8-2019

Salvadorian-Accented English Vowels Produced by Teachers of English as a Foreign Language

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by

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A Thesis

Submitted to the Graduate Faculty of

St. Cloud State University

in Partial Fulfillment of the Requirements

for the Degree of

Master of Arts in

English: Teaching English as a Second Language

August, 2019

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Abstract

English has spread in the world and it has become the international language of business and without a doubt, the most important language spoken and taught as a foreign language in Latin America. El Salvador is a country in Central America and this study presents information about the production of vowels by foreign speakers of English in this country. This is a replication of the studies conducted by Peterson and Barney (1952) and Hillenbrand, Getty, Wheeler, and Clark (1994). The participants of the study include English as a Foreign Language teachers in El Salvador. The information of Salvadorian-accented vowels includes information about six correlates including the formats F0, F1, F2, F3, duration, and intensity. The focus of the study is to assess intelligibility levels within Salvadorian-accented vowels and in comparison, with General American English which is conducted by analyzing data for the format one. Data and analysis is also conducted for the rest of the correlates because they also contribute to get an accurate representation of Salvadorian-accented vowels that can help determine how each of the vowel sounds is produced in Salvadorian Speech. The study also provides with conclusions, pedagogical implications, and potential future research in the field of Phonetics.

Acknowledgements

First and foremost, I would like to express gratitude to God who has given me the strength to complete my research project and who has never abandoned me in the two years I have been a student at Saint Cloud State University. The fist person I would like to thank is my advisor, Dr. Ettien Koffi, for being always there for me to provide knowledge, inspiration, and motivation throughout this research. He was the one who encourage me to do research in this field and was always willing to assist me along the way. Additionally, I am indebted to the rest of members of my committee: Dr. Edward Sadrai and Dr. Lisa Loftis, whose accurate comments helped me improve my research. I am also thankful to my wife Nathalie Fuentes who has offered me her full support and understanding even when I had to come to the US and she had to stay with my 3-year old daughter Anna Maria in El Salvador. Further, I want to thank my parents Joel Pena and Elida Coreas and brothers who had faith in me and have been supportive all the time. I am also thankful to Marta Carranza, Fernando Herrera, and Juan Rodriguez from Education USA and the American Embassy in El Salvador who made it possible for me to come to the US to complete this degree. Lastly, I want to thank all my friends Karla Herrera and Mariel Osorio for being patient, supportive, and understanding in the completion of this study.

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Chapter I: Introduction

English is by far the most important foreign language taught in El Salvador and most private and public schools include English as a foreign language classes in their programs. However, interaction with native speakers of English is not very common and when it occurs, communication is often difficult due to intelligibility issues. Vowels are extremely important for intelligibility since they are what listeners rely the most on when understanding a word. Variations of English vowels can be identified by their production of vowels as stated by Ladefoged (2006) “Accents of English differ more in the use of vowels than in their use of consonants” (p. 38). If this type of variation takes place in American native speakers of English from different regions of the country and it is safe to say that they apply for nonnative speakers of English as well (Koffi, 2017, p. 107). Prator and Robinett (1985) also provided this suggestion “If you wish to understand and be understood n English, you must be able to distinguish and make the distinctions between the vowel sounds with great accuracy” (p. 13).

The issue of intelligibility can be addressed by understanding what causes the problem and one of them can be the production of English sounds, especially vowels. English vowels can be a challenge for Spanish speakers since there is a considerable difference in the number of vowels in the two languages. Spanish has five phonemic vowels while General American English has eleven.

This research project focuses on the production of vowels by Salvadorian English speakers who are teachers of English in high schools and universities. Studying their vowels gives a window into the vowels that may cause intelligibility issues when communicating with other speakers of English.

There is significant importance attached to this research since it may be the first step in identifying Salvadorian-accented English vowels and how they compare to general American English. It may also be the beginning of a path to understand Salvadorian-accented English in general so that intelligibility can be improved and addressed properly to promote better communication with other speakers of English.

Chapter II: Literature Review

It is important to state that, to the best of my knowledge, no acoustic analysis of sounds has been done in El Salvador and that this would be the first study conducted to determine similarities and differences between vowel sounds produced by Salvadorian Speakers of English as a foreign language and General American English speakers.

Differences in the production and perception of sounds can be attributed to the speakers and listeners' backgrounds as Peterson and Barney (1952) stated:

> In the elementary case of a word containing a consonant-vowel-consonant phoneme structure, a speaker's pronunciation of the vowel within the word will be influenced by his particular dialectal background; and his pronunciation of the vowel may differ both in phonetic quality and in measurable characteristics from that produced in the word by speakers with other backgrounds. (p. 175)

Based on the previous quote it is possible to say that native languages may influence the production of vowel sounds in English as second/foreign language speakers and these differences vary in measurable characteristics, which means that it is possible to identify those differences if they are analyzed acoustically. At the same time, those differences among dialects can be contrasted to assess intelligibility.

General American English Vowels

Peterson and Barney (1952) were the pioneers in designing a method to measure the production of vowels. They recorded a list of ten monosyllabic words which began with [h] and ended with [d] and which differed only in the vowel. The words that they used were *heed, hid, head, had, hod, hawed, hood, who'd, hud,* and *heard*.

In their study, Peterson and Barney (1952) considered a total of 76 participants, including 33 men, 28 women, and 15 children. They conducted an analysis in which a group of 70 observers had to identify the vowels they heard, and they collected data on the number of agreements they had had in identifying each of the vowels. After plotting these sounds in a spectrogram by contrasting first and second formant measurements, they appear in the positions they take place in the mouth. For example, high, mid, low, front, central, and back. This study represents a reference for what is now known as the production of vowels in General American English.

Another important acoustic study in the US was conducted by Hillenbrand, Getty, Wheeler, and Clark (1994) in which they replicated the one by Peterson and Barney (1952). They decided to do it because of certain limitations in the previous study including that measurements were taking from single time examples of the sound, duration of the sounds was not included, and there wasn't any information about spectral change over time. Other limitations also included that there wasn't much information about dialects that the participants represented, the listening results were not reported separately for men, women, and children, there wasn't information about the ages of the participating children, and finally, the original signals were not available for further measurements.

Hillenbrand et al. (1994) considered 45 men, 48 women, and 46 ten- to 12-year old children (27 boys and 19 children). Most the speakers (87%) were raised in Michigan's Lower Peninsula. The remainder were from areas in the upper Midwest, such us Illinois, Wisconsin, Minnesota, Northern Ohio, and northern Indiana. Each of the participants was screened by performing an acoustic analysis on them in a regular speech by focusing mainly on the difference between /ɑ/ and /ɔ/. Another difference in this study compared to the one by Peterson and Barney (1952) was that the vowels /e/ and /o/ were also included. This study is said to represent the characteristics of vowel sounds for the Midwest in the US. The reference for general American English that is used in the present study would be the results of the study by Peterson and Barney (1952) and the results for the vowels /e/ and /o/ from the study conducted by Hillenbrand et al. (1994).

Intelligibility Assessment

Assessing intelligibility can be challenging. One way to assess intelligibility is to use an impressionistic methodology in which the analysis relies on the aural perceptions of native speakers to carry out intelligibility judgements on the L2 accented English vowels (Koffi, 2017, p. 108), but there is an important disadvantage presented by Lehiste and Peterson (1959) “a listener’s own linguistic background will strongly influence his influence his judgements about any speech which he hears” (p. 281). Ladefoged (2003) also said, “early phoneticians did wonderful work relying simply on their ears” (p. 30).

An alternative methodology to the traditional impressionistic model is presented by Koffi (2012), “The methodology that I use in this paper to assess the intelligibility of SoE has been labeled ‘instrumental’ because it does not rely on human agency to assess intelligibility but rather on acoustic devices and techniques”. An instrumental methodology to assess intelligibility is also suggested by Ladefoged, (2003) because “instrumental phonetics has made it possible to document descriptions of languages more precisely” (p. 30).

Formants provide with valuable information in the production of vowels. F1 shows a vowel’s height, F2 its backness, and F3 for lip rounding. According to Ladefoged (2006), F1 is the most relevant correlate in differentiating vowels since it contains 80% of the energy in the vowel and F2 is not as important in this role (p.188). As for F3, Ladefoged (2002) stated that “[it] has very little function in distinguishing the vowels shown” (p. 46).

Using Peterson and Barney’s (1952) and Hillenbrand et al.’s (1994) methodology, one can measure vowel intelligibility acoustically. Unintelligibility is also called masking. It takes place when the distance between two vowel phonemes in their F1s is less than 60 Hz. Koffi (2017, p. 109) presents the various levels of masking that may take place in Table 1.

Table 1

Acoustic Distance and Intelligibility

N0	F1 Acoustic Distance	Degrees of Masking
1.	> 61 Hz	No masking / Optimal intelligibility
2.	41 Hz – 60 Hz	Slight masking / Good intelligibility
3.	21 Hz – 40 Hz	Moderate masking / Compromised intelligibility
4.	0 Hz – 20 Hz	Complete masking / Severe unintelligibility

An important aspect in assessing intelligibility in English is how relevant confusion of two English phonemes is for communicative purposes. This is also essential for pedagogical implications because it allows teachers to focus on the sounds that cause confusion and that have the highest functional load. Catford (1987) defines

Relative Functional Load (RFL) in the following way "... the functional load of a phoneme or phonemic contrast is represented by the number of words in which it occurs in the lexicon, or in the case of a phonemic contrast, the number of pairs of words in the lexicon that serves to keep distinct" (p. 88).

Koffi (2017) explains how the Relative Functional Load is obtained:

> The methodology consists in collecting about 1000 words. Ideally, these words are common vocabulary items covering various semantic domains such as the human anatomy, the environment, the fauna and flora, the landscape, celestial bodies indigenous to the language group. The analyst then transcribes the words narrowly and carefully catalogues all the lexical minimal pairs and/or all phonetically similar sounds that occur in the same environment because such segments are phonemically contrastive. If the language is a tonal language, pitch differences that are contrastive are also noted. If one wishes to know the RFL of /p/ and /b/ for example, one finds all the words in the data in which both segments constitute minimal pair or occur in the same environment. If /p/ and /b/ contrast 22 out 37 words in initial, medial, or final positions, one concludes that the RFL of /p/ and /b/ is 59%. (p. 44)

According to Koffi (2017, p. 46), it is possible to identify five distinct levels of intelligibility based on the Relative Functional Load (See appendix C). Table 2 summarizes those levels.

Table 2

Relative Functional Load and Intelligibility

N0	Percentage	Intelligibility Rating
1.	80 – 100%	Severe unintelligibility
2.	60 – 79%	High unintelligibility
3.	40 – 59%	Moderate unintelligibility
4.	20 – 39 %	Low unintelligibility
5.	1 – 19%	Slight unintelligibility

L2 Accented English Vowels

There have been many studies conducted to assess the production of vowels by L2 English speakers. All the studies listed below have been replication studies using the same methodology as Peterson and Barney (1952) and Hillenbrand et al. (1994). They also performed the acoustic analyses using Praat, a free software for acoustic analyses. The goal of the studies was to establish a comparison between the production of vowels by GAE speakers and the one by L2 English speakers.

Khalil (2014) conducted a study to compare the production of English vowels by Egyptian English speakers. The results of the study showed that Egyptian English speakers have problems with vowels that do not exist in the Egyptian vowel system which are the front vowels /e, ɛ, æ / and the back vowels /ɑ, ɔ, ʊ, o/ (p. 13).

Khalil (2014) also provided three distinct levels in which the problematic English vowels can be classified. The first category is non-problematic vowels [i, u, ʌ], which are the ones that would not cause intelligibility issues when interacting with other English speakers. The second category is semi-problematic vowels [ɪ, ʊ] which are the vowels that may cause some degree of intelligibility. The last category is problematic which would cause serious unintelligibility issues for Egyptian English speakers [e, æ, ɛ, o, ɔ, ɑ] (p. 14).

Lucic (2015) studied English vowels produced by Montenegrin English speakers. The results were presented for male and female speakers separately. According to the study, Male speakers confuse the English vowels [æ] and [ɑ] since their F1s are 18 Hz apart from each other. The study also shows that the vowels [ɪ], [e] and [ɛ] can be problematic for male Montenegrin speakers because their F1s are in a range of 45 Hz. As for female Montenegrin speakers, the results show that the English vowels that may cause unintelligibility issues are [ʊ], [o], and [u] because they have F1s within 13 Hz. Finally, the vowels [ɪ], [i], and [e] may also cause unintelligibility issues for female Montenegrin speakers because their F1s are 17 Hz apart (p. 12).

Brown and Oyer (2013) studied the English vowels produced by a native Arabic speaker. The study shows that the vowels [ɛ] and [ɪ] produced by the participant and the sound [e] from GAE would cause confusion in a listener because their F1s are 6 Hz from each other and words like “weight”, “wet”, or “wit” would sound the same. Another pair of problematic sounds would be the sounds [o] in GAE and the participant’s [u] since they are 19 Hz apart in their F1s and the words “show” and “shoe” would sound the same. The study also shows that the sounds [i] and [e] produced by the participant and the sound [ɪ] in GAE would cause confusion because their F1s occur in a range of 19 Hz and the words wean” and “wane” produced by the participant would sound the same as the word “win”. Finally, the sound [ɔ] produced by the participant and the sound [ɑ] in GAE have F1s with a difference of 26 Hz causing words like “caught” and “cot” to sound the same (p. 12).

Packer and Lorincz (2013) conducted a study on the English vowels produced by Ibrahim, a 20-year-old male from Saudi Arabia whose first language is Arabic and who has been a student in an intensive English program in the US for a little over a year. The study shows that the vowels [ɪ] and [e] produced by the participant may be the cause of intelligibility issues since the vowel [ɪ] has been lowered and [e] has been raised and fronted which has caused them to merge closer than in GAE. Their F1s are 18 Hz apart from each other which means that two sounds would be perceived as the same. In addition, the student’s pronunciation of the sounds [u] and [o] are also getting closer to each other since the sound [u] has been lowered and centralized whereas the sound [o] has been raised and the two sounds are occurring closer to the sound [ʊ] produced in GAE and the proximity in these three vowel sounds may cause intelligibility issues. The sounds [ɑ] and [ʌ] produced by the participant are also very close to each other since their F1s are only 2 Hz apart from each other causing them to be perceived as the same. In addition, the sound [ɔ] has been lowered and centralized which would also cause confusion with the sounds [ɑ] and [ʌ] resulting in unintelligibility issues (p. 11).

Gordon and Hart (2013) studied the production of vowels by a native Japanese speaker. According to the study, the vowel sound [æ] produced by the participant is close to the sounds [ɑ] or [ɔ] in GAE and they would cause unintelligibility when communicating with English speakers. They also found that the sound [ɛ] produced by the participant would sound like the sound [æ] in GAE based on their F1 and F2 measurements and it would cause intelligibility issues. The study also shows that the sounds [o] and [ɔ] would cause unintelligibility since the participant's pronunciation of the sound [ɔ] is close to the sound [o] in GAE because their F1s are 26 Hz apart. Finally, the sound [ʊ] produced by the participant and the sound [ʌ] in GAE have F1s occurring in a range of 50 Hz which would cause some degree of unintelligibility (pp. 13-14)

Koffi and Ribeiro (2016) studied the English vowels produced by a Speaker of Portuguese. The results of the study indicate that the sounds [ʌ] (620 Hz) and [ʊ] (603 Hz) mask each other because their F1s are 17 Hz apart which means that when the participant says the words <book> and <buck> they would be perceived as the same word and it would cause unintelligibility issues; however, intelligibility is not seriously compromised because the relative functional load (RFL) between these two sounds is only 9%. The sounds [æ] (829 Hz) and [ɑ] (826 Hz) also mask each other because their F1s are within 3 Hz and this can be the cause of serious unintelligibility since the relative functional load for these two sounds is 76% (p. 86).

Zhang (2014) studied Chinese-accented English vowels. The results of the study provide with information on the vowels that may cause unintelligibility. The first pair of sounds that are confused are the sounds [ɔ] and [ʌ] which have a difference in their F1s of 0 Hz and would make the words <cut> and <caught> to sound the same. The second pair of sounds that may cause unintelligibility issues are the vowel [i] produced by the participant and the vowel [ɪ] in GAE which would make listeners hear the word <ship>

when the participant is actually producing the word <sheep>. The third pair of problematic vowel sounds are the sound [ɛ] produced by the participant and the sound [æ] in GAE which would cause confusion when the participant says the words <beg> and <bag>. Finally, the sounds [u] and [ʊ] may cause confusion because their F1s have a difference of 12 Hz (p. 136).

Koffi and Ruanglertslip (2013) studied the vowels produced by a Thai speaker. The results of the study show that confusion may take place when the participant produces the vowels [o] and [ɔ] because their acoustic distance in their F1s is 0 Hz, which would cause confusion when saying the words <boat> and <bought>. The vowels [e] and [ɛ] may also be confused because the distance in their F1s is 33 Hz causing the words <bet> and <bait> to be confused. The sounds [i] and [ɪ] would also be confused since their F1s are 40Hz apart from each other and it would cause confusion between the words <hit> and <heat> (p. 153).

Giacomino (2012) conducted a study to assess the production of English vowels of L1 Spanish speakers. The study included eight participants from Latin American countries including Panama, Costa Rica, El Salvador, Chile, and the Dominican Republic. The measurements that were considered by Giacomino (2012) were F1, F2, and duration. The discussion of the results was presented for male and female participants separately (p. 110). The results of the study indicate that unintelligibility takes place when male Spanish speakers produce the English vowel sounds [ɪ] and [e] since their F1s are only 35 Hz apart. The vowels [ɪ] and [i] are also problematic because they can be confused with each other. The English back vowels that may cause unintelligibility for male Spanish speakers are [u] and [ʊ] which have a difference of 28 Hz in their F1s. Finally, the vowels [ɑ] and [ɔ] occupy the same position in the English vowels space for Spanish male speakers of English. As for Female Spanish speakers, the study shows that the pair of vowel sounds [ɪ] and [i] are also confused and the sounds [ɔ] and [ʌ] are in the same position in the acoustic vowel space. The study concludes that female Spanish speakers are more intelligible when producing English vowels (pp. 110-111).

After reviewing some of the literature, the next step is to state the research questions and the methodology that was used to answer them.

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Chapter III: Methodology

Research Questions

1. How do L2 Salvadorian-accented English vowels compare to those produced in speakers of general American English?
2. What are the L2 Salvadorian-accented English vowels that may cause unintelligibly issues when interacting with other English speakers?

Participants

Data from 22 participants was obtained. It included recordings from 10 female and 12 male participants. They were all Salvadorian English teachers working in private and public institutions in the eastern region of El Salvador. Participants are EFL teachers that agreed to take part in the study. After conducting the first technical analysis of the recordings, three recordings from female speakers and four from male participants were dismissed because they did not have the clarity that was required for the analysis of the study and there was too much noise in the background.

Description of Data Collection Instruments

A digital voice recorder was used to gather the samples produced by the participants. The initial samples were recorded in an MP3 stereo format and then converted into WAV mono files.

A set of headphones with a fixed microphone was used for all participants when producing the samples. The headphones that were used were the GHB Sades model SA-708gt. They have a frequency range between 20-20000Hz. The sensitivity specifications are as follows: -112 dB to -3dB. The microphone is fixed to the headphones and it has the following sensitivity specifications: -54 dB to +/- 3 dB with a frequency range of 50-10Khz.

Praat 6. 0. 27 (Boersma & Weenick, 2017) is a free computer software that was used to measure the acoustic correlates of F0, F1, F2, F3, duration, and intensity of the vowels.

Procedures

The methodology used in this study was the same as in the studies by Peterson and Barney (1952) and Hillenbrand et al. (1994). Each of the 22 participants was recorded reading the words *heed, hid, head, had, hod, hawed, hood, who'd, hud, heard, hoed,* and *hayed*. Each word was repeated 3 times to get accurate measurements of the vowels produced. In addition, they were recorded reading an elicited paragraph containing all English vowels.

The recordings were made in rooms that were quiet enough to get appropriate quality in the recordings. The position of the microphone when the participants were recorded was the same for all the recordings so that the quality of the audios remained the same. Then, each of the participant's recording was saved in an mp3 stereo format and later converted into a WAV mono file for its analysis.

Analysis

Praat was the software used in the analysis of the eleven sets of words and the elicited paragraph. The first step was to splice each of the sets containing the same vowel. Then, spectrographs were created using the software, and they included measurements for the correlates F0, F1, F2, F3, duration, and intensity of each word in the sets. Figure 1 shows an example of how each spectrograph looked like.

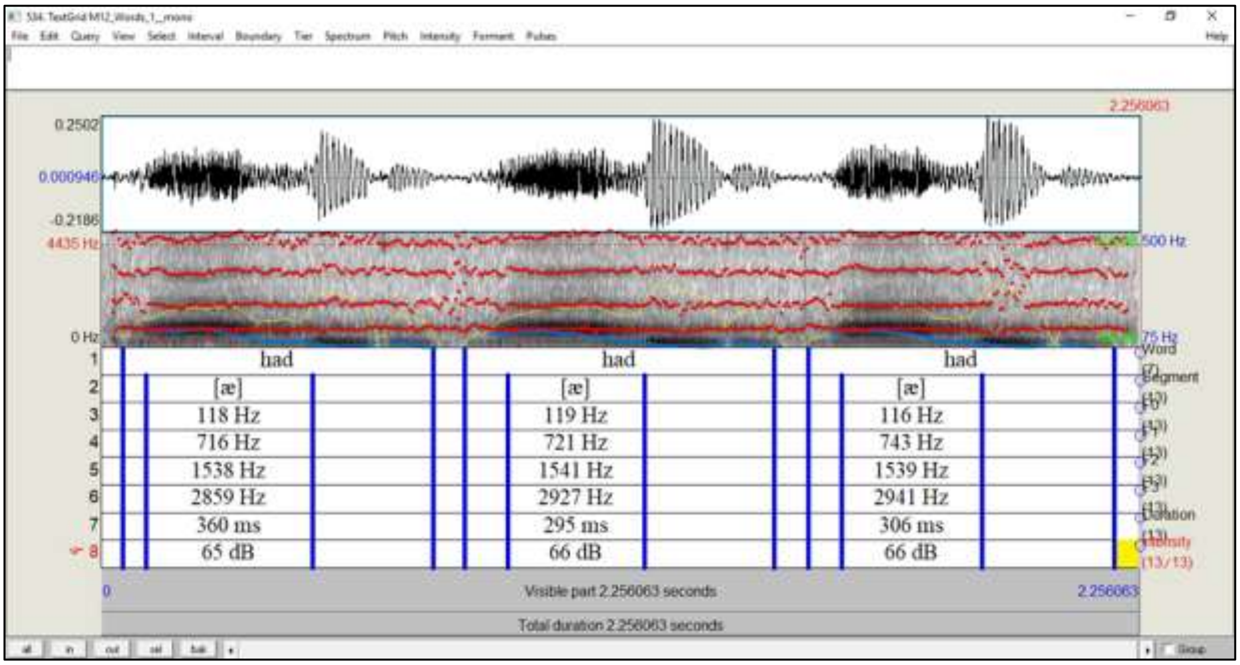

Figure 1: Annotated textGrid of "had".

After creating 11 spectrographs for each participant, each of the participants was coded with a number (1-8) and the letter M and F as identifiers for male or female. Then, data including the mean of each participant's measurements for each vowel sound and for each correlate was entered into twelve tables. Finally, all the results were added and divided by the number of participants to obtain a general mean of each measurement of the eleven English vowels. The standard deviation was also calculated for each of the correlates to obtain the variability in the results for each of the correlates. The report and analysis were conducted separately for male and female participants. The mean measurements of Salvadorian-accented vowels and General American English for F1 and F2 were entered into NORM (2017), another free online software to produce the comparative acoustic vowels spaces. This comparison was displayed visually, and it made it possible to see which vowel sounds masked within Salvadorian-accented English vowels or in comparison to general American English (See Figure 2).

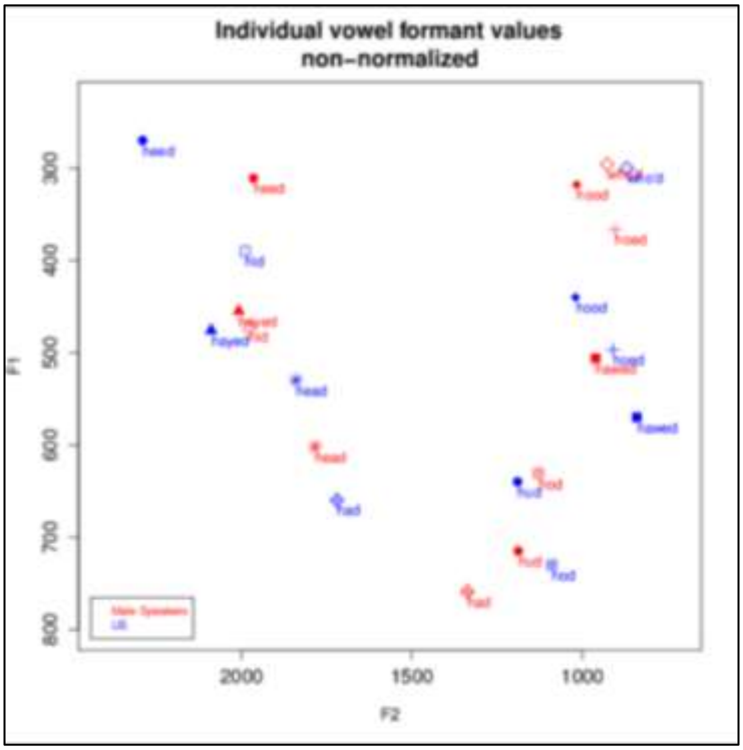

Figure 2: Acoustic vowel space for Salvadorian male speakers.

An important part of the analysis of the data was to assess the degree of making. The analysis was conducted using the classification provided by Koffi (2017, p. 109). Masking takes place when two different vowel sounds produced by the same speaker have F1s within an acoustic distance less than or equal to 60 Hz. It can also take place when a vowel produced by an L2 English speaker masks with a different one produced in general American English; Therefore, analyses were conducted in both ways and by keeping the same ≤ 60 Hz reference. The degree of masking was classified as no masking if the acoustic distance in their F1s was above 60 Hz, slight masking if it was between 41 and 60 Hz, moderate if it was between 21 and 40 Hz, or complete if it was between 0 and 20 Hz.

Once the vowels that may cause intelligibility issues were identified, an analysis was performed based on their Relative Functional Loads. This provides with valuable information on the impact of two different vowels sounds have in the English lexicon and provides information of the pair of vowel sounds. The analysis was based on the categories offered by Koffi (2017, p. 46). If the RFL of the unintelligible pairs based on their masking had an RFL between 80 and 100% unintelligibility would be identified as severe. If it was between 60 and 79%, it would be high. If it was between 40 and 59%, it would be moderate. If it was between 20 and 39%, it would be low. Finally, if it was between 1 and 19%, it would be slight (see Appendix C).

An analysis for F2 was also conducted because it was important to obtain an acoustic vowel space, but it was also part of the specific analysis since it may signal significant changes for vowel backness. Specific vowels in which changes were above 200 Hz were identified and discussed.

The next correlate to be analyzed was F0 which represents pitch. Pitch was analyzed by obtaining the average pitch in GAE for male and female participants and then comparing it to the one in Salvadorian-accented Speech for male and female participants. The analysis for F3 was done separately for front and back vowels and a comparison was made with GAE to assess the degree of lip-rounding in the production of Salvadorian-accented vowels.

Duration was also analyzed by obtaining averages from GAE and Salvadorian-accented vowels, but it was also conducted separately to identify vowel sounds that differ by more than 10 ms which indicates that two sounds would be perceived differently. Finally, the correlate of intensity was analyzed by making a comparison of averages in GAE and Salvadorian-accented vowels. The next chapter presents the results for the present study for the correlates F1 and F2 for male and female participants.

Chapter IV: Results

F1 and F2

This chapter presents the results of this study for the correlates F1 and F2. According to Ladefoged (2006), F1 represents the most important correlate to differentiate vowels because it contains 80% of the energy in the vowels whereas F2 does not play such an essential role (p.188). However, F2 has been included in the results because it is used as reference in the visual representation of an acoustic vowel space and it is also an indicator of changes that take place in English. The results of the study are presented separately for female and male participants.

Each of the tables below presents the results obtained from male and female Salvadorian participants. It includes the mean for each correlate in the eleven vowel sounds recorded by the participants as well as the general mean and the standard deviation of the results which provides additional information on how the results vary throughout the participants.

The analysis of the results has two parts. The first one is based on the production of vowels within Salvadorian male or female speakers and the second one is in comparison with GAE by using the reference in the studies conducted by Peterson and Barney (1952) and Hillenbrand et al. (1998). Tables 3 and 4 bellow present a summary for the correlates F1 and F2.

Table 3

Summary of F1 for Salvadorian Male Participants

Words	heed	Hid	hayed	Head	had	hod	Hawed	hoed	hood	who'd	hud
F1 Correlate	[i]	[ɪ]	[e]	[ɛ]	[æ]	[ɑ]	[ɔ]	[o]	[ʊ]	[u]	[ʌ]
P&B[1] (1952)	270	390	476[2]	530	660	730	570	497[3]	440	300	640
Speaker 1	317	610	541	706	800	415	365	302	285	275	670
Speaker 2	326	377	459	641	810	357	294	314	318	339	700
Speaker 3	308	341	476	631	821	742	783	415	294	293	746
Speaker 4	247	399	297	359	694	703	263	254	266	238	696
Speaker 5	364	555	505	660	743	701	686	509	445	453	728
Speaker 6	400	545	542	647	796	674	717	485	413	333	680
Speaker 7	213	546	416	644	683	730	398	298	278	199	775
Speaker 8	319	404	405	532	726	732	545	360	252	239	727
Mean	311	472	455	602	759	631	506	367	318	296	715
St. Deviation	59.4	102	81.8	109.7	54.5	153.9	203.7	93.3	71.1	79.5	35.2

Table 4

Summary of F2 for Salvadorian Male Speakers

Words	heed	Hid	hayed	Head	had	hod	Hawed	hoed	hood	who'd	hud
F2 Correlate	[i]	[ɪ]	[e]	[ɛ]	[æ]	[ɑ]	[ɔ]	[o]	[ʊ]	[u]	[ʌ]
P&B (1952)	2290	1990	2089*	1840	1720	1090	840	910*	1020	870	1190
Speaker 1	1989	1947	1978	2035	1267	901	910	908	870	860	1023
Speaker 2	2021	2233	2135	2120	1572	1139	998	990	1268	1452	1189
Speaker 3	1420	1850	1711	1772	1040	1158	1100	962	971	657	1120
Speaker 4	2024	1934	1900	1843	1437	1356	772	864	1016	760	1388
Speaker 5	2029	1697	1995	1512	1379	1239	1005	962	1015	980	1208
Speaker 6	2200	1971	2032	1125	1171	1042	1072	875	1062	931	962
Speaker 7	1815	2027	2171	1788	1297	1184	943	840	1095	950	1271
Speaker 8	2227	2179	2143	2084	1539	1018	891	832	841	828	1350
Mean	1965	1979	2008	1784	1337	1129	961	904	1017	927	1188
St. Deviation	254.8	171.5	152.3	333.3	181.2	141.1	105.8	60.7	134	237.2	149.5

[1] Stands for Peterson and Barney.

[2] Data taken from Hillenbrand et al. (1998)

[3] Data taken from Hillenbrand et al. (1998)

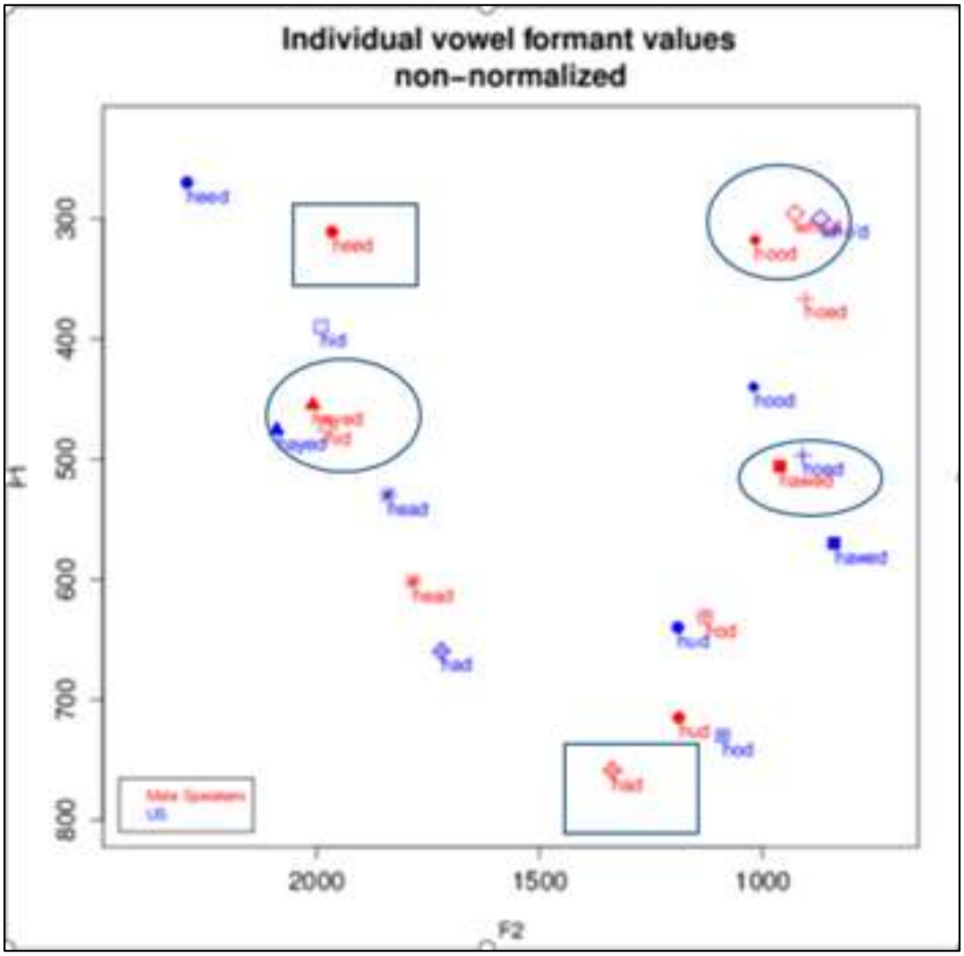

Figure 3: Acoustic vowel space for Salvadorian male participants.

F1 and F2 for Salvadorian Male Speakers

After analyzing the results of F1 for male speakers, the study indicates that there are two pairs of vowels within Salvadorian- accented vowels that can affect intelligibility when speaking English. The first one is [ɪ] (472 Hz) and [e] (455 Hz) with an acoustic distance of 18 Hz which implies complete masking and severe unintelligibility. This is a very important finding because the relative functional load of this pair is 80%. The second pair is the vowel sounds [ʊ] (318 Hz) and [u] (296 Hz) with an acoustic distance of 22 Hz implying moderate masking and compromised intelligibility, but with a relative functional load of only 7% which indicates that the importance in differentiating the two sounds is low in American English lexicon.

When comparing the results for male Salvadorian participants and the vowels produced in General American English, there is only one pair of vowels that may cause unintelligibility issues which is the Salvadorian-accented [ɔ] (506 Hz) and GAE [o] (497 Hz) with an acoustic distance of 9 Hz indicating complete masking and severe unintelligibility. The relative functional load of this pair is 88% detonating significant importance in American English Lexicon. However, after analyzing individual results, confusion between Salvadorian-accented vowel [ɔ] (506 Hz) and GAE [o] (497 Hz) is only caused by the average because none of the individual F1 results of Salvadorian-accented vowel sound [ɔ] is close enough to the GAE [o] (497 Hz).

The results for F2 in male Salvadorian-accented vowels indicate that there are two vowels that have moved significantly in the acoustic vowel space. The first one is [i] (1965 Hz) which has moved towards the center in comparison to GAE [i] (2290 Hz) with an acoustic distance of 325 Hz. The second one is the vowel sound [æ] (1337 Hz) which has also moved towards the center in comparison to GAE [æ] (1720 Hz) with an acoustic distance of 383 Hz. Both movements can be identified in the acoustic vowel space presented above for the Salvadorian male participants.

Table 5

Summary of F1 for Salvadorian Female Participants

Words	heed	Hid	hayed	Head	had	hod	hawed	hoed	hood	who'd	hud
F1 Correlate	[i]	[ɪ]	[e]	[ɛ]	[æ]	[ɑ]	[ɔ]	[o]	[ʊ]	[u]	[ʌ]
P&B (1952)	310	430	*536	610	860	850	590	*555	470	370	760
Speaker 1	582	480	604	688	828	785	809	644	555	539	835
Speaker 2	464	472	623	715	804	809	741	714	548	454	818
Speaker 3	349	383	458	702	883	846	858	447	366	360	830
Speaker 4	409	434	481	615	757	688	583	519	420	389	659
Speaker 5	313	452	419	750	878	768	643	350	361	329	772
Speaker 6	460	552	438	575	855	839	575	470	458	440	838
Speaker 7	349	502	373	644	693	652	600	379	339	370	559
Mean	418	467	485	669	814	769	687	503	435	411	758
St. Deviation	92.5	53.2	94	61.2	69.1	74	115.4	133.9	88.8	71.3	108.5

Table 6

Summary of F2 for Salvadorian Female Participants

Words	heed	Hid	hayed	Head	had	hod	hawed	hoed	hood	who'd	hud
F2 Correlate	[i]	[ɪ]	[e]	[ɛ]	[æ]	[ɑ]	[ɔ]	[o]	[ʊ]	[u]	[ʌ]
P&B (1952)	2790	2480	*2530	2330	2050	1220	920	*1035	1160	950	1640
Speaker 1	2241	1939	2326	1167	1219	1120	1136	969	957	961	1218
Speaker 2	1388	1543	2121	1407	1706	1072	941	963	1204	1142	1057
Speaker 3	946	1184	1778	1758	1393	1361	1396	980	1238	1357	1408
Speaker 4	1458	1948	1139	1302	1147	967	998	931	833	1032	970
Speaker 5	1619	2046	1965	2106	1672	1064	1304	1191	1502	1004	1110
Speaker 6	1671	1349	1269	1436	1200	1141	1030	982	989	946	1246
Speaker 7	2057	1547	1425	1876	1234	1659	1431	954	1575	1003	1724
Mean	1625	1650	1717	1578	1367	1197	1176	995	1185	1063	1247
St. Deviation	430.7	331.3	450.8	340.2	232.5	236.5	199.8	87.8	279.8	144.2	253.6

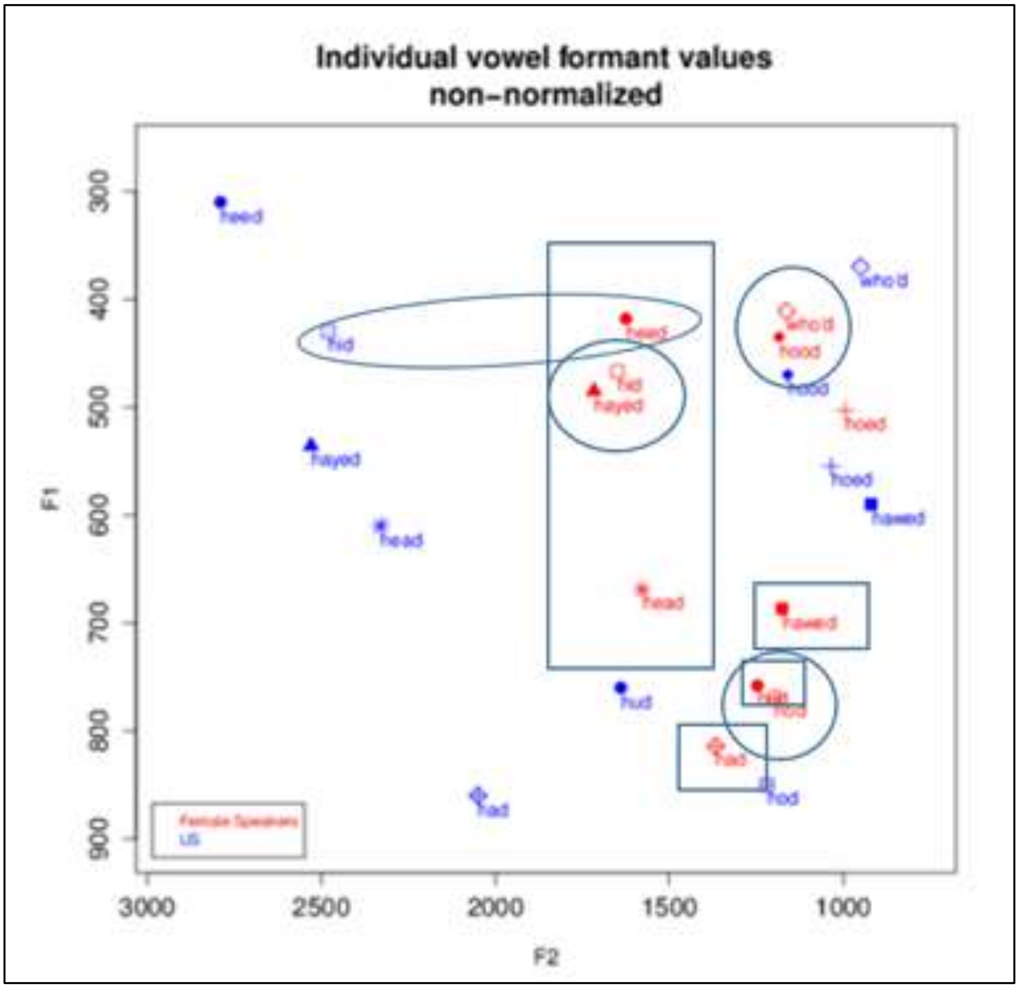

Figure 4: Acoustic vowel space for Salvadorian female speakers

F1 and F2 for Salvadorian Female Speakers

Within Salvadorian-accented vowels, the results of the study for Salvadorian female participants show that there are three pairs of vowels that may cause unintelligibility. The first one includes the vowel sounds [ɪ] (467 Hz) and [e] (485 Hz) with an acoustic distance of 18 Hz resulting in complete masking and severe unintelligibility and with a relative functional load of 80% indicating profound impact on American English lexicon. The second pair includes the vowel sounds [ʊ] (435 Hz) and [u] (411 Hz) with an acoustic distance of 24 Hz demonstrating moderate masking and compromised intelligibility but with a relative functional load of only 7% which is low. The last two vowel sounds are [ɑ] (769 Hz) and [ʌ] (758 Hz) with an acoustic distance of 11 Hz showing Complete masking and severe unintelligibility and with a relative functional load of 65% which would have a high impact on English lexicon.

In comparison with GAE for Female participants, the results indicate that the Salvadorian-accented [i] (418 Hz) and GAE [ɪ] (430 Hz) have an acoustic distance of 12 Hz which implies complete masking and severe unintelligibility. The relative functional load for this pair of sounds is 95% with significant impact on English lexicon. After reviewing individual results, they indicate that the acoustic distance is low enough to cause unintelligibility in only 3 of the seven participants with acoustic distances of 16, 21 and 30 Hz.

The results for F2 in female participants show that all front vowels have become centralized consistently. The Salvadorian-accented vowel [i] (1625 Hz) in contrast with GAE [i] (2790 Hz) with an acoustic distance of 1165 Hz. The Salvadorian-accented vowel [ɪ] (1650 Hz) in comparison to GAE [ɪ] (2480 Hz) with an acoustic distance of 830 Hz. The Salvadorian-accented vowel [e] (1717 Hz) and the GAE [e] (2530 Hz) with an acoustic distance of 813 Hz. The Salvadorian-accented vowel [ɛ] (1578 Hz) and the GAE [ɛ] (2330 Hz) with an acoustic distance of 808 Hz. Finally, The Salvadorian-accented vowel [æ] (1367 Hz) in contrast with GAE [æ] (2050 Hz) with an acoustic distance of 817 Hz.

