bauer 1985).

This paper will also briefly look at non-normalized vowel formant values across the year groups in order to get a sense of the range of data obtainable from a single speaker's recordings spanning long periods, and to discuss the possibility of identifying age-related physiological changes and how these may impact on the overall perceived changes in a speaker's phonological features.

3 Findings

3.1 T-Glottaling

Taking as possible environments all word-medial and word-final instances of /t/, we find that throughout the data the incidence of t-glottaling is low (Table 2).

Table 2: Variants of /t/ by time period

	1960s	1980s	2000s
/ʔ/	11%	6%	8%
not /ʔ/	89%	94%	92%
N	503	405	532

The amount of t-glottaling ranges between 11% and 6%, so although it is never highly prevalent in Attenborough's speech, it seems that /ʔ/ is a variable available to him. However, it is unclear from Table 2 if the differences in the level of t-glottaling observed translate to a significant change in his usage of the non-standard variant. Furthermore, there are many other independent variables outside of the time period that could have affected the rate of t-glottaling. A multivariate analysis was therefore conducted using Rbrul (Johnson 2014) in

R (R Core Team 2014) to examine the effects of time period (year group), the location of /t/ in the word, the word class, word, preceding segment, preceding segment type (vowel or consonant), following segment, and following segment type (vowel, consonant, or pause):

```
BEST STEP-UP MODEL OF RESPONSE Dep_Var IS WITH PREDICTOR(S): Word [random, not
tested] and Following.segment.type (1.59e-14) + Position_in_Word (2.04e-08) +
Year.Group (0.0054) + Preceding.segment.type (0.0276) + Word_Class (0.0153)

[p-values building from null model]

BEST STEP-DOWN MODEL OF RESPONSE Dep_Var IS WITH PREDICTOR(S): Word [random, not
tested] and Following.segment.type (1.77e-15) + Position_in_Word (1.29e-07) +
Preceding.segment.type (0.00766) + Word_Class (0.0153) + Year.Group (0.0337)

[p-values dropping from full model]

STEP-UP AND STEP-DOWN MATCH!
```

Figure 1: Results of multivariate analysis of independent factors affecting t-glottaling, /ʔ/=1.

The results of the multivariate analysis (as shown in Figure 1) suggest that the word, word class, position in word, time period, preceding segment, and following segment all have an effect on determining the probability that /ʔ/ is used by Attenborough. First, the time period shows a significant influence: /ʔ/ is more likely in the 1960s than the 1980s, although by the 2000s it is less apparent which way the trend is going. It is notable that the actual preceding and following segments do not seem to be a strong factor, possibly due to their large numbers. Factor weights for word-final position, modifier words (number, adverbs, and adjectives), and being followed by a consonant are high, suggesting that these are the environments in which most of the glottaling occurred.

To eliminate the effect that classification into year groups could have on the accuracy of the data analysis, the factor of year was also run through Rbrul. No significant relationships were found between the specific year and the features under analysis. In contrast, significant differences have been found between the year groups, meaning that year on year differences in Attenborough's usage were insignificant, but clear differences could be distinguished in his speech from different periods in his life.

3.2 TRAP/STRUT Vowels

The number of instances of the TRAP vowel that were found in Attenborough's recordings were much greater in the 1960s data (*n*=146) than in the 1980s (*n*=63) or the 2000s (*n*=94), but there were enough instances in each case for a useful analysis.

