The perception of word-final t-glottaling in RP by Polish learners of English

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1. Introduction

The glottal stop functions in many languages worldwide, including English. In the accents of English on the British Isles it is frequently used as a complete replacement for voiceless stops, as in *water* [wɔːʔə], which is known as t-glottalling (Wells, 2008a). This is generally distinguished from glottal reinforcement, or glottalisation, which is the insertion of a glottal stop not instead but before a consonant, as in *beat* [biːʔt]. This paper focuses on the former process and a particular position it occurs in – word-finally, as in *start* [staːʔ].

There is general agreement that the glottal stop as a variant of /t/ is steadily making its way into Received Pronunciation, the pronunciation model for the educated English and the reference accent for EFL teaching (Trudgill, 2008: 10; Wells 2008a; Cruttenden, 2008: 81-82). Because of the link t-glottalling has with the basilectal varieties of British English (Trudgill, 2008: 9), its use in RP tends to be stigmatised (Cruttenden, 2008: 82). It seems that t-glottalling, with its connotations of the working class and slovenly, debased speech of the younger generations, is an innovation that is not welcomed warmly by some native speakers. Although there has been a considerable amount of research into the occurrences and status of t-glottalling in accents of British English, the present author knows of no previous research that would concentrate on the perception of this process by Polish EFL learners.

2. Speaker-friendly lenition – listener-unfriendly fortition

From the phonetic point of view, t-glottalling is an example of debuccalisation. Harris (1994: 120) describes it as "the loss of the coronal gesture, with the residual reflex being realized with the glottal stricture". In other words, there is no articulatory movement of the tongue and the stop changes its place of articulation from oral to glottal. Fabricius (2000: 21) notes that the lack of the tongue movement classifies it as a speaker-friendly lenition.

As far as the listener is concerned, although the articulation of the voiceless alveolar plosive changes from oral to glottal, the phonemic sound structure remains the same. Thus, the native listener of English manages to perceive the difference between short realised as [ʃɔːt] and [ʃɔːʔ]. Obviously, in real life utterances are never analysed out of context, but from an acoustic standpoint, the listener who wants to reconstruct the intended message of the speaker relies partly on internal and transitional cues in the speech signal (Strange, 1989:

2081-2084; Ladefoged, 2011: 198-202, 204). In the case of word-final /t/, the first category includes the stop closure, while the second comprises formant changes during the offset of the preceding vowel and, as some would argue, the release burst (Jun, 2004: 5). In a VC utterance, changes in vowel formants occur because the tongue is moving from a vocalic position to a consonantal position before the vocalic segment has been completely pronounced. This information is encoded in the acoustic signal and provides a valuable place cue for the listener.

But even though a debuccalised /t/ retains an important internal cue, i.e. the stop closure, the abovementioned transitional cues are absent from the signal because there is no tongue movement to produce formant changes and the noisy release burst. The listener can only rely on what Cruttenden (2008: 179) describes as "the sudden cessation of the preceding sound", or word-final creaky voice, as vocal folds are being put together for the glottal stop while still vibrating. This, however, may not be enough for the non-native listener to retrieve the message of the speaker from the acoustic signal.

3. Hypotheses

We assume that the debuccalisation of (t) affects the perception of English speech by Polish learners of English. This should be the case for a couple of reasons. To start with, Poles do not possess a glottal allophone in their inventory. They produce the sound in speech, but it is associated with the production of vowels, not consonants. In Polish it is possible to reinforce a word starting with a vowel with a glottal stop. This is called hard attack and it is also one of the possibilities of using the glottal stop in English, although its use is optional and normally used for adding emphasis, as in *She's* [ʔ] *awfully good* (Cruttenden, 2008: 179). Moreover, a [ʔ] is arguably less perceptually salient than a [t] due to the loss of transitional acoustic cues, especially the release burst, and Poles tend to experience problems with the perception of glottalised English speech (Sobkowiak, 2001: 99).

The second purpose of the study is to see if, having studied the language for almost 3 years, third-year students will have an advantage in terms of the perception of the glottal stop over first-year students.

Third, the experiment will try to determine whether the changing vowel length in such pairs as *great* vs. *grey*, or *seat* vs. *see* leaves any clue to the listener as to whether a word ends with a vowel or a consonant. In Polish, unlike in English, there is no shortening of vowels before voiceless stops, which may hinder Polish-English communication (Sobkowiak, 2001: 130, 192-196). Therefore, in a VC utterance a word-final [ʔ] preceded by a long vowel may render a word even more unintelligible or ambiguous.