It is also to necessary to point out that there are two Salvadorian-accented back vowels that have changed significantly in comparison with GAE. The first one is the

Salvadorian-accented vowel [ɔ] (1176 Hz) which has been moved towards the center in contrast with GAE [ɔ] (920 Hz) with an acoustic distance of 256 Hz. Finally, the Salvadorian vowel [ʌ] (1247 Hz) is more backed than GAE [ʌ] (1640 Hz) with an acoustic distance of 393 Hz.

The next chapter presents the results for the correlates F0, F3, Duration, and Intensity.

F0, F3, Duration, and Intensity

Chapter III presents finding for the rest of the correlates including F0, F3, Intensity and Duration. These correlates do not influence intelligibility, but they provide with valuable information about accentedness or particularities that take place in a variation of the English language. The analysis for these correlates is conducted by comparing the results from Salvadorian-accented English and GAE to establish differences in the production of vowels.

F0 is the measurement that represents pitch which varies according to a range of factors including gender, age, height, and complexity. According to Titze (1994), “The average speaking F0 for adult females is around 200 Hz and for adults around 125 Hz” (p. 170). Therefore, a comparison can also be made to verify if the data is consistent with the framework provided by Titze in 1994. Tables 7 and 8 present a summary of the results for F0.

Table 7

F0 for Salvadorian Male Participants

Words	heed	Hid	hayed	Head	had	hod	hawed	hoed	hood	who'd	hud
F0 Correlate	[i]	[ɪ]	[e]	[ɛ]	[æ]	[ɑ]	[ɔ]	[o]	[ʊ]	[u]	[ʌ]
P&B (1952)	136	135	129	130	127	124	129	129	137	141	130
Speaker 1	129	120	127	124	167	122	127	127	128	128	148
Speaker 2	122	116	121	117	117	121	126	122	137	133	115
Speaker 3	155	147	140	121	123	128	131	139	151	149	137
Speaker 4	200	155	155	138	152	162	164	155	168	180	153
Speaker 5	144	145	138	130	188	160	147	136	153	161	141
Speaker 6	131	174	129	114	131	132	127	123	132	118	119
Speaker 7	163	148	138	136	142	147	150	146	153	151	151
Speaker 8	152	119	137	127	117	131	156	145	161	153	144
Mean	149	140	135	125	142	137	141	136	147	146	138
St. Deviation	23.6	19.2	10.2	8.1	24.4	15.9	14.9	11.9	13.7	18.5	13.6

F0 for Salvadorian Male Speakers

The results for F0 in Salvadorian male participants indicate that pitch is higher than in GAE in ten of the eleven vowel sounds. [ɛ] is the only vowel sound in Salvadorian-accented vowels for male participants that shows an F0 that is 5Hz lower than its counterpart in GAE. By obtaining an average in F0 values in all vowel sounds, the average for GAE is 131 Hz and the one for Salvadorian male participants is 139 Hz. The results indicate that F0 is in average 8 Hz higher in Salvadorian male participants in comparison with GAE. The 139 Hz average pitch in Salvadorian participants is consistent with the value of 125 Hz provided by Titze in 1994.

Table 8

F0 for Salvadorian Female Participants

Words	heed	Hid	hayed	Head	had	hod	hawed	hoed	hood	who'd	Hud
F0 Correlate	[i]	[ɪ]	[e]	[ɛ]	[æ]	[ɑ]	[ɔ]	[o]	[ʊ]	[u]	[ʌ]
P&B (1952)	235	232	*219	223	210	212	216	*217	232	231	221
Speaker 1	242	229	211	220	217	250	249	235	251	256	252
Speaker 2	239	195	193	202	232	245	198	188	235	209	225
Speaker 3	203	195	187	187	226	174	194	197	200	191	163
Speaker 4	199	200	174	192	186	193	181	179	212	195	190
Speaker 5	205	185	187	190	167	162	188	199	207	210	184
Speaker 6	215	198	200	197	190	175	198	209	236	232	177
Speaker 7	213	212	186	187	226	158	193	189	209	201	184
Mean	216	202	191	196	206	193	200	199	221	213	196
St. Deviation	17.2	14	11.7	11.7	25	38.3	22.3	18.3	19	23	30.9

F0 for Salvadorian Female Speakers

The results also indicate significant differences when comparing F0 for Salvadorian female participants and GAE. The data shows that F0 is consistently lower in all vowel sounds. The average for GAE is 222 Hz and the one for Salvadorian-accented vowels for female participants is 203 Hz. F0 for Salvadorian female participants is 19 Hz lower than that of GAE for all vowel sounds. The 203 Hz average for Salvadorian female participants is also consistent with the value of 200 provided by Titze in 1994.

The next correlate to be analyzed is F3 which does not have foremost importance when distinguishing vowels, but it can provide with information about additional information that can be used to determine accentedness in a language. F3 provides information about lip rounding as West (1999) defines it "F3 lowers with tongue retraction and lip rounding (protrusion and lowering of the upper lip, raising of the lower lip) (p.1902). Since lip rounding takes in place in most English back vowels, the analysis is presented separately for front and back vowels. Tables 9 and 10 present a summary for F3.

Table 9

F3 for Salvadorian Male Participants

Words	**heed**	**Hid**	**hayed**	**Head**	**had**	**hod**	**hawed**	**hoed**	**hood**	**who'd**	**Hud**
F3 Correlate	[i]	[ɪ]	[e]	[ɛ]	[æ]	[ɑ]	[ɔ]	[o]	[ʊ]	[u]	[ʌ]
P&B (1952)	3010	2550	*2691	2480	2410	2440	2410	*2459	2240	2240	2390
Speaker 1	3137	3348	2891	3414	2665	2994	2988	2823	2675	2680	2811
Speaker 2	3279	3260	3280	3319	3212	3129	3057	3018	3187	2247	3177
Speaker 3	2878	2937	2999	2881	2634	2998	2917	2961	2825	2856	2775
Speaker 4	3438	3245	3270	3134	3171	3052	2865	2847	3093	2739	3158
Speaker 5	3113	2826	3126	2421	1973	2487	2850	2834	2672	2702	2342
Speaker 6	3131	3095	3109	2455	2426	3135	2952	3112	2977	3045	2953
Speaker 7	3070	3131	3103	2873	2606	3080	2959	2813	2673	2673	2925
Speaker 8	2871	3240	2937	3052	2909	2822	2716	2793	2535	2688	2334
Mean	3114	3135	3089	2943	2699	2962	2913	2900	2829	2703	2809
St. Deviation	188.8	177.4	142.2	364.6	404.5	216.2	103.5	116.3	232.6	224	324.3

F3 for Salvadorian Male Speakers

The first part of the analysis is for F3 in front vowels. F3 in GAE for the vowel sound [ɪ] is 2550 Hz and the one for Salvadorian male speech is 3135 Hz with a difference of 585 Hz. F3 for the vowel sound [e] in GAE is 2691 Hz and the one in Salvadorian General English is 3089 Hz with a difference of 398 Hz. F3 for the vowel sound [ɛ] in GAE is 2480 Hz and the one is Salvadorian male speech is 2943 Hz with a difference of 463 Hz. The results indicate that lips are more spread in Salvadorian male speech than GAE when producing the vowel sounds [ɪ], [e], and [ɛ].

The results for back vowels show that the vowel sound [ɑ] in GAE has an F3 of 2440 Hz and the one in Salvadorian male speech is 2962 Hz with a difference of 522 Hz. F3 for the vowel sound [ɔ] in GAE is 2410 Hz and the one in Salvadorian male speech is 2913 Hz with a difference of 503 Hz. The vowel sound [o] in GAE has an F3 of 2459 Hz and the one for Salvadorian male Speech is 2900 Hz with a difference of 459 Hz. F3 for the vowel sound [ʊ] in GAE is 2240 Hz and the one in Salvadorian male Speech is 2829 Hz with a difference of 589 Hz. F3 for the vowel sound [u] in GAE is 2240 Hz and the one in Salvadorian male Speech is 2703 Hz with a difference of 463 Hz. Finally, F3 for the vowel sound [ʌ] In GAE is 2390 Hz and the one in Salvadorian male Speech is 2809 Hz with a difference of 419 Hz. The results clearly indicate that lips are more spread in Salvadorian male Speech than in GAE in the production of the back vowels [ɑ], [ɔ], [o], [ʊ], [u], and [ʌ].

Table 10

F3 for Salvadorian Female Participants

Words	**heed**	**Hid**	**hayed**	**Head**	**had**	**hod**	**hawed**	**hoed**	**hood**	**who'd**	**hud**
F3 Correlate	[i]	[ɪ]	[e]	[ɛ]	[æ]	[ɑ]	[ɔ]	[o]	[ʊ]	[u]	[ʌ]
P&B (1952)	3310	3070	*3047	2990	2850	2810	2710	*2828	2680	2670	2780
Speaker 1	3131	3121	3130	2598	2432	3145	2990	3110	3042	2991	2906
Speaker 2	2953	2983	2973	2684	2785	3022	2964	2993	2975	2821	2990
Speaker 3	3007	2994	3116	2893	2454	2557	2695	2988	3027	3059	2997
Speaker 4	3037	3024	2953	2634	2248	2944	2881	2871	2767	2853	2817
Speaker 5	2930	3232	3107	3123	3210	2939	3008	2931	3086	2776	2967
Speaker 6	2982	2718	2909	2635	2674	2888	2970	2787	2778	2768	2980
Speaker 7	3314	2951	3112	3350	2681	3298	3196	2845	3140	2787	3299
Mean	3050	3003	3042	2845	2640	2970	2957	2932	2973	2865	2993
St. Deviation	133.3	158.7	93.7	291.5	310.9	230.8	150.2	108.6	146.5	114.7	148.9

F3 for Salvadorian Female Speakers

Data for female speech indicates that the front vowel sound [i] in GAE has an F3 of 3310 Hz and the one in Salvadorian female speech 3050 Hz with a difference of 260 Hz. The vowel sound [æ] in GAE has an F3 of 2850 Hz and the one in Salvadorian female speech 2640 Hz with a difference of 210 Hz. The back vowel [ɔ] in GAE has an F3 of 2710 Hz and the one on Salvadorian female speech 2957 Hz with a difference of 247 Hz. The vowel sound [ʊ] in GAE has an F3 of 2680 Hz and the one in Salvadorian female speech 2973 Hz with a difference of 293 Hz. Finally, the vowel sound [ʌ] in GAE has an F3 of 2780 Hz and the one in Salvadorian female speech 2993 Hz with a difference of 213 Hz.

The data mentioned above shows that in Salvadorian female speech lips are more rounded in the production of the front vowel sound [i] and more spread in the production of the vowel sound [æ]. Regarding back vowels, Data also shows that lips are more spread in the production of back vowel sounds [ɔ], [ʊ], and [ʌ]. In conclusion, spreading is not as prominent in Salvadorian female speech as it is in Salvadorian male speech.

The following correlate to be analyzed is “Duration” which does not play a significant role in distinguishing vowels, but it provides with valuable information about the length of a vowel in a speech. Duration is a correlate that can be easily perceived by a listener if the difference is above 10 milliseconds (Koffi, 2017, p. 93). Differences in duration can be identifiers of accentedness since they can be perceived by other speakers of English. The analysis will be conducted by comparing duration averages in

GAE and Salvadorian-accented vowels and by comparing individual differences. Tables 11 and 12 bellow summarize the data for the correlate of "Duration".

Table 11

Duration for Salvadorian Male Participants

Words	heed	Hid	hayed	Head	had	hod	hawed	hoed	hood	who'd	Hud
Duration	[i]	[ɪ]	[e]	[ɛ]	[æ]	[ɑ]	[ɔ]	[o]	[ʊ]	[u]	[ʌ]
P&B (1952)	243	192	*267	189	278	267	283	*265	192	237	188
Speaker 1	221	191	253	197	243	231	204	244	219	210	205
Speaker 2	245	205	280	243	266	264	255	271	222	224	207
Speaker 3	173	135	218	219	215	163	156	248	190	215	153
Speaker 4	190	176	331	205	273	248	167	239	197	222	229
Speaker 5	215	186	271	193	207	171	191	196	177	187	174
Speaker 6	255	148	178	186	214	207	185	247	235	230	188
Speaker 7	246	201	340	298	317	230	255	346	141	278	201
Speaker 8	234	169	259	265	320	241	160	271	164	261	157
Mean	222	176	266	225	256	219	196	257	193	228	189
St. Deviation	28.8	24.7	53.7	39.6	45	36.2	39.4	42.6	31.8	28.8	26.3

Duration for Salvadorian Male Speakers

The average duration for male speakers in GAE is 236 ms and the one for Salvadorian male participants is 220 ms with a difference of 14 ms lower which indicates that the difference would be perceived by listeners. By looking at individual results, duration is consistently lower in Salvadorian male speech. The analysis for front vowels indicates that the duration of vowel sound [i] in Salvadorian male speech is 222 ms and the one in GAE is 243 ms with a difference of 22 ms. The duration of the vowel sound [ɪ] in GAE is 192 ms and the one in Salvadorian male speech is 176 ms with a difference of 16 ms. The duration of the vowel sound [æ] in Salvadorian male speech is 256 ms and the one in GAE is 278 ms with a difference of 22 ms. The only front vowel that is longer in Salvadorian male speech is the vowel [ɛ] with a duration of 225 ms and the one in GAE is 189 ms with a difference of 36 ms.

The analysis for back vowels indicate that duration of the vowel sound [ɑ] in GAE is 267 ms and the one in Salvadorian male speech is 219 ms with a difference of 48 ms. The duration for the GAE vowel sound [ɔ] is 283 ms and the one in Salvadorian male speech is 196 ms with a difference of 87 ms.

Table 12

Duration for Salvadorian Female Participants

Words	**heed**	**Hid**	**hayed**	**Head**	**had**	**hod**	**hawed**	**hoed**	**hood**	**who'd**	**hud**
Duration	[i]	[ɪ]	[e]	[ɛ]	[æ]	[ɑ]	[ɔ]	[o]	[ʊ]	[u]	[ʌ]
P&B (1952)	306	237	*320	254	332	323	353	326	*249	303	226
Speaker 1	168	214	313	212	296	266	201	201	196	194	222
Speaker 2	281	223	356	224	263	251	255	274	250	243	225
Speaker 3	271	195	268	259	281	249	246	319	267	317	193
Speaker 4	164	88	305	147	122	116	283	287	149	204	162
Speaker 5	261	223	280	211	229	173	266	260	215	180	174
Speaker 6	365	226	435	251	384	276	239	272	154	377	254
Speaker 7	151	119	265	184	199	189	243	262	201	94	187
Mean	237	184	317	212	253	217	247	267	204	229	202
St. Deviation	79	56.6	60.6	38.4	82.2	59.1	25.5	35.5	44.3	93.3	32.4

Duration for Salvadorian Female Speakers

The average duration for female speakers in GAE is 293 ms whereas the one in Salvadorian female speech is 233 ms with a difference of 60 ms. When looking at individual results, they indicate that vowel sounds in Salvadorian female speech are consistently shorter that GAE. The analysis for front vowels indicates that the duration of the vowel sound [i] in GAE is 306 ms and the one in Salvadorian male speech is 237 ms with a difference of 69 ms. The duration for the vowel sound [ɪ] in GAE is 237 ms and the one in Salvadorian female speech is 184 ms with a difference of 53 ms. The vowel sound [ɛ] has a duration of 254 ms in GAE and 212 ms in Salvadorian female speech with a difference of 42 ms. Finally, the vowel sound [æ] has a duration of 332 ms in GAE and 253 ms in Salvadorian female speech with a difference of 79 ms.

The analysis for back vowels also shows that vowels in Salvadorian female speech is shorter. The vowel sound[ɑ] has a duration of 323 ms in GAE and 217 ms in Salvadorian female speech with a difference of 106 ms. The vowel sound [ɔ] has a duration of 353 ms and the one in Salvadorian female speech is 247 ms with a difference of 106 ms. The duration of the vowel sound [o] in GAE is 326 ms and the one for Salvadorian female speech is 267 ms with a difference of 59 ms. The vowel sound [ʊ] in GAE has a duration of 249 ms and the one in Salvadorian female speech is 204 ms with a difference of 45 ms. The vowel sound [u] in GAE has a duration of 303 ms and the one in Salvadorian female speech is 229 ms with a difference of 74 ms. Finally, the vowel sound [ʌ] in GAE has a duration of 226 ms and the one in Salvadorian female speech is 202 ms with a difference of 24 ms.

The last of the correlates to be analyzed is "Intensity" which is defined by Koffi (2017), "The acoustic correlate of intensity consists of two acoustic events: tympanic pressure + particle velocity" (p. 88). Intensity is not a relevant correlate when assessing intelligility, but it can provide with information about how "loud" speech was when it was recorded. The analysis for this correlate is conducted by getting the averages in GAE and Salvadorian-accented Vowels. Tables 13 and 14 provide a summary for the correlate of Intensity.

Table 13

Intensity for Salvadorian Male Participants

Words	**heed**	**Hid**	**hayed**	**Head**	**had**	**hod**	**hawed**	**hoed**	**hood**	**who'd**	**Hud**
Intensity	[i]	[ɪ]	[e]	[ɛ]	[æ]	[ɑ]	[ɔ]	[o]	[ʊ]	[u]	[ʌ]
L&P (1959)	75.1	78.1	78.6	79.3	79.4	80.2	80.6	79.7	78.4	78.2	79.7
Speaker 1	64	57	61	55	57	57	58	60	62	63	58
Speaker 2	71	68	65	60	59	61	63	63	71	69	59
Speaker 3	69	67	60	62	64	62	64	64	67	67	63
Speaker 4	83	77	82	77	72	72	76	79	80	80	73
Speaker 5	62	58	60	58	63	60	60	58	59	58	63
Speaker 6	65	59	61	65	66	68	69	61	62	61	67
Speaker 7	74	66	70	62	64	65	67	69	70	72	66
Speaker 8	72	70	72	68	65	69	69	70	71	72	69
Mean	70	65.2	66.3	63.3	63.7	64.2	65.7	65.5	67.7	67.7	64.7
St. Deviation	6.2	6.4	7.3	6.3	4.2	4.7	5.3	6.4	6.3	6.6	4.7

Table 14

Intensity for Salvadorian Female Participants

Words	**heed**	**Hid**	**hayed**	**Head**	**had**	**hod**	**hawed**	**hoed**	**hood**	**who'd**	**hud**
Intensity	[i]	[ɪ]	[e]	[ɛ]	[æ]	[ɑ]	[ɔ]	[o]	[ʊ]	[u]	[ʌ]
L&P (1959)	75.1	78.1	78.6	79.3	79.4	80.2	80.6	79.7	78.4	78.2	79.7
Speaker 1	54	56	54	57	56	59	61	57	55	56	58
Speaker 2	54	55	55	57	55	58	59	59	56	56	59
Speaker 3	61	59	59	55	56	58	61	58	61	62	56
Speaker 4	60	61	58	57	58	58	56	58	59	59	58
Speaker 5	57	53	56	50	51	52	52	54	54	55	51
Speaker 6	53	53	55	55	53	58	56	55	59	54	52
Speaker 7	62	55	58	53	53	55	54	57	63	58	53
Mean	57.2	56	56.4	54.8	54.5	56.8	57	56.8	58.1	57.1	55.2
St. Deviation	3.7	3	1.9	2.6	2.3	2.4	3.4	1.7	3.2	2.7	3.2

Intensity for Salvadorian Male and Female Speakers

The average intensity for male participants in GAE is 78.7 dB and the one in Salvadorian male speech is 65.8 dB with a difference of 12.9 dB. The 12.9 dB indicates that Salvadorian male speech would be perceived as quieter in comparison to GAE. The average intensity for Female participants in GAE is 78.8 dB and the one in Salvadorian female speech is 56.3 dB with a difference of 22.5 dB. The 22.5 dB difference shows that Salvadorian female speech would be perceived as much quieter that GAE.

Following the analysis of the six correlates, the next chapter presents the conclusions of the study, pedagogical implications, and future research.

Chapter V: Conclusion

This is to the best of my knowledge the first acoustic study of Salvadorian-accented vowels and this study provides with information about vowels that may cause unintelligibility when communicating with other speakers of English. The analysis of intelligibly is based on the correlate F1 which contains 80% of the vowel energy according to Ladefoged (2006, p. 188). The analysis is made by assessing the degree of masking which takes place when two different sounds cannot be differentiated because they mask each other allowing unintelligibility to take place. It also includes data for their RFL.

The findings indicate that the Salvadorian-accented vowels that may cause unintelligibility for male participants include the front vowel sounds [ɪ] (472 Hz) and [e] (455 Hz) with an acoustic distance of 18Hz implying complete masking and severe unintelligibility and with a RFL of 80% which means differentiation of this pair is essential in the English language lexicon. The second pair of vowel sounds that may cause unintelligibility is [ʊ] (318 Hz) and [u] (296 Hz) with an acoustic distance of 22 Hz which indicates moderate masking and compromised intelligibility, but with a low relative functional load of only 7%. Lastly, when comparting Salvadorian-accented vowels for male participants and GAE the pair of vowel sounds [ɔ] (506 Hz) and GAE [o] (497 Hz) shows an acoustic distance of 9 Hz resulting in complete masking and Severe unintelligibility and with a high RFL of 88%.

The study also presents the vowel sounds that may cause unintelligibility issues in Salvadorian Female participants. Results show that there are three pairs of vowels that may cause unintelligibility. The first vowel sounds include [ɪ] (467 Hz) and [e] (485 Hz) with an acoustic distance of 18 Hz showing complete masking and severe unintelligibility and with a high RFL of 80%. The second pair of the vowel sounds are [ʊ] (435 Hz) and [u] (411 Hz) with an acoustic distance of 24 Hz indicating moderate masking and compromised intelligibility but with a low RFL only 7%. The last 2 vowel sounds are [ɑ] (769 Hz) and [ʌ] (758 Hz) with an acoustic distance of 11 Hz showing complete masking and severe unintelligibility and with a high RFL of 65%. When comparing Salvadorian female speech with GAE, the results show that the Salvadorian-accented vowel sound [i] (418 Hz) and GAE [ɪ] (430 Hz) have an acoustic distance of 12Hz implying complete masking and severe unintelligibility and a high RFL of 95%.

The second correlate that is included in the study is F2 which represents backness which does not influence intelligibility, but it becomes important when plotting vowels in an acoustic vowel space. Data shows that there are two vowel sounds that show significant changes in Salvadorian male speech in comparison to GAE. The front vowel sound [i] (1965 Hz) which has moved towards the center in contrast with GAE [i] (2290 Hz) with an acoustic distance of 325 Hz. The second one is the vowel sound [æ] (1337 Hz) which has also moved towards the center in comparison to GAE [æ] (1720 Hz) with an acoustic distance of 383 Hz.

The results for Salvadorian female participants also show significant changes because all front vowels have become centralized in comparison to GAE. The Salvadorian-accented vowel [i] (1625 Hz) in comparison to GAE [i] (2790 Hz) with an acoustic distance of 1165 Hz. The Salvadorian-accented vowel [ɪ] (1650 Hz) and the

GAE [ɪ] (2480 Hz) with an acoustic distance of 830 Hz. The Salvadorian-accented vowel [e] (1717 Hz) in comparison to the GAE [e] (2530 Hz) with an acoustic distance of 813 Hz. The Salvadorian-accented vowel [ɛ] (1578 Hz) in contrast with GAE [ɛ] (2330 Hz) with an acoustic distance of 808 Hz. Finally, The Salvadorian-accented vowel [æ] (1367 Hz) and the GAE [æ] (2050 Hz) with an acoustic distance of 817 Hz. The results of this centralization are consistent for all front vowels in Salvadorian female speech. There are also two back vowels which also show changes in comparison to GAE. The Salvadorian-accented vowel [ɔ] (1176 Hz) with movement towards the center in comparison to GAE [ɔ] (920 Hz) with an acoustic distance of 256 Hz and the Salvadorian vowel [ʌ] (1247 Hz) is more backed than its counterpart in GAE [ʌ] (1640 Hz) with an acoustic distance of 393 Hz.

The results for the correlate F0 also provide with valuable information that can determine accentedness in a variation of English. The results for F0 in Salvadorian male speech show that pitch is higher than in GAE. The average F0 of 131 Hz in GAE and 139 Hz in Salvadorian male speech indicate that F0 is in average 8 Hz higher in Salvadorian male participants in comparison to GAE. When comparing F0 for Salvadorian female participants and GAE, data shows that F0 is lower. The average for GAE is 222 Hz and the one for Salvadorian-accented vowels for female participants is 203 Hz with a difference of 19 Hz.

The results for the correlate F3 in Salvadorian male speech that represents lip rounding show that F3 in Salvadorian male speech for the front vowel sounds [ɪ] 3135 Hz, [e] 3089 Hz, and [ɛ] 2943 Hz are higher than the same sounds in GAE [ɪ] 2550 Hz,

[e] 2691 Hz, and [ɛ] 2480 Hz. The results show that lips are more spread in Salvadorian male speech than GAE when producing the vowel sounds listed above.

The results for all back vowels show that the vowel sounds in Salvadorian male speech [ɑ] 2962 Hz, [ɔ] 2913 Hz, [o] 2900 Hz, [ʊ] 2829 Hz, and [u] 2703 Hz, and [ʌ] 2809 Hz are also higher than their counterparts in GAE [ɑ] 2440 Hz, [ɔ] 2410 Hz, [o] 2459 Hz, [ʊ] 2240 Hz, and [u] 2240 Hz, and [ʌ] 2390 Hz. The results also show that lips are more spread in Salvadorian male speech than in GAE in the production of all the back vowels.

The results for Salvadorian female speech show that the front vowel sound [i] 3050 Hz in Salvadorian female speech is lower than the same sound in GAE which is 3310 Hz. The vowel sound [æ] in Salvadorian female speech is 2640 Hz and it is lower than the same sound in GAE which is 2850 Hz. The results indicate that lips are more rounded in Salvadorian female speech in the production of [i] and more spread in the production of [æ].

F3 for the back-vowel sounds [ɔ] 2957 Hz, [ʊ] 2973 Hz, and [ʌ] 2993 Hz in Salvadorian female speech is higher than the same sounds in GAE [ɔ] 2710 Hz, [ʊ] 2680 Hz, and [ʌ] 2780 Hz which indicates that lips are more spread in the production of the back-vowel sounds [ɔ], [ʊ], and [ʌ] in Salvadorian female speech.

The next correlate that is presented is duration which can affect accentedness and rhythm in a variation of English. The results indicate that in average duration for the eleven vowel sounds is 220 ms and 236 ms in GAE which shows that vowels produced in Salvadorian male speech is in average 14 ms lower than those in GAE and the difference could be perceived by listeners. The results for female participants indicate that in average duration for the eleven vowels sounds is 233 ms and the one in GAE is 293 indicating that Salvadorian female speech is in average 60 ms shorter and the difference would be clearly perceived by listeners.

The last of the correlates to be analyzed is intensity which can be interpreted as how loud speakers were when they were recorded. The average intensity in Salvadorian male speech is 65.8 is lower that the in one in GAE which is 78.7. The results indicate that Salvadorian male speech would be perceived as quieter. The results in Salvadorian female speech show that the average intensity is 56.3 dB and the one in GAE is 78.8. The difference is clear, and it would result in the perception of Salvadorian female speech as much quieter than GAE.

Pedagogical Implications

Direct instruction for individual sounds when students are learning English as a second language has not been very common in the past in El Salvador. This can be attributed to various factors including that instructors do not have the knowledge of English sounds and they avoid teaching them, but it can also be explained as lack of research and instruments to accurately assess and teach sounds in English. This study provides with an overview that will set the base for the assessment and instruction of English vowels which are the most important sounds in the English language in achieving the goal of intelligibility.

The use of acoustic vowel spaces provides with information that is the past was just an ideal representation and theory of English vowels, but now it can become a valuable instrument to assess individual production of vowels and a comparison with GAE by keeping in mind that the goal in communication should be to be intelligible. This study can also be important in the improvement of English as a foreign language teaching in El Salvador by using acoustic vowel spaces.

Future Research

More research can be conducted to determine accurately the production of Spanish vowels by Salvadorian speakers and establish possible correlations with the production of English vowels. This study also opens the door for future studies for more English sounds including consonants so that a complete picture of Salvadorian-accented English can be determined.

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Appendix A: Letter of Consent

Salvadorian-Accented English Vowels Produced by Teachers of English as a Foreign Language

Consent to Participate

You are invited to participate in a research study about **the production of Salvadorian-Accented English Vowels by Teachers of English as a Foreign Language.**
If you agree to be part of the research study, you will be asked to read aloud and be recorded reading eleven sets of English words and a short-elicited paragraph containing all English vowels.

Benefits of the research: This research will provide with information about how Salvadorian-accented English vowels are produced by English as a foreign language teachers, which will lead to identify vowels that may cause intelligibility issues when communicating with other speakers of English. The results of the study will also benefit you as a teacher to identify and address unintelligibility when communicating with other English speakers, and also to encourage future studies on the subject.

Risks and discomforts: The risks in the study are minimal.They are not greater that the risk of speaking or reading aloud in an everyday life situation.

Data collected will remain confidential. Data will be kept confidential since it will be stored in a password protected computer and the only people who will have access to it will be me, the researcher, and my advisor. All the data will be converted into numbers by using the software PRAAT (A phonetic analysis software) so your identity will be FULLY protected. In the study, data will be presented as general categories which will be male and female or a general category as English teachers. Your name WILL NOT be used and your information WILL NOT be quoted individually in the study. All the data from the study will be generalized so no individual referenced will be made.

Participating in this study is completely voluntary. Your decision whether or not to participate will not affect your current or future relations with St. Cloud State University, or the researcher. If you decide to participate, you are free to withdraw at any time without penalty.

If you have any questions about this research study now, you may ask them now. If you have additional questions later you may contact me at (320) 3132102/joelalfredo85@gmail.com or my advisor Dr. Ettien Koffi at (320) 308-3539/enkoffi@stcloudstate.edu. Results of the study can be requested from the researcher or they can be downloaded from the St. Cloud State University Repository.
Your signature indicates that you are at least 18 years of age, you have read the information provided above, and you have consent to participate.

_______________________________________ ______________

Signature Date

Appendix B: List of Words to be Recorded

Directions: Say each of the words below three times (x3) as naturally as possible.

1. heed, heed, heed (Note: the vowel sounds like the “ee” in <fleece>)
2. hid, hid, hid (Note: the vowel sounds like the “i” in <kit>)
3. hayed, hayed, hayed (Note: the vowel sounds like the “a” in <face>)
4. head, head, head (Note: the vowel sounds like the “e” in <dress>)
5. had, had, had (Note: the vowel sounds like the “a” in <bath>)
6. hod, hod, hod (Note: the vowel sounds like the “o” in <lot>)
7. hawed, hawed, hawed (Note: the vowel sounds like the “o” in <cloth>)
8. hoed, hoed, hoed (Note: the vowel sounds like the “oa” in <goat>)
9. hood, hood, hood (Note: the vowel sounds like the “oo” in <foot>)
10. who’d, who’d, who’d (Note: the vowel sounds like the “oo” in <goose>)
11. hud, hud, hud (Note: the vowel sounds like the “u” in <hug>)

Elicited Paragraph

Directions: Read the following text as naturally as possible. You might want to practice it several times before recording it so that you get a smooth reading that resembles how you talk.

Please call Stella. Ask her to bring these things with her from the store: Six good spoons of fresh snow peas, five thick slabs of blue cheese, and maybe a foot-long sandwich as a snack for her brother Bob. We also need a small plastic snake, the little yellow book, a rubber duck, a paper I-pad, the dog video game, a big toy frog for the kids, but not the faked gun. Don’t forget the ten sea turtles, the mat that my mom bought and the silver nun. She can scoop these things into three red bags, and two old backpacks, and we will go meet Sue, her, Jake, and Jenny Monday, Wednesday, or Sunday at the very last train station at the edge of the zoo which is in Zone four by the zebra sign. The entrance is for sure near York’s Treasure Bank.

Appendix C: Summary of the Relative Functional Load

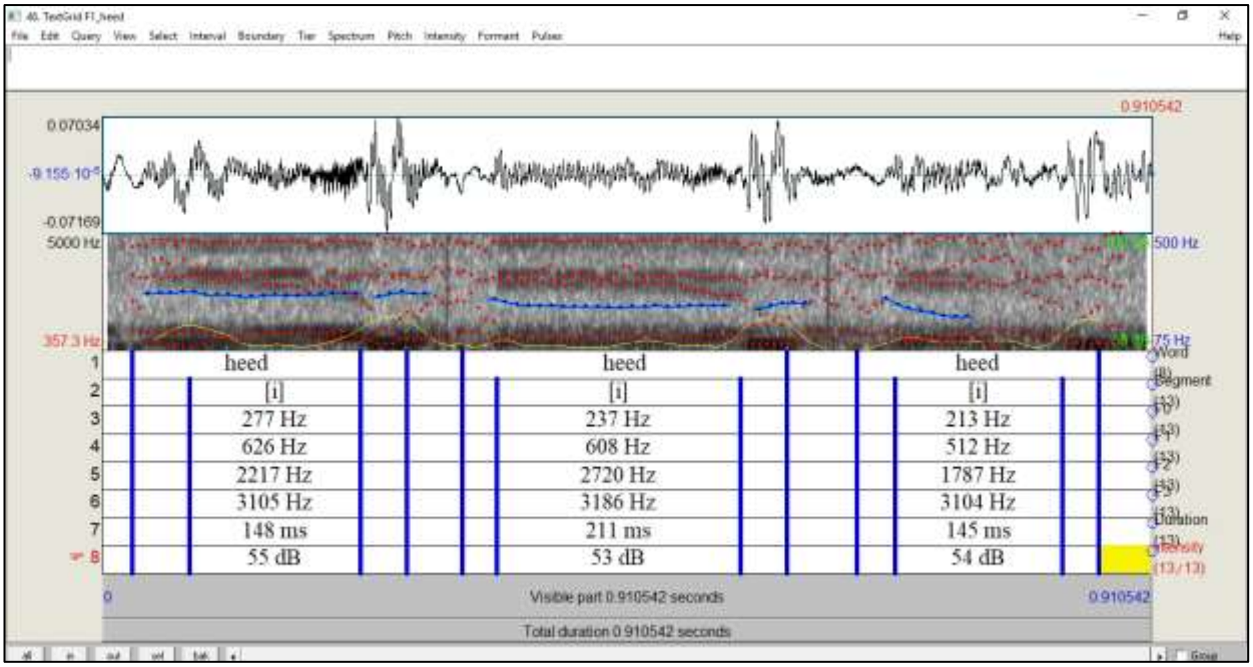
The following table provides a summary of the Relative Functional Load applied to the eleven vowel sounds in the English language. Table adapted from Koffi, (2017, p. 45-46)

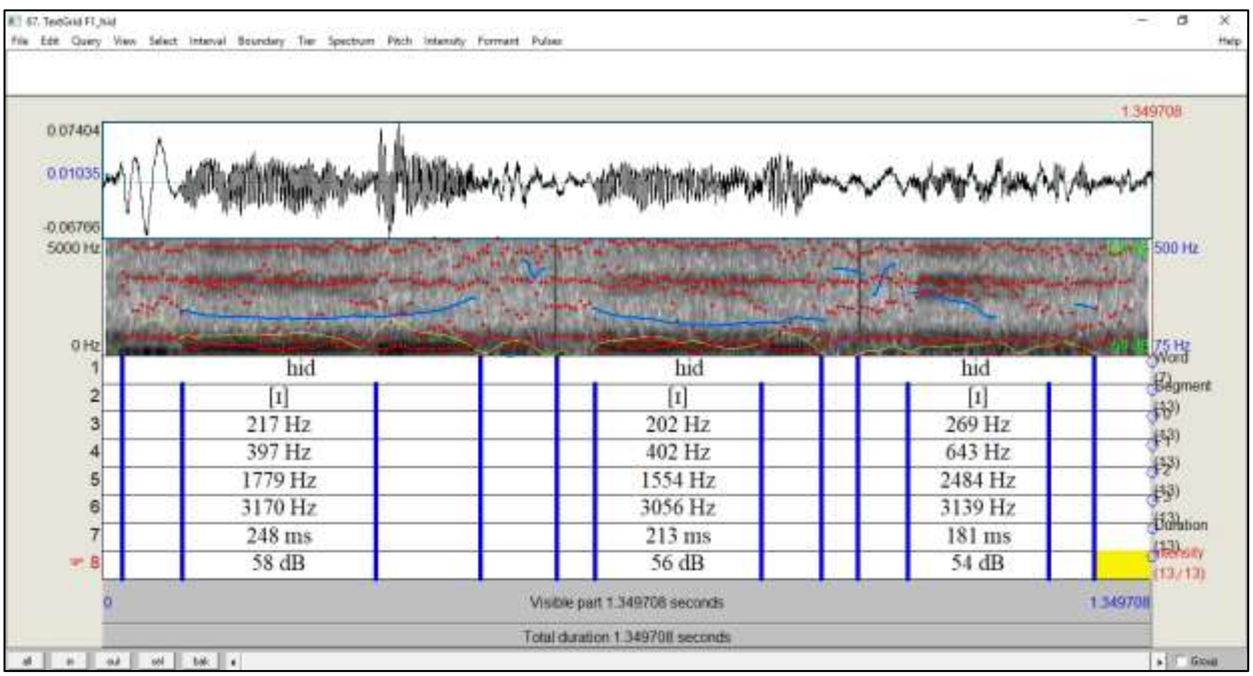
Words	Vowel Phonemes	Percentage
bit / bat	/ɪ/ vs. /æ/	100
beet / bit	/i/ vs. /ɪ/	95
bought / boat	/ɔ/ or /ɑ/ vs. /o/	88
bit / but	/ɪ/ vs. /ʌ/	86
bit / bait	/ɪ/ vs. /e/	80
cat / cot	/æ/ vs. /ɔ/ or /ɑ/	76
cat / cut	/æ/ vs. /ʌ/	68
cot / cut	/ɔ/ or /ɑ/ vs. /ʌ/	65
bit / bet	/ɪ/ vs. /ɛ/	54
bet / bait	/ɛ/ vs. /e/	53
bet / bat	/ɛ/ vs. /æ/	53
coat / coot	/o/ vs. /ʊ/	51
beet / boot	/i/ vs. /ʊ/	50
bet / but	/ɛ/ vs. /ʌ/	50
bought / boot	/ɔ/ or /ɑ/ vs. /ʊ/	50
pet / pot	/ɛ/ vs. /ɑ/	45
*cot / caught	/ɔ/ vs. /ɑ/	26
box / books	/ɑ/ or /ɔ/ vs. /ʊ/	18
pill / pull	/ɪ/ vs. /ʊ/	13.5
pull / pole	/ʊ/ vs. /o/	12
*put / putt	/ʊ/ vs. /ʌ/	9
*pull / pool	/ʊ/ vs. /u/	7
cam / calm	/æ/ vs. /ɑ/	4.5

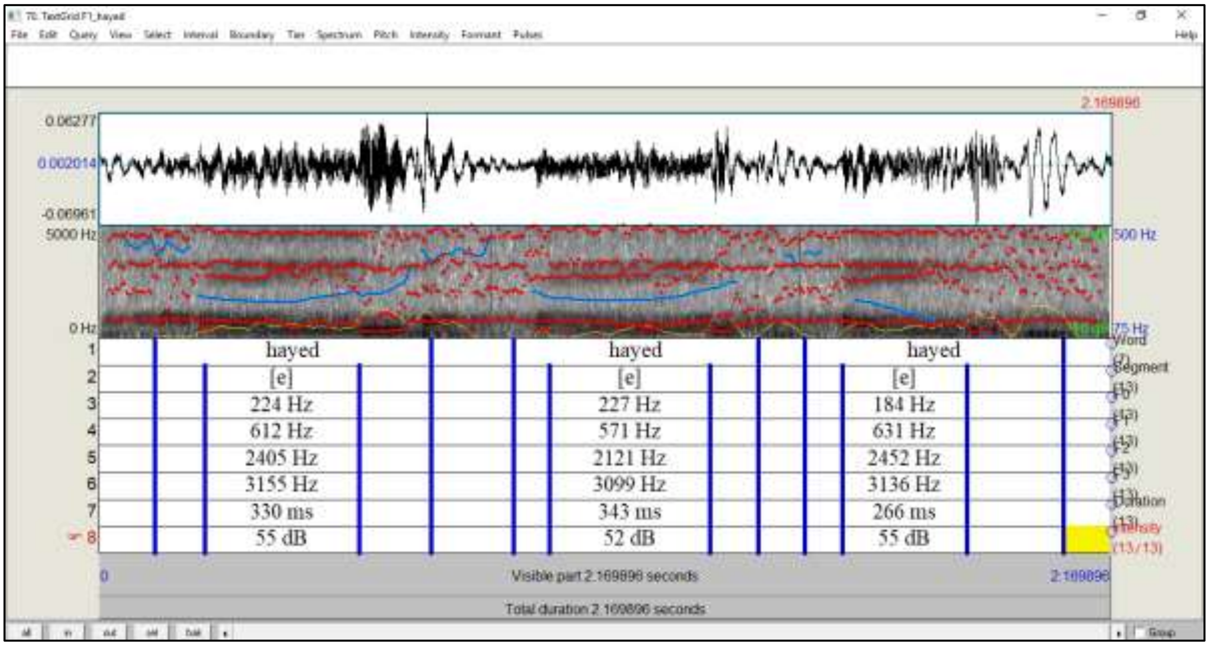
*Stands for variable pronunciations among different dialects of English. /ɑ/ and /ɔ/ are listed together because they have merged or are merging many dialects of American English.