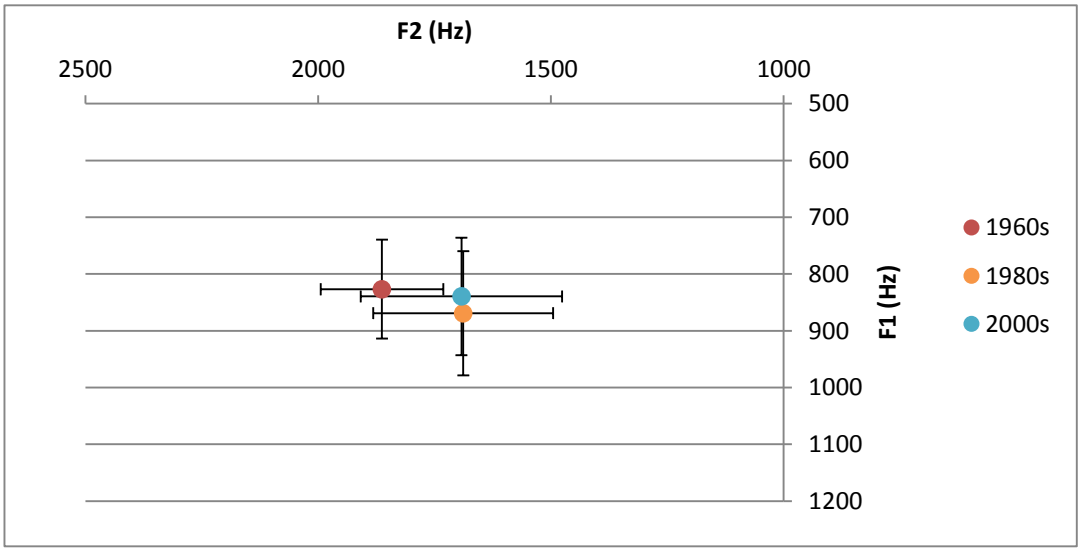

Figure 2: Formant averages for TRAP, categorized by year group.

The average values and standard deviations of the formants of TRAP tokens plotted in Figure 2 show that the /æ/ of the 1960s is more front and slightly higher than the values of the 1980s and 2000s, so much so that it appears the later averages may be entirely outside the range seen in the 1960s (see Table 3). A Student's T-test

of the data corroborates this, with significant results obtained for both formants between the 1960s (p<0.05) and 1980s (p<0.05). No significant difference was found between the formant values of the 1980s and the 2000s, and a comparison of the 1960s with the 2000s found that only the F2 value significantly differed (p<0.05) (see Table 4).

Table 3: Averages and Standard Deviations for TRAP vowel formants, categorized by year group

Year	F2 avg	F2 stdev	F1 avg	F1 stdev
1960s	1863	131	827	87
1980s	1688	193	869	110
2000s	1692	217	840	104

Table 4: Student's T-test of TRAP vowel formants, categorized by year group

Year 1	Year 2	F2	F1
1960s	**1980s**	1.05 E-12	0.003
1980s	**2000s**	6.73 E-13	0.307
2000s	**2000s**	0.906	0.089

The results indicate that while there has been a clear centering of this front vowel between the 1960s and the 1980s, the change appears to have been complete by the 1980s and does not extend further into the 2000s. The direction of its vertical movement is less clear, with what appears to have been a lowering between the 1960s and the 1980s, which was then reversed somewhat in the 2000s.

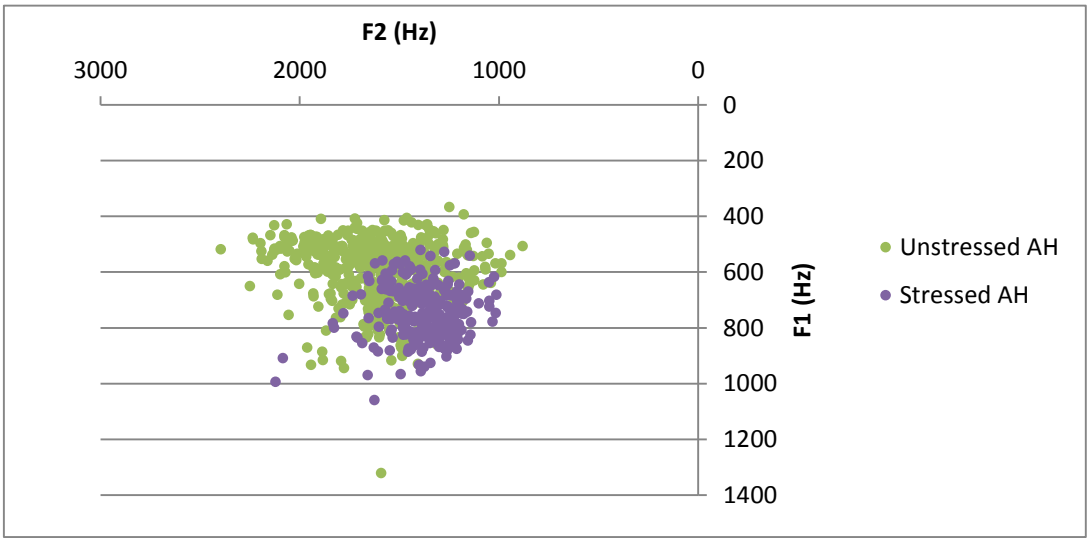

Figure 3: Formant tokens for STRUT (ARPAbet "AH"), categorized by stress.