4. Method

The experiment referred to throughout this work was part of a paper submitted in partial fulfilment of the requirements for the degree of Bachelor of Arts at the Adam Mickiewicz University (Łodzikowski, 2010). The experiment relied on an electronic questionnaire with questions referring to accompanying speech samples.

Students' task was to listen to speech samples and decide which word or phrase they heard. The survey was put up as a limited-access course on Moodle, the free e-learning platform used by the AMU School of English. Moodle automated the data gathering process and provided the fastest way possible to enter the questionnaire results into a database. All of the respondents participated in the experiment online in private. They could replay the samples as many times as they wanted. They were advised to use headphones.

The questionnaire comprised 24 questions, including five demographic questions, 16 experimental questions and three questions left blank for comments. Each experimental question was accompanied by a short sound file. This part of the survey was presented in the form of a multiple choice test with one correct answer and consisted of 3 types of questions:

- 10 speech samples containing a [ʔ] word-finally after a long vowel or a sequence of vowels (/iː/, /eɪ/, /aɪ/, /aʊ/, /aɪə/) or after a short vowel (/ɪ/, /æ/, /ɒ/, /ə/, and in one case /ən/), and providing as possible answers words ending with a vowel or a (t); e.g. for [greɪʔ] the respondents could choose between *great* and *grey*;
- 3 speech samples not containing a [ʔ] word-finally and ending with a long vowel a sequence of vowels instead (/iː/, /eɪ/), but again providing as answers words ending with a (t) or without it; e.g. for the word /deɪ/ the options included *Dave*, *date* and *day*;
- 3 distractors, disregarded in the analysis.

As illustrated by the examples above, for each word or phrase the respondents could choose from a set of words that differed by as few phonological features as possible. The experimental words were presented either on their own, or embedded in the context of short phrases. The full list of questions is provided in the questionnaire in Appendix A.

5. Stimuli

As stimuli, this study uses samples of running speech taken from two video interviews with Prince Henry of Wales, who could be classified as a modern speaker of RP. Whereas the speech of this young and educated speaker exhibits some features typical of modern RP, he is also known for his extensive t-glottalling (Wells, 2008b). It is crucial to note that there is considerable disagreement about the definition of RP, or even the name itself. Rather than trying to define what RP is or is not, the present author decided that the pronunciation of Prince Henry falls within the definition of RP as an accent that is social- and education-based rather than location-based (Cruttenden, 2008: 76).

First, he is a member of the Royal Family and received the education expected of someone of his social status. Second, the fact that he adopted t-glottalling, perhaps in order to sound more modern or fashionable, does not automatically make him a non-RP speaker. As Trudgill (2008: 12) pointed out, "[w]e do not say that because the royal princes use T Glottalling, they are speaking Cockney. We say that, because the royal princes use T Glottalling, T Glottalling has now become a feature of RP." Third, the t-glottalling environments in his speech corresponded to the general description of such environments in RP by Wells (2008a). Prince Henry glottalled syllable-finally and word-finally after a vowel or a sonorant and before an obstruent, nasal or a semivowel.

A detailed analysis of the environments in which t-glottalling occurred in the speech samples used for the experiment is shown in the table in Appendix B.

The audio-visual files with the interviews were obtained from the Internet. The first interview was conducted and published by the Guardian in March 2008. The second one was broadcast by NBC in June 2007. After a thorough impressionistic analysis of both interviews, the utterances that matched the experimental requirements were exported as MP3 files (192 kbps, 44.100 kHz). Loud and soft parts of the recordings were evened out with dynamic range compression.

6. Subjects

The respondents were 15 first-year students (henceforth 1 BA) and 15 third-year students (henceforth 3 BA) at the AMU School of English. All the subjects in the sample were females. Their average age was 21.1 years old. On average the participants had been studying English for 11 years, 4 years being the minimum and 16 years the maximum value. Almost half of them had never been to any English speaking country. For those who had, the average visit duration was two weeks. The subjects were picked at random from 3 first-year and 4 third-year groups of students.