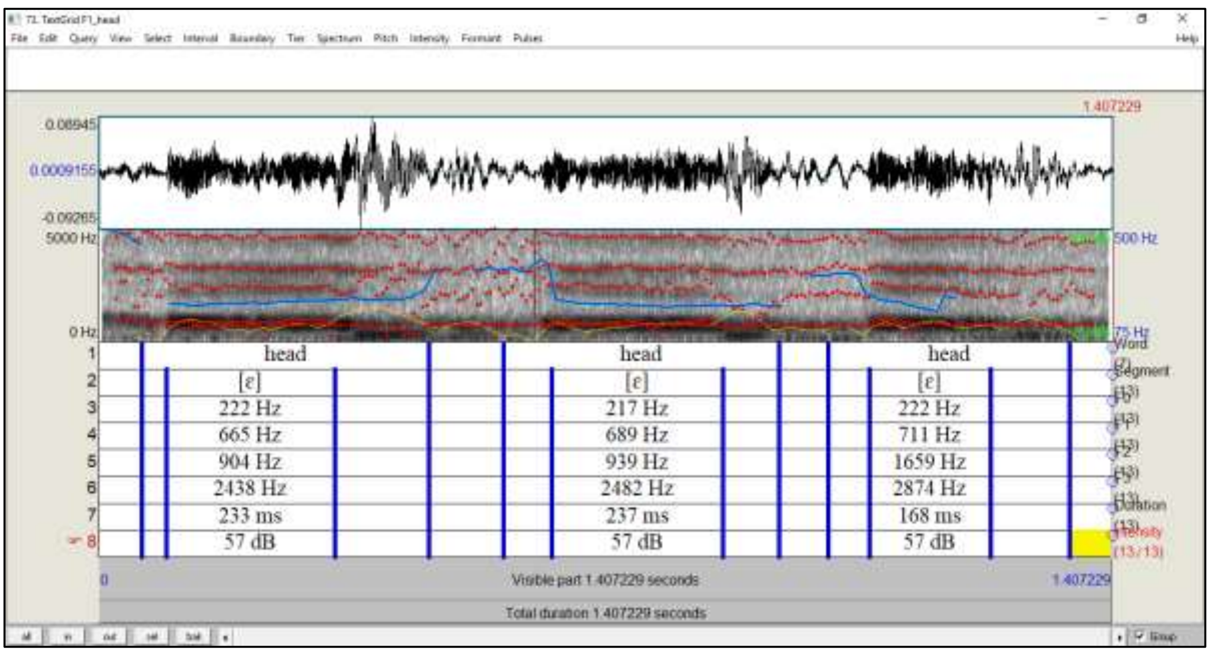
Appendix D: Spectrographs

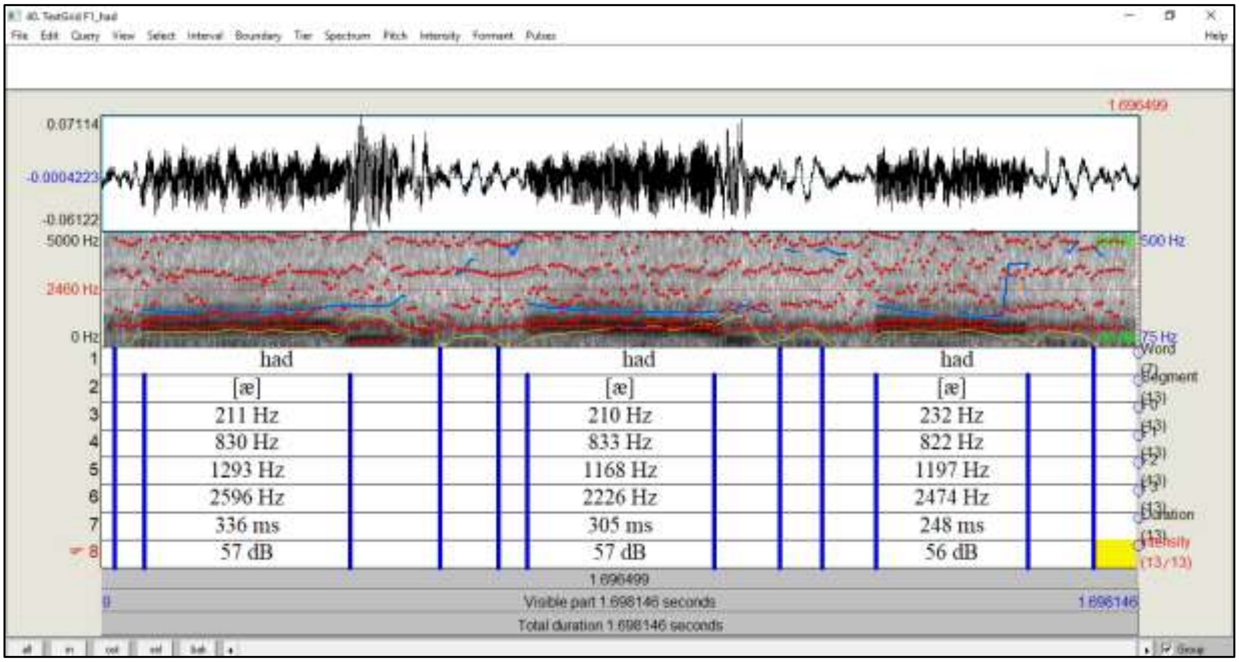
F1

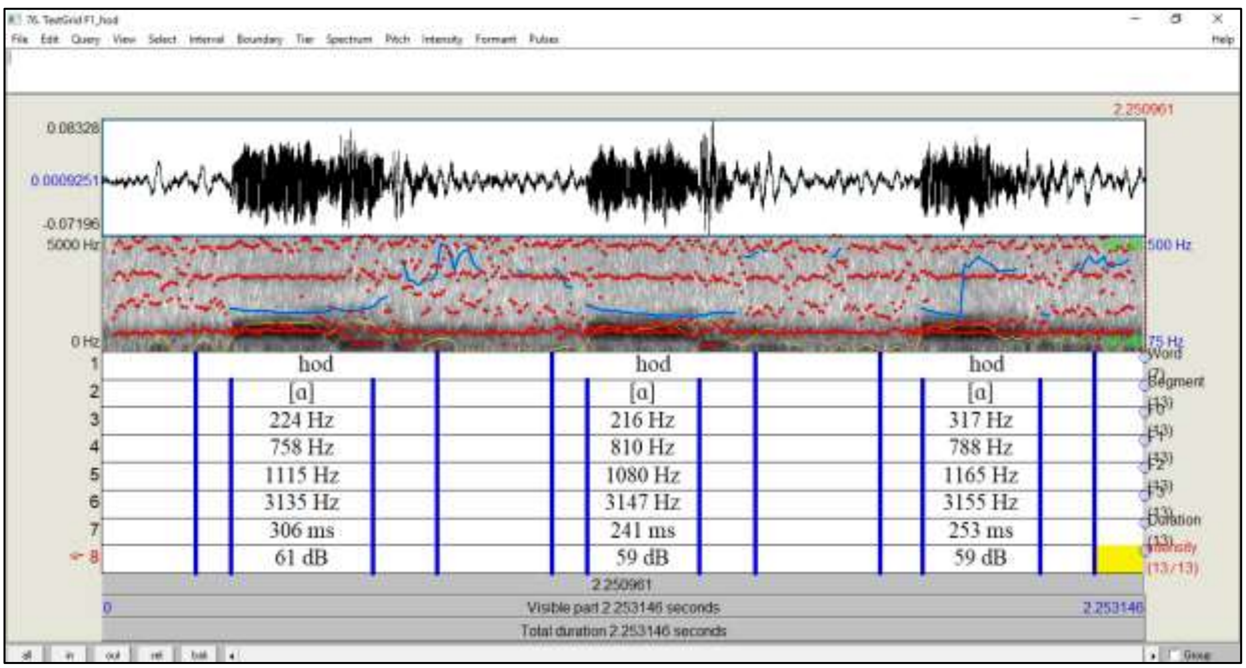


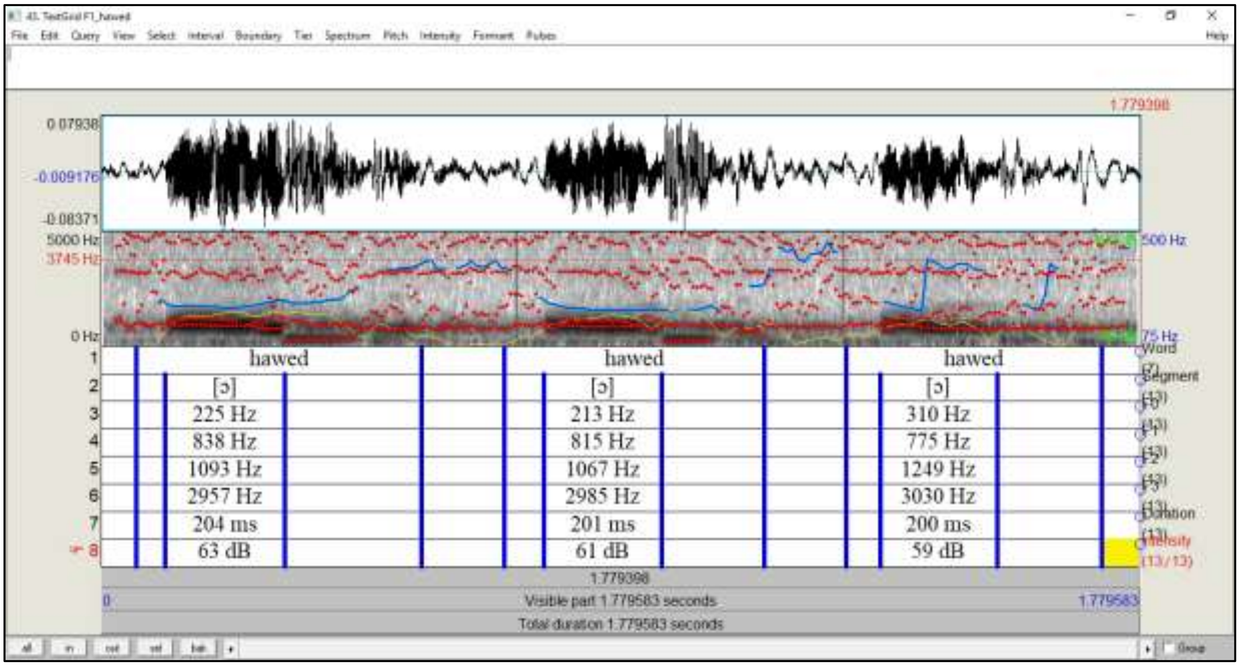



70. TextGrid F1_hayed
File Edit Query View Select Interval Boundary Tier Spectrum Pitch Intensity Formant Pulses
Help
2.169896
0.06277
0.002014
-0.06961
5000 Hz
0 Hz
500 Hz
75 Hz
hayed
hayed
hayed
[e]
[e]
[e]
224 Hz
227 Hz
184 Hz
612 Hz
571 Hz
631 Hz
2405 Hz
2121 Hz
2452 Hz
3155 Hz
3099 Hz
3136 Hz
330 ms
343 ms
266 ms
55 dB
52 dB
55 dB
Word
Segment
F0
F1
F2
F3
Duration
Intensity
(13/13)
0
Visible part 2.169896 seconds
2.169896
Total duration 2.169896 seconds

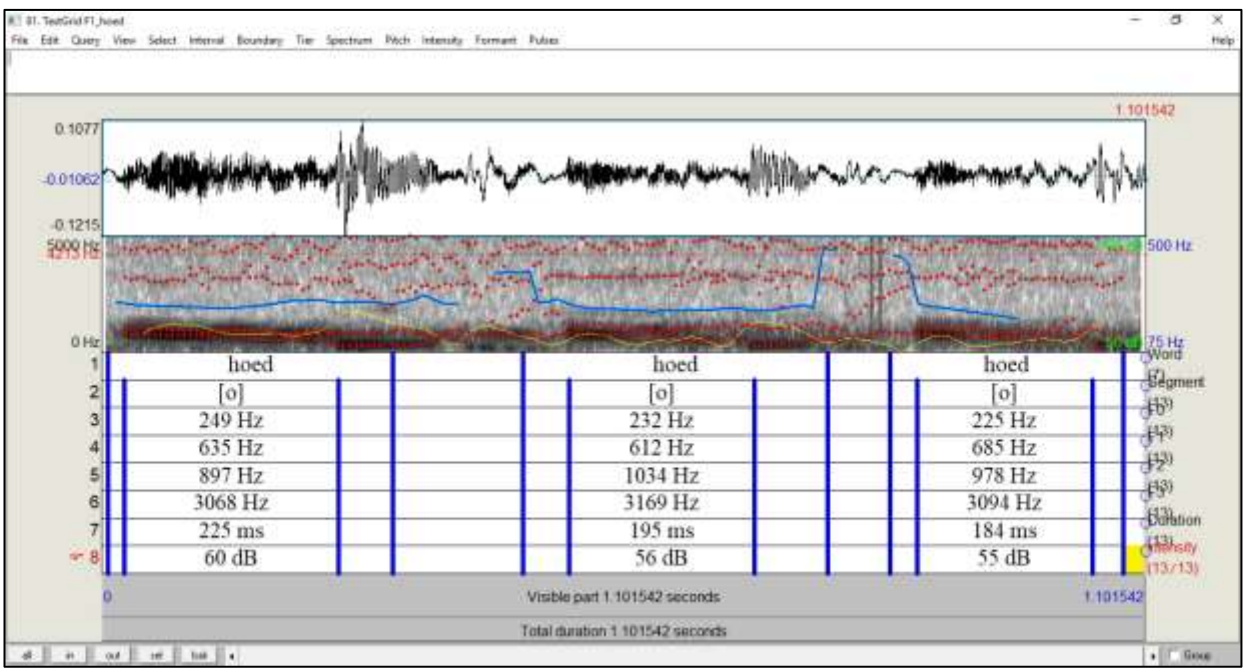

71. TextGrid F1_head
File Edit Query View Select Interval Boundary Tier Spectrum Pitch Intensity Formant Pulses
Help
1.407229
0.08945
0.0009155
-0.09265
5000 Hz
0 Hz
500 Hz
75 Hz
head
head
head
[ɛ]
[ɛ]
[ɛ]
222 Hz
217 Hz
222 Hz
665 Hz
689 Hz
711 Hz
904 Hz
939 Hz
1659 Hz
2438 Hz
2482 Hz
2874 Hz
233 ms
237 ms
168 ms
57 dB
57 dB
57 dB
Word
Segment
F0
F1
F2
F3
Duration
Intensity
(13/13)
0
Visible part 1.407229 seconds
1.407229
Total duration 1.407229 seconds


had
[æ]
211 Hz
830 Hz
1293 Hz
2596 Hz
336 ms
57 dB
had
[æ]
210 Hz
833 Hz
1168 Hz
2226 Hz
305 ms
57 dB
had
[æ]
232 Hz
822 Hz
1197 Hz
2474 Hz
248 ms
56 dB
Visible part 1.698146 seconds
Total duration 1.698146 seconds

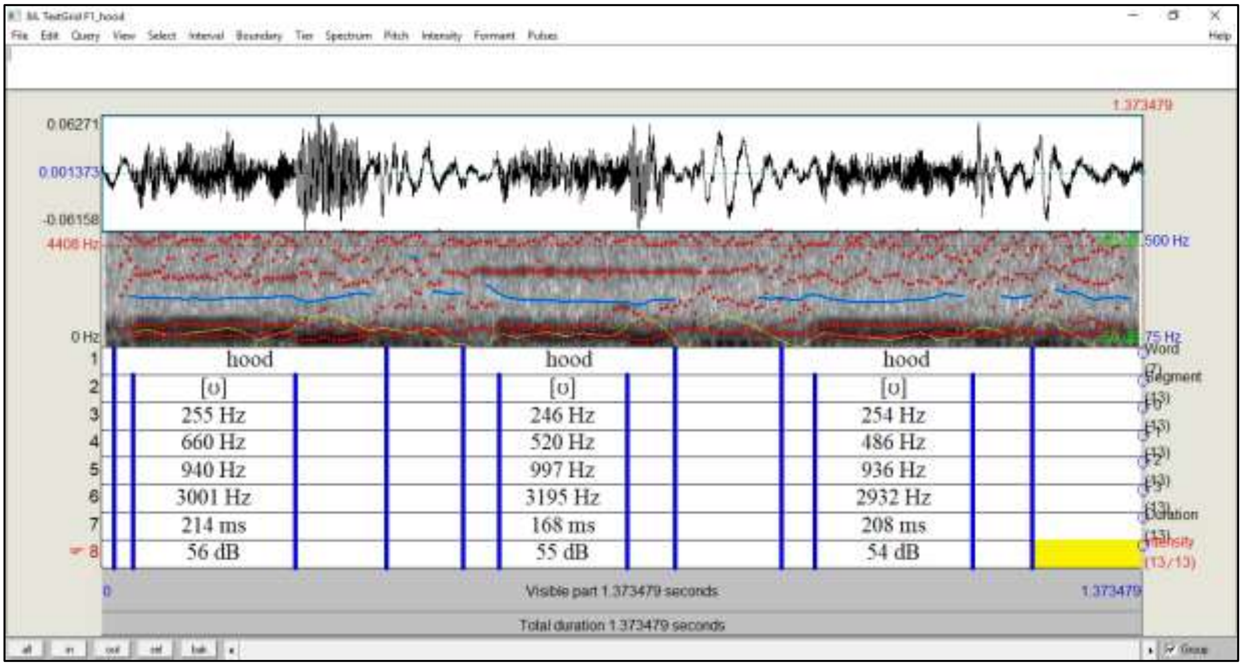

hod
[ɑ]
224 Hz
758 Hz
1115 Hz
3135 Hz
306 ms
61 dB
hod
[ɑ]
216 Hz
810 Hz
1080 Hz
3147 Hz
241 ms
59 dB
hod
[ɑ]
317 Hz
788 Hz
1165 Hz
3155 Hz
253 ms
59 dB
Visible part 2.253146 seconds
Total duration 2.253146 seconds

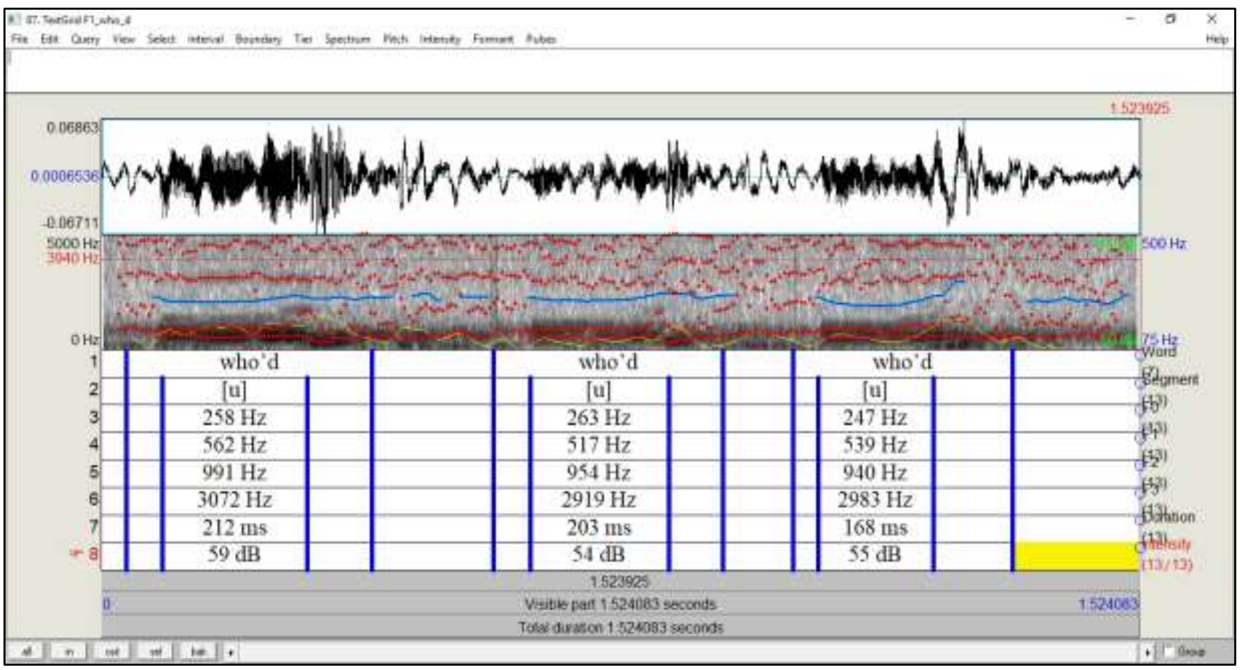


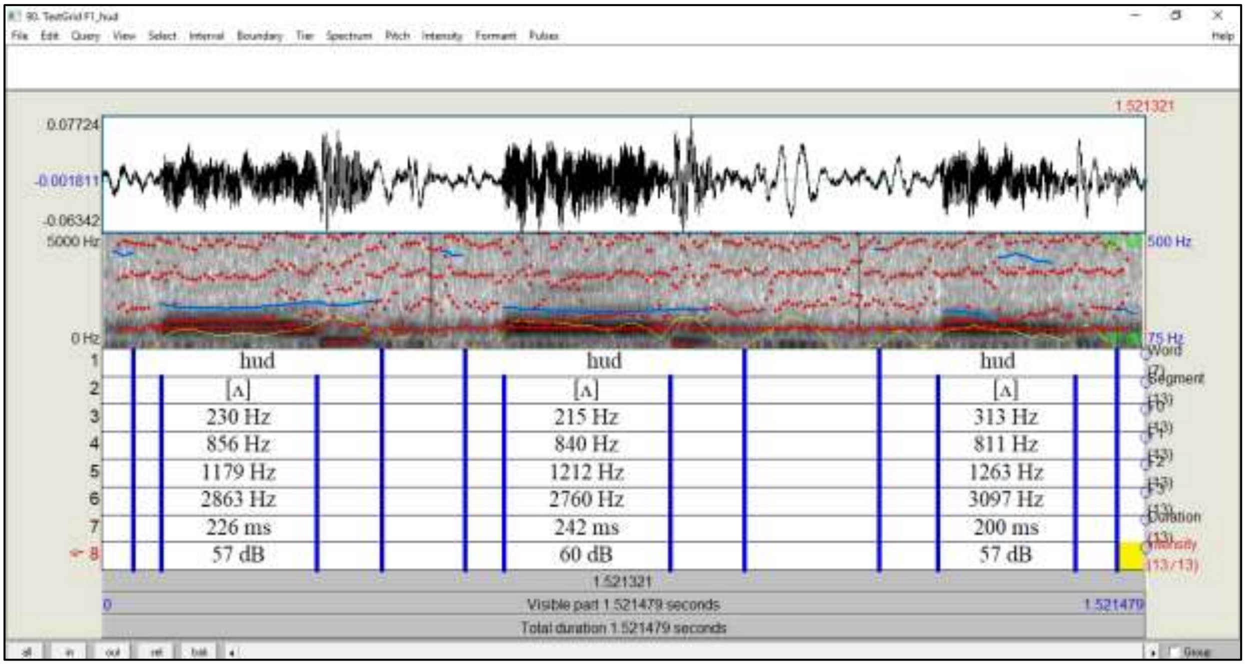
File Edit Query View Select Interval Boundary Tier Spectrum Pitch Intensity Formant Pulses
Help
1.779398
0.07938
-0.009176
-0.08371
5000 Hz
3745 Hz
0 Hz
500 Hz
75 Hz
hawed
hawed
hawed
[ɔ]
[ɔ]
[ɔ]
225 Hz
213 Hz
310 Hz
838 Hz
815 Hz
775 Hz
1093 Hz
1067 Hz
1249 Hz
2957 Hz
2985 Hz
3030 Hz
204 ms
201 ms
200 ms
63 dB
61 dB
59 dB
Word
Segment
F0
F1
F2
F3
Duration
Intensity
(13/13)
1.779398
0
Visible part 1.779583 seconds
1.779583
Total duration 1.779583 seconds



File Edit Query View Select Interval Boundary Tier Spectrum Pitch Intensity Formant Pulses
Help
1.101542
0.1077
-0.01062
-0.1215
5000 Hz
0 Hz
500 Hz
75 Hz
hoed
hoed
hoed
[o]
[o]
[o]
249 Hz
232 Hz
225 Hz
635 Hz
612 Hz
685 Hz
897 Hz
1034 Hz
978 Hz
3068 Hz
3169 Hz
3094 Hz
225 ms
195 ms
184 ms
60 dB
56 dB
55 dB
Word
Segment
F0
F1
F2
F3
Duration
Intensity
(13/13)
0
Visible part 1.101542 seconds
1.101542
Total duration 1.101542 seconds

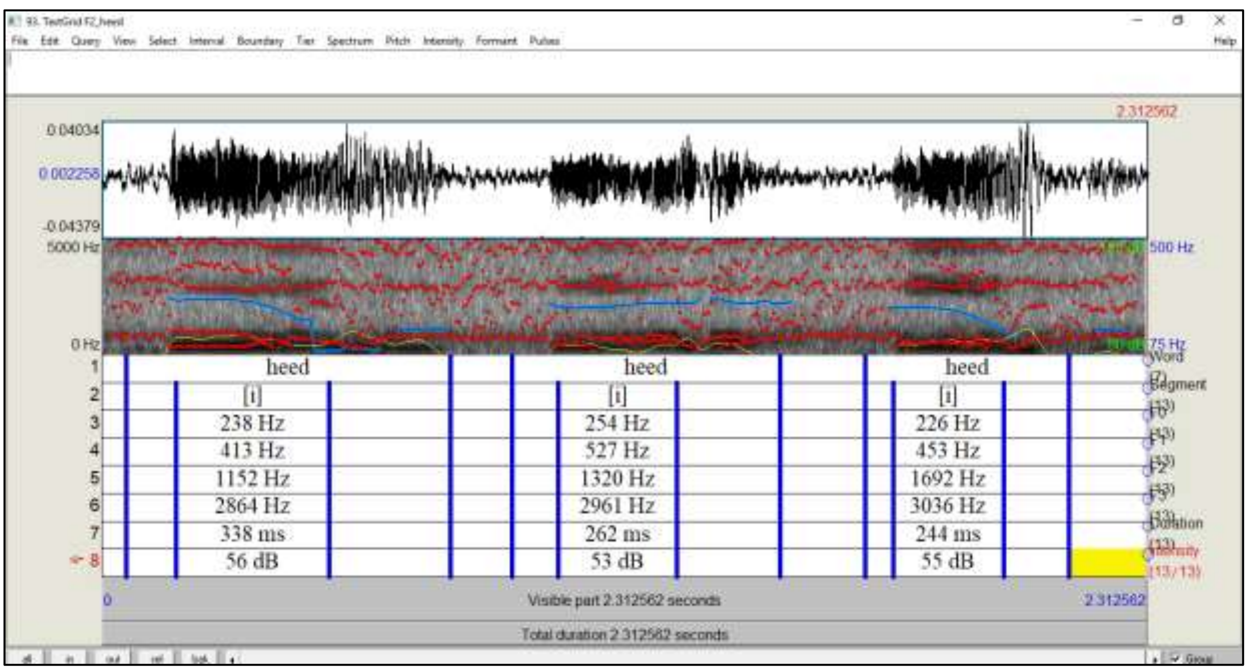

File Edit Query View Select Interval Boundary Tier Spectrum Pitch Intensity Formant Pulses
Help
1.373479
0.06271
0.001373
-0.06158
4408 Hz
500 Hz
0 Hz
75 Hz
hood
hood
hood
[ʊ]
[ʊ]
[ʊ]
255 Hz
246 Hz
254 Hz
660 Hz
520 Hz
486 Hz
940 Hz
997 Hz
936 Hz
3001 Hz
3195 Hz
2932 Hz
214 ms
168 ms
208 ms
56 dB
55 dB
54 dB
Word
Segment
F0
F1
F2
F3
Duration
Intensity
(13/13)
Visible part 1.373479 seconds
Total duration 1.373479 seconds


File Edit Query View Select Interval Boundary Tier Spectrum Pitch Intensity Formant Pulses
Help
1.523925
0.06863
0.0006536
-0.06711
5000 Hz
3940 Hz
500 Hz
0 Hz
75 Hz
who'd
who'd
who'd
[u]
[u]
[u]
258 Hz
263 Hz
247 Hz
562 Hz
517 Hz
539 Hz
991 Hz
954 Hz
940 Hz
3072 Hz
2919 Hz
2983 Hz
212 ms
203 ms
168 ms
59 dB
54 dB
55 dB
Word
Segment
F0
F1
F2
F3
Duration
Intensity
(13/13)
1.523925
Visible part 1.524083 seconds
1.524083
Total duration 1.524083 seconds

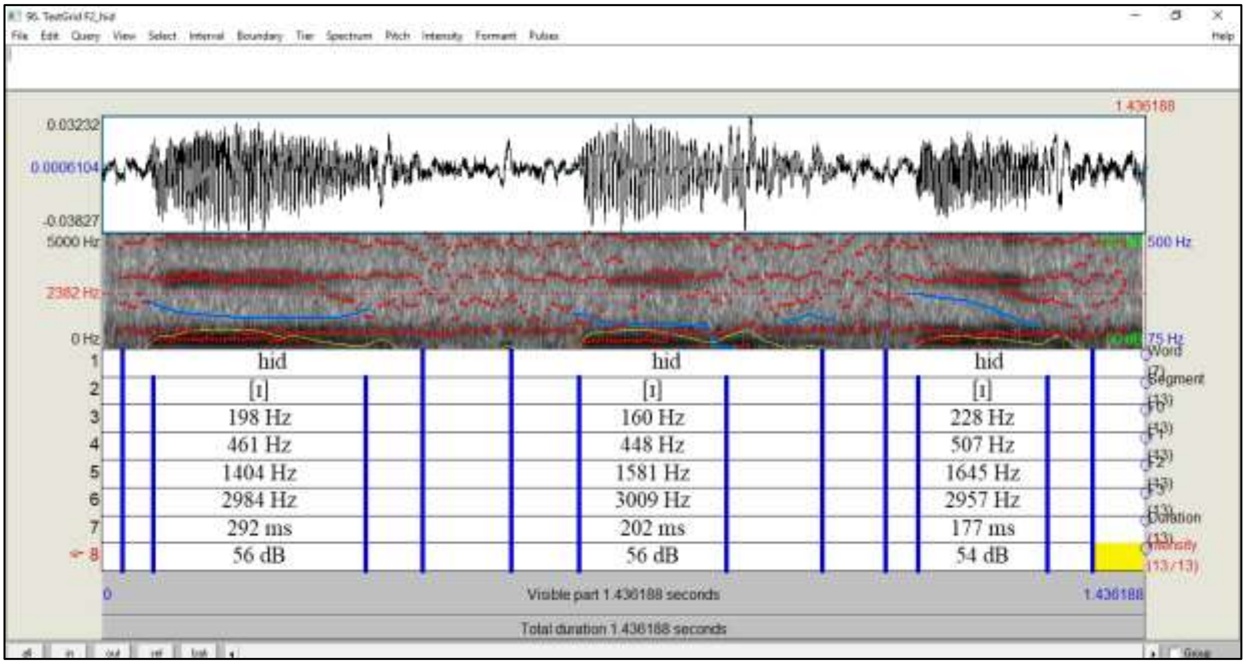


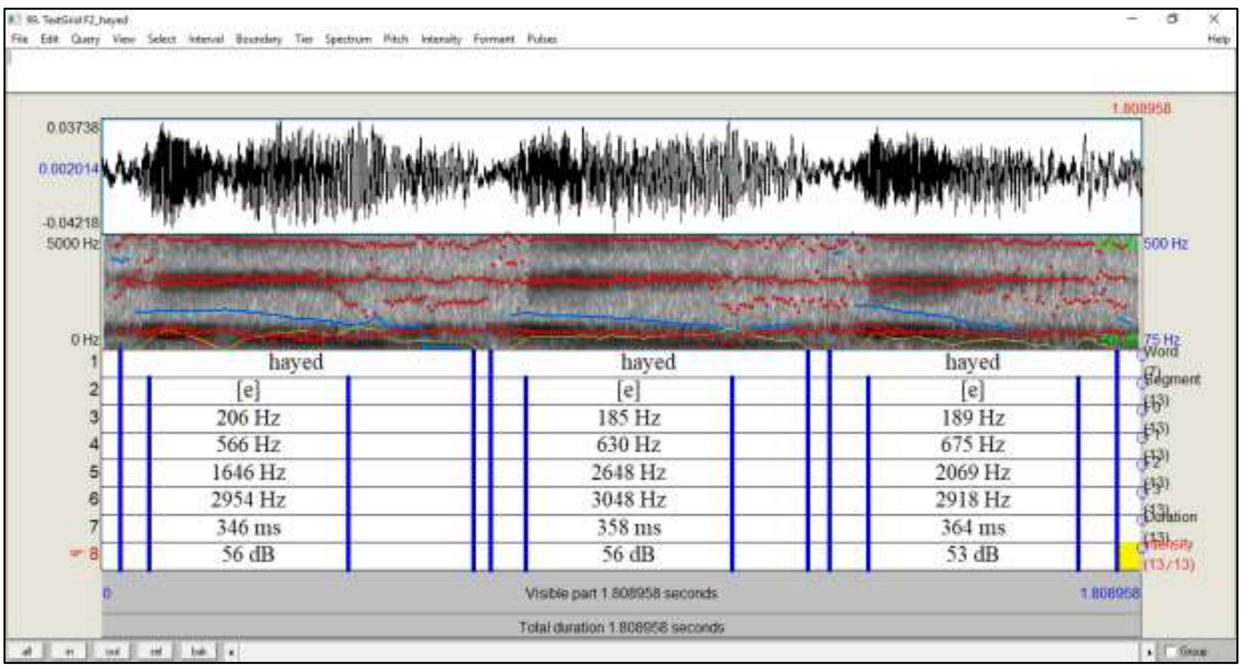
0.07724
-0.001811
-0.06342
5000 Hz
0 Hz
1.521321
500 Hz
75 Hz
hud
[ʌ]
230 Hz
856 Hz
1179 Hz
2863 Hz
226 ms
57 dB
hud
[ʌ]
215 Hz
840 Hz
1212 Hz
2760 Hz
242 ms
60 dB
hud
[ʌ]
313 Hz
811 Hz
1263 Hz
3097 Hz
200 ms
57 dB
Word
Segment
Duration
Intensity
(13/13)
Visible part 1.521479 seconds
1.521479
Total duration 1.521479 seconds

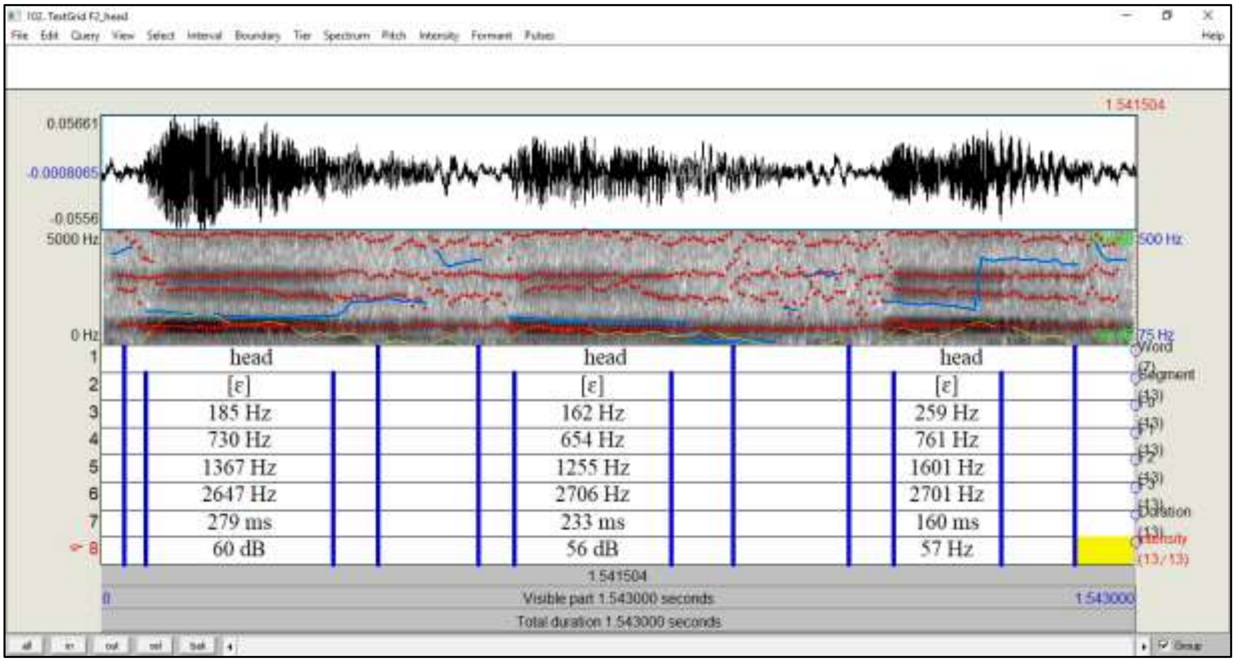
F2

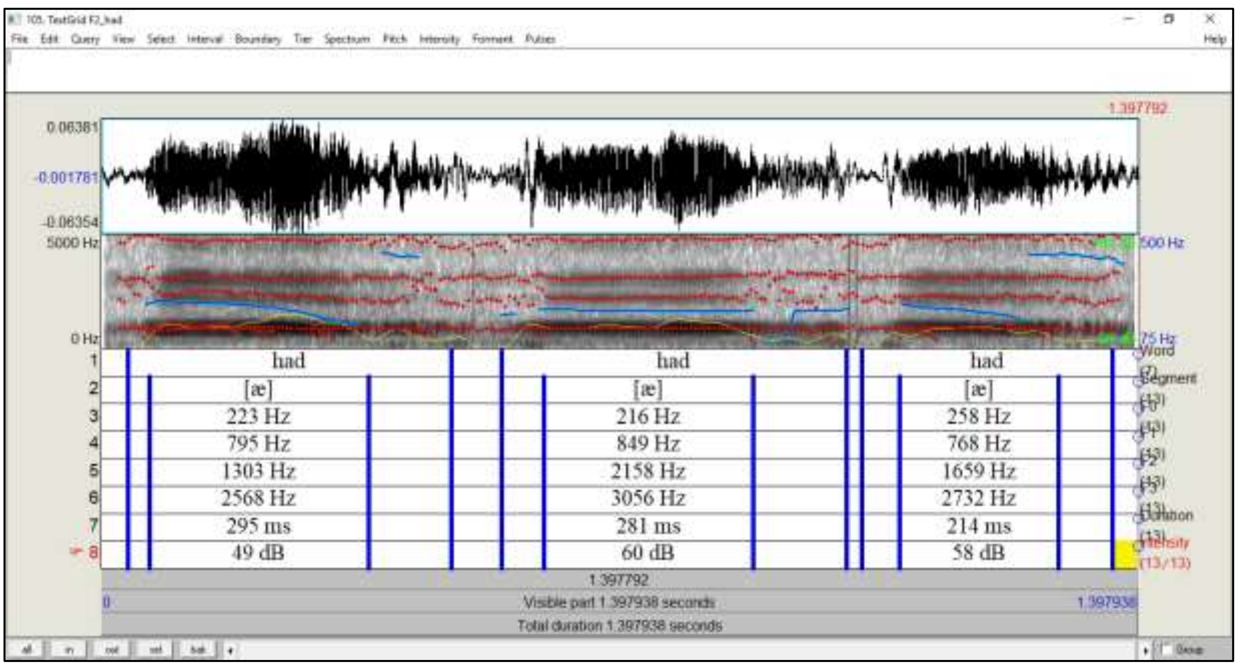


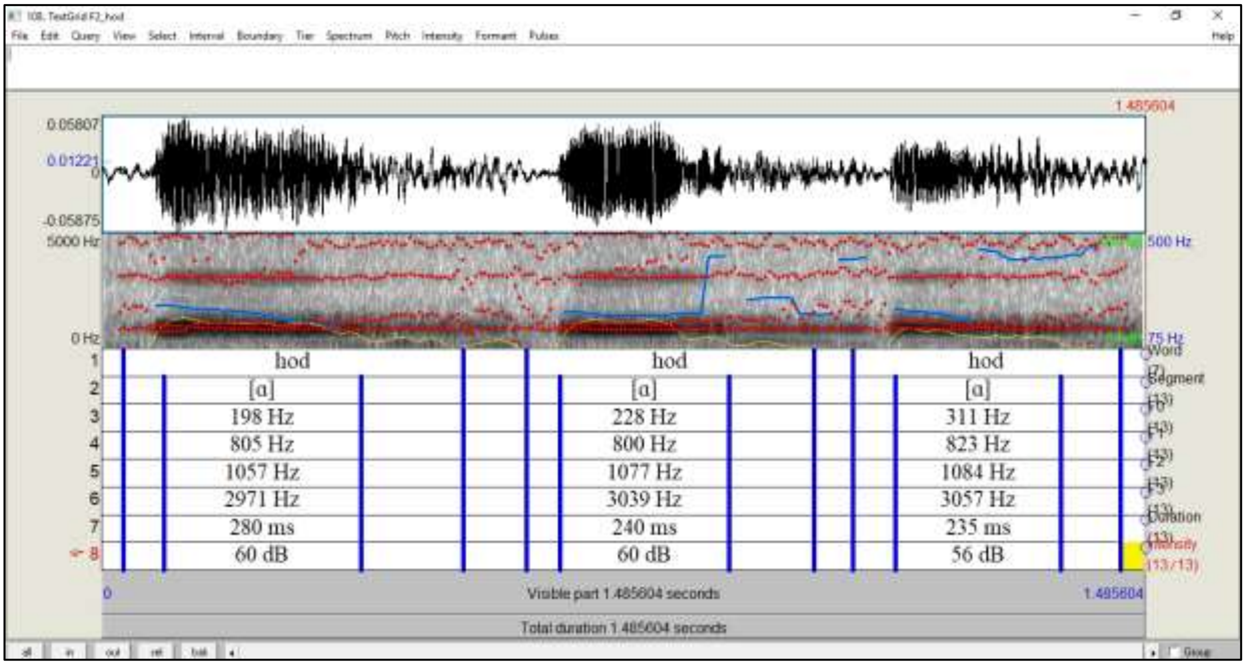
0.04034
0.002258
-0.04379
5000 Hz
0 Hz
2.312562
500 Hz
75 Hz
heed
[i]
238 Hz
413 Hz
1152 Hz
2864 Hz
338 ms
56 dB
heed
[i]
254 Hz
527 Hz
1320 Hz
2961 Hz
262 ms
53 dB
heed
[i]
226 Hz
453 Hz
1692 Hz
3036 Hz
244 ms
55 dB
Word
Segment
Duration
Intensity
(13/13)
Visible part 2.312562 seconds
2.312562
Total duration 2.312562 seconds

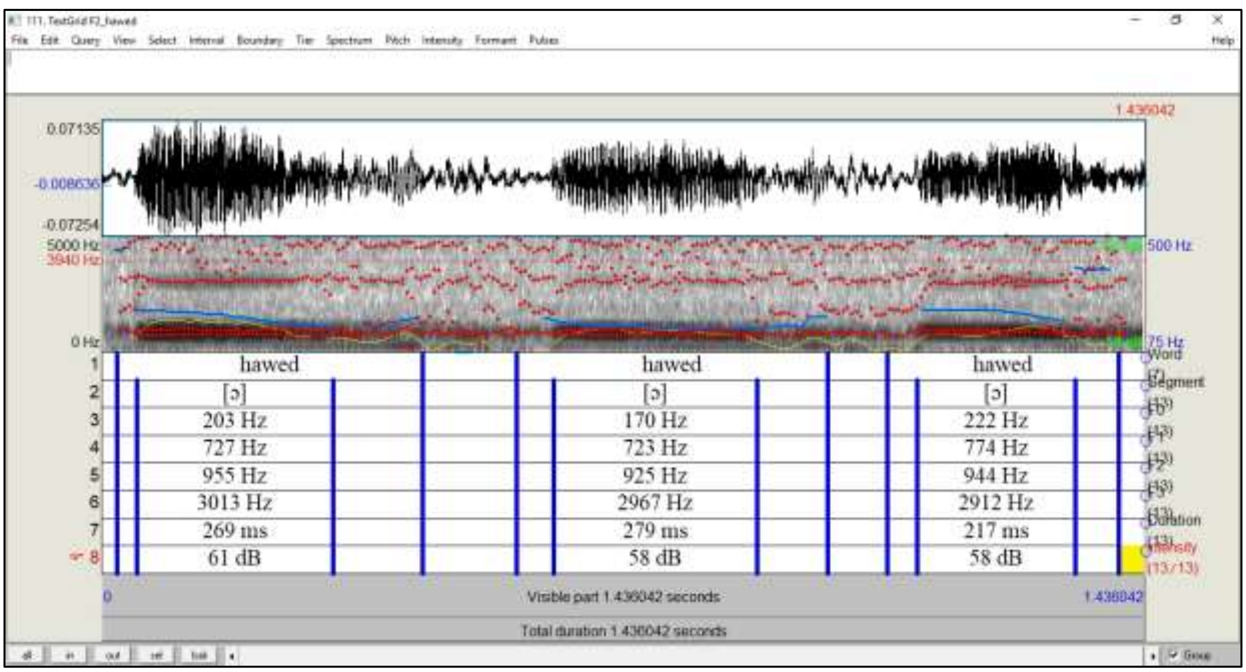

File Edit Query View Select Interval Boundary Tier Spectrum Pitch Intensity Formant Pulses
Help
1.436188
0.03232
0.0006104
-0.03827
5000 Hz
2382 Hz
0 Hz
500 Hz
75 Hz
hid
hid
hid
[ɪ]
[ɪ]
[ɪ]
198 Hz
160 Hz
228 Hz
461 Hz
448 Hz
507 Hz
1404 Hz
1581 Hz
1645 Hz
2984 Hz
3009 Hz
2957 Hz
292 ms
202 ms
177 ms
56 dB
56 dB
54 dB
Word
Segment
F0
F1
F2
F3
Duration
Intensity
(13/13)
0
Visible part 1.436188 seconds
1.436188
Total duration 1.436188 seconds