The STRUT vowel presented more difficulty, owing to the way that the vowels had been coded in earlier stages of the study. Since the ARPAbet utilized by FAVE-align did not have a separate representation for the phoneme /ə/, all instances of this vowel were collapsed together with the STRUT vowel AH, which normally represents /ʌ/. This means that among the data for the STRUT vowel is a considerable number of /ə/, or AH0, which Figure 3 shows us to be differently patterned. Only stressed instances of the STRUT vowel are considered in the following analysis.

Table 5: Averages and Standard Deviations for STRUT vowel formants, categorized by year group

Year	F2 avg	F2 stdev	F1 avg	F1 stdev
1960s	1380	154	753	105
1980s	1368	140	758	83
2000s	1386	182	729	91

Table 6: Student's T-test of STRUT vowel formants, categorized by year group

Year 1	Year 2	F2	F1
1960s	1980s	0.604	0.766
1980s	2000s	0.811	0.086
2000s	2000s	0.497	0.042

The number of instances of stressed /ʌ/, i.e., of AH1 and AH2, were more evenly distributed across the 1960s (n=97), 1980s (n=64), and 2000s (n=99) than TRAP. Unlike TRAP, the STRUT vowel presents very little change, and the formant averages for all three periods are within 50Hz of each other, as Figure 4 illustrates.

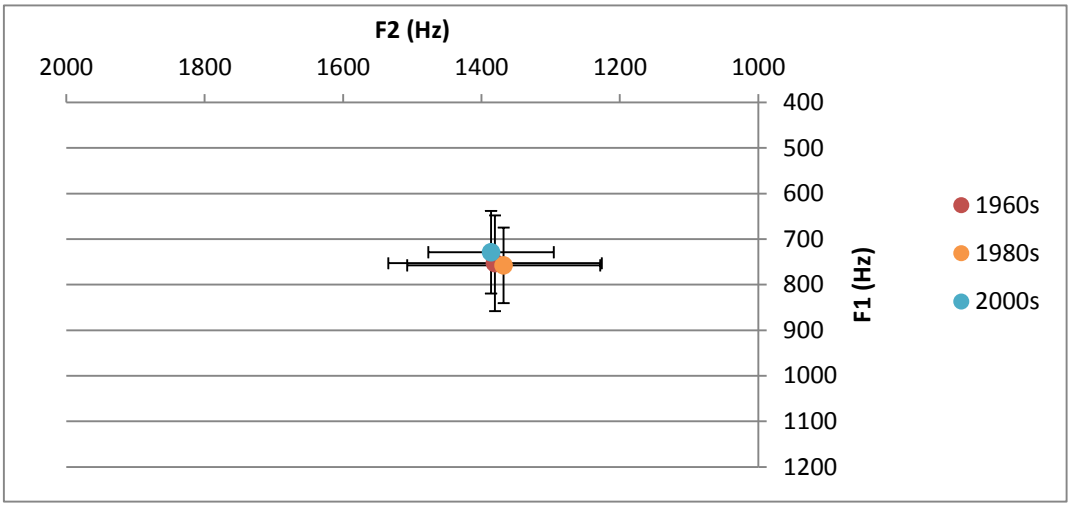

Figure 4: Formant averages for STRUT (ARPAbet "AH"), categorized by year group.

A T-test of the data values gives us the same result: none of the values among any of the years are significantly different from each other (p>0.05), with the exception of F1 between the 1980s and the 2000s (p<0.05) (see Tables 5 and 6), where there appears to have been a small but significant raising of /ʌ/.

The TRAP and STRUT vowels have been plotted in Figure 5 to establish their relative positions in space to each other. They are quite clearly distinct. It is therefore difficult to tell from this initial view if their relationship to each other has changed. In order to quantify the TRAP/STRUT distinction, I have used a simple mathematical measure treating the F1 and F2 formants as a plane such that a straight-line distance between two vowels in the same time point can be taken. This is represented in Figure 5 by the line linking the points of each year group.