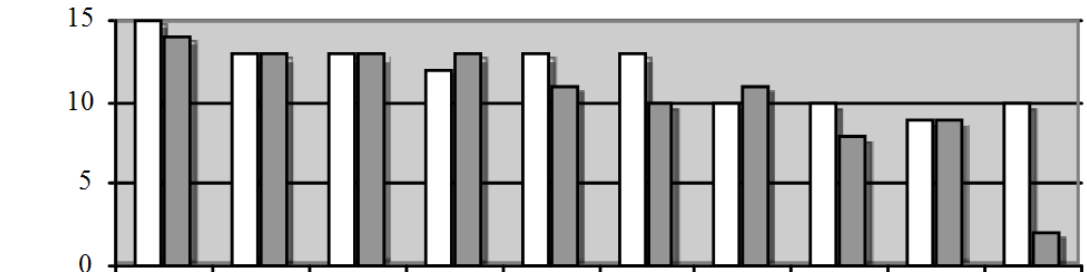
The English programme at the School of English is recognised as excellent and its students are highly proficient in EFL. At the time of taking part in the experiment, the 1 BA students had already acquired some practical and theoretical knowledge of English segmental phonetics, while the third-year students' skills of English pronunciation had already been tested by two end-of-year examinations.

7. Analysis of results

The perception tests confirmed the first hypothesis that t-glottalling has a marked negative influence on the students' perception of English. Only 65% of all students correctly identified the words in the set of 13 questions. For a total of 390 answers submitted by the 30 respondents, 272 were correct, that is the respondents pointed to the right word or phrase spoken by the speaker. The remaining 118 answers were incorrect.

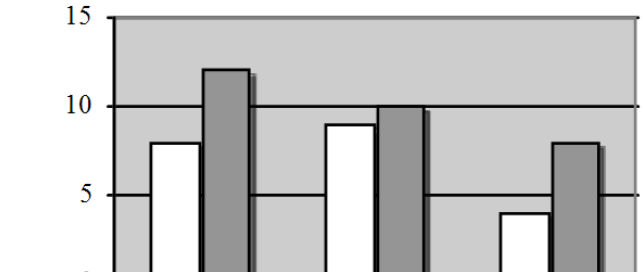
Regarding the distribution of answers among the 1 BA and 3 BA students, the former answered correctly in 71% of cases, and the latter in 68%. The first-year students scored higher than the other group in 7 questions, while the third-year students performed better 4 times. Twice both groups answered in the same way. Unexpectedly, the 1 BA students were slightly more successful than their older colleagues, despite being supposedly less experienced. Even though for this preliminary study the differences observed in the data were not statistically significant at p=.05 (Chi-square test), one would expect visibly better performance on the part of the 3 BA students. This might have been caused by the uneven distribution of classes devoted to the theoretical and practical aspects of English pronunciation in the BA programme at the AMU School of English. All first-year students take a course in the descriptive grammar of English, which focuses mainly on phonetics, and attend pronunciation practice classes, which extend to their second year. Those two courses are no longer on

the third-year curriculum. It might be the case that the 3 BA students' performance improved with practice over the course of the first two years at the School and they got out of practice in their third year.



	it	dif-ferent	hate	quiet	great	not	out	seat	but	that
1 BA	15	13	13	12	13	13	10	10	9	10
3 BA	14	13	13	13	11	10	11	8	9	2

Chart 1. The number of students in each year that successfully recognised words with a word-final glottalled (t).



	day	be	my
1 BA	8	9	4
3 BA	12	10	8

Chart 2. The number of students in each year that successfully recognised words with no word-final glottalled (t).

The discrepancy between the two groups, however, was not clear-cut. The distribution was uneven when it comes to the successful recognition of the two question types. Regarding the speech samples that contained a glottalled (t) word-finally, the 1 BA students' correct answers constituted 53% of both groups' correct answers, while the 3 BA students' correct answers formed the remaining 47% (see Chart 1 for a detailed description). The first-year students, however, performed worse at recognising words without a word-final glottal stop, scoring 41%, as opposed to 3 BA's 59% (see Chart 2). Perhaps the 1 BA students were better at perceiving [ʔ] only there where it really was present because they expected it everywhere in an accent that exhibited t-glottalling along the lines of Cockney, and could not tell the difference between its presence and absence. For these reasons, the results are difficult to interpret and the second hypothesis should be tested again on a larger group of respondents.

As far as the perception of t-glottalling after long and short vowels is concerned, there were little differences between the two environments. 52% of all the correct indications were for a [ʔ] after a long vowel or a sequence of vowels, compared with 48% for a [ʔ] after a short vowel. That proved to be one of the most difficult words from the set with the glottal stop, especially for the 3 BA students. The respondents had least problems with it. As the difference between the perception of t-glottalling after long and short vowels was insignificant, the third hypothesis is rejected, although it should be tested again on a larger sample to see if this was not due to chance.