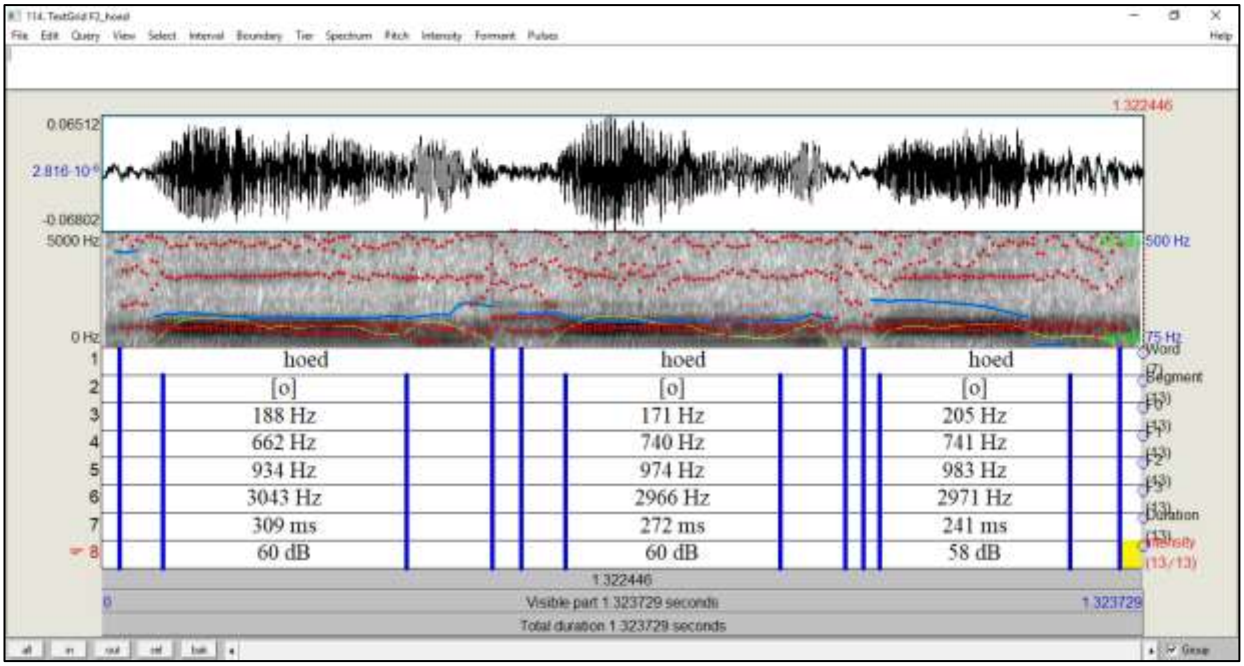

File Edit Query View Select Interval Boundary Tier Spectrum Pitch Intensity Formant Pulses
Help
1.808958
0.03738
0.002014
-0.04218
5000 Hz
0 Hz
500 Hz
75 Hz
hayed
hayed
hayed
[e]
[e]
[e]
206 Hz
185 Hz
189 Hz
566 Hz
630 Hz
675 Hz
1646 Hz
2648 Hz
2069 Hz
2954 Hz
3048 Hz
2918 Hz
346 ms
358 ms
364 ms
56 dB
56 dB
53 dB
Word
Segment
F0
F1
F2
F3
Duration
Intensity
(13/13)
0
Visible part 1.808958 seconds
1.808958
Total duration 1.808958 seconds

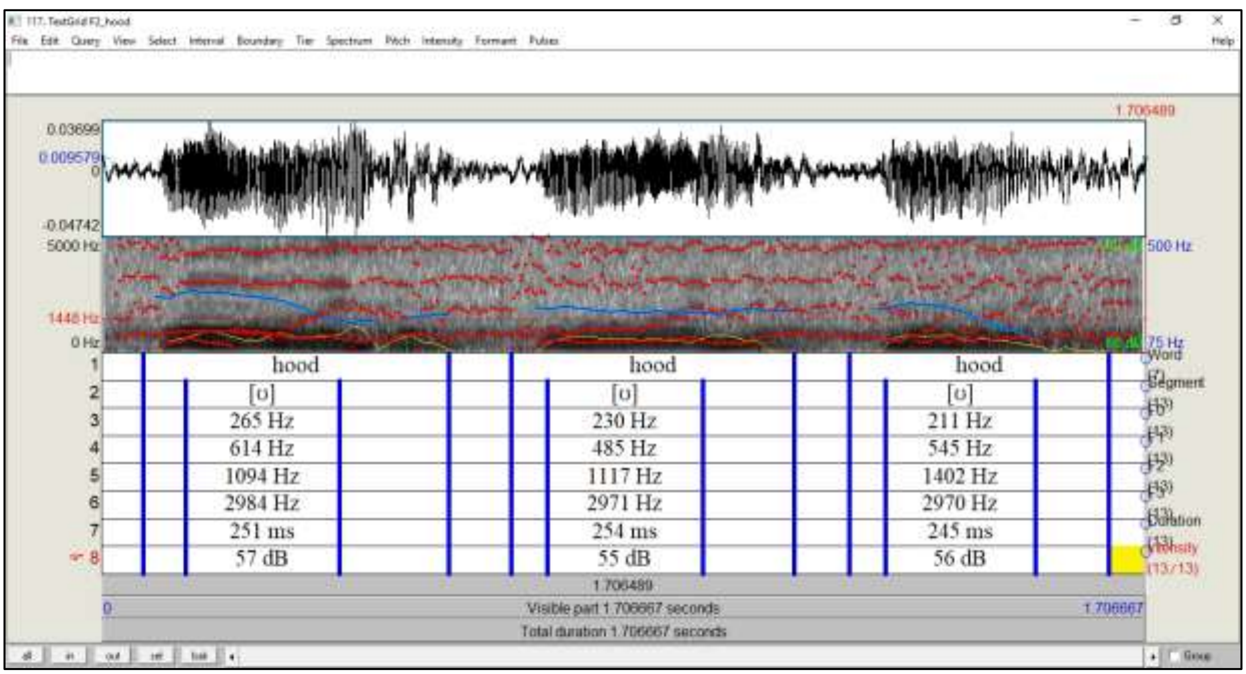

File Edit Query View Select Interval Boundary Tier Spectrum Pitch Intensity Formant Pulses
Help
1.541504
0.05661
-0.0008065
-0.0556
5000 Hz
0 Hz
500 Hz
75 Hz
head
[ɛ]
185 Hz
730 Hz
1367 Hz
2647 Hz
279 ms
60 dB
head
[ɛ]
162 Hz
654 Hz
1255 Hz
2706 Hz
233 ms
56 dB
head
[ɛ]
259 Hz
761 Hz
1601 Hz
2701 Hz
160 ms
57 Hz
Word
Segment
Duration
Intensity
(13/13)
1.541504
Visible part 1.543000 seconds
1.543000
Total duration 1.543000 seconds
all in out sel bak
Group

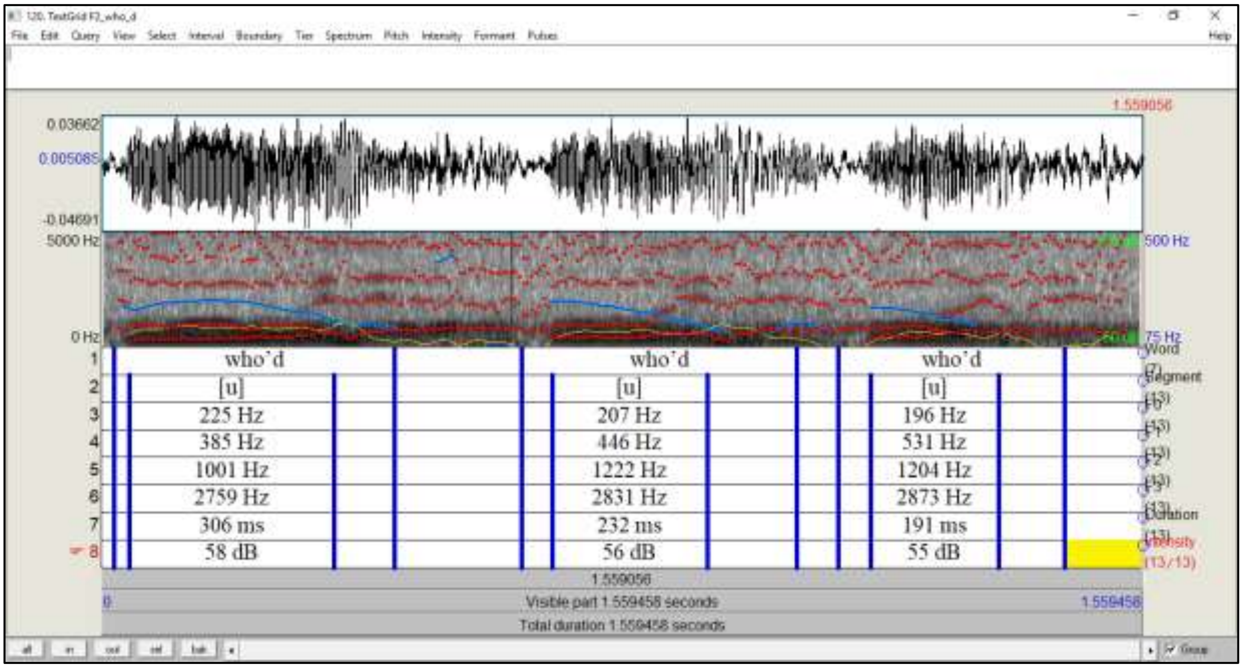

File Edit Query View Select Interval Boundary Tier Spectrum Pitch Intensity Formant Pulses
Help
1.397792
0.06381
-0.001781
-0.06354
5000 Hz
0 Hz
500 Hz
75 Hz
had
[æ]
223 Hz
795 Hz
1303 Hz
2568 Hz
295 ms
49 dB
had
[æ]
216 Hz
849 Hz
2158 Hz
3056 Hz
281 ms
60 dB
had
[æ]
258 Hz
768 Hz
1659 Hz
2732 Hz
214 ms
58 dB
Word
Segment
Duration
Intensity
(13/13)
1.397792
Visible part 1.397938 seconds
1.397938
Total duration 1.397938 seconds
all in out sel bak
Group

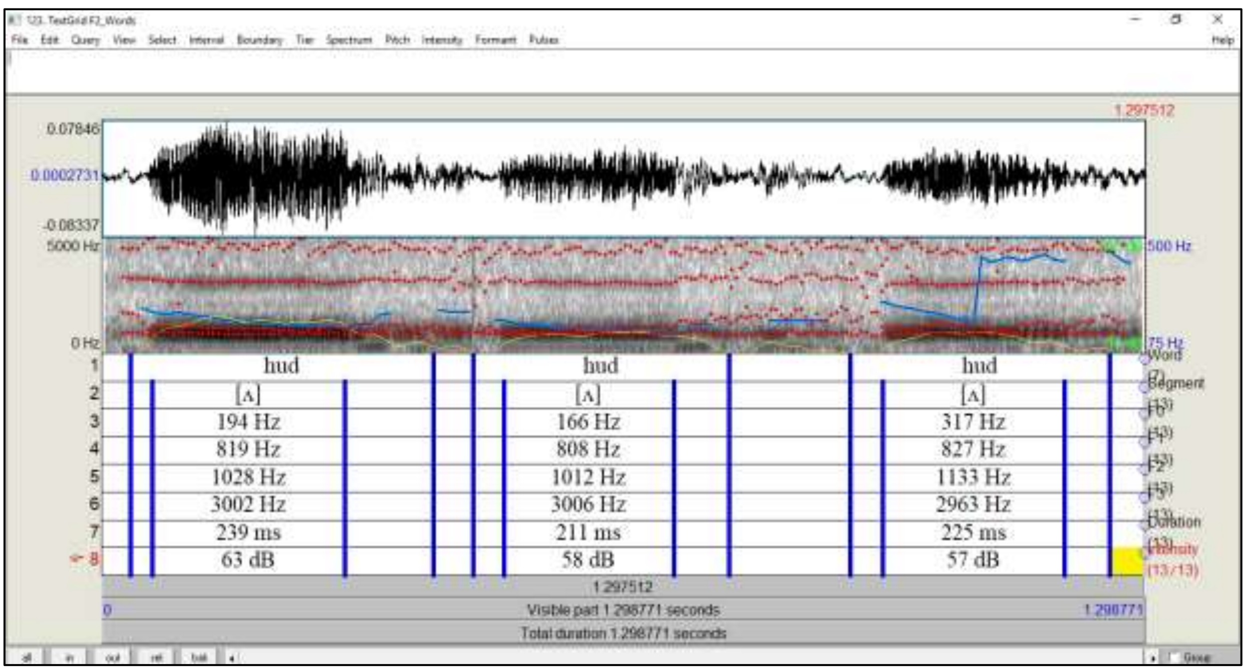

1.485604
0.05807
0.01221
-0.05875
5000 Hz
0 Hz
500 Hz
75 Hz
hod
[ɑ]
198 Hz
805 Hz
1057 Hz
2971 Hz
280 ms
60 dB
hod
[ɑ]
228 Hz
800 Hz
1077 Hz
3039 Hz
240 ms
60 dB
hod
[ɑ]
311 Hz
823 Hz
1084 Hz
3057 Hz
235 ms
56 dB
Word
Segment
F0
F1
F2
F3
Duration
Intensity
(13/13)
Visible part 1.485604 seconds
Total duration 1.485604 seconds


1.436042
0.07135
-0.008636
-0.07254
5000 Hz
3940 Hz
0 Hz
500 Hz
75 Hz
hawed
[ɔ]
203 Hz
727 Hz
955 Hz
3013 Hz
269 ms
61 dB
hawed
[ɔ]
170 Hz
723 Hz
925 Hz
2967 Hz
279 ms
58 dB
hawed
[ɔ]
222 Hz
774 Hz
944 Hz
2912 Hz
217 ms
58 dB
Word
Segment
F0
F1
F2
F3
Duration
Intensity
(13/13)
Visible part 1.436042 seconds
Total duration 1.436042 seconds

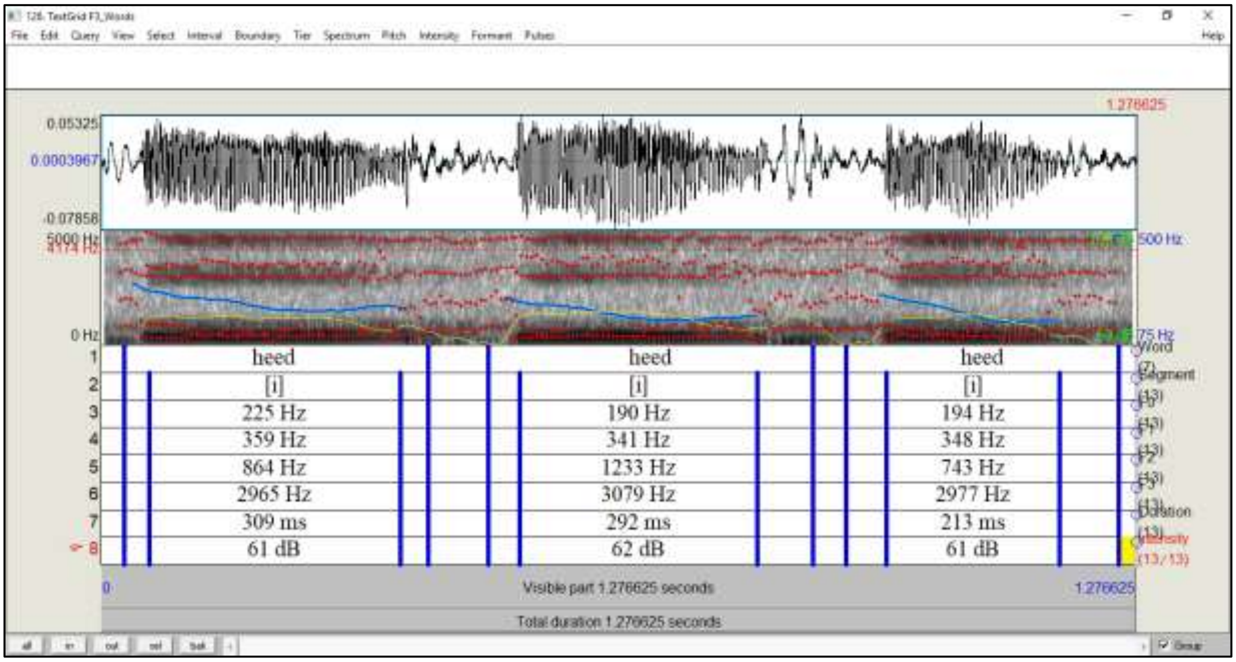

114. TextGrid F2_hoed
1.322446
0.06512
-0.06802
5000 Hz
0 Hz
500 Hz
75 Hz
hoed
[o]
188 Hz
662 Hz
934 Hz
3043 Hz
309 ms
60 dB
hoed
[o]
171 Hz
740 Hz
974 Hz
2966 Hz
272 ms
60 dB
hoed
[o]
205 Hz
741 Hz
983 Hz
2971 Hz
241 ms
58 dB
Word
Segment
Duration
Intensity
(13/13)
Visible part 1.323729 seconds
1.323729
Total duration 1.323729 seconds

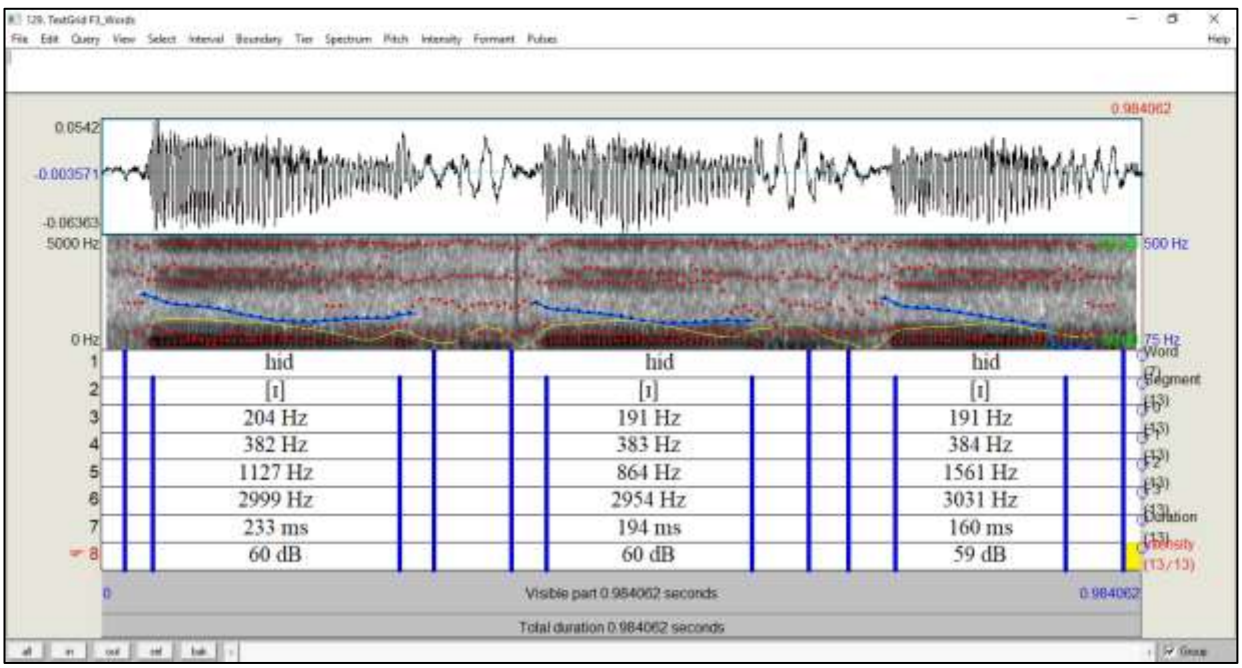

117. TextGrid F2_hood
1.706489
0.03699
0.009579
-0.04742
5000 Hz
1448 Hz
0 Hz
500 Hz
75 Hz
hood
[ʊ]
265 Hz
614 Hz
1094 Hz
2984 Hz
251 ms
57 dB
hood
[ʊ]
230 Hz
485 Hz
1117 Hz
2971 Hz
254 ms
55 dB
hood
[ʊ]
211 Hz
545 Hz
1402 Hz
2970 Hz
245 ms
56 dB
Word
Segment
Duration
Intensity
(13/13)
Visible part 1.706667 seconds
1.706667
Total duration 1.706667 seconds

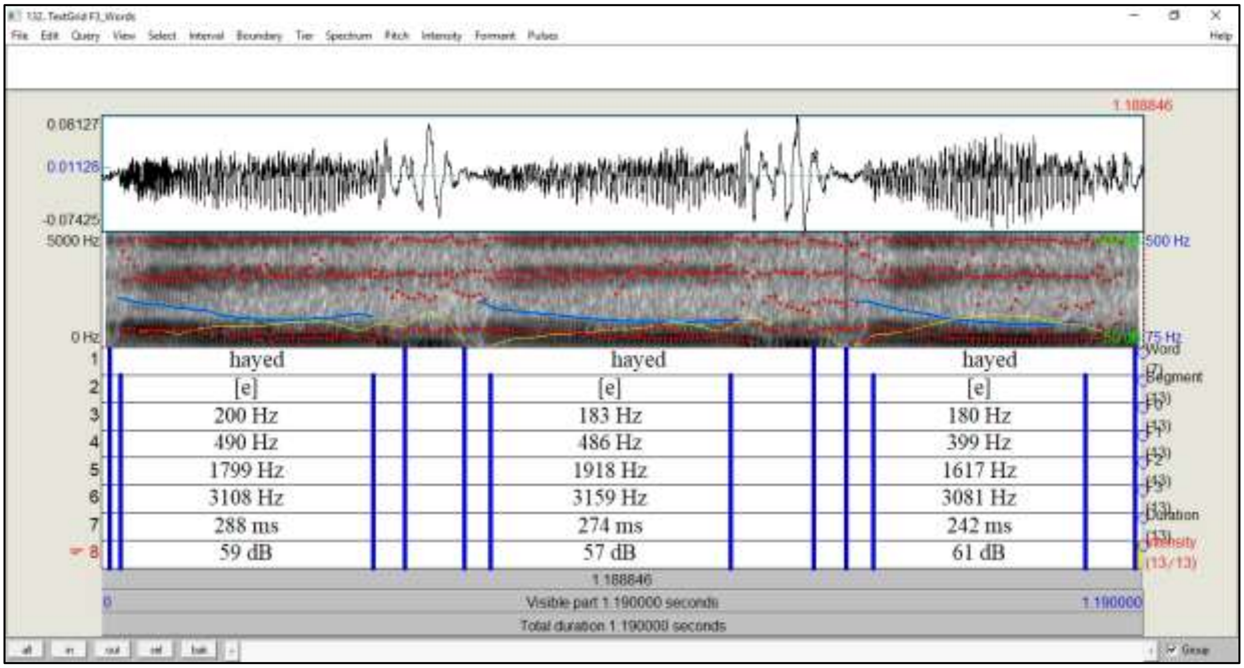

who'd
[u]
225 Hz
385 Hz
1001 Hz
2759 Hz
306 ms
58 dB
who'd
[u]
207 Hz
446 Hz
1222 Hz
2831 Hz
232 ms
56 dB
who'd
[u]
196 Hz
531 Hz
1204 Hz
2873 Hz
191 ms
55 dB
Visible part 1.559458 seconds
Total duration 1.559458 seconds

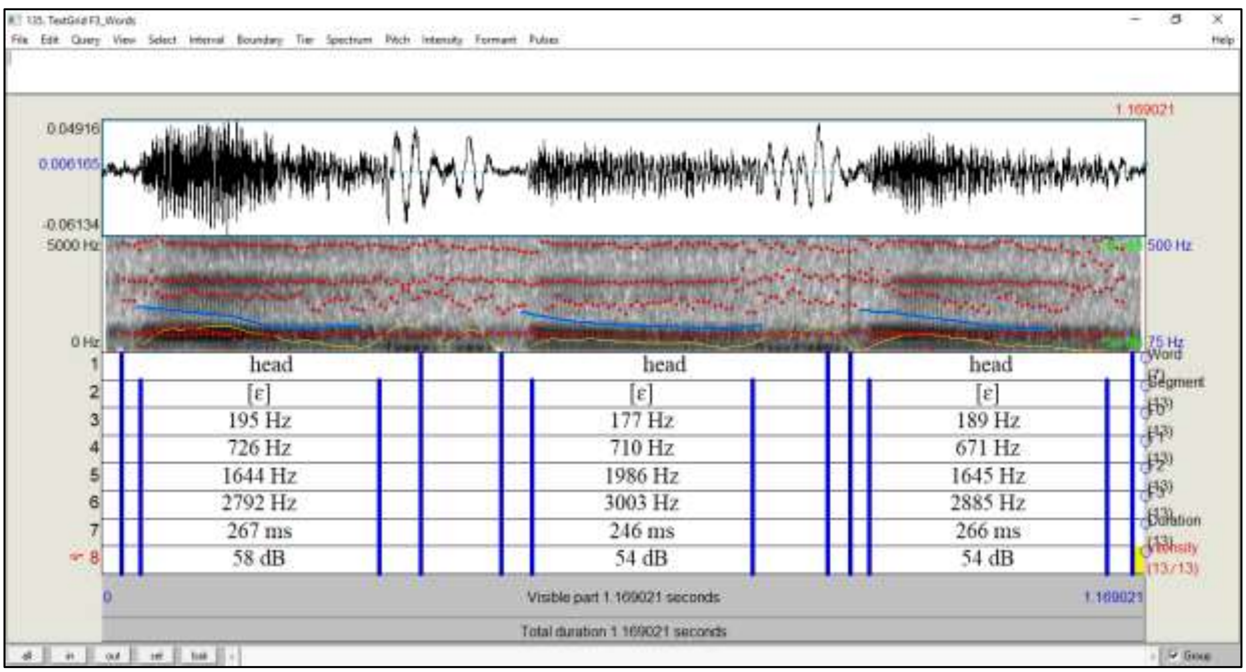

hud
[ʌ]
194 Hz
819 Hz
1028 Hz
3002 Hz
239 ms
63 dB
hud
[ʌ]
166 Hz
808 Hz
1012 Hz
3006 Hz
211 ms
58 dB
hud
[ʌ]
317 Hz
827 Hz
1133 Hz
2963 Hz
225 ms
57 dB
Visible part 1.298771 seconds
Total duration 1.298771 seconds

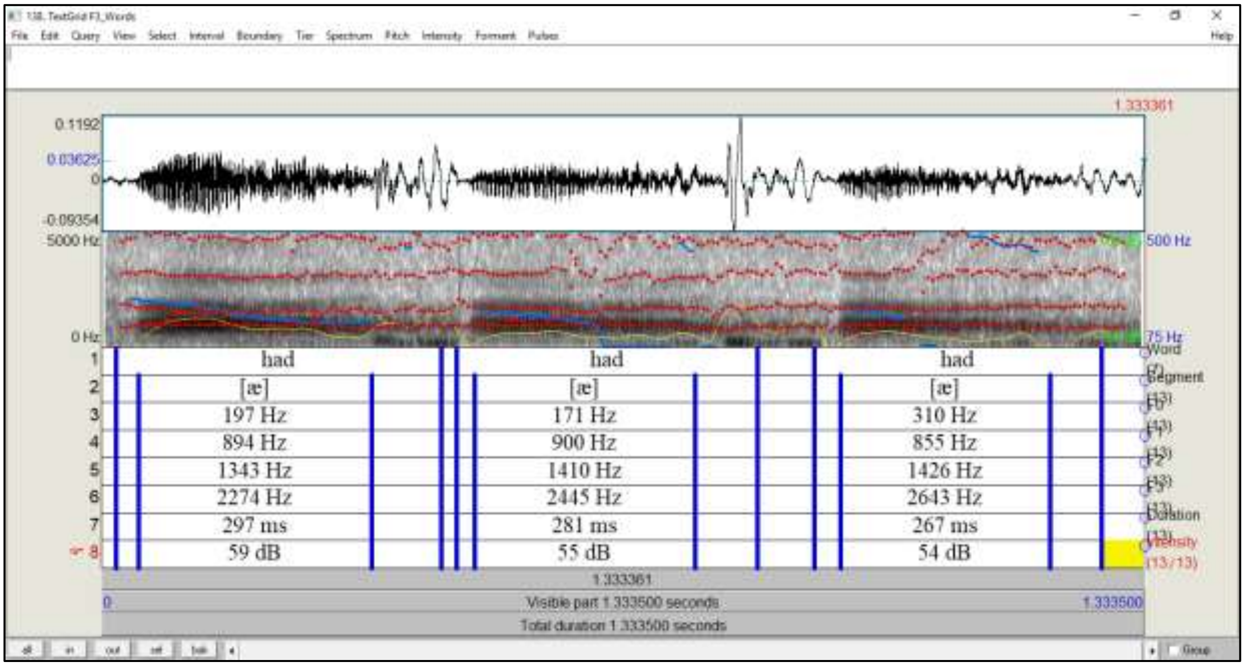
F3

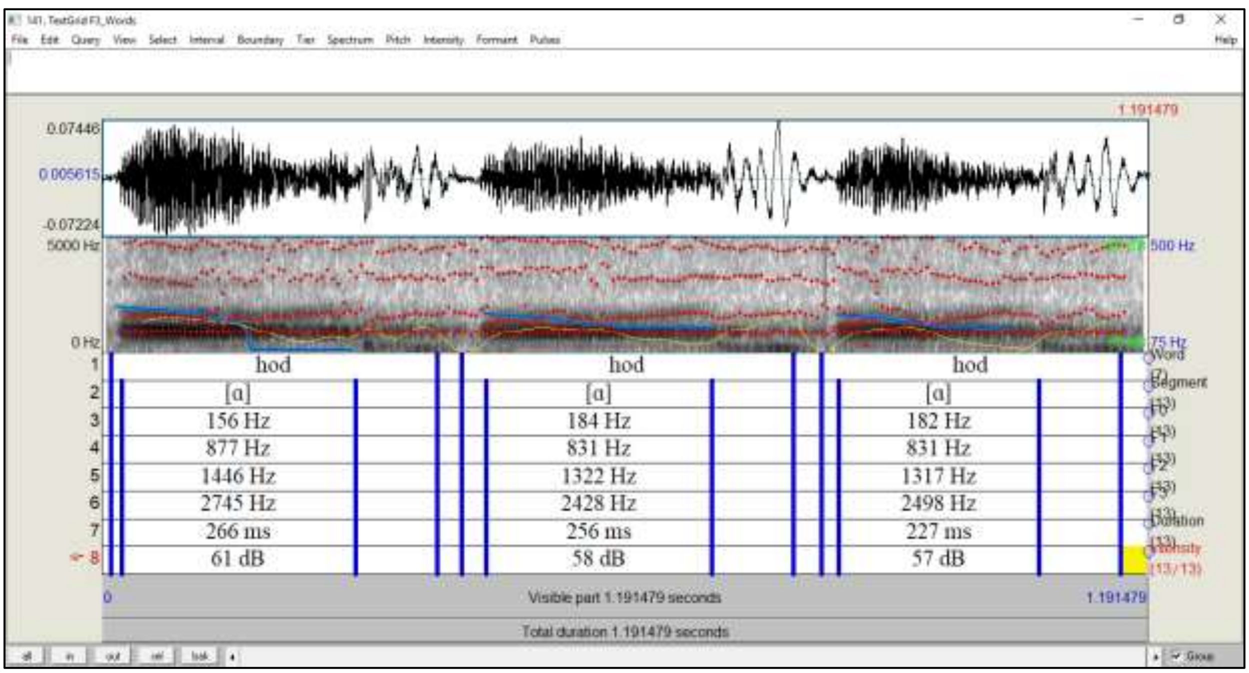

128. TextGrid F3_Words
File Edit Query View Select Interval Boundary Tier Spectrum Pitch Intensity Formant Pulses
Help
1.276625
0.05325
0.0003967
-0.07858
5000 Hz
4174 Hz
0 Hz
500 Hz
75 Hz
heed
[i]
225 Hz
359 Hz
864 Hz
2965 Hz
309 ms
61 dB
heed
[i]
190 Hz
341 Hz
1233 Hz
3079 Hz
292 ms
62 dB
heed
[i]
194 Hz
348 Hz
743 Hz
2977 Hz
213 ms
61 dB
Word
Segment
Duration
Intensity
(13/13)
0
Visible part 1.276625 seconds
1.276625
Total duration 1.276625 seconds

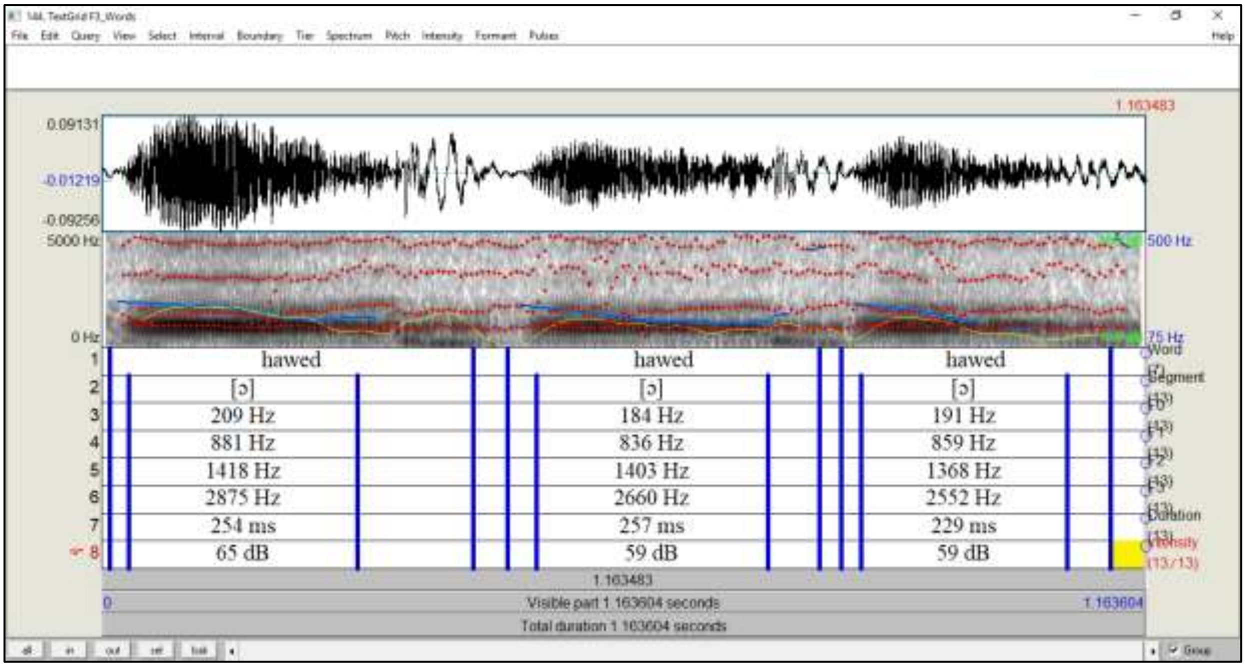

129. TextGrid F3_Words
File Edit Query View Select Interval Boundary Tier Spectrum Pitch Intensity Formant Pulses
Help
0.984062
0.0542
-0.003571
-0.06363
5000 Hz
0 Hz
500 Hz
75 Hz
hid
[ɪ]
204 Hz
382 Hz
1127 Hz
2999 Hz
233 ms
60 dB
hid
[ɪ]
191 Hz
383 Hz
864 Hz
2954 Hz
194 ms
60 dB
hid
[ɪ]
191 Hz
384 Hz
1561 Hz
3031 Hz
160 ms
59 dB
Word
Segment
Duration
Intensity
(13/13)
0
Visible part 0.984062 seconds
0.984062
Total duration 0.984062 seconds

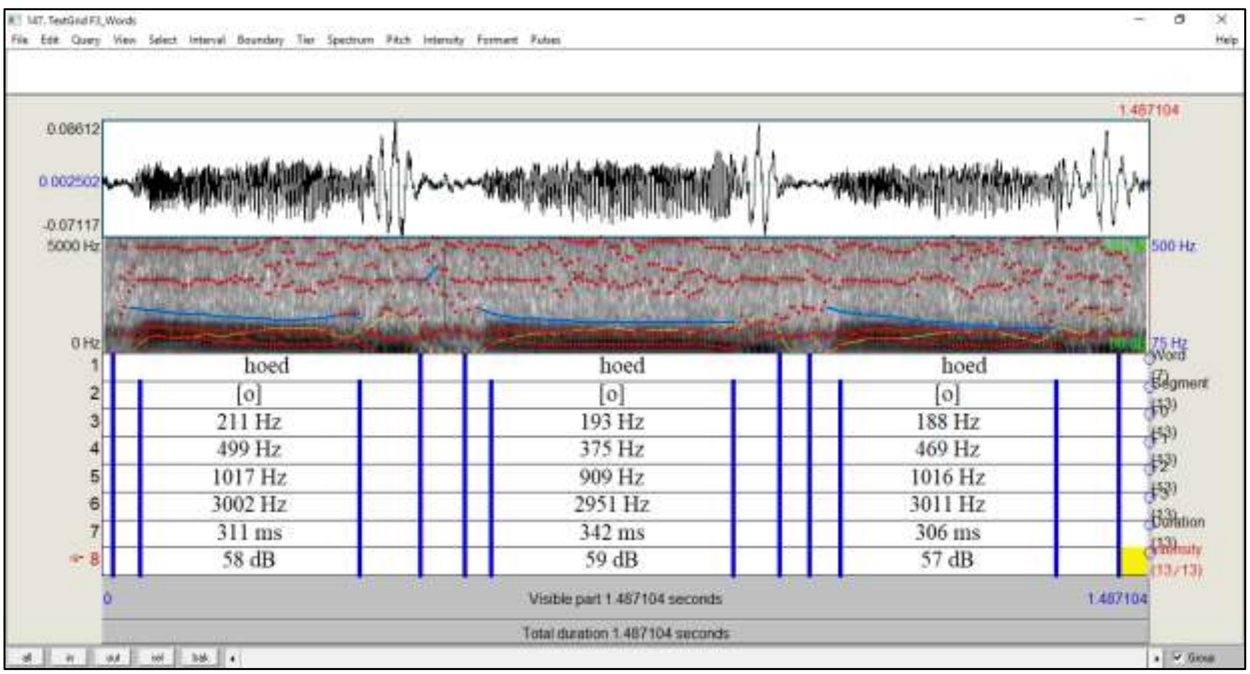

1.188846
0.08127
0.01128
-0.07425
5000 Hz
0 Hz
500 Hz
75 Hz
hayed
hayed
hayed
[e]
[e]
[e]
200 Hz
183 Hz
180 Hz
490 Hz
486 Hz
399 Hz
1799 Hz
1918 Hz
1617 Hz
3108 Hz
3159 Hz
3081 Hz
288 ms
274 ms
242 ms
59 dB
57 dB
61 dB
Word
Segment
Duration
(13/13)
1.188846
0
Visible part 1.190000 seconds
1.190000
Total duration 1.190000 seconds

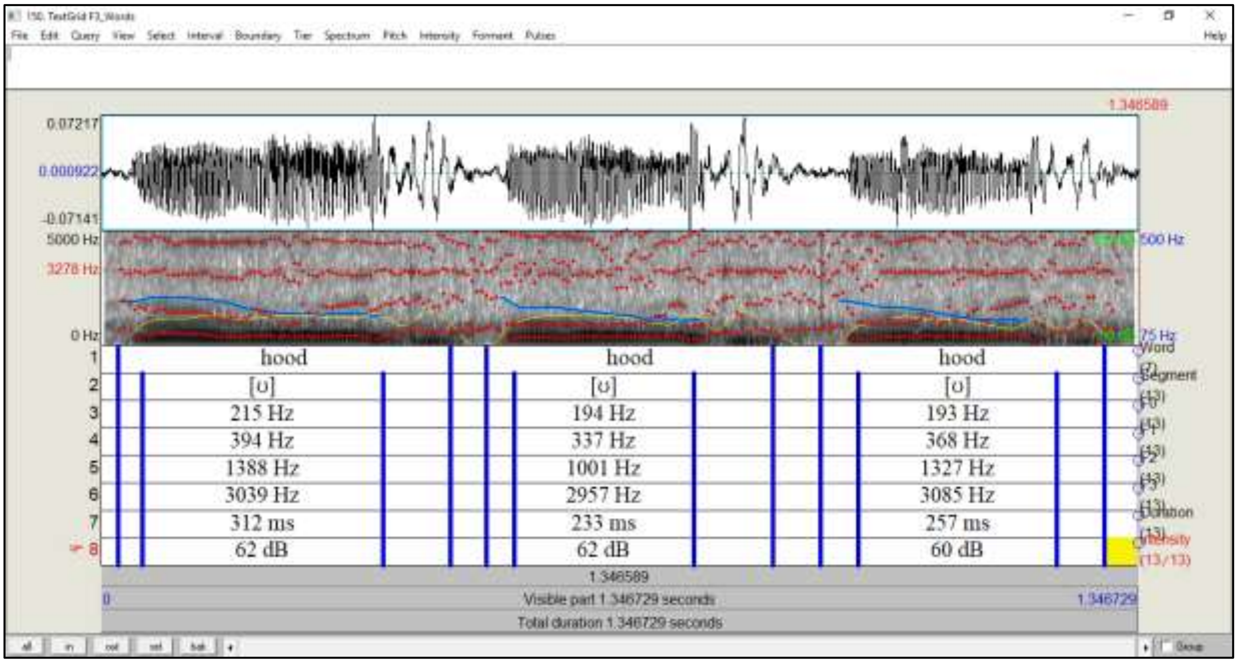

1.169021
0.04916
0.006165
-0.06134
5000 Hz
0 Hz
500 Hz
75 Hz
head
head
head
[ɛ]
[ɛ]
[ɛ]
195 Hz
177 Hz
189 Hz
726 Hz
710 Hz
671 Hz
1644 Hz
1986 Hz
1645 Hz
2792 Hz
3003 Hz
2885 Hz
267 ms
246 ms
266 ms
58 dB
54 dB
54 dB
Word
Segment
Duration
(13/13)
0
Visible part 1.169021 seconds
1.169021
Total duration 1.169021 seconds

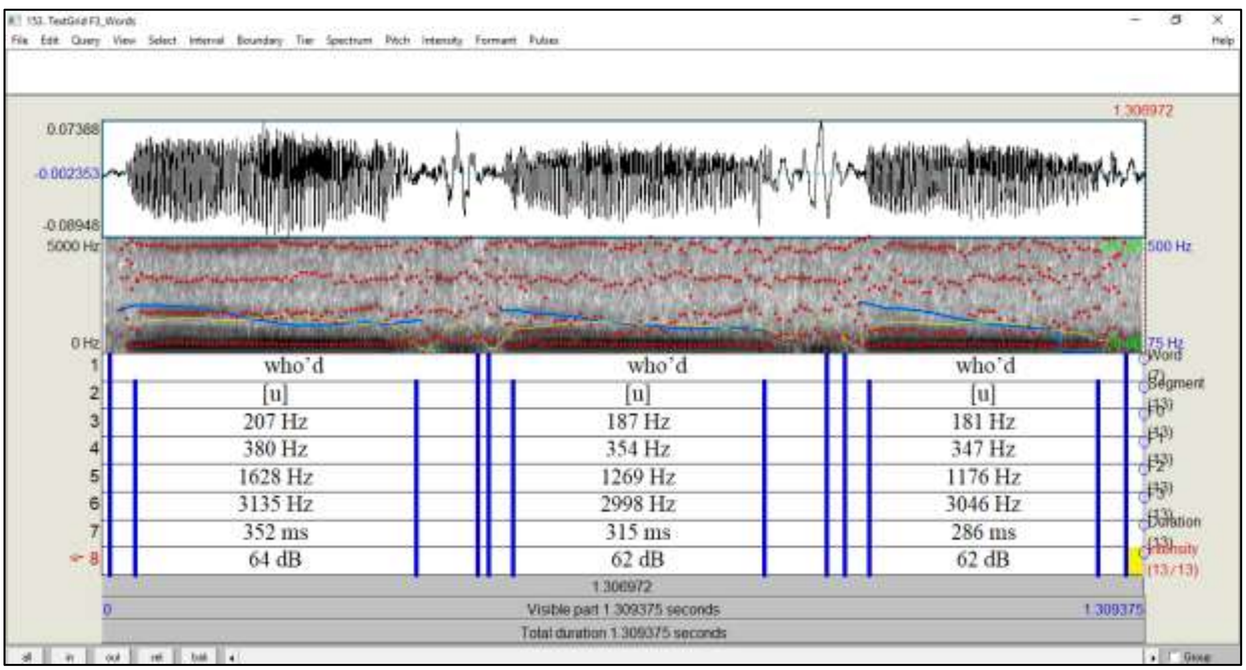

had
[æ]
197 Hz
894 Hz
1343 Hz
2274 Hz
297 ms
59 dB
had
[æ]
171 Hz
900 Hz
1410 Hz
2445 Hz
281 ms
55 dB
had
[æ]
310 Hz
855 Hz
1426 Hz
2643 Hz
267 ms
54 dB
Visible part 1.333500 seconds
Total duration 1.333500 seconds