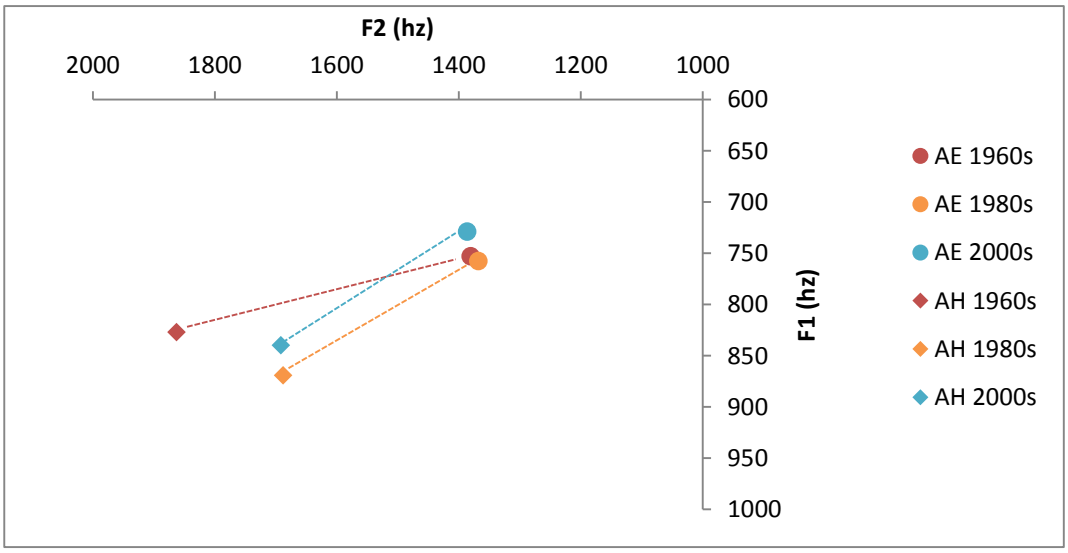

Figure 5: Distances between TRAP and STRUT averages, categorized by year group.

The distance between the TRAP and STRUT vowels is 488 units in the 1960s, 338 units in the 1980s, and 325 units in the 2000s. This measure is also used in Fabricius (2007), where she accompanies it with a description of the angle of TRAP to STRUT. This second measure is not attempted here, where I seek only to establish if change is occurring, and if so, the direction it is occurring in.

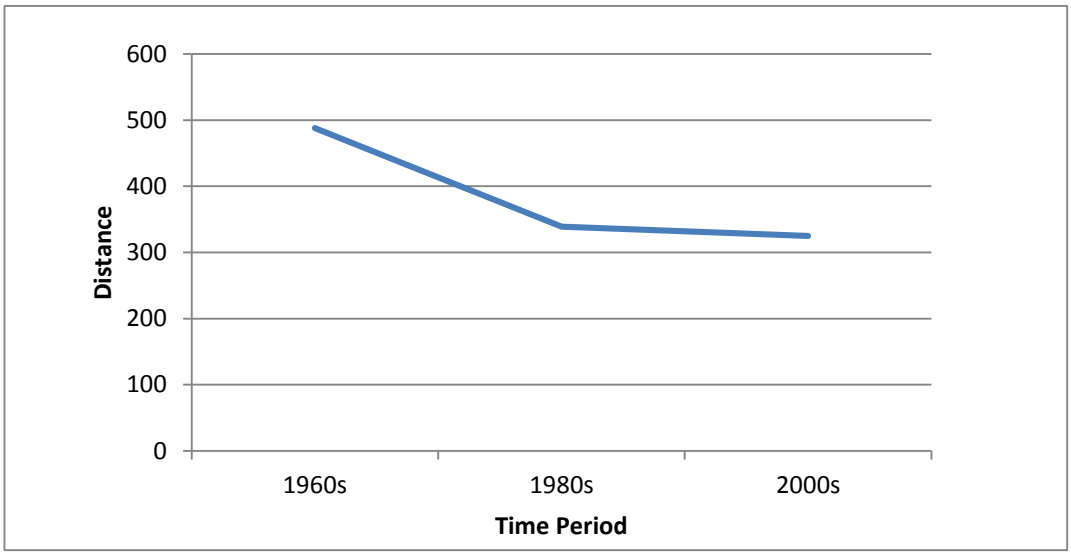

Figure 6: Planar distance between TRAP and STRUT averages, across year groups.