8. Conclusion

Recent decades have seen a rise in the occurrence frequency of t-glottalling in Received Pronunciation. The potential articulatory benefits of this weakening for the native speaker of English contrast with the auditory challenges it presents for the Polish listener. The aim of this preliminary study was to see how Polish learners of English perceive t-glottalled speech. Thirty students listened to short audio files containing words and phrases excised from interviews with a prototypical young British speaker from the upper classes who relies heavily on t-glottalling, and completed a questionnaire.

The experiment proved that word-final t-glottalling causes difficulties in the perception of English speech. The first-year students performed visibly better at recognising the speech samples with a glottalled (t). For the speech samples that deliberately lacked a (t) in any form, there was a discrepancy between the students from the first and third year to the advantage of the latter. Although the study does not disprove the relation between the amount of time studying English at the university level and the successful perception of t-glottalling, further research is needed to see whether or not the results were due to chance. There was no statistically significant difference between the perception of a [ʔ] preceded by a long or short vowel. Due to the statistical insignificance of the results, the study remains inconclusive but provides a starting point for further research on a larger scale.

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Appendix A: Questionnaire

[The headers classifying a question as a distractor or a target are provided only here for reference. The correct answer is highlighted in bold. Demographic questions are omitted. The question accompanying all the samples was: "Listen to the sample. What did the speaker say? Choose the correct option".]

You are about to respond to a questionnaire on an accent of English. You will be asked to listen to 16 short recordings and decide what the speaker said. The questionnaire is short and simple, it will take you about 5 minutes to complete it.

1. Distractor 1
    a. way
    b. boy
2. Glottal Stop 1
    a. great
    b. grave
    c. grey
3. Glottal Stop 2
    a. choir
    b. quiet
4. No Glottal Stop 1
    a. might sleep
    b. my sea
    c. might see
5. Distractor 2
    a. get back home and make sure it's all right
    b. get back home and make sure things are all right
6. Glottal Stop 3
    a. putting on a pot
    b. put it on a pot
7. Glottal Stop 4
    a. final
    b. find now
    c. find out
8. Distractor 3
    a. I really could punch
    b. a really good bunch
9. Glottal Stop 5
    a. there are many a way or something like that
    b. that arm anyway or something like that
10. No Glottal Stop 2
    a. Dave
    b. date
    c. day
11. Glottal Stop 6
    a. amber
    b. ember
    c. um but
12. Glottal Stop 7
    a. notches
    b. not just
    c. noxious
13. No Glottal Stop 3
    a. beep
    b. beat
    c. be
14. Glottal Stop 8
    a. seat
    b. see
15. Glottal Stop 9
    a. I have to say it
    b. I have to say
    c. I hate to say it
    d. I hate to say
16. Glottal Stop 10
    a. different about it
    b. differing about it
17. Regarding all samples, what accent of English do you think it was? Please try to be as specific as possible. (open question)
18. Was the person speaking a native speaker of English? (yes/no)
19. Have you got any comments? (optional)

Appendix B: Analysis of speech samples

Question code	Transcript	IPA narrow transcription	Environment for t-glottalling
GS1	great	[greɪʔ]	long V_#P
GS2	quiet	[kwaɪəʔ]	long V_#P
NGS1	my seat	[maɪsiːʔ]	(long V_#F)
GS3	put it on a pot	[pʊʔɪʔɔnəpɒʔ]	short V_#short V_#short V
GS4	find out	[faɪndaʊʔ]	long V_#P
GS5	that arm anyway or something like that	[ðæʔɑːmeniweɪəsʌmθɪŋlaɪ kðæʔ]	short V_#long V
NGS2	day	/deɪ/	(long V_#P)
GS6	um but	[ʌmbəʔ]	short V_#P
GS7	not just	[nɒʔdʒəstˀ]	short V_#A
NGS3	be	/biː/	(long V_#P)
GS8	my seat	[maɪsiːʔ]	long V_#P
GS9	I hate to say it	[aɪheɪʔtəseɪəʔ]	long V_#S; short V_#P
GS10	different about it	[dɪfrənʔəbaʊʈɪʔ]	short VN_#short V; short V_#P

In the Question code column, GS=speech sample with glottalled word-final (t), while NGS=speech sample with no word-final (t). In the Transcript column, the words for which near-homophones were provided as answers in the questionnaire are underlined. In the last column: _=glottal stop, P=pause, #=word boundary, V=vowel, S=stop, A=affricate, N=nasal; parentheses show the environment in which the [ʔ] would have been placed if the word had contained a (t).