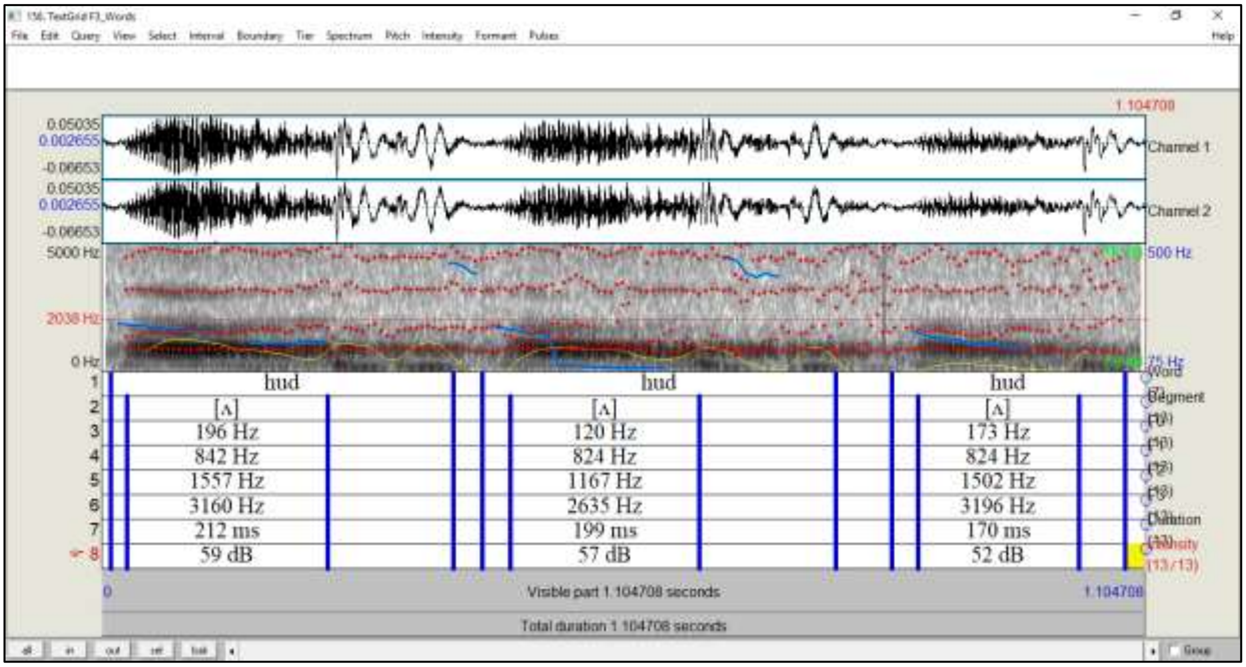

hod
[ɑ]
156 Hz
877 Hz
1446 Hz
2745 Hz
266 ms
61 dB
hod
[ɑ]
184 Hz
831 Hz
1322 Hz
2428 Hz
256 ms
58 dB
hod
[ɑ]
182 Hz
831 Hz
1317 Hz
2498 Hz
227 ms
57 dB
Visible part 1.191479 seconds
Total duration 1.191479 seconds


hawed
[ɔ]
209 Hz
881 Hz
1418 Hz
2875 Hz
254 ms
65 dB
hawed
[ɔ]
184 Hz
836 Hz
1403 Hz
2660 Hz
257 ms
59 dB
hawed
[ɔ]
191 Hz
859 Hz
1368 Hz
2552 Hz
229 ms
59 dB
Visible part 1.163604 seconds
Total duration 1.163604 seconds


hoed
[o]
211 Hz
499 Hz
1017 Hz
3002 Hz
311 ms
58 dB
hoed
[o]
193 Hz
375 Hz
909 Hz
2951 Hz
342 ms
59 dB
hoed
[o]
188 Hz
469 Hz
1016 Hz
3011 Hz
306 ms
57 dB
Visible part 1.487104 seconds
Total duration 1.487104 seconds

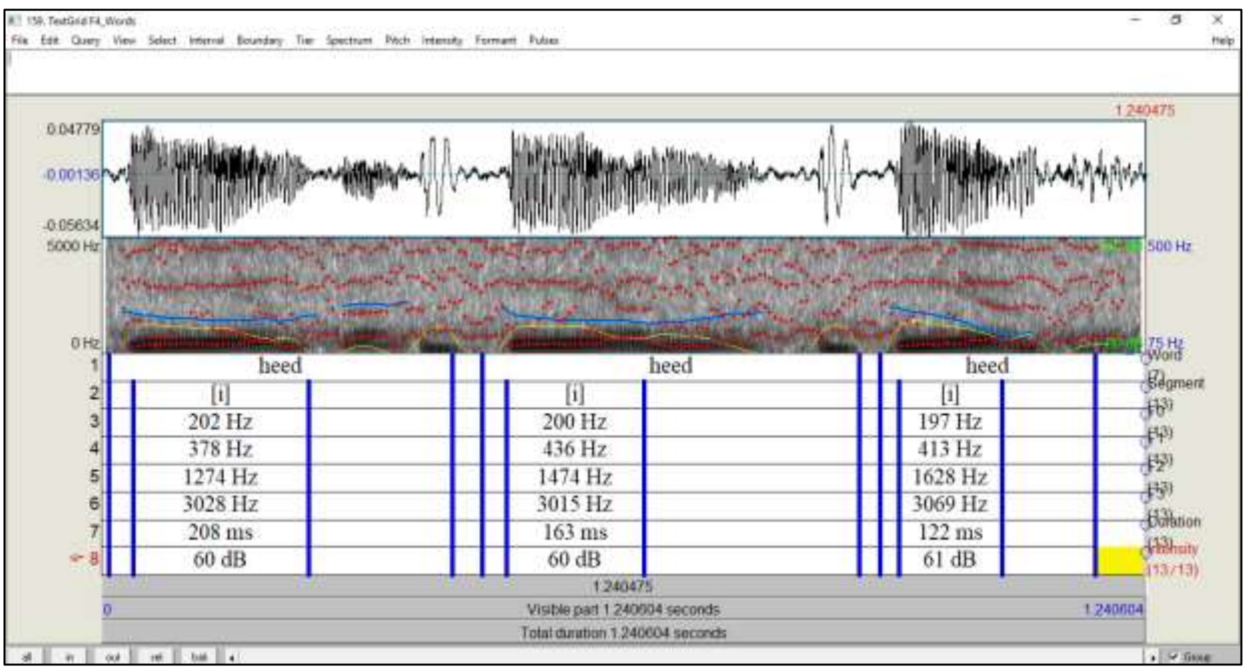

150. TextGrid F3_Words
File Edit Query View Select Interval Boundary Tier Spectrum Pitch Intensity Formant Pulses
Help
1.346589
0.07217
0.000922
-0.07141
5000 Hz
3278 Hz
0 Hz
500 Hz
75 Hz
hood
hood
hood
[ʊ]
[ʊ]
[ʊ]
215 Hz
194 Hz
193 Hz
394 Hz
337 Hz
368 Hz
1388 Hz
1001 Hz
1327 Hz
3039 Hz
2957 Hz
3085 Hz
312 ms
233 ms
257 ms
62 dB
62 dB
60 dB
Word
Segment
Duration
Intensity (13/13)
1.346589
0
Visible part 1.346729 seconds
1.346729
Total duration 1.346729 seconds


153. TextGrid F3_Words
File Edit Query View Select Interval Boundary Tier Spectrum Pitch Intensity Formant Pulses
Help
1.306972
0.07388
-0.002353
-0.08948
5000 Hz
0 Hz
500 Hz
75 Hz
who'd
who'd
who'd
[u]
[u]
[u]
207 Hz
187 Hz
181 Hz
380 Hz
354 Hz
347 Hz
1628 Hz
1269 Hz
1176 Hz
3135 Hz
2998 Hz
3046 Hz
352 ms
315 ms
286 ms
64 dB
62 dB
62 dB
Word
Segment
Duration
Intensity (13/13)
1.306972
0
Visible part 1.309375 seconds
1.309375
Total duration 1.309375 seconds

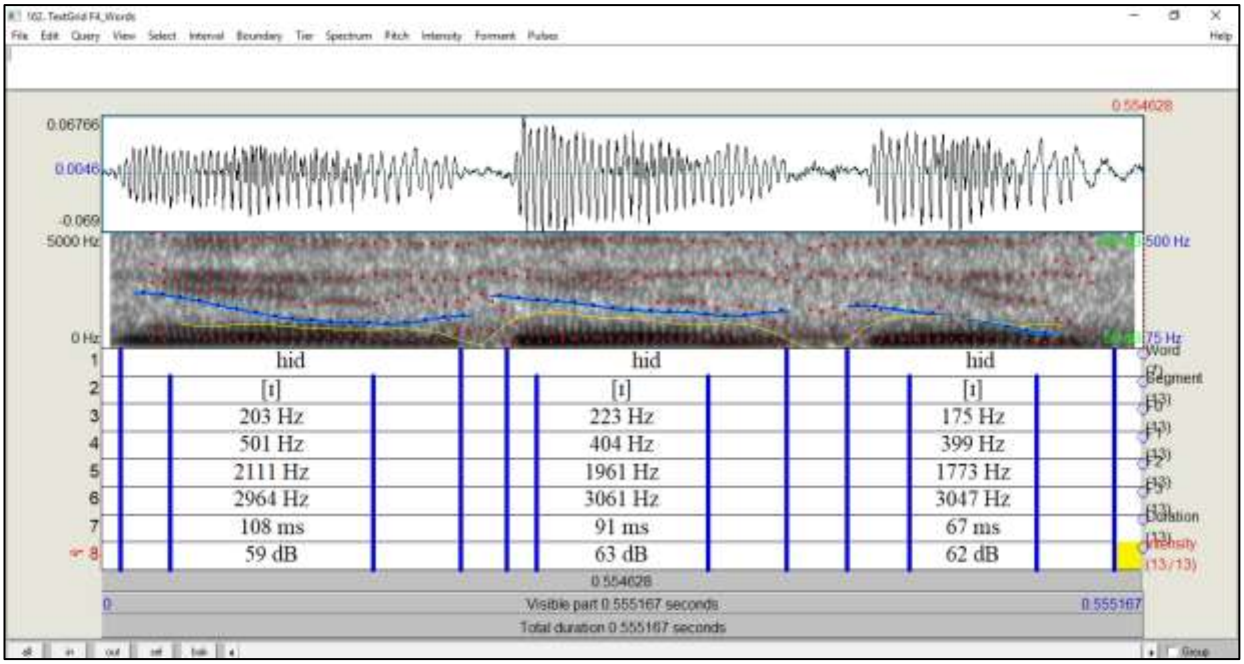


Channel 1
Channel 2
5000 Hz
2038 Hz
0 Hz
500 Hz
75 Hz
hud
[ʌ]
196 Hz
842 Hz
1557 Hz
3160 Hz
212 ms
59 dB
hud
[ʌ]
120 Hz
824 Hz
1167 Hz
2635 Hz
199 ms
57 dB
hud
[ʌ]
173 Hz
824 Hz
1502 Hz
3196 Hz
170 ms
52 dB
Visible part 1.104708 seconds
Total duration 1.104708 seconds

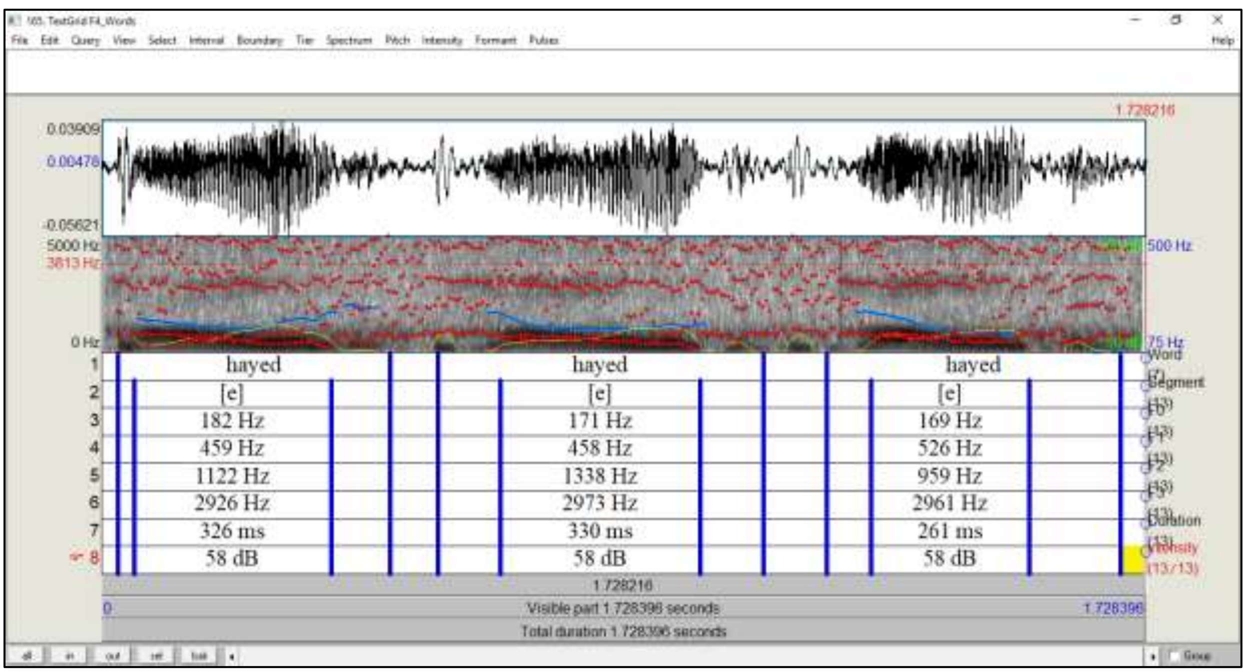
F4



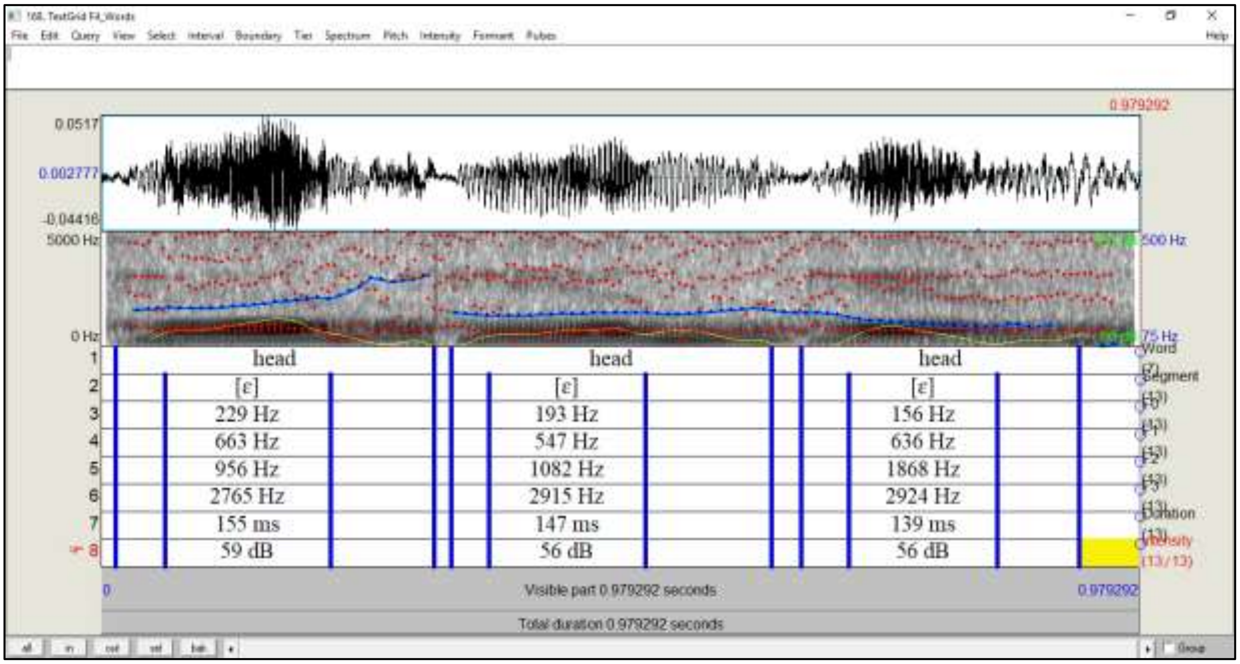
5000 Hz
0 Hz
500 Hz
75 Hz
heed
[i]
202 Hz
378 Hz
1274 Hz
3028 Hz
208 ms
60 dB
heed
[i]
200 Hz
436 Hz
1474 Hz
3015 Hz
163 ms
60 dB
heed
[i]
197 Hz
413 Hz
1628 Hz
3069 Hz
122 ms
61 dB
Visible part 1.240604 seconds
Total duration 1.240604 seconds

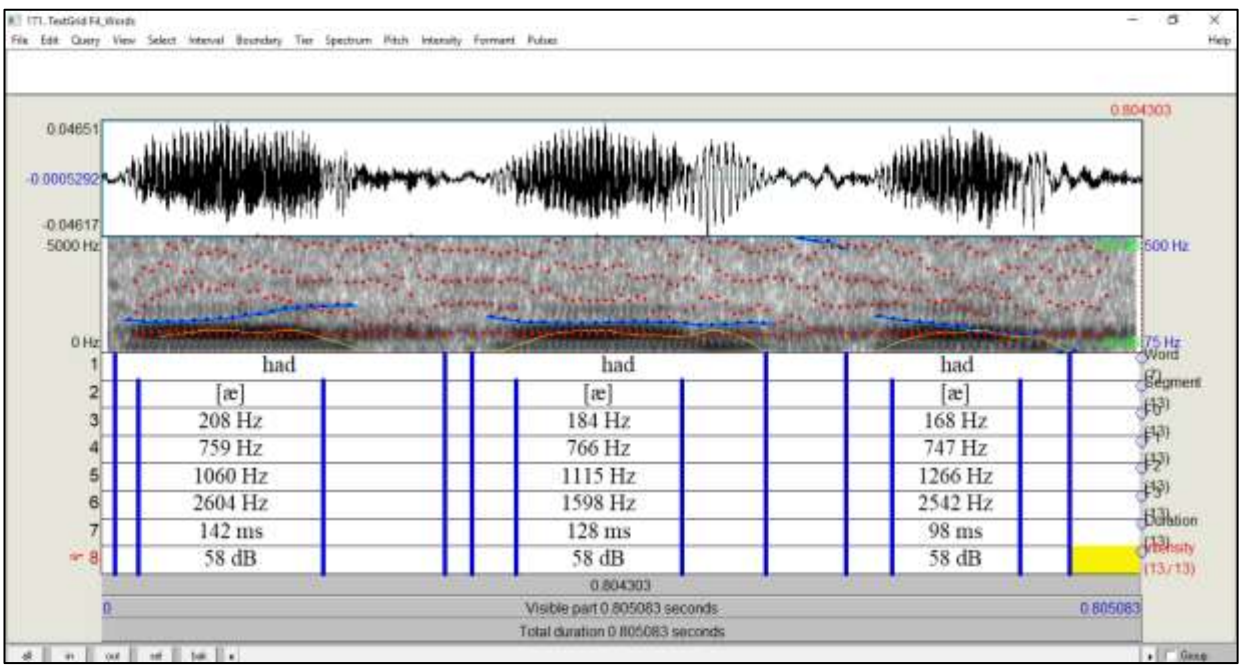


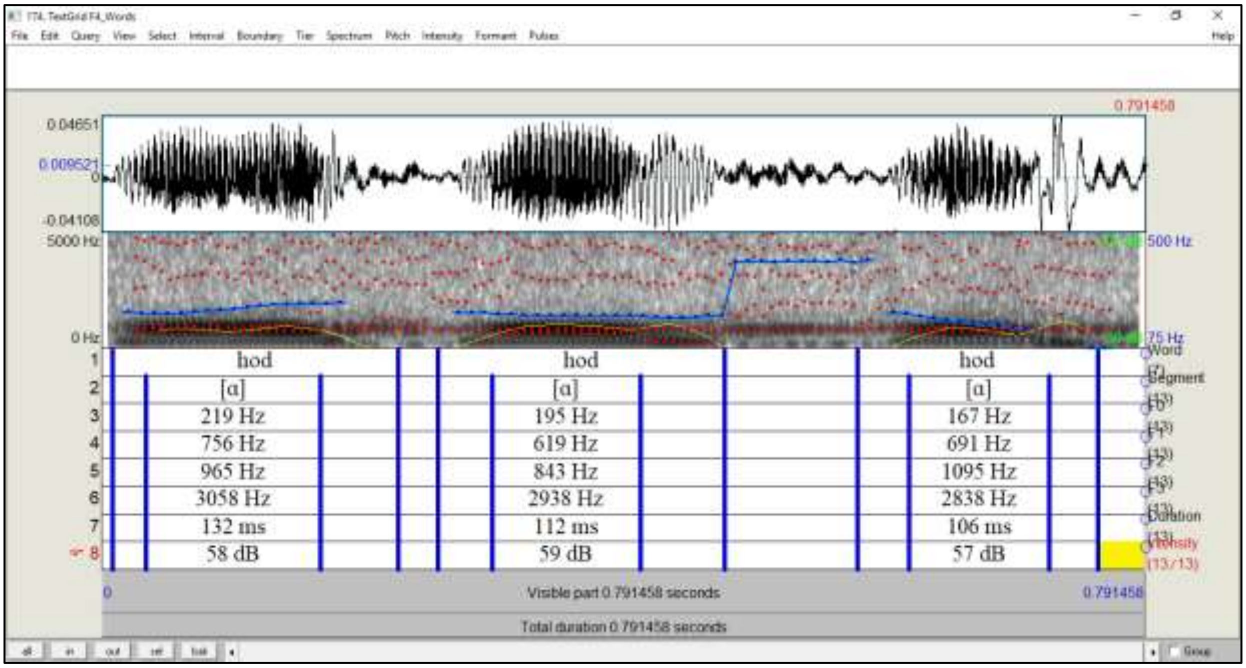
File Edit Query View Select Interval Boundary Tier Spectrum Pitch Intensity Formant Pulses
Help
0.554628
0.06766
0.0046
-0.069
5000 Hz
0 Hz
500 Hz
75 Hz
hid
hid
hid
[ɪ]
[ɪ]
[ɪ]
203 Hz
223 Hz
175 Hz
501 Hz
404 Hz
399 Hz
2111 Hz
1961 Hz
1773 Hz
2964 Hz
3061 Hz
3047 Hz
108 ms
91 ms
67 ms
59 dB
63 dB
62 dB
Word
Segment
F0
F1
F2
F3
Duration
Intensity
(13/13)
Visible part 0.555167 seconds
0.555167
Total duration 0.555167 seconds

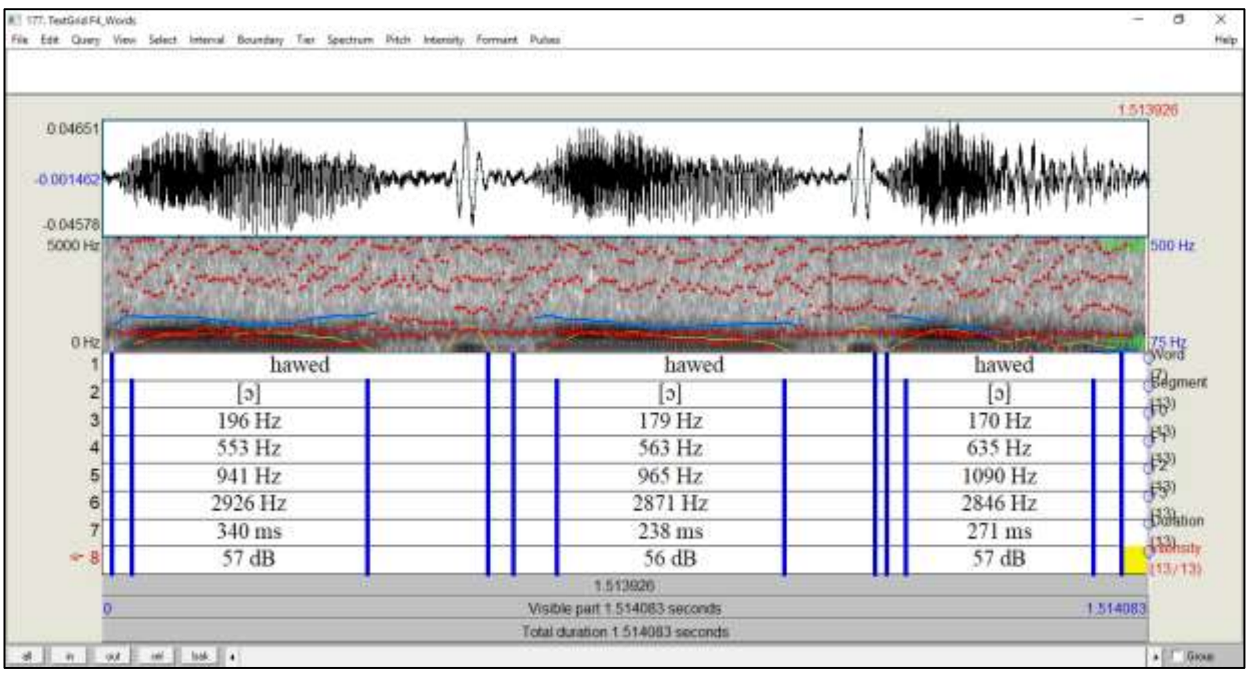


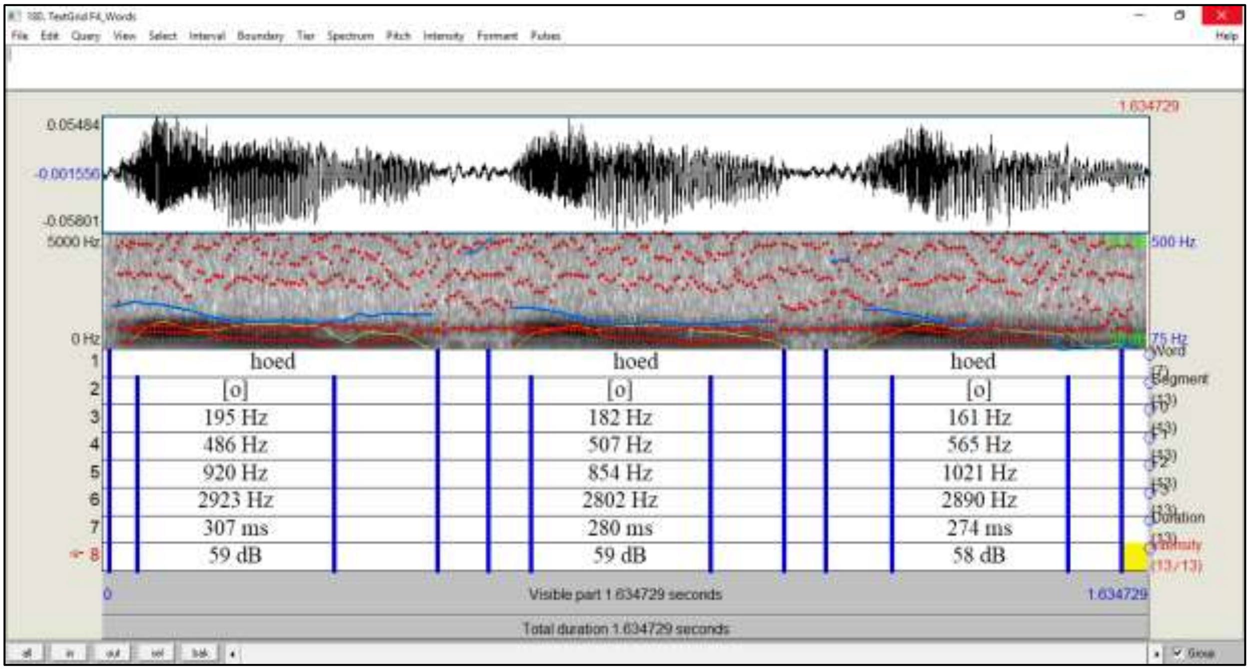
File Edit Query View Select Interval Boundary Tier Spectrum Pitch Intensity Formant Pulses
Help
1.728216
0.03909
0.00478
-0.05621
5000 Hz
3813 Hz
0 Hz
500 Hz
75 Hz
hayed
hayed
hayed
[e]
[e]
[e]
182 Hz
171 Hz
169 Hz
459 Hz
458 Hz
526 Hz
1122 Hz
1338 Hz
959 Hz
2926 Hz
2973 Hz
2961 Hz
326 ms
330 ms
261 ms
58 dB
58 dB
58 dB
Word
Segment
F0
F1
F2
F3
Duration
Intensity
(13/13)
Visible part 1.728396 seconds
1.728396
Total duration 1.728396 seconds

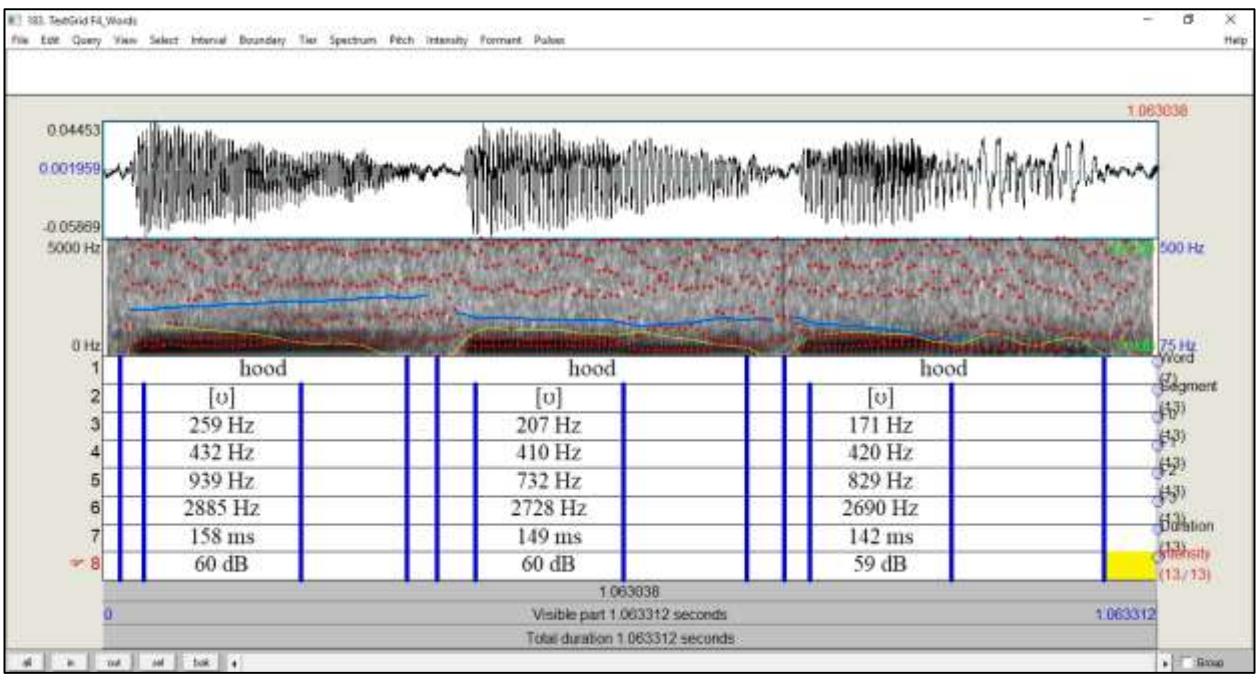

head
[ɛ]
229 Hz
663 Hz
956 Hz
2765 Hz
155 ms
59 dB
head
[ɛ]
193 Hz
547 Hz
1082 Hz
2915 Hz
147 ms
56 dB
head
[ɛ]
156 Hz
636 Hz
1868 Hz
2924 Hz
139 ms
56 dB
Visible part 0.979292 seconds
Total duration 0.979292 seconds

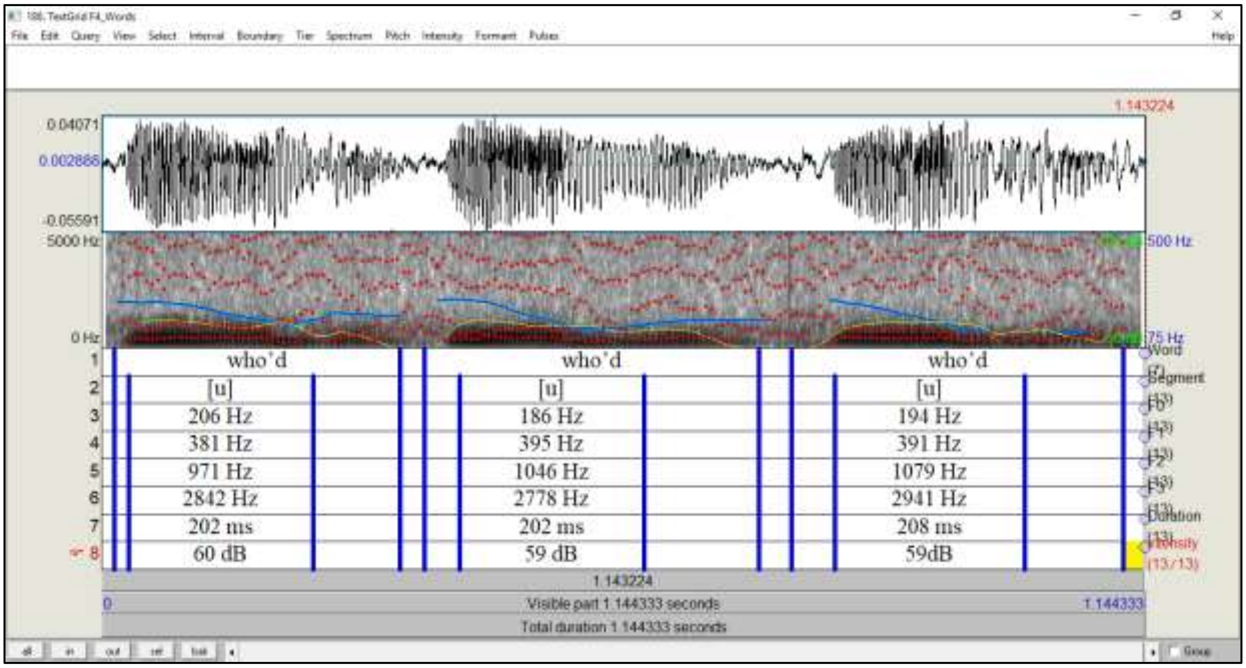

had
[æ]
208 Hz
759 Hz
1060 Hz
2604 Hz
142 ms
58 dB
had
[æ]
184 Hz
766 Hz
1115 Hz
1598 Hz
128 ms
58 dB
had
[æ]
168 Hz
747 Hz
1266 Hz
2542 Hz
98 ms
58 dB
Visible part 0.805083 seconds
Total duration 0.805083 seconds

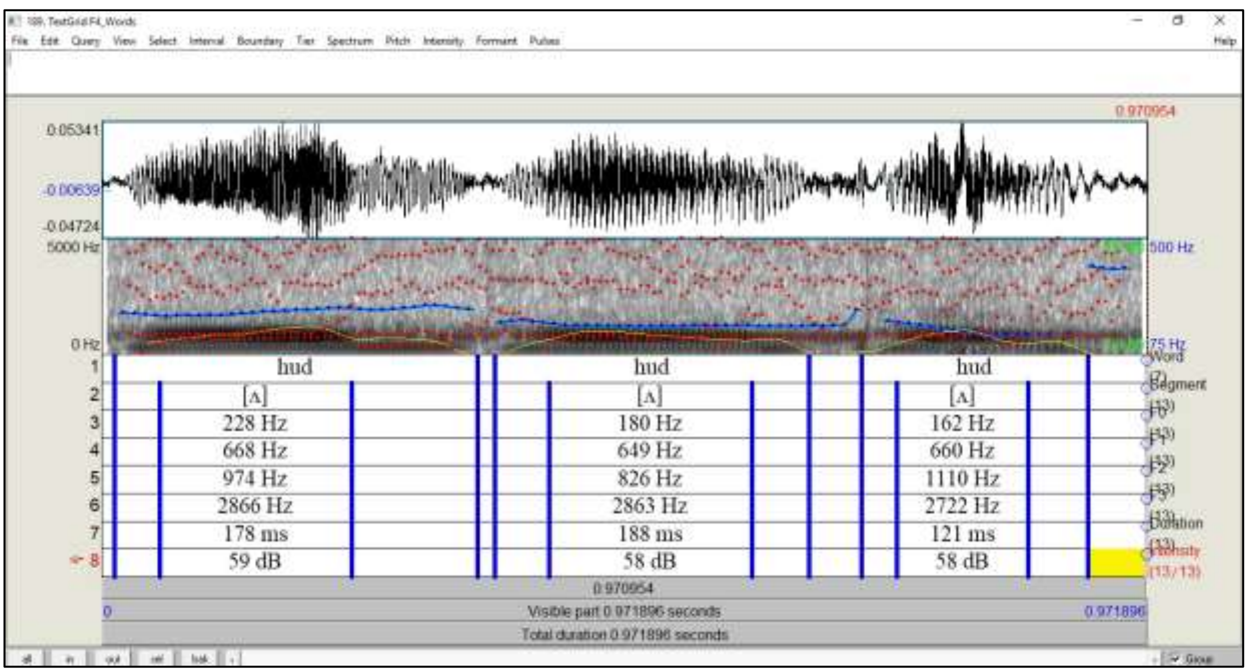

hod
[ɑ]
219 Hz
756 Hz
965 Hz
3058 Hz
132 ms
58 dB
hod
[ɑ]
195 Hz
619 Hz
843 Hz
2938 Hz
112 ms
59 dB
hod
[ɑ]
167 Hz
691 Hz
1095 Hz
2838 Hz
106 ms
57 dB
Visible part 0.791458 seconds
Total duration 0.791458 seconds


hawed
[ɔ]
196 Hz
553 Hz
941 Hz
2926 Hz
340 ms
57 dB
hawed
[ɔ]
179 Hz
563 Hz
965 Hz
2871 Hz
238 ms
56 dB
hawed
[ɔ]
170 Hz
635 Hz
1090 Hz
2846 Hz
271 ms
57 dB
Visible part 1.514083 seconds
Total duration 1.514083 seconds

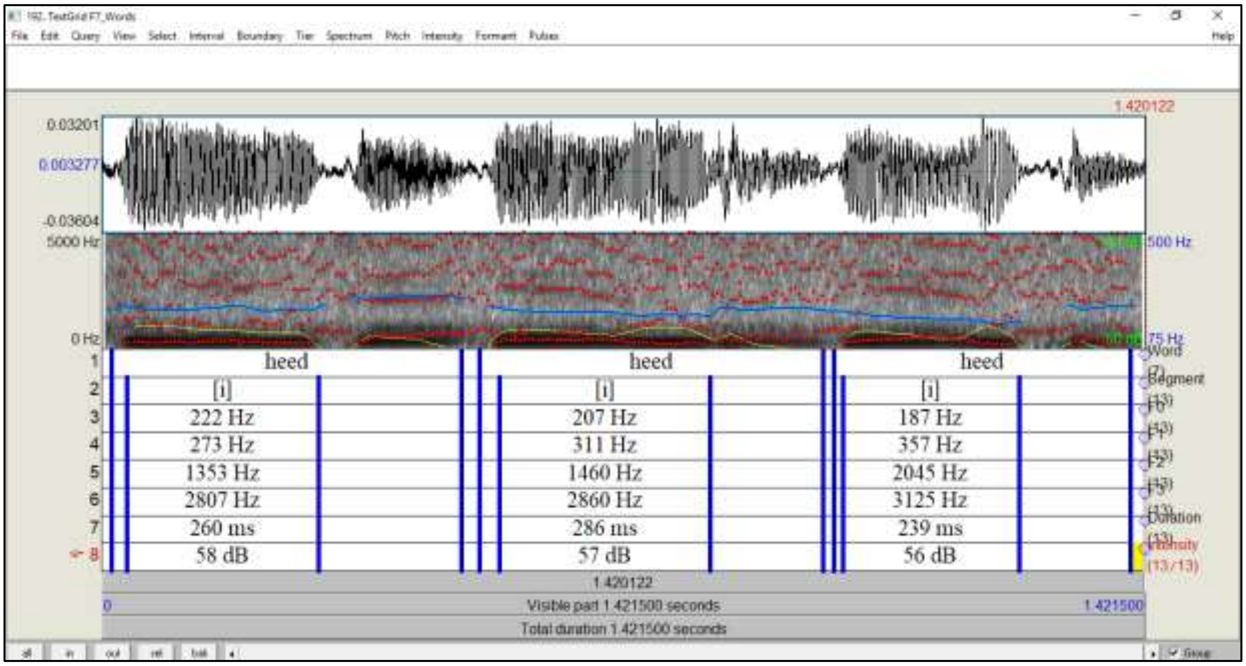

hoed
[o]
195 Hz
486 Hz
920 Hz
2923 Hz
307 ms
59 dB
hoed
[o]
182 Hz
507 Hz
854 Hz
2802 Hz
280 ms
59 dB
hoed
[o]
161 Hz
565 Hz
1021 Hz
2890 Hz
274 ms
58 dB
Visible part 1.634729 seconds
Total duration 1.634729 seconds


hood
[ʊ]
259 Hz
432 Hz
939 Hz
2885 Hz
158 ms
60 dB
hood
[ʊ]
207 Hz
410 Hz
732 Hz
2728 Hz
149 ms
60 dB
hood
[ʊ]
171 Hz
420 Hz
829 Hz
2690 Hz
142 ms
59 dB
Visible part 1.063312 seconds
Total duration 1.063312 seconds

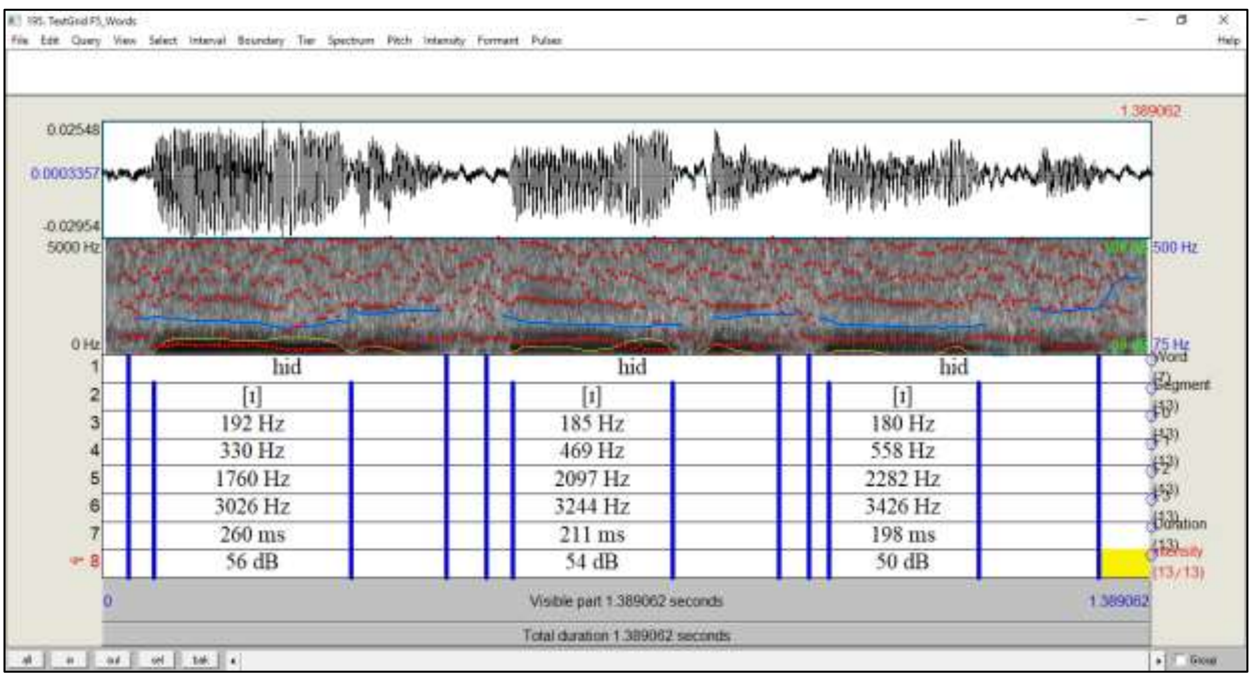

who'd
[u]
206 Hz
381 Hz
971 Hz
2842 Hz
202 ms
60 dB
who'd
[u]
186 Hz
395 Hz
1046 Hz
2778 Hz
202 ms
59 dB
who'd
[u]
194 Hz
391 Hz
1079 Hz
2941 Hz
208 ms
59dB
Visible part 1.144333 seconds
Total duration 1.144333 seconds


hud
[ʌ]
228 Hz
668 Hz
974 Hz
2866 Hz
178 ms
59 dB
hud
[ʌ]
180 Hz
649 Hz
826 Hz
2863 Hz
188 ms
58 dB
hud
[ʌ]
162 Hz
660 Hz
1110 Hz
2722 Hz
121 ms
58 dB
Visible part 0.971896 seconds
Total duration 0.971896 seconds