These imagined planar values have been plotted in Figure 6. There appears to be a downward trend in the distance between the TRAP and STRUT vowels in that they appear to have got closer to each other, particularly between the 1960s and the 1980s. However, this only represents what could possibly be a pattern, and further testing would be required to determine if the decrease was of significance. What is certain is that Attenborough's TRAP and STRUT vowels have not coalesced and remain phonologically distinct.

3.3 Non-normalized Formant Comparisons for all Vowels

In this section, I give a short overview of the non-normalized vowel formant values as presented in Figure 7. The ellipses in the figure encircle the same vowel, or in the case of AH, ER, and OW, a group of vowels, throughout the time period. While not intended to provide any scientific measure, this allows us to visualize the range of movement of the vowels in formant space. Many vowels seem to have shifted considerably. While a comprehensive examination is not possible here, some general patterns are worth pointing out.

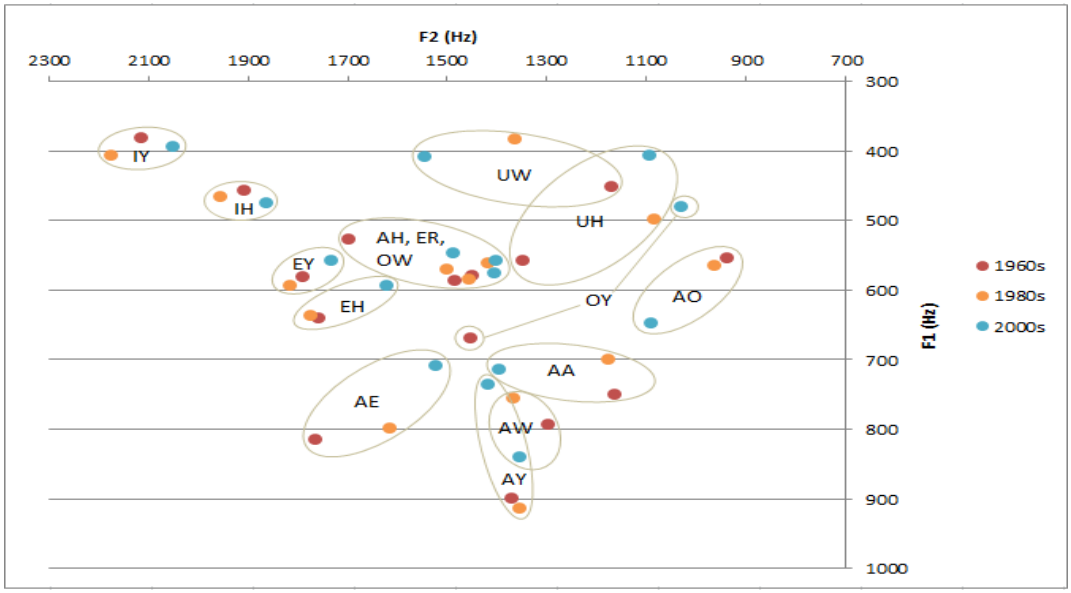

Figure 7: All vowel averages by time period.

First, the high- and mid-front to central vowels (IY, IH, EY, and EH) undergo much smaller changes than all the low and back vowels. The pattern within this group is such that the formant values of the 1960s fall between those of the 1980s and 2000s, where those of the 2000s are more central than the more fronted 1980s' vowels. There seems to be no clear pattern linking the low and back vowel shifts.

Second, there seems to be a cluster of three vowels that are undifferentiated in the accent: ER, AH, and OW. Of the three, OW, which is a diphthong, forms a trend line from the outlying 1960s point to within the cluster, backing and lowering considerably over time to end up mixed with ER and AH.

Third, the vowel formant values of the 2000s are generally clustered nearer to the center than the values from other periods — this is true of all vowels except AW, UH, and OY.[1]

4 Discussion

In line with the trend in RP, Attenborough's /æ/ has become more open, although only slightly and not conclusively, since the difference between his 1960s' and 2000s' production is not significant. This is in contrast to the findings of Harrington et al. (2000), whose study of the Queen's Christmas broadcasts found her /æ/ opening over a period of 30 years, following trends in wider RP usage. However, there is also little evidence here that /ʌ/ has fronted or indeed changed at all, although it seems that there has been a comparable decrease in the distinction between the two vowels.