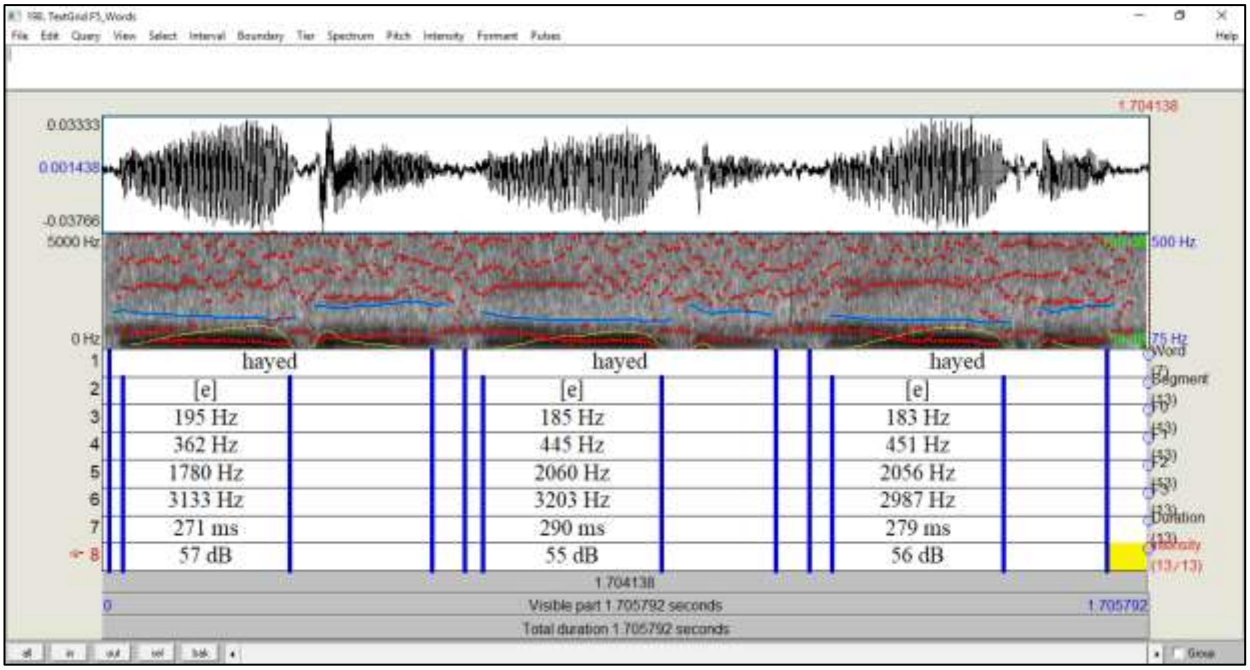
F5

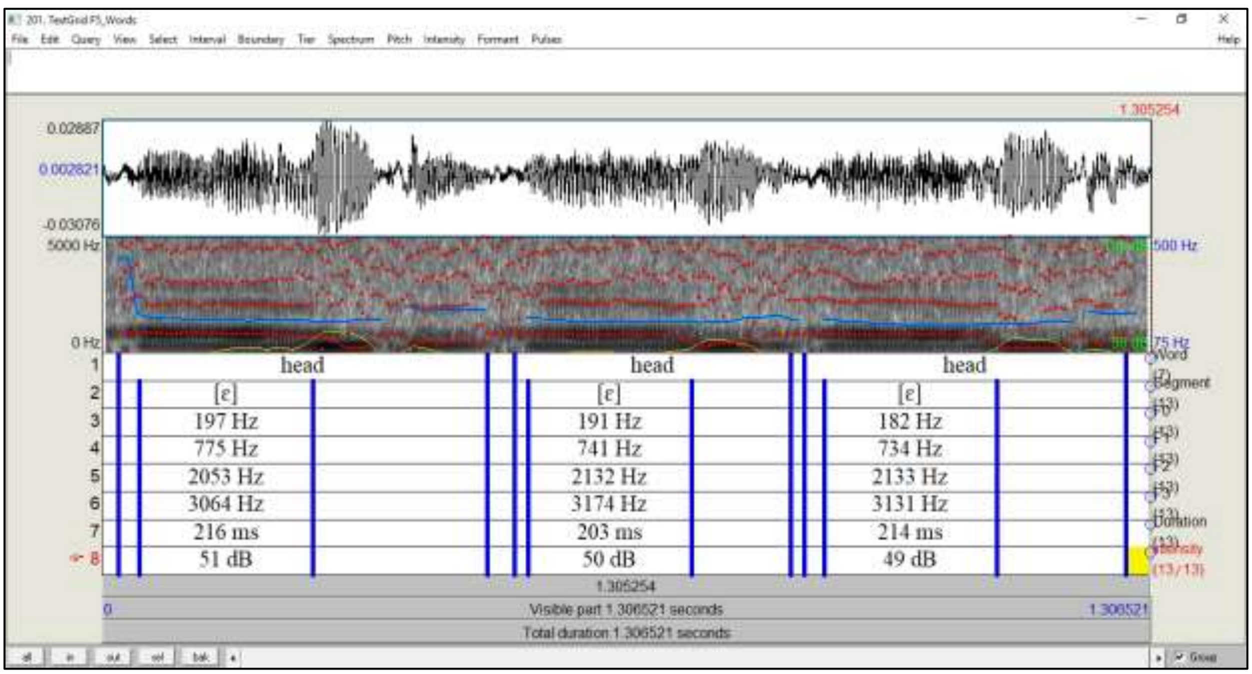


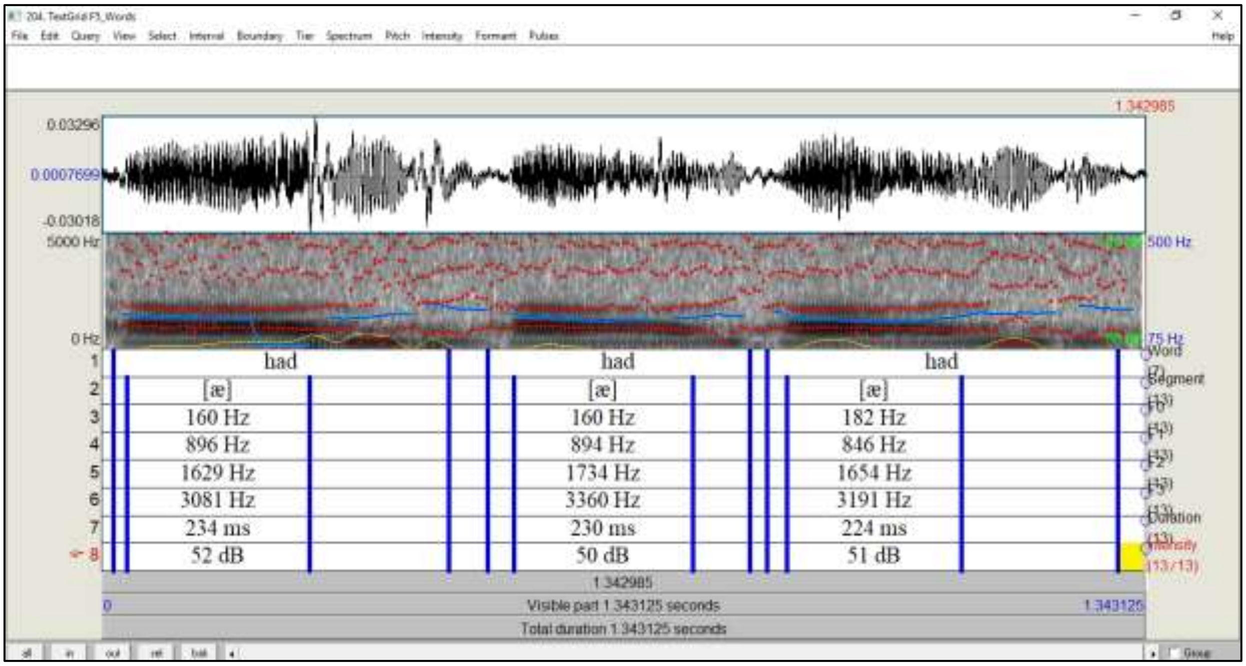
1.420122
0.03201
0.003277
-0.03604
5000 Hz
500 Hz
0 Hz
75 Hz
heed
heed
heed
[i]
[i]
[i]
222 Hz
207 Hz
187 Hz
273 Hz
311 Hz
357 Hz
1353 Hz
1460 Hz
2045 Hz
2807 Hz
2860 Hz
3125 Hz
260 ms
286 ms
239 ms
58 dB
57 dB
56 dB
Word
Segment
Duration
Intensity
(13/13)
1.420122
Visible part 1.421500 seconds
1.421500
Total duration 1.421500 seconds

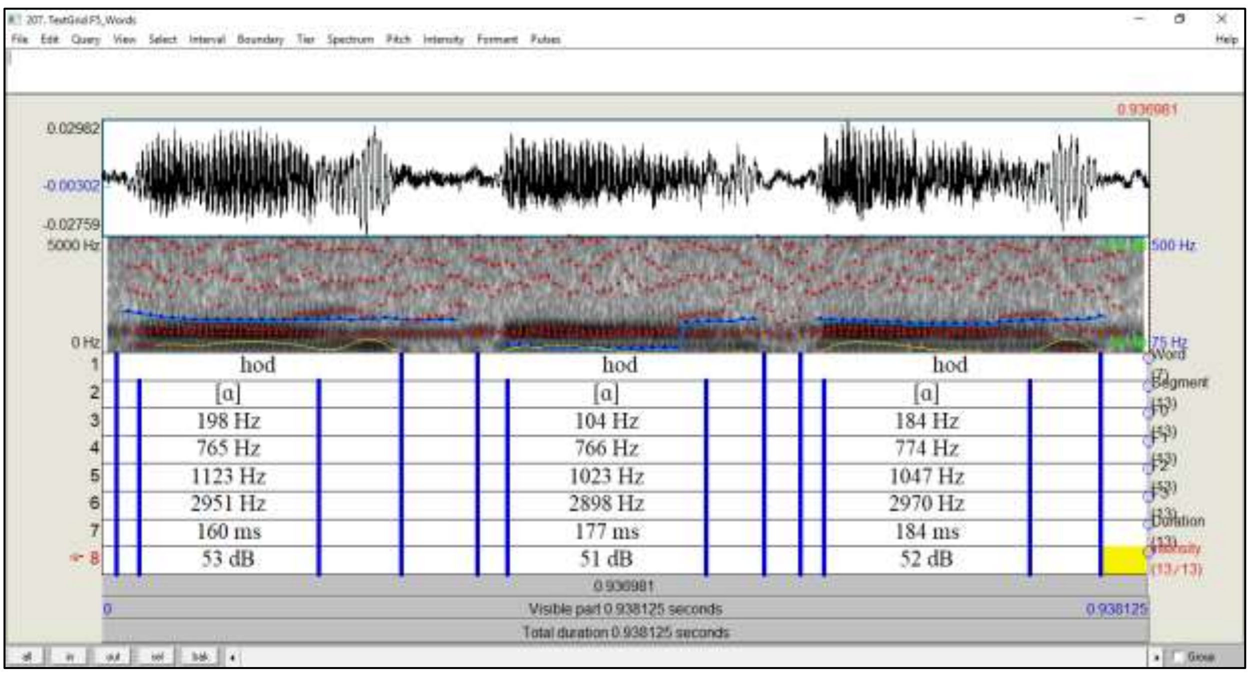


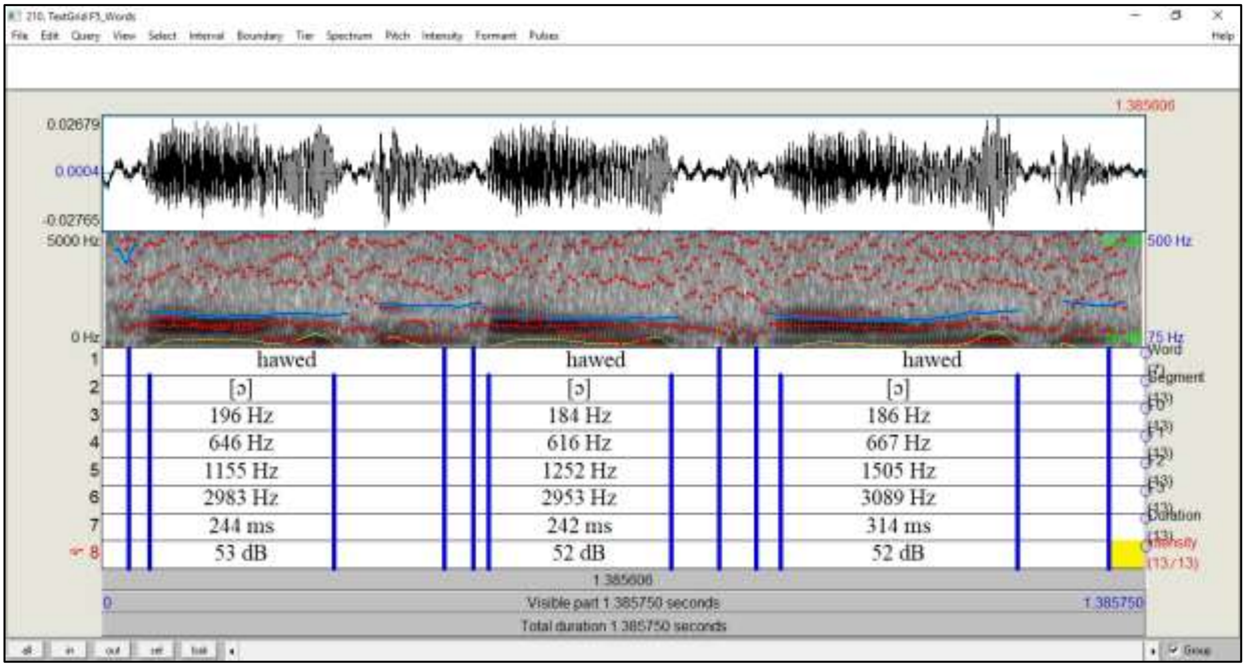
1.389062
0.02548
0.0003357
-0.02954
5000 Hz
500 Hz
0 Hz
75 Hz
hid
hid
hid
[ɪ]
[ɪ]
[ɪ]
192 Hz
185 Hz
180 Hz
330 Hz
469 Hz
558 Hz
1760 Hz
2097 Hz
2282 Hz
3026 Hz
3244 Hz
3426 Hz
260 ms
211 ms
198 ms
56 dB
54 dB
50 dB
Word
Segment
Duration
Intensity
(13/13)
Visible part 1.389062 seconds
1.389062
Total duration 1.389062 seconds

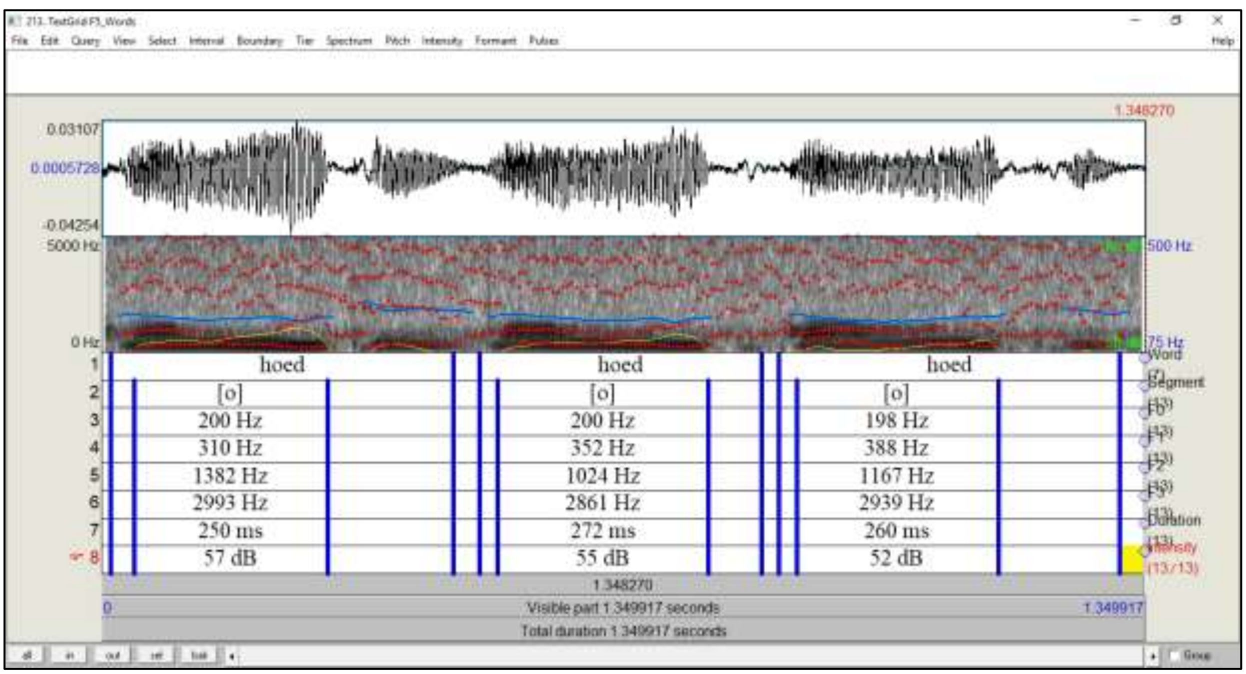

hayed
[e]
195 Hz
362 Hz
1780 Hz
3133 Hz
271 ms
57 dB
hayed
[e]
185 Hz
445 Hz
2060 Hz
3203 Hz
290 ms
55 dB
hayed
[e]
183 Hz
451 Hz
2056 Hz
2987 Hz
279 ms
56 dB
1.704138
Visible part 1.705792 seconds
Total duration 1.705792 seconds

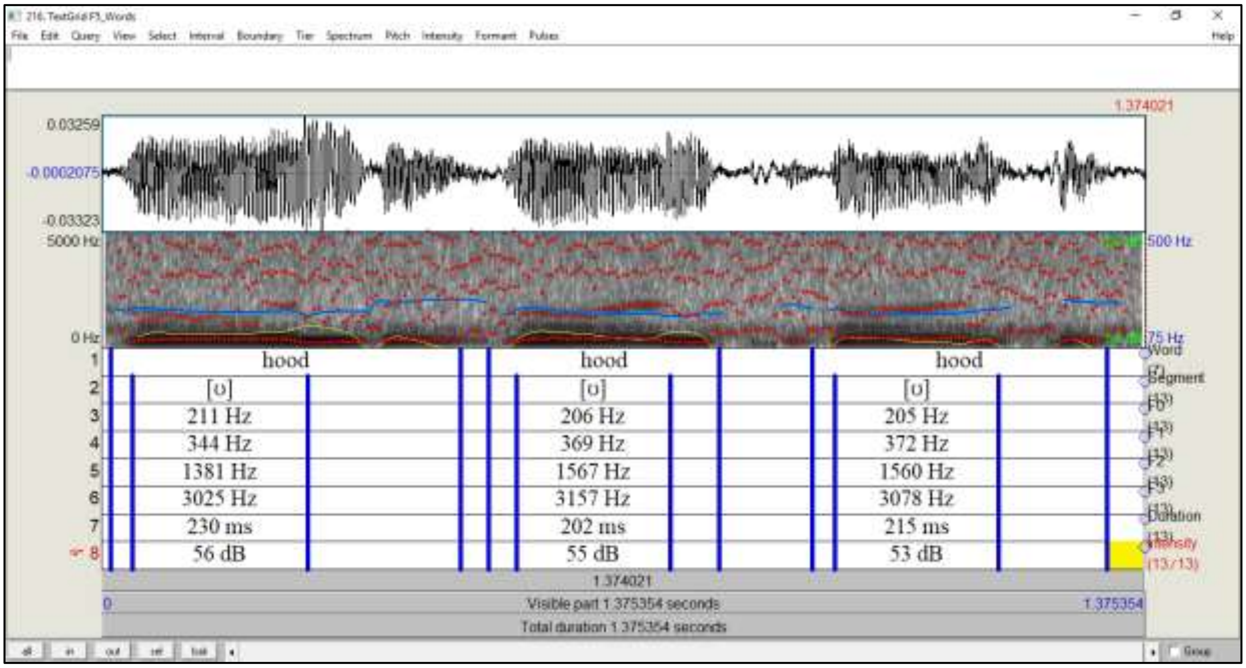

head
[ɛ]
197 Hz
775 Hz
2053 Hz
3064 Hz
216 ms
51 dB
head
[ɛ]
191 Hz
741 Hz
2132 Hz
3174 Hz
203 ms
50 dB
head
[ɛ]
182 Hz
734 Hz
2133 Hz
3131 Hz
214 ms
49 dB
1.305254
Visible part 1.306521 seconds
Total duration 1.306521 seconds

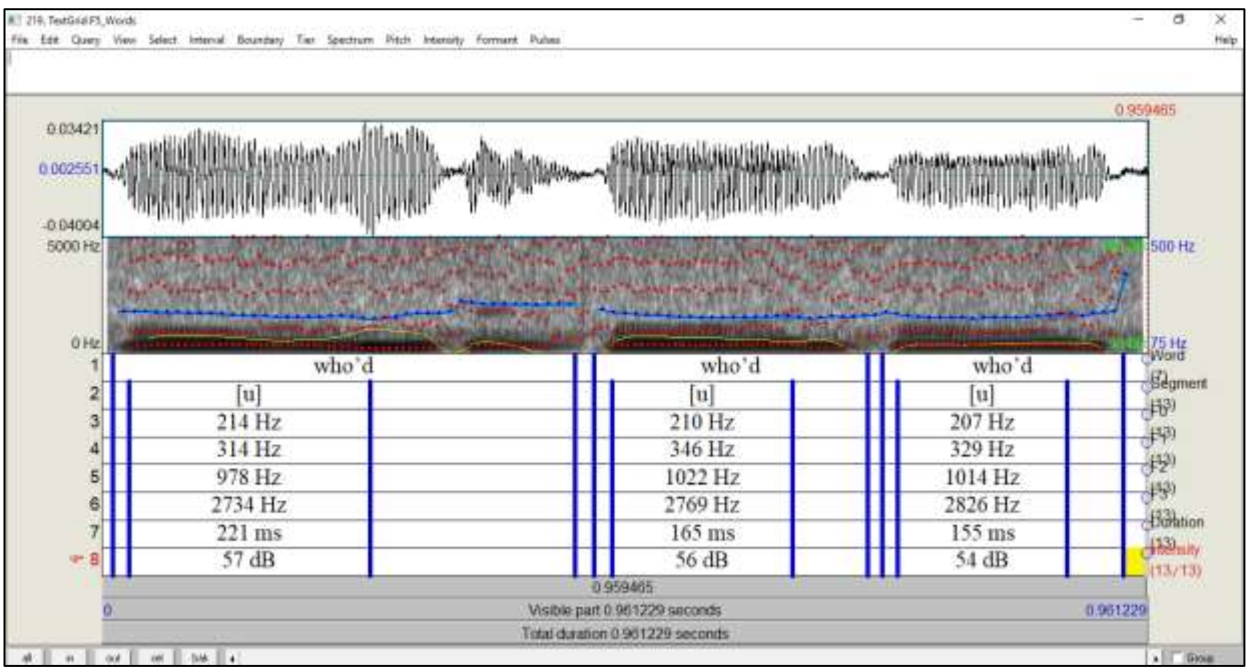

had
[æ]
160 Hz
896 Hz
1629 Hz
3081 Hz
234 ms
52 dB
had
[æ]
160 Hz
894 Hz
1734 Hz
3360 Hz
230 ms
50 dB
had
[æ]
182 Hz
846 Hz
1654 Hz
3191 Hz
224 ms
51 dB
Visible part 1.343125 seconds
Total duration 1.343125 seconds

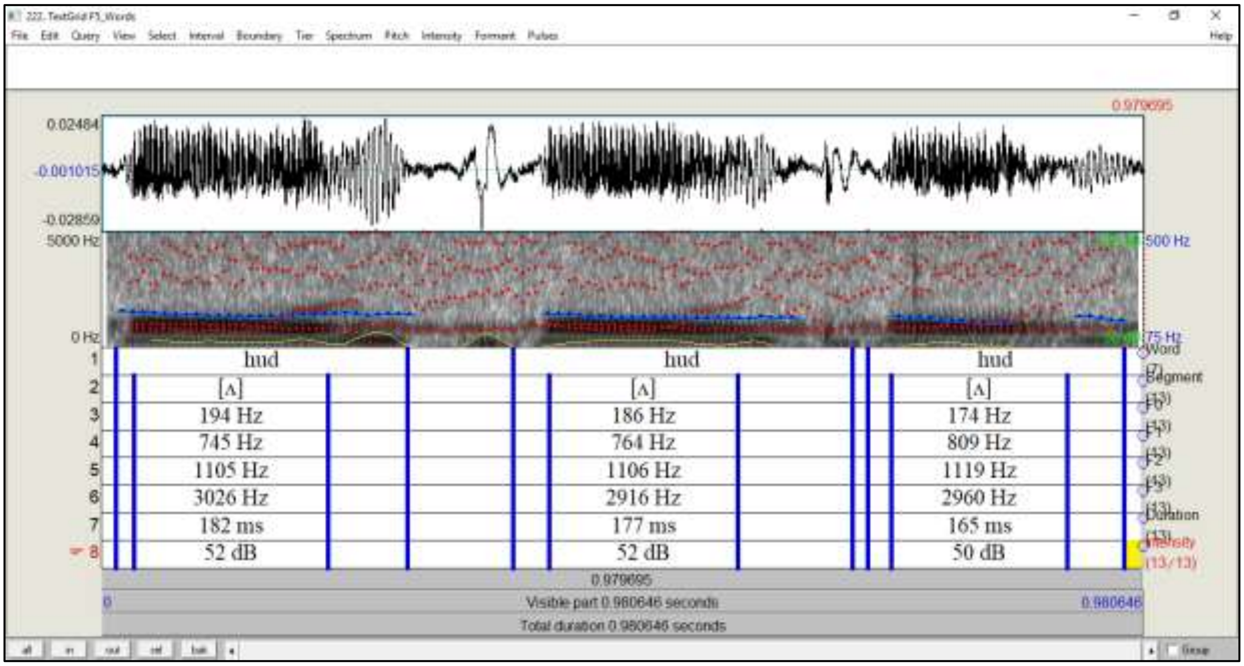

hod
[ɑ]
198 Hz
765 Hz
1123 Hz
2951 Hz
160 ms
53 dB
hod
[ɑ]
104 Hz
766 Hz
1023 Hz
2898 Hz
177 ms
51 dB
hod
[ɑ]
184 Hz
774 Hz
1047 Hz
2970 Hz
184 ms
52 dB
Visible part 0.938125 seconds
Total duration 0.938125 seconds


210. TextGrid F3_Words
File Edit Query View Select Interval Boundary Tier Spectrum Pitch Intensity Formant Pulses
Help
1.385606
0.02679
0.0004
-0.02765
5000 Hz
0 Hz
500 Hz
75 Hz
hawed
hawed
hawed
[ɔ]
[ɔ]
[ɔ]
196 Hz
184 Hz
186 Hz
646 Hz
616 Hz
667 Hz
1155 Hz
1252 Hz
1505 Hz
2983 Hz
2953 Hz
3089 Hz
244 ms
242 ms
314 ms
53 dB
52 dB
52 dB
Word
Segment
F0
F1
F2
F3
Duration
Intensity
(13/13)
1.385606
Visible part 1.385750 seconds
1.385750
Total duration 1.385750 seconds


213. TextGrid F3_Words
File Edit Query View Select Interval Boundary Tier Spectrum Pitch Intensity Formant Pulses
Help
1.348270
0.03107
0.0005728
-0.04254
5000 Hz
0 Hz
500 Hz
75 Hz
hoed
hoed
hoed
[o]
[o]
[o]
200 Hz
200 Hz
198 Hz
310 Hz
352 Hz
388 Hz
1382 Hz
1024 Hz
1167 Hz
2993 Hz
2861 Hz
2939 Hz
250 ms
272 ms
260 ms
57 dB
55 dB
52 dB
Word
Segment
F0
F1
F2
F3
Duration
Intensity
(13/13)
1.348270
Visible part 1.349917 seconds
1.349917
Total duration 1.349917 seconds

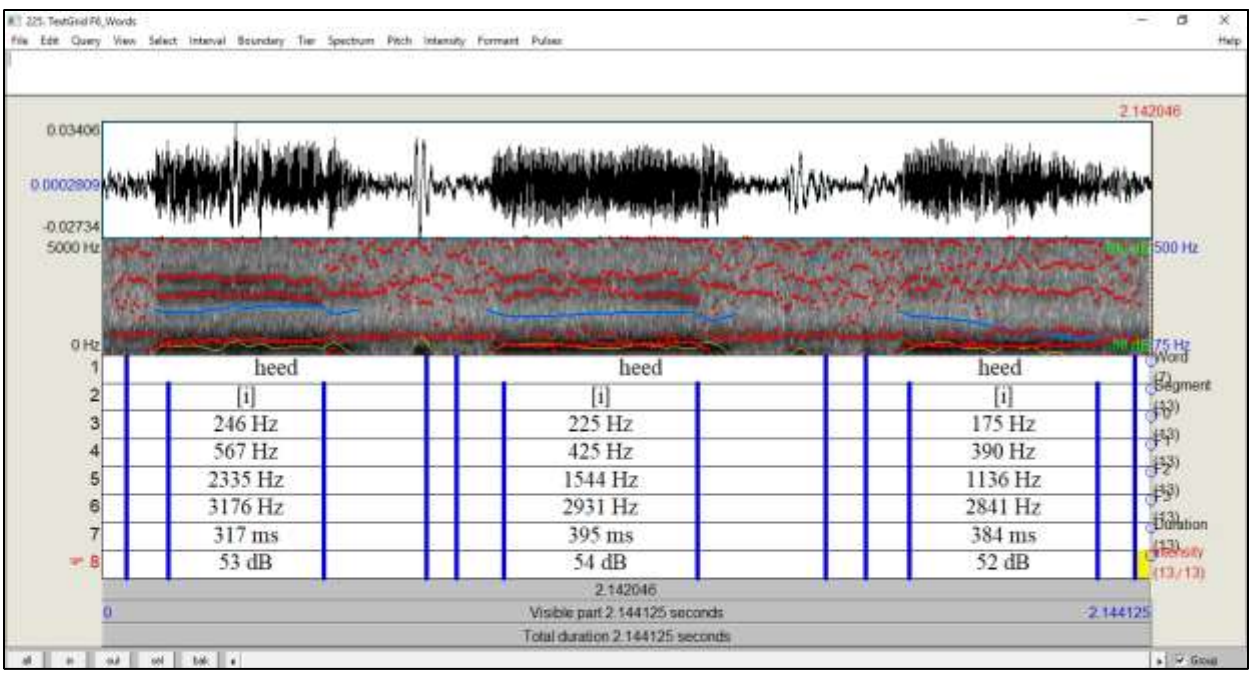

hood
[ʊ]
211 Hz
344 Hz
1381 Hz
3025 Hz
230 ms
56 dB
hood
[ʊ]
206 Hz
369 Hz
1567 Hz
3157 Hz
202 ms
55 dB
hood
[ʊ]
205 Hz
372 Hz
1560 Hz
3078 Hz
215 ms
53 dB
Visible part 1.375354 seconds
Total duration 1.375354 seconds


who'd
[u]
214 Hz
314 Hz
978 Hz
2734 Hz
221 ms
57 dB
who'd
[u]
210 Hz
346 Hz
1022 Hz
2769 Hz
165 ms
56 dB
who'd
[u]
207 Hz
329 Hz
1014 Hz
2826 Hz
155 ms
54 dB
Visible part 0.961229 seconds
Total duration 0.961229 seconds

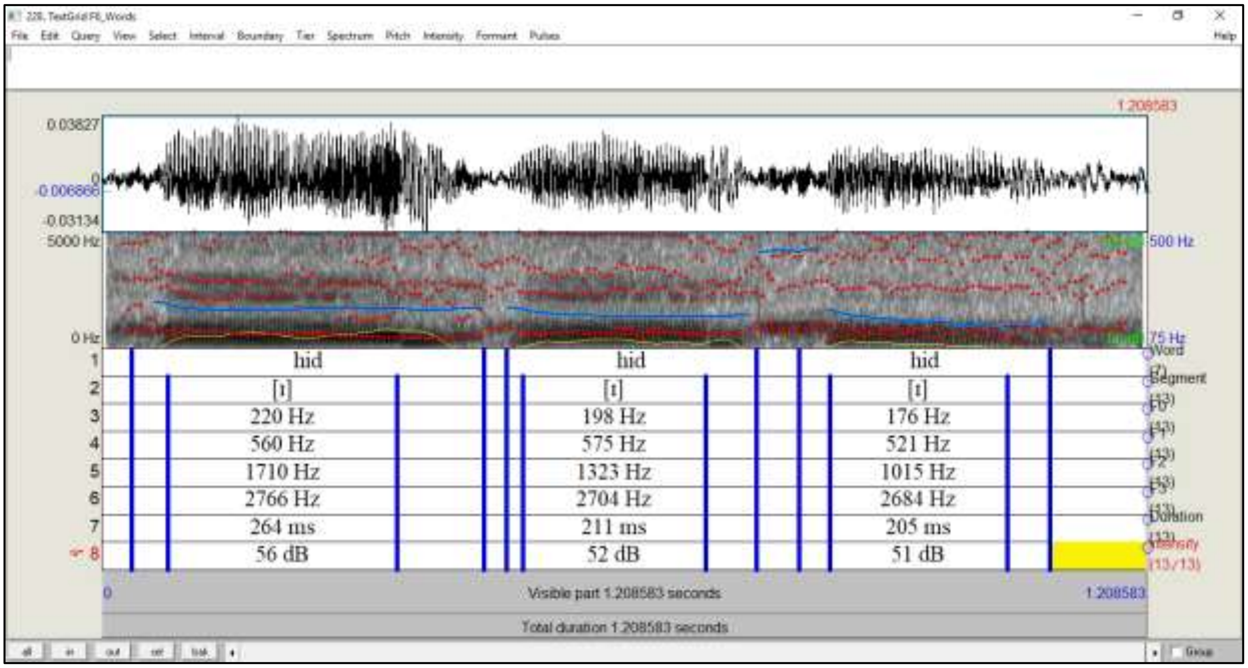


0.979695
0.02484
-0.001015
-0.02859
5000 Hz
0 Hz
500 Hz
75 Hz
hud
hud
hud
[ʌ]
[ʌ]
[ʌ]
194 Hz
186 Hz
174 Hz
745 Hz
764 Hz
809 Hz
1105 Hz
1106 Hz
1119 Hz
3026 Hz
2916 Hz
2960 Hz
182 ms
177 ms
165 ms
52 dB
52 dB
50 dB
Word
Segment
F0
F1
F2
F3
Duration
Intensity
(13/13)
0.979695
0
Visible part 0.980646 seconds
0.980646
Total duration 0.980646 seconds

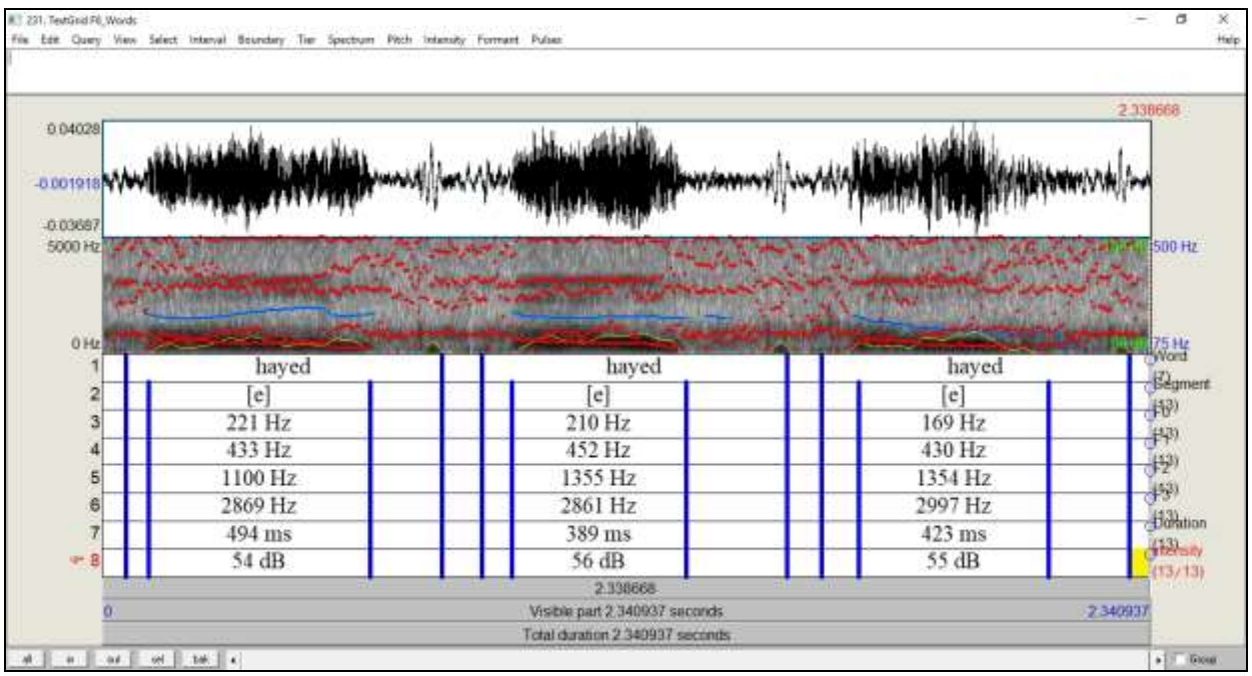
F6



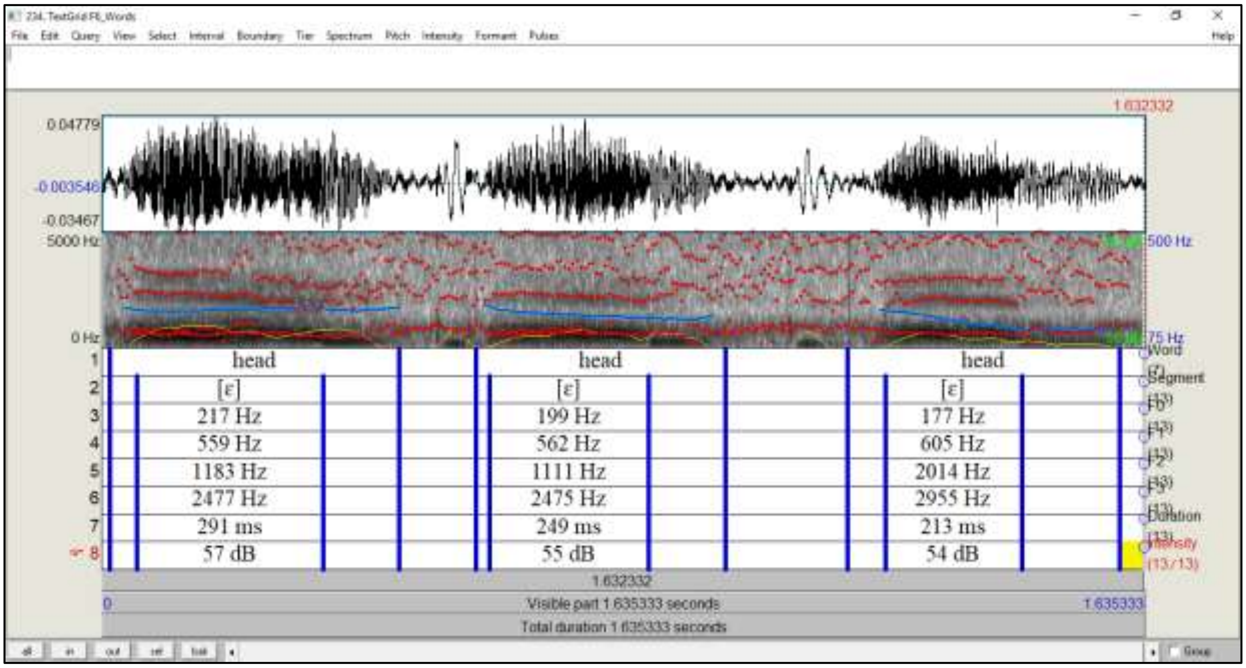
2.142046
0.03406
0.0002809
-0.02734
5000 Hz
0 Hz
500 Hz
75 Hz
heed
heed
heed
[i]
[i]
[i]
246 Hz
225 Hz
175 Hz
567 Hz
425 Hz
390 Hz
2335 Hz
1544 Hz
1136 Hz
3176 Hz
2931 Hz
2841 Hz
317 ms
395 ms
384 ms
53 dB
54 dB
52 dB
Word
Segment
F0
F1
F2
F3
Duration
Intensity
(13/13)
2.142046
0
Visible part 2.144125 seconds
2.144125
Total duration 2.144125 seconds



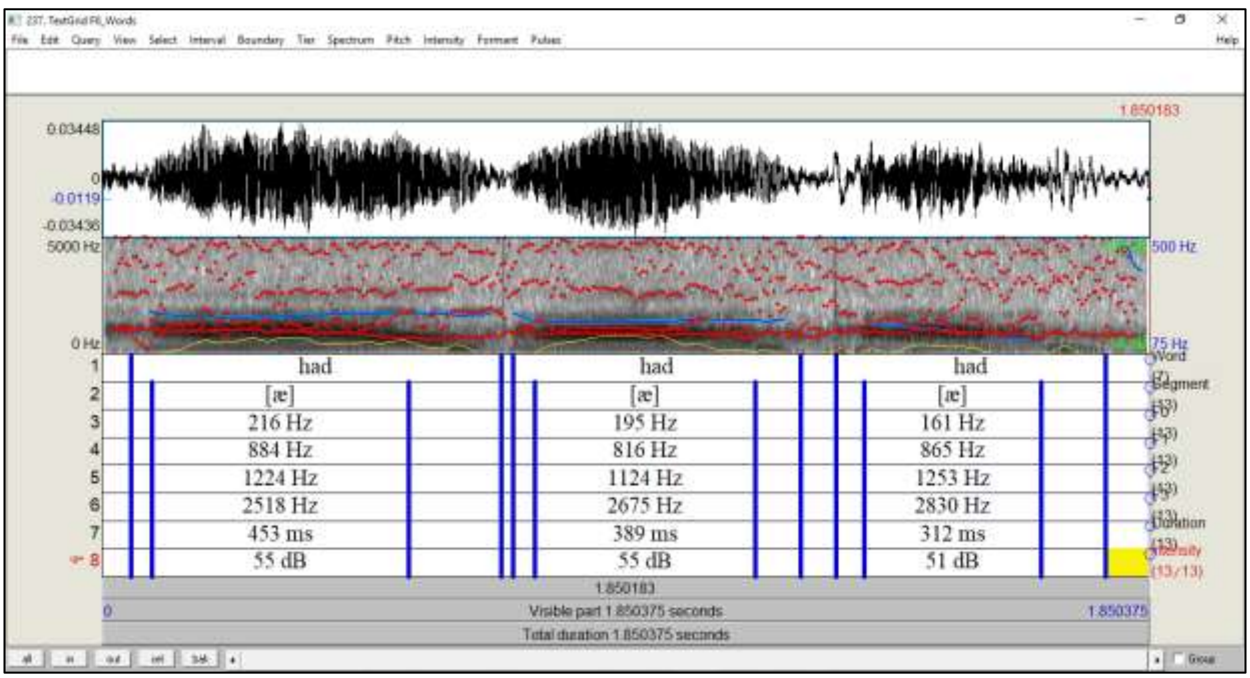
1.208583
0.03827
0
-0.006866
-0.03134
5000 Hz
0 Hz
500 Hz
75 Hz
hid
hid
hid
[ɪ]
[ɪ]
[ɪ]
220 Hz
198 Hz
176 Hz
560 Hz
575 Hz
521 Hz
1710 Hz
1323 Hz
1015 Hz
2766 Hz
2704 Hz
2684 Hz
264 ms
211 ms
205 ms
56 dB
52 dB
51 dB
Word
Segment
F0
F1
F2
F3
Duration
Intensity
(13/13)
Visible part 1.208583 seconds
Total duration 1.208583 seconds