Where RP has seen more t-glottaling we find only a generally low usage of /ʔ/ in the data, likely because the register for narration is a formal one and the non-standard variant would therefore be unsuitable for use in broadcasting, where social expectations are likely to prefer the prescriptive standard. This does not, however, discount the fact that Attenborough could well have a less formal register in which more usage of the non-standard /ʔ/ might occur, or indeed even be preferred. The study can only therefore claim that his use of RP accent is relatively stable in terms of t-glottaling as compared to that of the wider community. In the cases where t-glottaling is evident in the data, there is no deviation from the usual RP preference for word-final glottaling over intervocalic glottaling.

None of these observations are unexpected, given Attenborough's position almost as a steward of the traditional accent features. Interestingly, a comparison with Harrington et al.'s (2000) study finds Attenborough to be arguably more conservative than the Queen, at least in terms of the vowel qualities of the TRAP and STRUT vowels. Although in both studies the style of the broadcast has remained fairly constant and both subjects are distinguished speakers of RP with far-reaching influence, Attenborough's speech is directly linked to his livelihood, while the Queen's seat, rather than her speech, is what imbues her with authority. A BBC broadcaster could plausibly be seen to be of lesser ilk if his accent is observed to falter and become altered by more widespread trends, whereas the Queen is highly unlikely to seem less royal for small changes in pronunciation that match the direction of changes in the general populace. In this way, perhaps, Attenborough has the greater impetus to maintain the accent in the face of change. Also, while the Queen's broadcasts are primarily for British citizens, Attenborough's documentaries have enjoyed a wide viewership worldwide, and it is possible that he may find the geographically neutral and widely recognized character of traditional RP to be a continued advantage outside of the UK.

In contrast, Shapp et al.'s (2014) study of Ginsburg finds her to be increasing her usage of a "more stigmatized" raising of the THOUGHT vowel at the same time as this seems to be in decreased use in the general population, unlike the Queen and Attenborough, who make minimal or no change toward the usage behaviors of their surrounding community. The authors suggest that Ginsburg's change patterns are indicative of her change in social position: as a judge in power she has no need to converge toward the norm. This is quite unlike the social circumstances of the Queen and Attenborough, who both produce their recorded material for public consumption. They are thus held more accountable for their speech, while linguistic capital is not as salient for a woman in Ginsburg's position. This comparison helps us recognize the multiplicity of forces that may be affecting the speech of the individual, and which cause them to change or to resist change.

With regard to the general vowel centering in the 2000s, I suspect, on an anecdotal basis, that this could be due to the processes of aging: Attenborough's enunciation in narration is distinctly less sharp in these documentaries, even to the naked ear. It is possible that aging has resulted in lessened dexterity of the tongue through physical and neurological degradation such that vowels are more often forcibly produced nearer the center of the mouth and the tongue moves less. Age-related speech differences are known to exist: Xue and Hao's (2003) investigation of the vocal tract in young adults and the elderly finds a significant increase in vocal tract volume and a consistent lowering of formant frequencies for many vowels in the elderly compared to young adults. Other studies have also found differences between the speech of younger and older adults, for example, Hoit and Hixon's (1987) study of age and speech breathing finds differences in lung capacity-related

[1] Note that there are no instances of OY for the 1980s and only a single value of OY for the 2000s. All other vowels have a larger amount of data.

measures such as the number of syllables produced per breath, which no doubt affects the production and acoustic properties of speech. While it is not a new area of study, this interface between gerontology, biology, and linguistics will no doubt benefit from more study that enables us to better tease apart physiological changes from possibly sociolinguistic ones.

Seductive though the notion of uncovering age-linked vowel changes is, however, we cannot discount the possibility of confounds such as advances in recording technology and video quality affecting the non-normalized data, although the sound quality should logically get clearer rather than muddier.

5 Conclusion

Although this study has found limited change in an individual's speech corresponding to change in the direction of the community, there is no doubt that it can be found within the lifespan of a single individual, although its true causes may be difficult to discern. David Attenborough's individual patterns of language change could be due to a combination of changes in his social surroundings, psychology/attitudes, or physiology of age, as well as other changes in his environment that are not immediately available to the purview of the general public. Among other things, his marriage, the birth of his children, and his changing relationship with the BBC could register as major events, which might consequently have had some degree of effect on his language. The main idea is that we cannot actually discard any multitude of factors as implausible on the whole. What means nothing to one person, could be life-changing to another and could therefore manifest itself in the speech patterns of an individual.