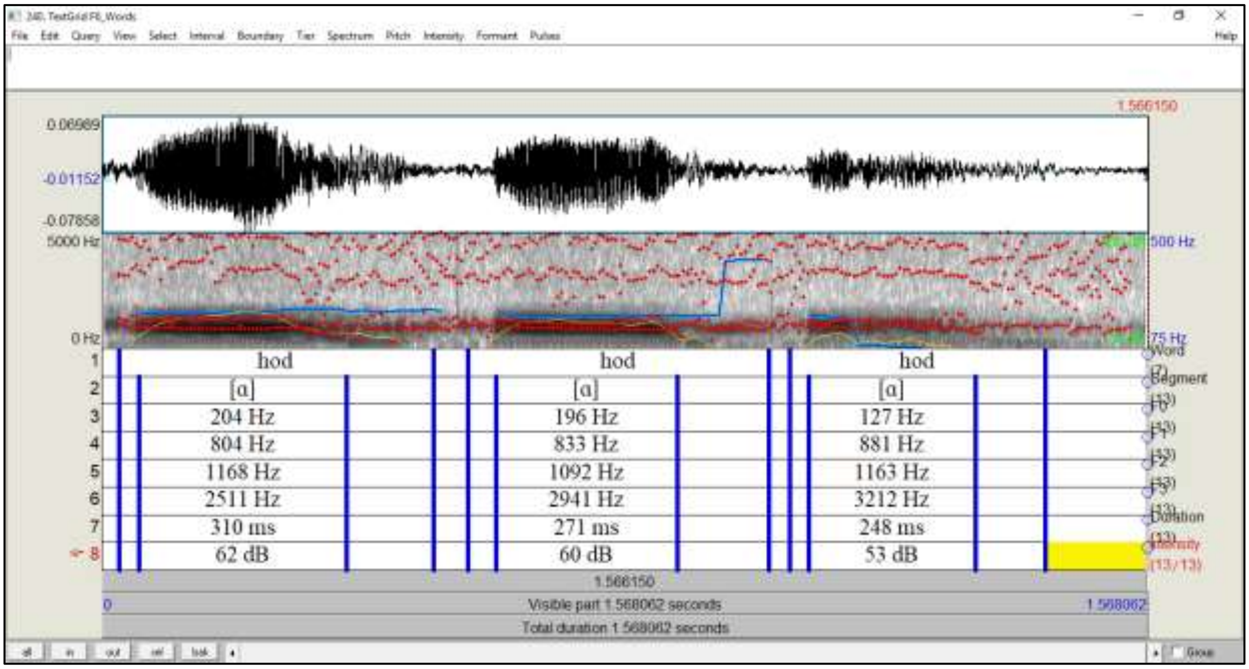
2.338668
0.04028
-0.001918
-0.03687
5000 Hz
0 Hz
500 Hz
75 Hz
hayed
hayed
hayed
[e]
[e]
[e]
221 Hz
210 Hz
169 Hz
433 Hz
452 Hz
430 Hz
1100 Hz
1355 Hz
1354 Hz
2869 Hz
2861 Hz
2997 Hz
494 ms
389 ms
423 ms
54 dB
56 dB
55 dB
Word
Segment
F0
F1
F2
F3
Duration
Intensity
(13/13)
2.338668
Visible part 2.340937 seconds
Total duration 2.340937 seconds



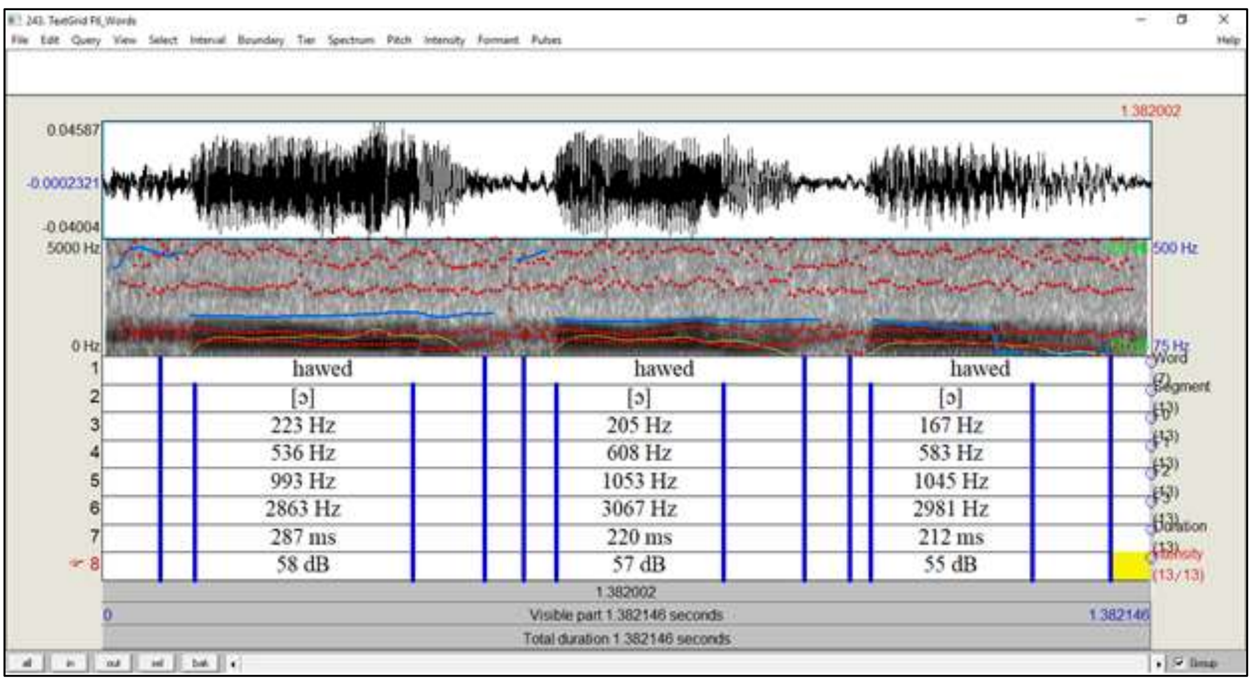
0.04779
-0.003546
-0.03467
5000 Hz
0 Hz
1.632332
500 Hz
75 Hz
head
[ɛ]
217 Hz
559 Hz
1183 Hz
2477 Hz
291 ms
57 dB
head
[ɛ]
199 Hz
562 Hz
1111 Hz
2475 Hz
249 ms
55 dB
head
[ɛ]
177 Hz
605 Hz
2014 Hz
2955 Hz
213 ms
54 dB
Word
Segment
F0
F1
F2
F3
Duration
Intensity
(13/13)
Visible part 1.635333 seconds
1.635333
Total duration 1.635333 seconds



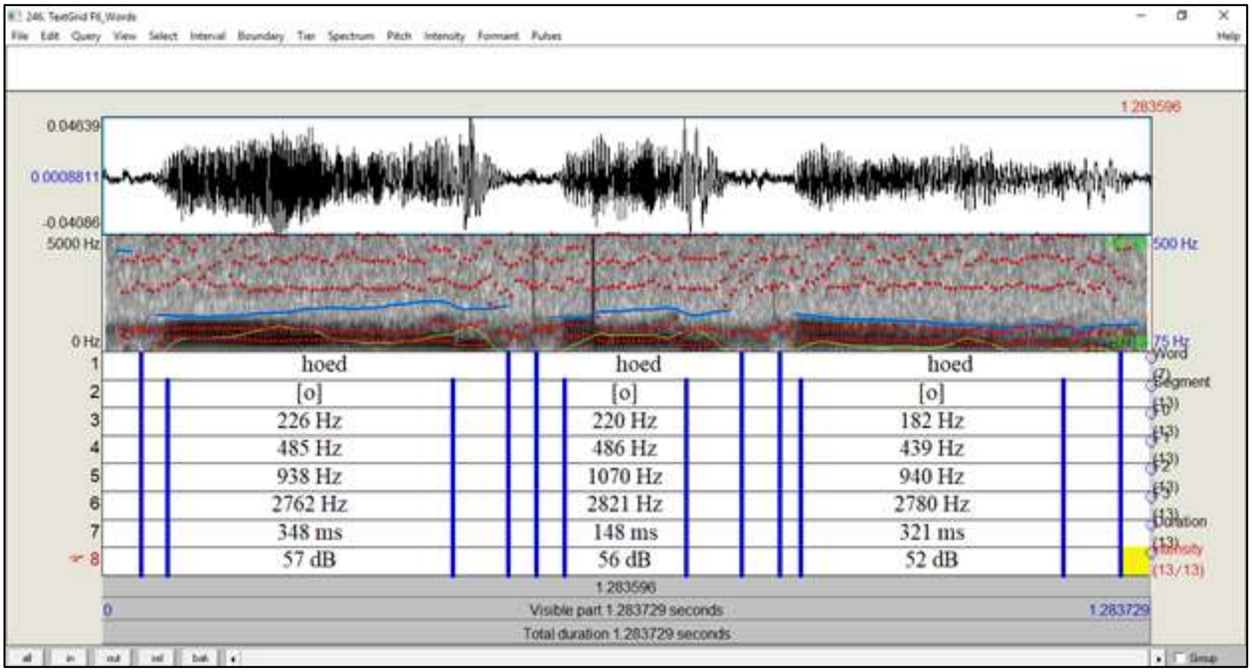
0.03448
0
-0.0119
-0.03436
5000 Hz
0 Hz
1.850183
500 Hz
75 Hz
had
[æ]
216 Hz
884 Hz
1224 Hz
2518 Hz
453 ms
55 dB
had
[æ]
195 Hz
816 Hz
1124 Hz
2675 Hz
389 ms
55 dB
had
[æ]
161 Hz
865 Hz
1253 Hz
2830 Hz
312 ms
51 dB
Word
Segment
Duration
Intensity
(13/13)
Visible part 1.850375 seconds
1.850375
Total duration 1.850375 seconds

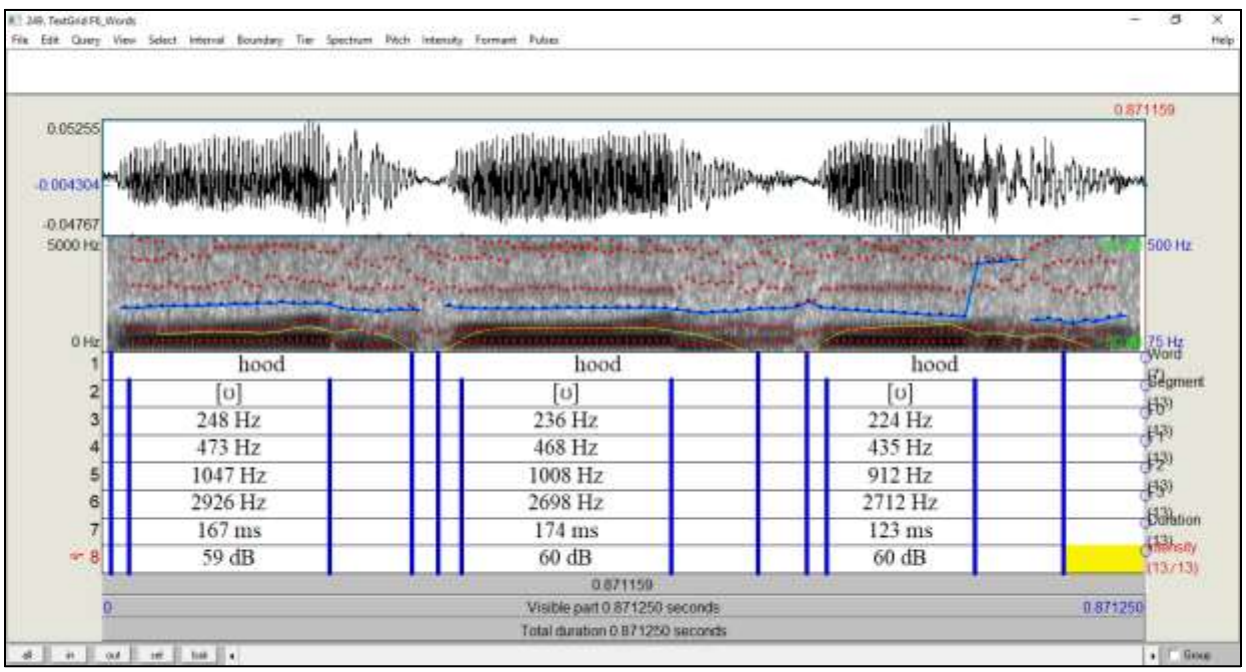


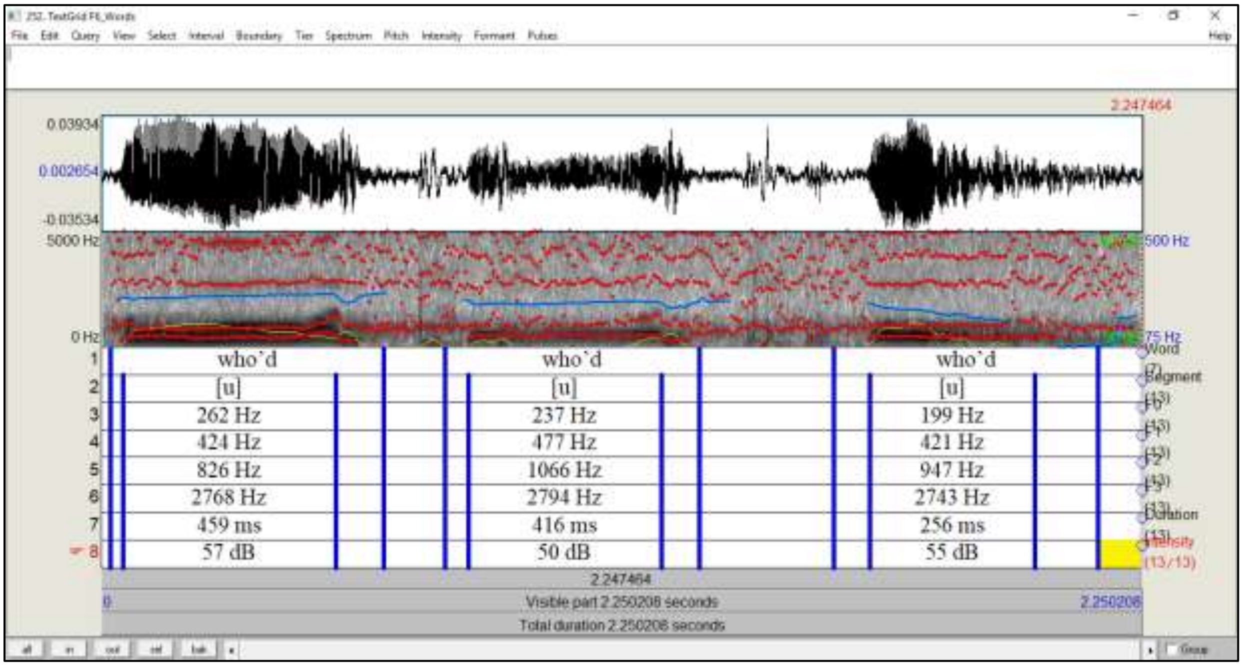
240. TextGrid F6_Words
File Edit Query View Select Interval Boundary Tier Spectrum Pitch Intensity Formant Pulses
Help
1.566150
0.06989
-0.01152
-0.07858
5000 Hz
0 Hz
500 Hz
75 Hz
hod
hod
hod
[ɑ]
[ɑ]
[ɑ]
204 Hz
196 Hz
127 Hz
804 Hz
833 Hz
881 Hz
1168 Hz
1092 Hz
1163 Hz
2511 Hz
2941 Hz
3212 Hz
310 ms
271 ms
248 ms
62 dB
60 dB
53 dB
Word
Segment
Duration
Intensity
(13/13)
1.566150
Visible part 1.568062 seconds
1.568062
Total duration 1.568062 seconds

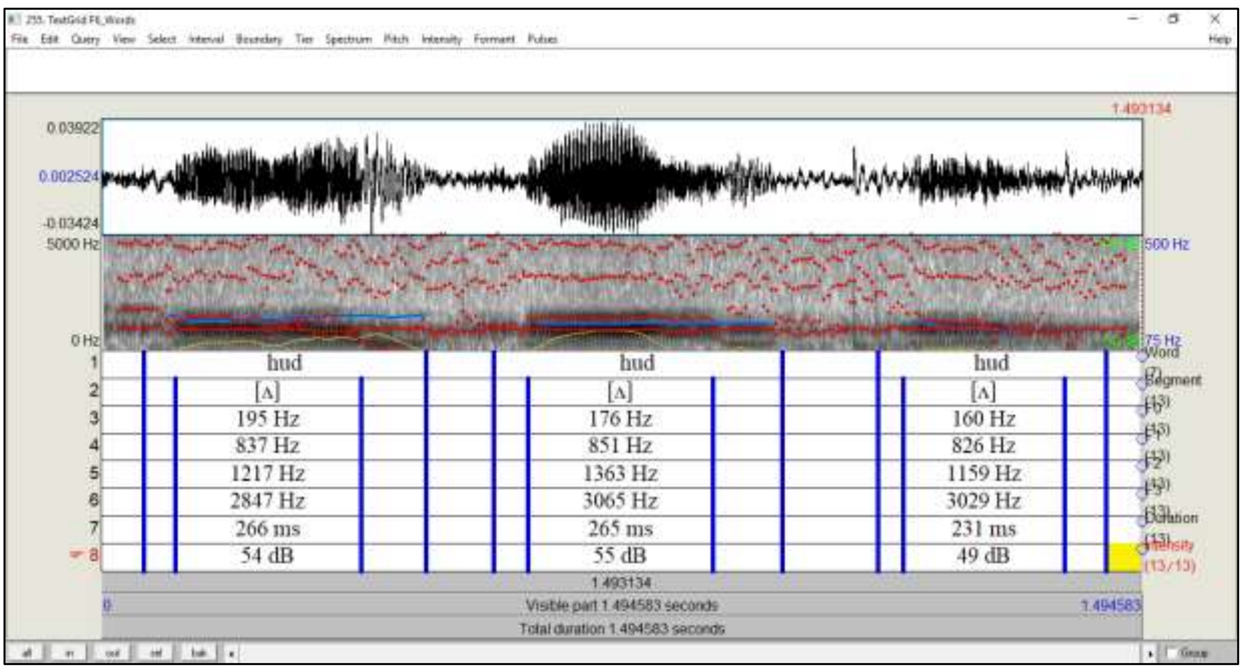


243. TextGrid F6_Words
File Edit Query View Select Interval Boundary Tier Spectrum Pitch Intensity Formant Pulses
Help
1.382002
0.04587
-0.0002321
-0.04004
5000 Hz
0 Hz
500 Hz
75 Hz
hawed
hawed
hawed
[ɔ]
[ɔ]
[ɔ]
223 Hz
205 Hz
167 Hz
536 Hz
608 Hz
583 Hz
993 Hz
1053 Hz
1045 Hz
2863 Hz
3067 Hz
2981 Hz
287 ms
220 ms
212 ms
58 dB
57 dB
55 dB
Word
Segment
Duration
Intensity
(13/13)
1.382002
Visible part 1.382146 seconds
1.382146
Total duration 1.382146 seconds

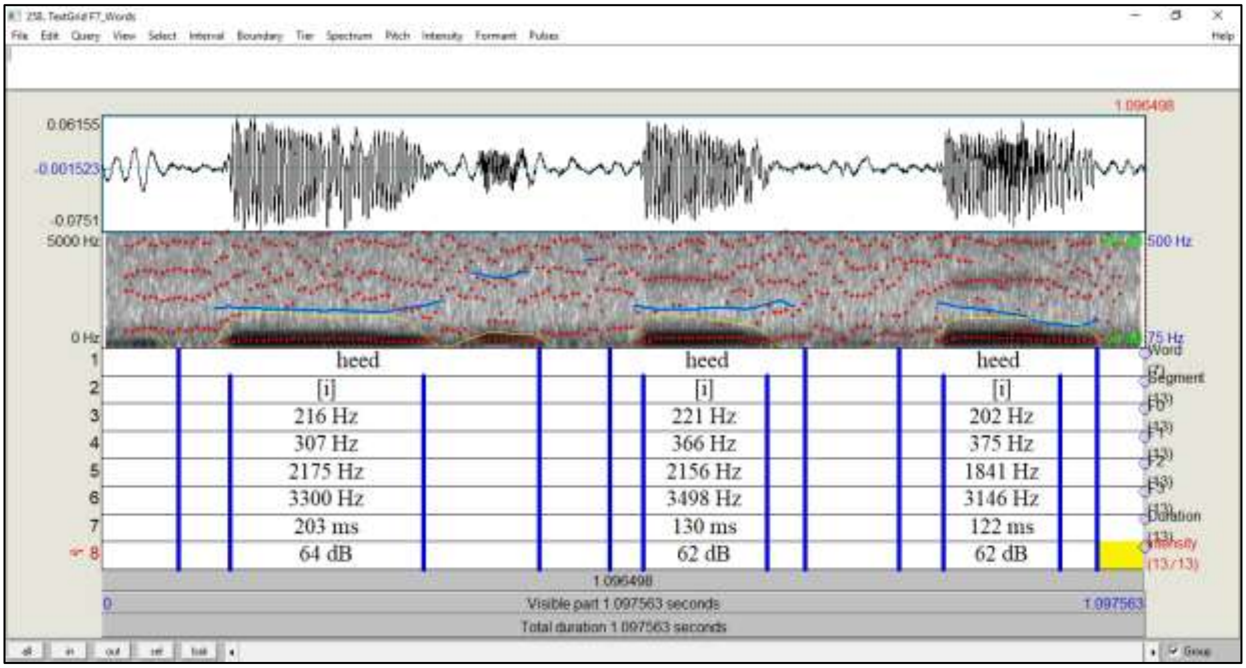

0.04639
0.0008811
-0.04086
5000 Hz
0 Hz
1.283596
500 Hz
75 Hz
hoed
[o]
226 Hz
485 Hz
938 Hz
2762 Hz
348 ms
57 dB
hoed
[o]
220 Hz
486 Hz
1070 Hz
2821 Hz
148 ms
56 dB
hoed
[o]
182 Hz
439 Hz
940 Hz
2780 Hz
321 ms
52 dB
Visible part 1.283729 seconds
Total duration 1.283729 seconds


0.05255
-0.004304
-0.04767
5000 Hz
0 Hz
0.871159
500 Hz
75 Hz
hood
[ʊ]
248 Hz
473 Hz
1047 Hz
2926 Hz
167 ms
59 dB
hood
[ʊ]
236 Hz
468 Hz
1008 Hz
2698 Hz
174 ms
60 dB
hood
[ʊ]
224 Hz
435 Hz
912 Hz
2712 Hz
123 ms
60 dB
Visible part 0.871250 seconds
Total duration 0.871250 seconds

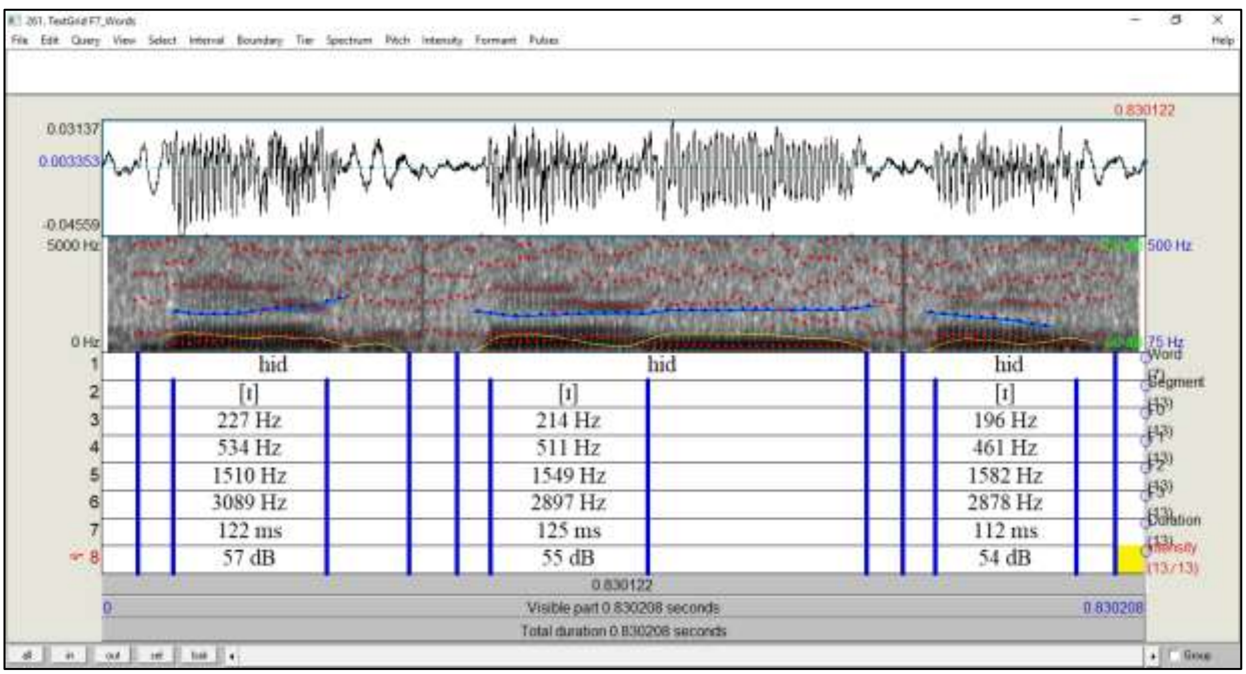

who'd
[u]
262 Hz
424 Hz
826 Hz
2768 Hz
459 ms
57 dB
who'd
[u]
237 Hz
477 Hz
1066 Hz
2794 Hz
416 ms
50 dB
who'd
[u]
199 Hz
421 Hz
947 Hz
2743 Hz
256 ms
55 dB
Visible part 2.250208 seconds
Total duration 2.250208 seconds


hud
[ʌ]
195 Hz
837 Hz
1217 Hz
2847 Hz
266 ms
54 dB
hud
[ʌ]
176 Hz
851 Hz
1363 Hz
3065 Hz
265 ms
55 dB
hud
[ʌ]
160 Hz
826 Hz
1159 Hz
3029 Hz
231 ms
49 dB
Visible part 1.494583 seconds
Total duration 1.494583 seconds

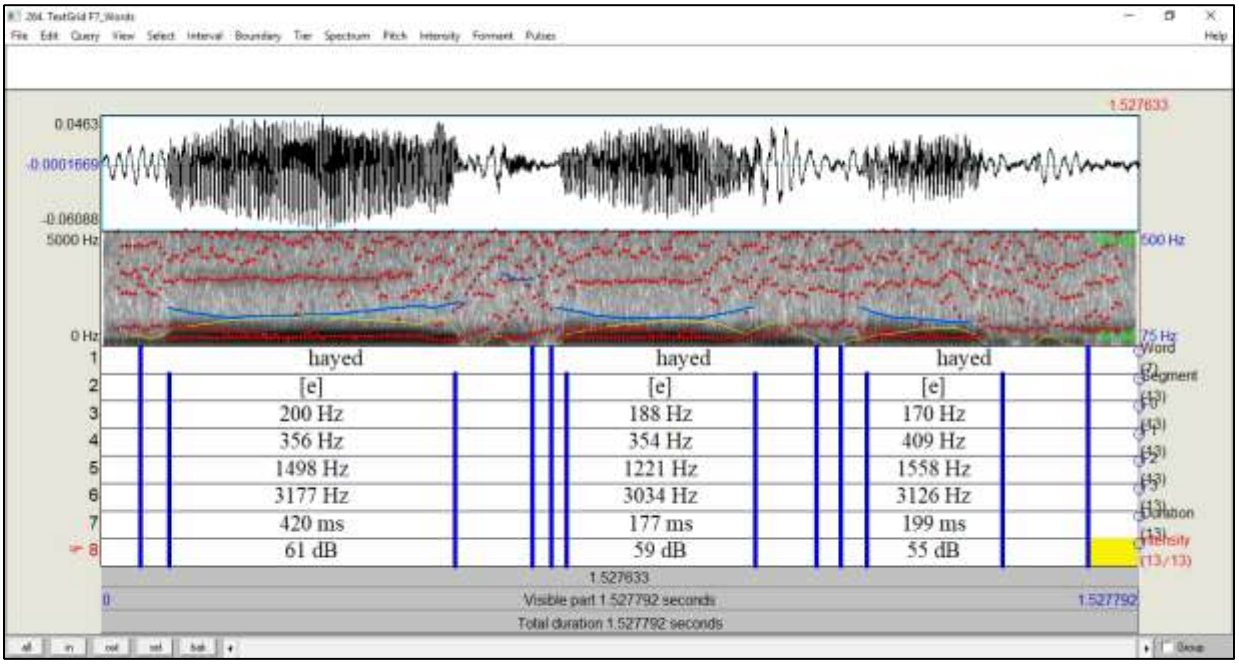
F7

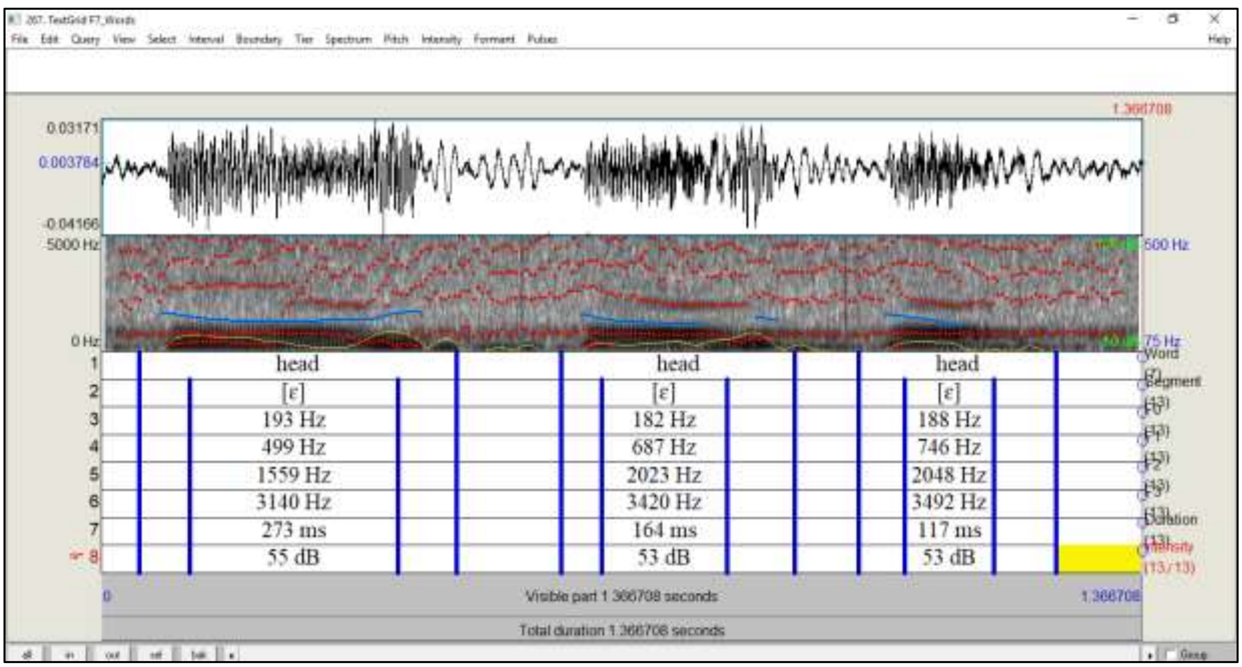


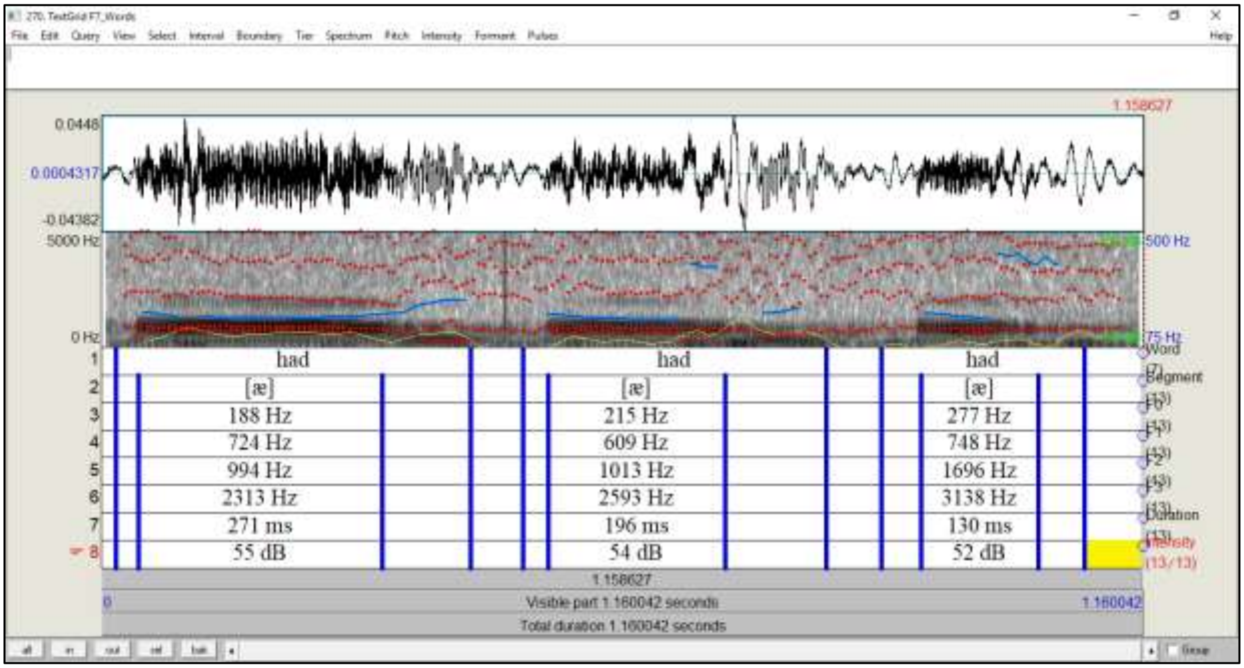
heed
[i]
216 Hz
307 Hz
2175 Hz
3300 Hz
203 ms
64 dB
heed
[i]
221 Hz
366 Hz
2156 Hz
3498 Hz
130 ms
62 dB
heed
[i]
202 Hz
375 Hz
1841 Hz
3146 Hz
122 ms
62 dB
Visible part 1.097563 seconds
Total duration 1.097563 seconds



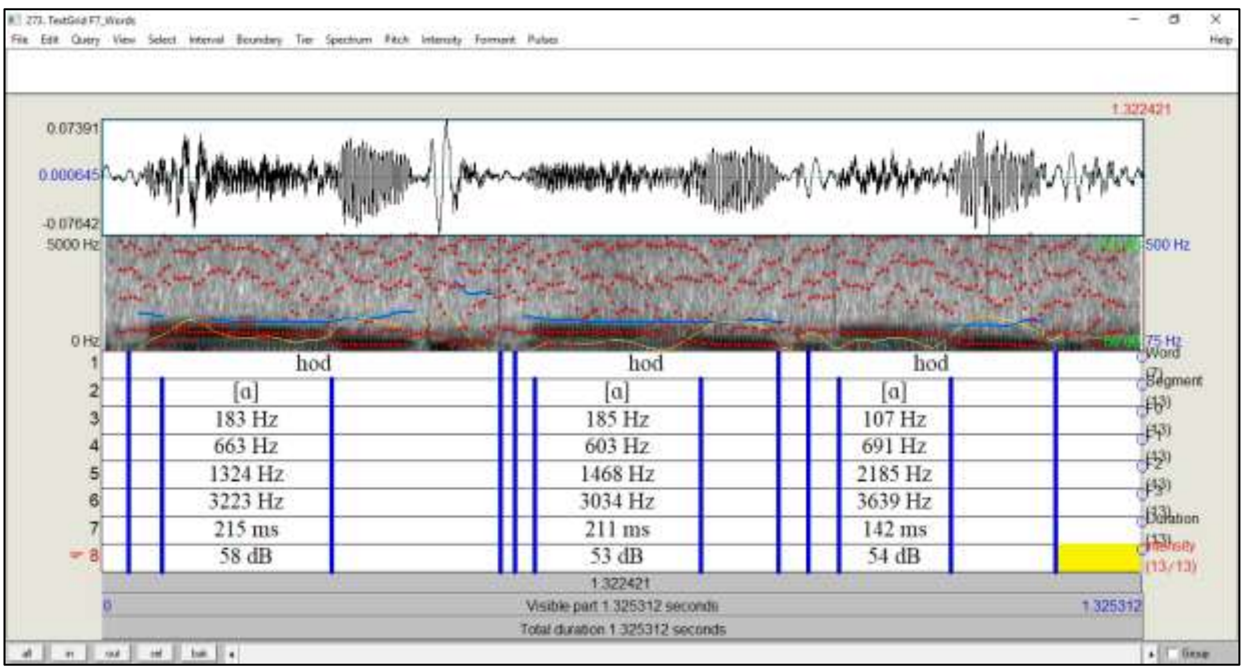
hid
[ɪ]
227 Hz
534 Hz
1510 Hz
3089 Hz
122 ms
57 dB
hid
[ɪ]
214 Hz
511 Hz
1549 Hz
2897 Hz
125 ms
55 dB
hid
[ɪ]
196 Hz
461 Hz
1582 Hz
2878 Hz
112 ms
54 dB
Visible part 0.830208 seconds
Total duration 0.830208 seconds


1.527633
0.0463
-0.0001669
-0.06088
5000 Hz
0 Hz
500 Hz
75 Hz
hayed
[e]
200 Hz
356 Hz
1498 Hz
3177 Hz
420 ms
61 dB
hayed
[e]
188 Hz
354 Hz
1221 Hz
3034 Hz
177 ms
59 dB
hayed
[e]
170 Hz
409 Hz
1558 Hz
3126 Hz
199 ms
55 dB
Word
Segment
F0
F1
F2
F3
Duration
Intensity
(13/13)
1.527633
Visible part 1.527792 seconds
1.527792
Total duration 1.527792 seconds

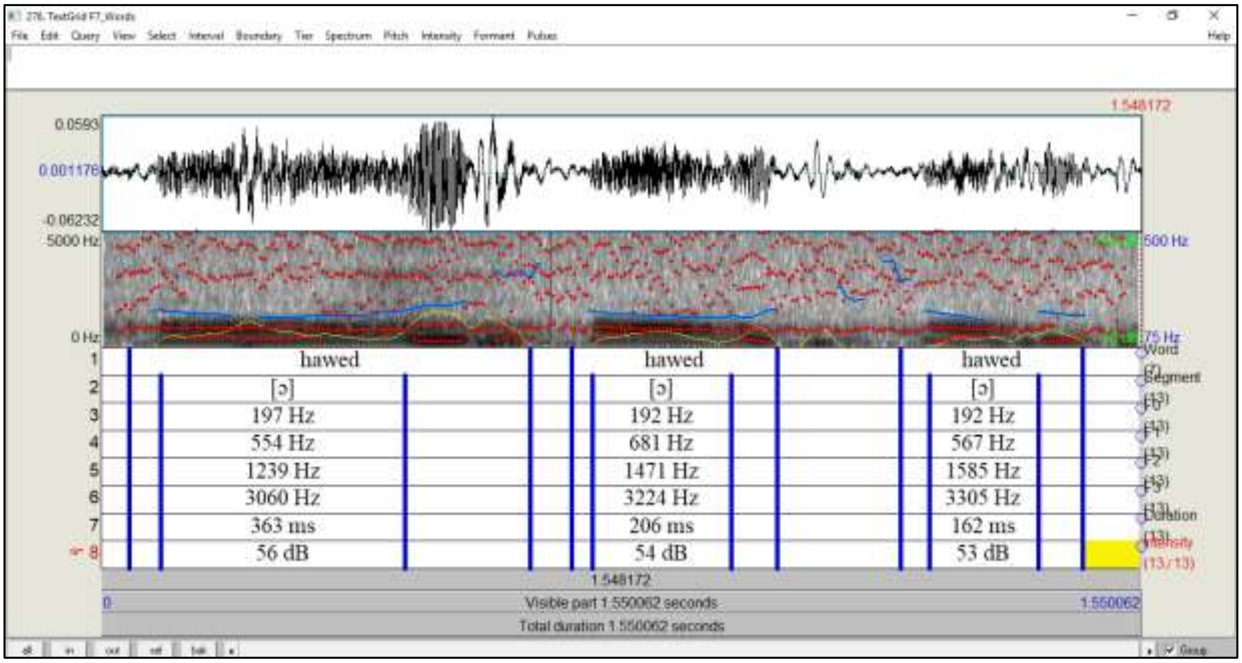

1.366708
0.03171
0.003784
-0.04166
5000 Hz
0 Hz
500 Hz
75 Hz
head
[ɛ]
193 Hz
499 Hz
1559 Hz
3140 Hz
273 ms
55 dB
head
[ɛ]
182 Hz
687 Hz
2023 Hz
3420 Hz
164 ms
53 dB
head
[ɛ]
188 Hz
746 Hz
2048 Hz
3492 Hz
117 ms
53 dB
Word
Segment
F0
F1
F2
F3
Duration
Intensity
(13/13)
Visible part 1.366708 seconds
1.366708
Total duration 1.366708 seconds