Separating the effects of each possible factor remains a goal that proves elusive, and only more studies of different speakers in different situations can help to tease apart the complicated linguistic, social, and physiological factors that together bring about the language change that we are able to observe.

As with Sankoff's (2004) study of Neil and Nicholas, what we have here is another speaker whose life has been quite different from the everyman's. Very few people have had occasion to regularly broadcast over a period of more than 60 years, and the exceptional Sir David Attenborough is one of them. It is hoped that through this very preliminary examination of only a fraction of his contributions to the genre of wildlife documentary, we are able to glimpse also a snippet of the barely explored, beckoning field of language change across the lifespan.

References

Bauer, L. 1985. Tracing phonetic change in the received pronunciation of British English. *Journal of Phonetics* 13(1):61–81.

Boersma, Paul, and David Weenink. 2014. Praat: Doing phonetics by computer [Computer program, Version 5.4.02]. Accessed 15 September 2014, URL http://www.praat.org/

Brugman, Hennie, and Albert Russel. 2004. Annotating multimedia/ multi-modal resources with ELAN. In *Proceedings of LREC 2004, Fourth International Conference on Language Resources and Evaluation*, ed. M. T. Lino, M. F. Xavier, F. Ferreira, R. Costa, and R. Silva, 2065–2068. Paris: European Language Resources Association.

Cameron, Deborah. 2003. Gender issues in language change. *Annual Review of Applied Linguistics* 23:187–201.

Fabricius, Anne H. 2007. Variation and change in the TRAP and STRUT vowels of RP: A real time comparison of five acoustic data sets. *Journal of the International Phonetic Association* 37(3):293–320.

Fruehwald, Josef. 2011. handCoder [Praat script]. Accessed 30 September 2014, URL http://val-systems.blogspot.co.uk/2011/02/hand-coder-praat-script.html

Gimson, A.C. 1966. *An Introduction to the Pronunciation of English*. London: Edward Arnold.

Harrington, Jonathan, Sallyanne Palethorpe, and Catherine Watson. 2000. Monophthongal vowel changes in Received Pronunciation: An acoustic analysis of the Queen's Christmas broadcasts. *Journal of the International Phonetic Association* 30(1-2):63–78.

Hoit, Jeanette D., and Thomas J. Hixon. 1987. Age and speech breathing. *Journal of Speech, Language, and Hearing Research* 30(3):351–366.

Johnson, Daniel E. 2014. Rbrul [R script, Version 2.25]. Accessed 15 October 2014, URL http://www.danielezrajohnson.com/rbrul.html

Labov, William. 2006 [1966]. *The Social Stratification of English in New York City*. Cambridge, UK: Cambridge University Press.

R Core Team. 2014. R: A language and environment for statistical computing [Computer software]. Accessed 15 October, URL http://www.R-project.org/

Rosenfelder, Ingrid, Joe Fruehwald, Keelan Evanini, and Jiahong Yuan. 2011. FAVE (Forced Alignment and Vowel Extraction) [Computer program suite]. Accessed 1 October, URL http://fave.ling.upenn.edu

Sankoff, Gillian. 2004. Adolescents, young adults and the critical period: Two case studies from 'Seven Up'. In *Sociolinguistic Variation: Critical Reflections*, ed. C. Fought, 121–139. New York: Oxford University Press.

Shapp, Allison, Nathan LaFave, and John Victor Singler. 2014. Ginsburg v. Ginsburg: A longitudinal study of regional features in a Supreme Court Justice's speech. *University of Pennsylvania Working Papers in Linguistics* 20(2):149–158.

Wagner, Suzanne E. 2012. Age grading in sociolinguistic theory. *Language and Linguistics Compass* 6(6):371–382.

Wells, J.C. 1982. *Accents of English*. Cambridge, UK: Cambridge University Press.
Wells, J.C. 1997. Whatever happened to Received Pronunciation? In *II Jornadas de Estudios Ingleses*, ed. C. Medina and P. Soto, 19–28. Spain: Universidad de Jaén.
Xue, Steve A., and Grace, J. Hao. 2003. Changes in the human vocal tract due to aging and the acoustic correlates of speech production: A pilot study. *Journal of Speech, Language, and Hearing Research* 46(3):689–701.

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