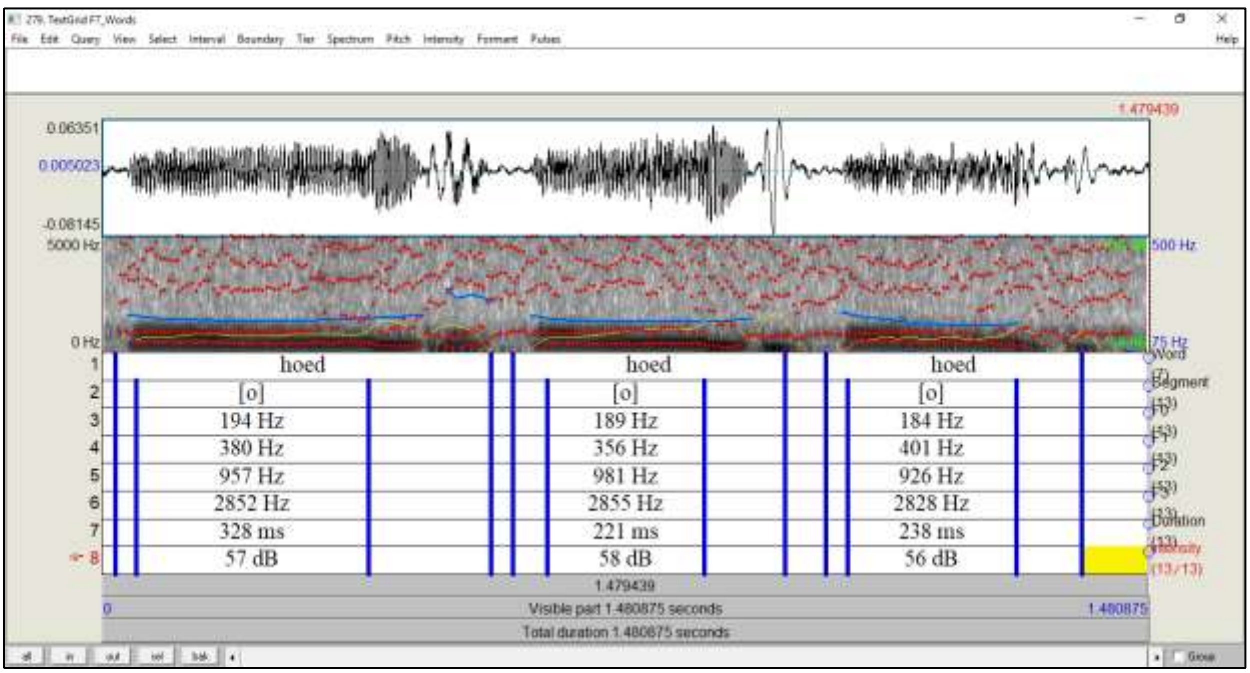


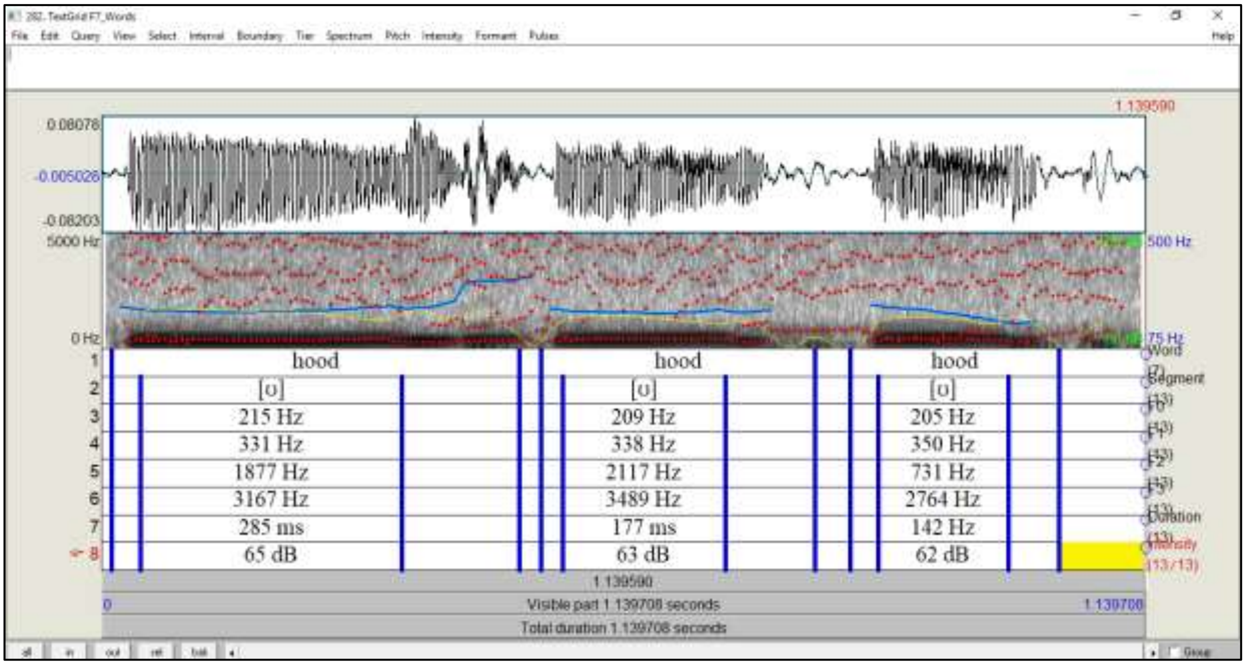
0.0448
0.0004317
-0.04382
5000 Hz
0 Hz
1.158627
500 Hz
75 Hz
had
[æ]
188 Hz
724 Hz
994 Hz
2313 Hz
271 ms
55 dB
had
[æ]
215 Hz
609 Hz
1013 Hz
2593 Hz
196 ms
54 dB
had
[æ]
277 Hz
748 Hz
1696 Hz
3138 Hz
130 ms
52 dB
Word
Segment
F0
F1
F2
F3
Duration
Intensity
(13/13)
Visible part 1.160042 seconds
1.160042
Total duration 1.160042 seconds

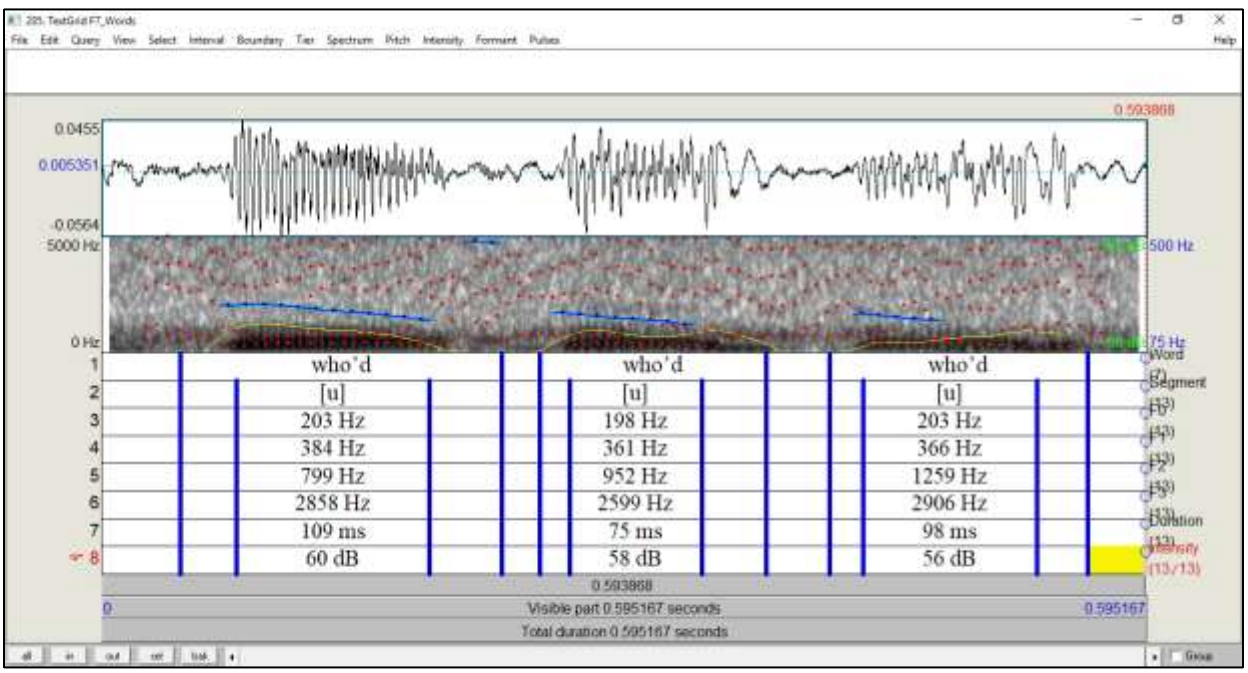


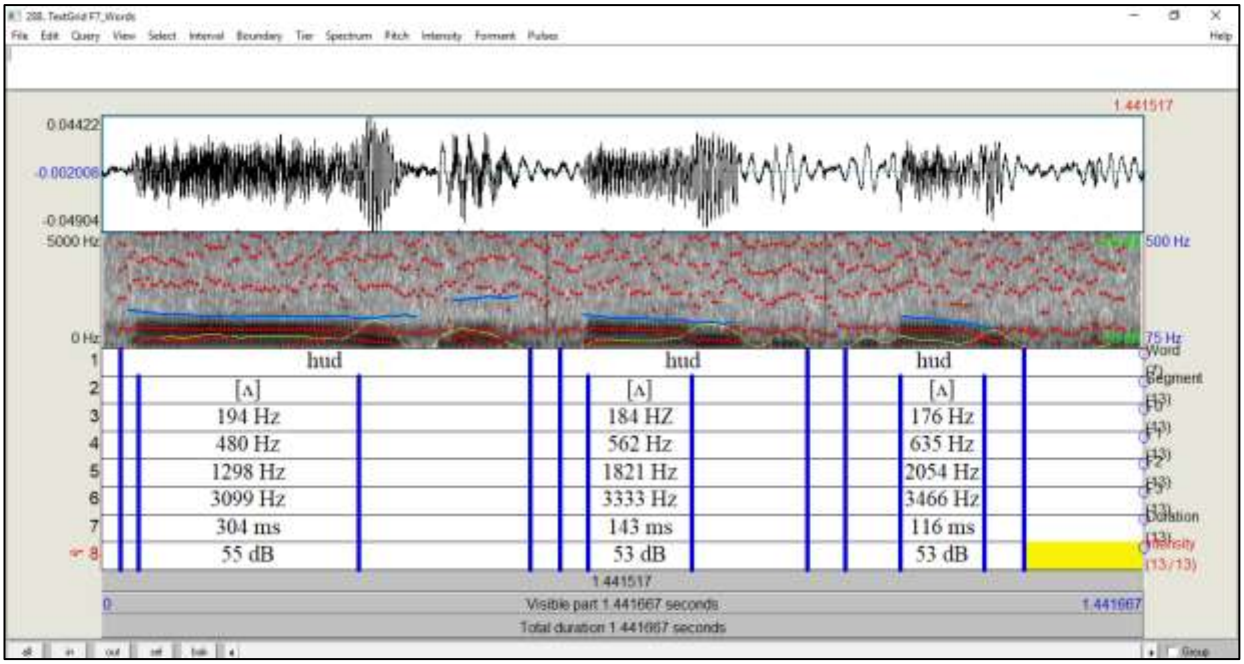
0.07391
0.000645
-0.07642
5000 Hz
0 Hz
1.322421
500 Hz
75 Hz
hod
[ɑ]
183 Hz
663 Hz
1324 Hz
3223 Hz
215 ms
58 dB
hod
[ɑ]
185 Hz
603 Hz
1468 Hz
3034 Hz
211 ms
53 dB
hod
[ɑ]
107 Hz
691 Hz
2185 Hz
3639 Hz
142 ms
54 dB
Word
Segment
F0
F1
F2
F3
Duration
Intensity
(13/13)
Visible part 1.325312 seconds
1.325312
Total duration 1.325312 seconds


hawed
[ɔ]
197 Hz
554 Hz
1239 Hz
3060 Hz
363 ms
56 dB
hawed
[ɔ]
192 Hz
681 Hz
1471 Hz
3224 Hz
206 ms
54 dB
hawed
[ɔ]
192 Hz
567 Hz
1585 Hz
3305 Hz
162 ms
53 dB
Visible part 1.550062 seconds
Total duration 1.550062 seconds


hoed
[o]
194 Hz
380 Hz
957 Hz
2852 Hz
328 ms
57 dB
hoed
[o]
189 Hz
356 Hz
981 Hz
2855 Hz
221 ms
58 dB
hoed
[o]
184 Hz
401 Hz
926 Hz
2828 Hz
238 ms
56 dB
Visible part 1.480875 seconds
Total duration 1.480875 seconds

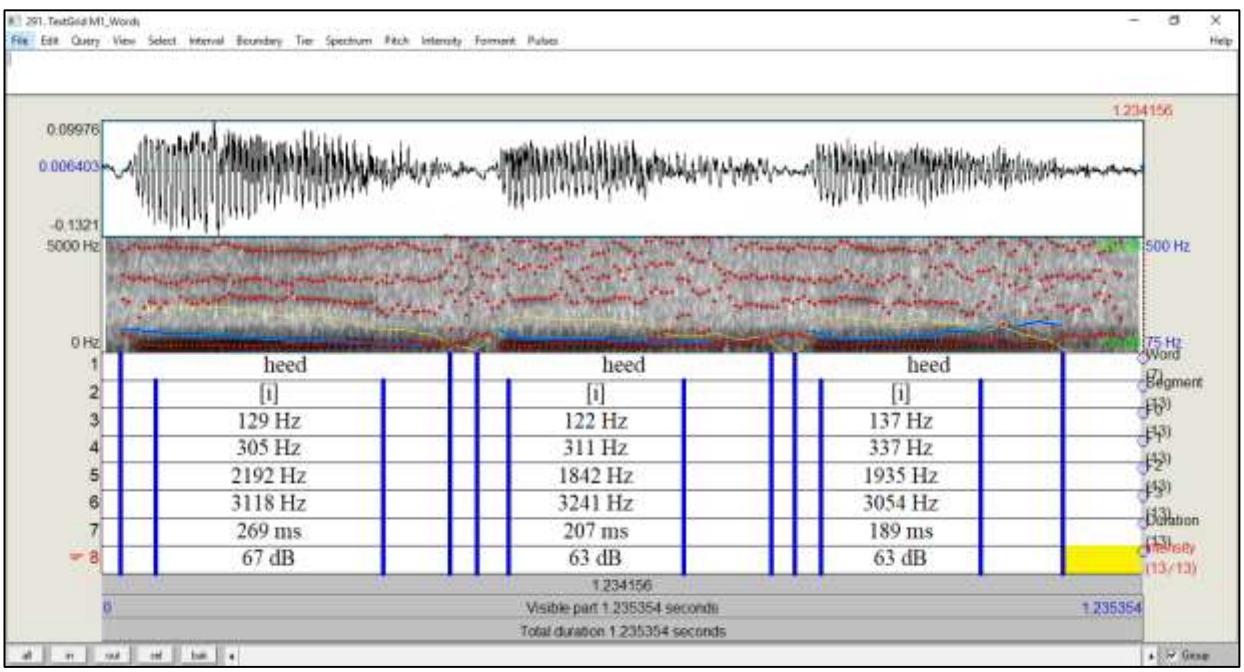

hood
[ʊ]
215 Hz
331 Hz
1877 Hz
3167 Hz
285 ms
65 dB
hood
[ʊ]
209 Hz
338 Hz
2117 Hz
3489 Hz
177 ms
63 dB
hood
[ʊ]
205 Hz
350 Hz
731 Hz
2764 Hz
142 Hz
62 dB
Visible part 1.139708 seconds
Total duration 1.139708 seconds


who'd
[u]
203 Hz
384 Hz
799 Hz
2858 Hz
109 ms
60 dB
who'd
[u]
198 Hz
361 Hz
952 Hz
2599 Hz
75 ms
58 dB
who'd
[u]
203 Hz
366 Hz
1259 Hz
2906 Hz
98 ms
56 dB
Visible part 0.595167 seconds
Total duration 0.595167 seconds

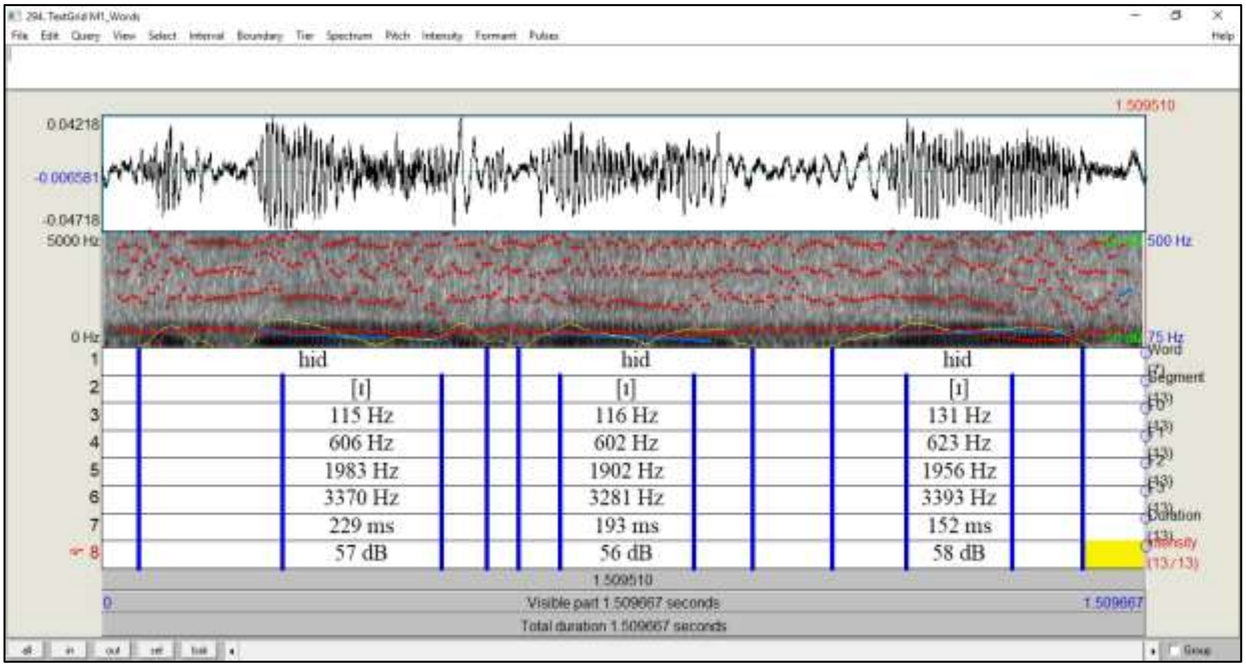


hud
[ʌ]
194 Hz
480 Hz
1298 Hz
3099 Hz
304 ms
55 dB
hud
[ʌ]
184 HZ
562 Hz
1821 Hz
3333 Hz
143 ms
53 dB
hud
[ʌ]
176 Hz
635 Hz
2054 Hz
3466 Hz
116 ms
53 dB
Visible part 1.441667 seconds
Total duration 1.441667 seconds

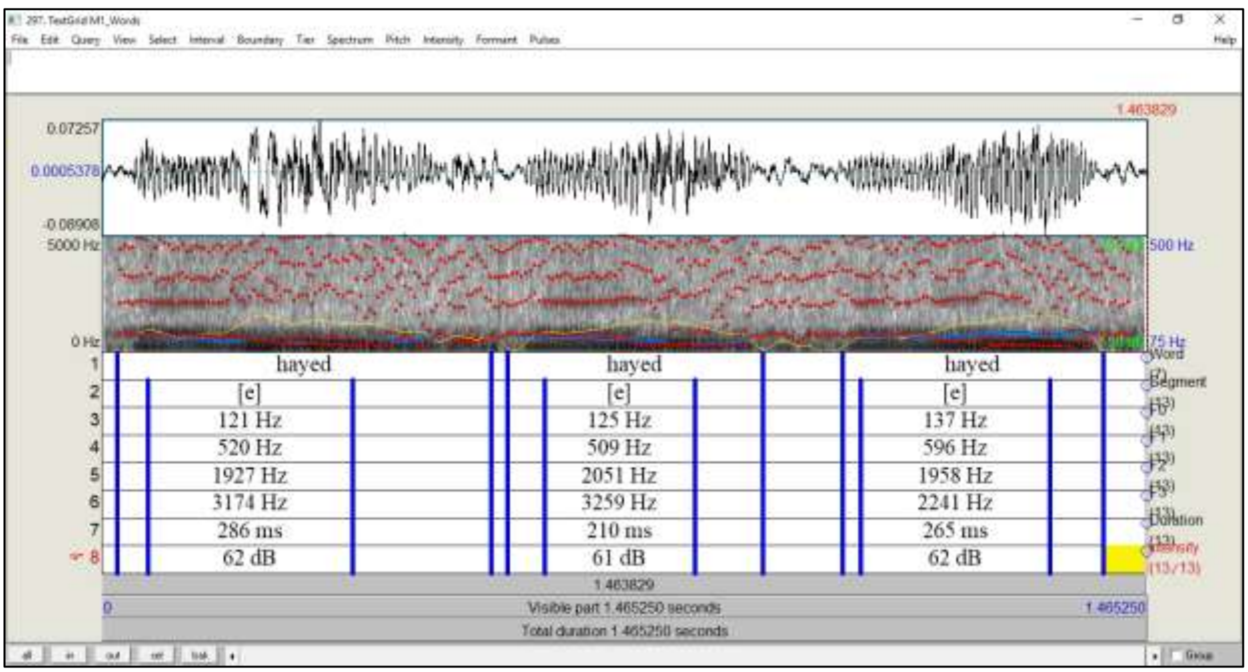
M1



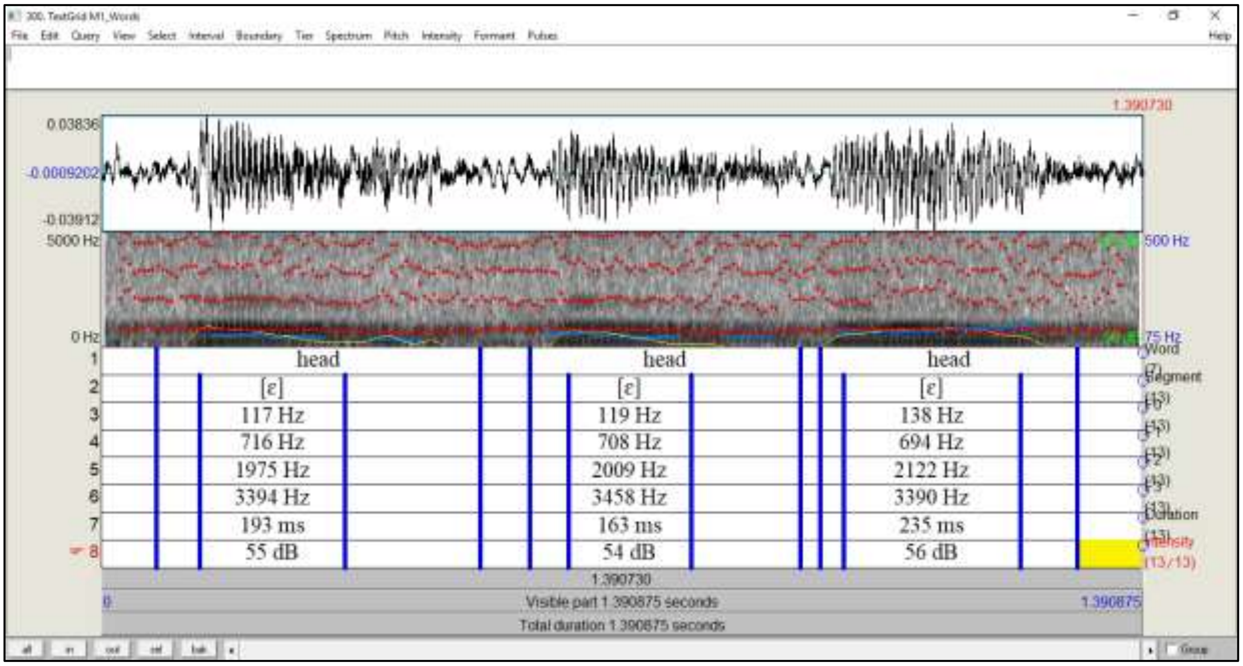
heed
[i]
129 Hz
305 Hz
2192 Hz
3118 Hz
269 ms
67 dB
heed
[i]
122 Hz
311 Hz
1842 Hz
3241 Hz
207 ms
63 dB
heed
[i]
137 Hz
337 Hz
1935 Hz
3054 Hz
189 ms
63 dB
Visible part 1.235354 seconds
Total duration 1.235354 seconds

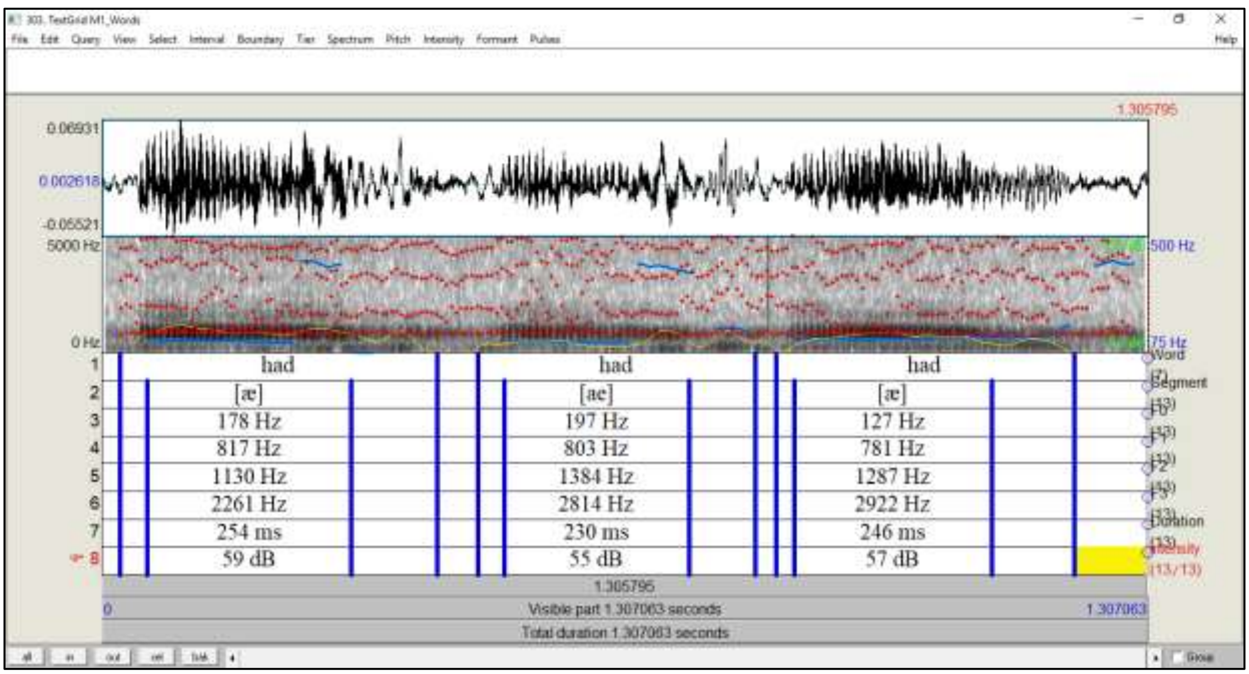


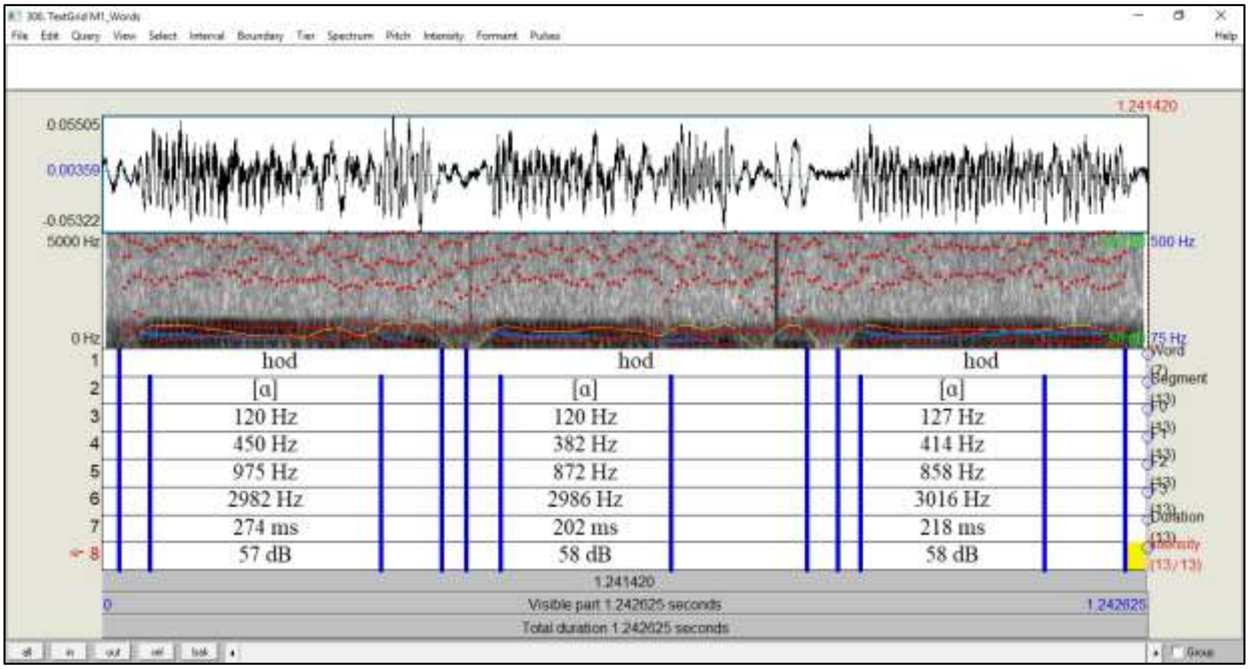
0.04218
-0.006581
-0.04718
5000 Hz
0 Hz
500 Hz
75 Hz
hid
[ɪ]
115 Hz
606 Hz
1983 Hz
3370 Hz
229 ms
57 dB
hid
[ɪ]
116 Hz
602 Hz
1902 Hz
3281 Hz
193 ms
56 dB
hid
[ɪ]
131 Hz
623 Hz
1956 Hz
3393 Hz
152 ms
58 dB
1.509510
Visible part 1.509667 seconds
Total duration 1.509667 seconds

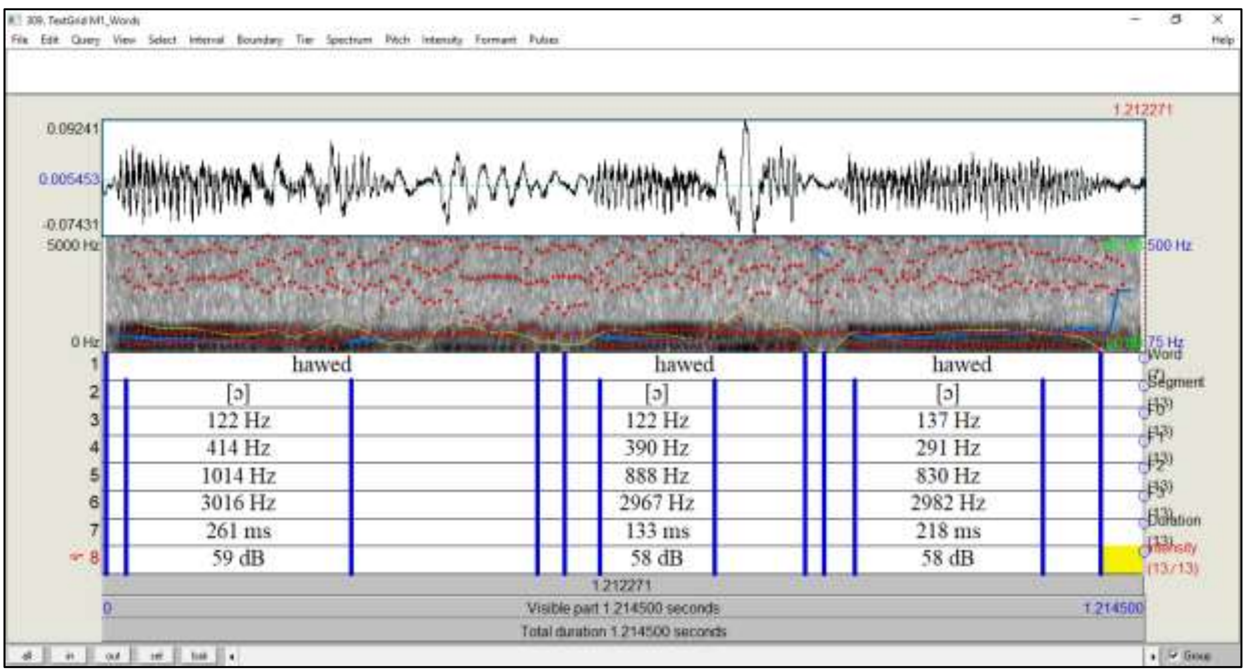


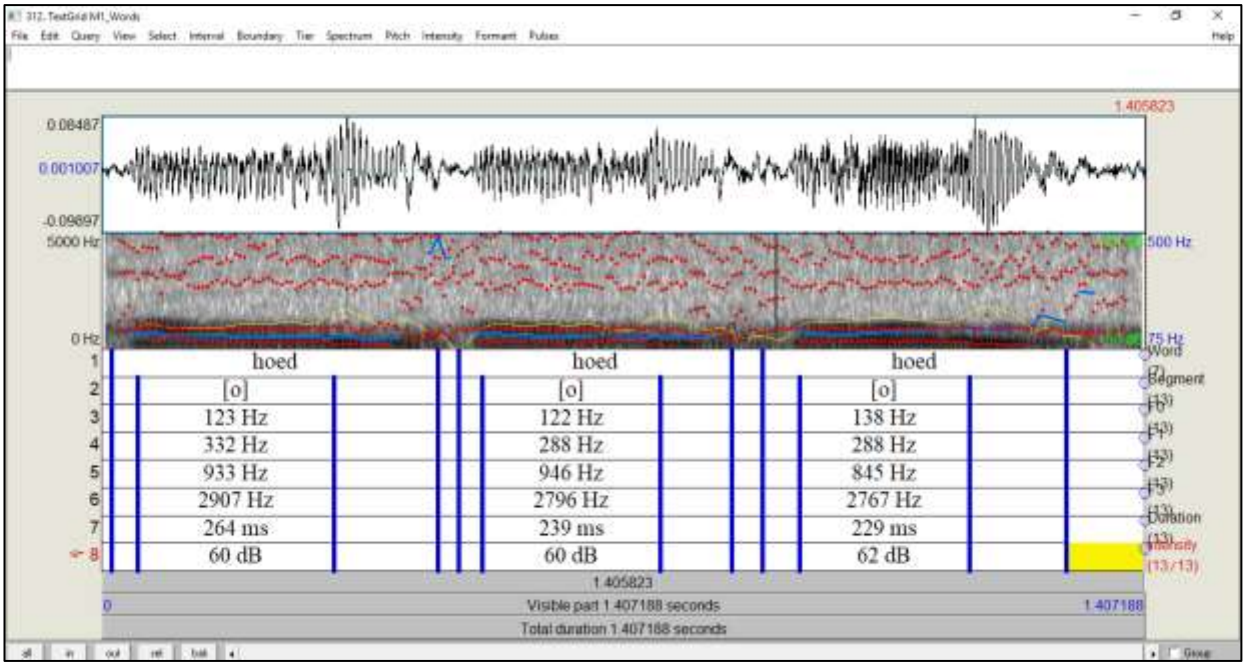
0.07257
0.0005378
-0.08908
5000 Hz
0 Hz
500 Hz
75 Hz
hayed
[e]
121 Hz
520 Hz
1927 Hz
3174 Hz
286 ms
62 dB
hayed
[e]
125 Hz
509 Hz
2051 Hz
3259 Hz
210 ms
61 dB
hayed
[e]
137 Hz
596 Hz
1958 Hz
2241 Hz
265 ms
62 dB
1.463829
Visible part 1.465250 seconds
Total duration 1.465250 seconds

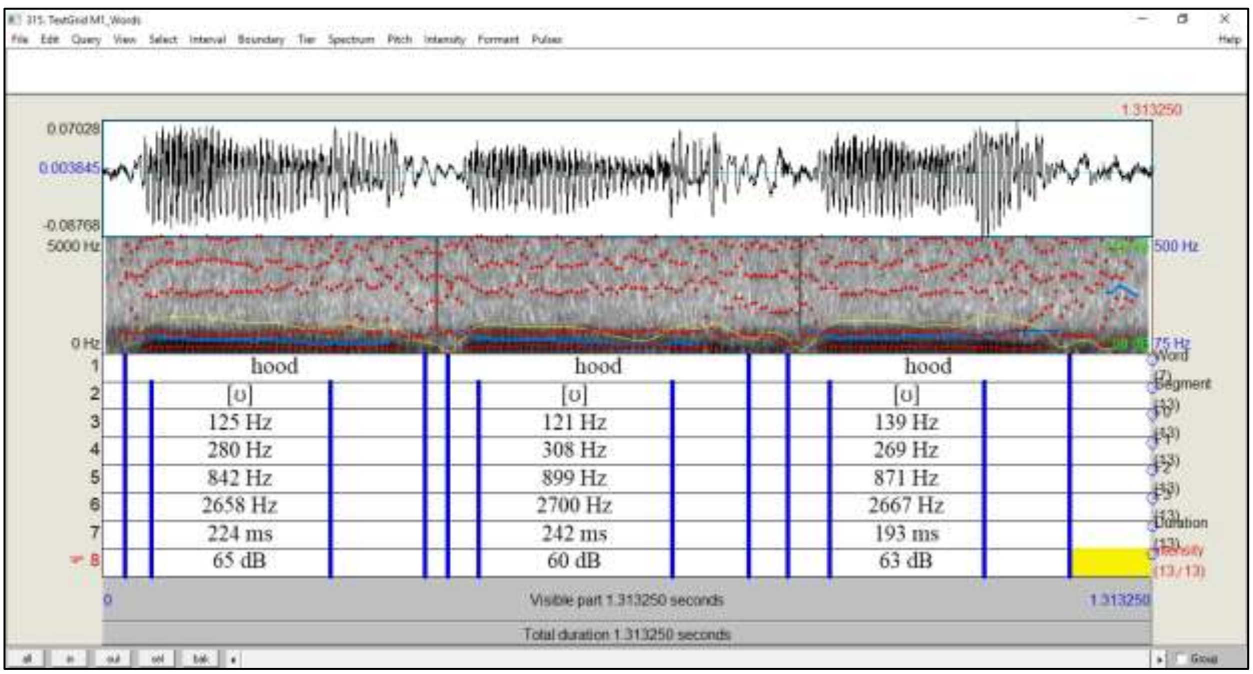

0.03836
-0.0009202
-0.03912
5000 Hz
0 Hz
1.390730
500 Hz
75 Hz
head head head
[ɛ] [ɛ] [ɛ]
117 Hz 119 Hz 138 Hz
716 Hz 708 Hz 694 Hz
1975 Hz 2009 Hz 2122 Hz
3394 Hz 3458 Hz 3390 Hz
193 ms 163 ms 235 ms
55 dB 54 dB 56 dB
Visible part 1.390875 seconds
Total duration 1.390875 seconds

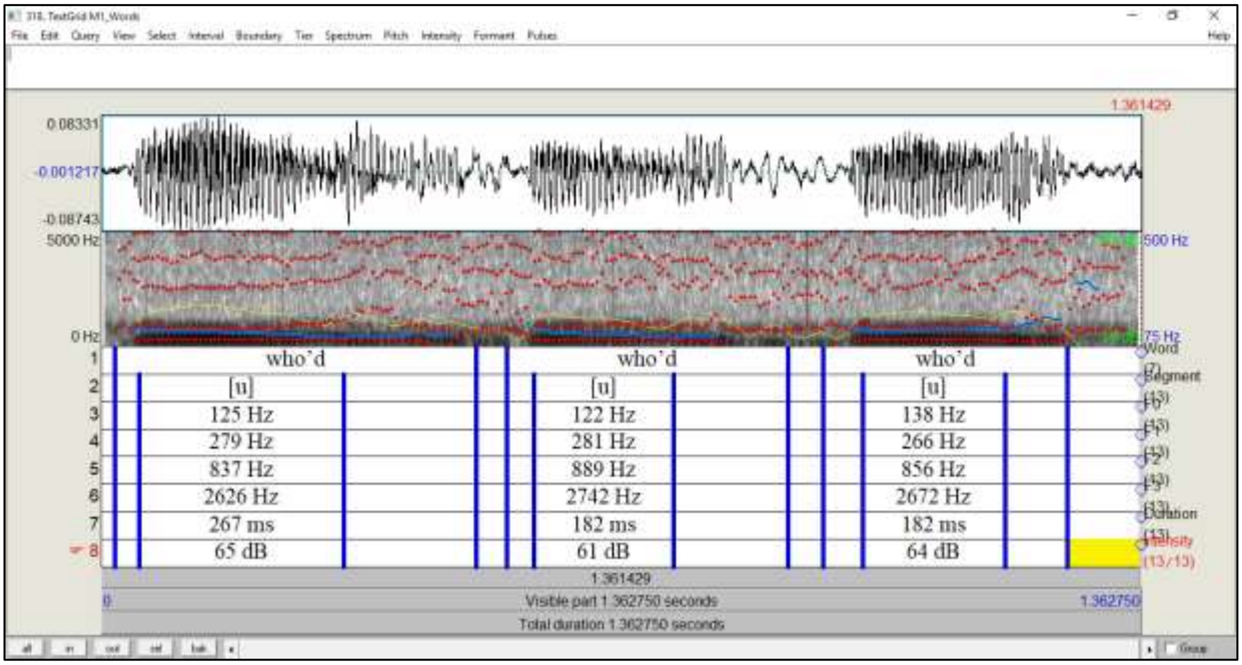

0.06931
0.002618
-0.05521
5000 Hz
0 Hz
1.305795
500 Hz
75 Hz
had had had
[æ] [ae] [æ]
178 Hz 197 Hz 127 Hz
817 Hz 803 Hz 781 Hz
1130 Hz 1384 Hz 1287 Hz
2261 Hz 2814 Hz 2922 Hz
254 ms 230 ms 246 ms
59 dB 55 dB 57 dB
Visible part 1.307063 seconds
Total duration 1.307063 seconds

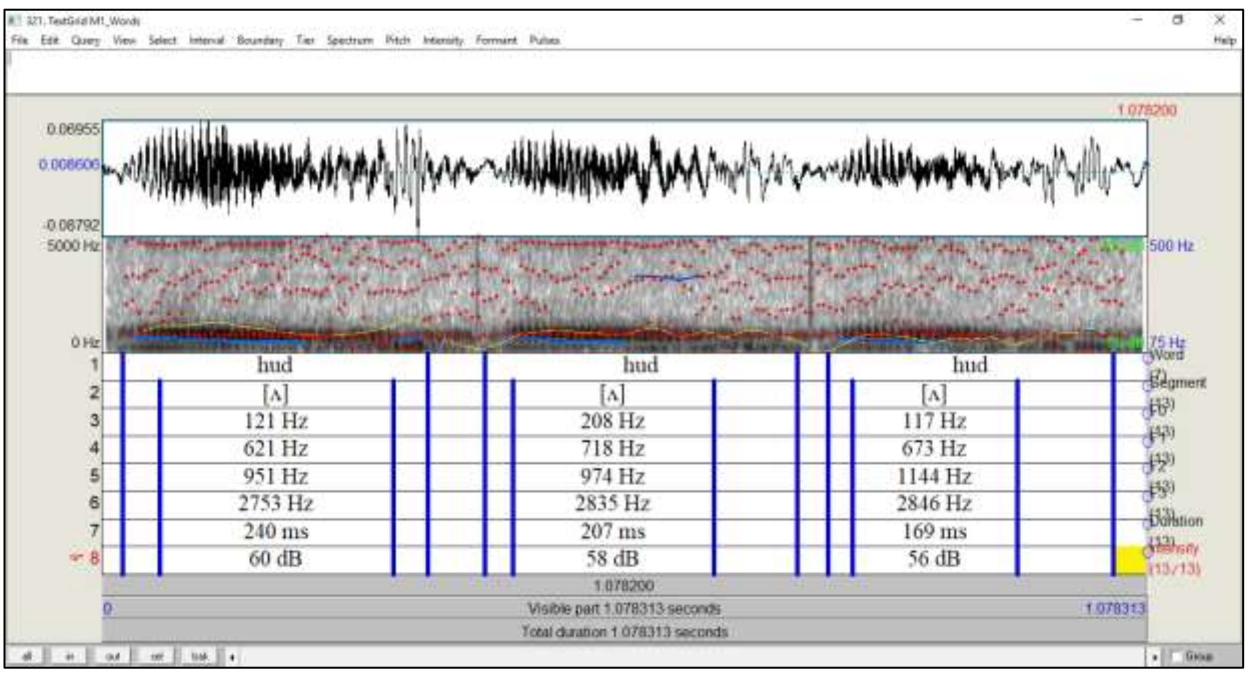

1.241420
0.05505
0.00359
-0.05322
5000 Hz
0 Hz
500 Hz
75 Hz
hod
[ɑ]
120 Hz
450 Hz
975 Hz
2982 Hz
274 ms
57 dB
hod
[ɑ]
120 Hz
382 Hz
872 Hz
2986 Hz
202 ms
58 dB
hod
[ɑ]
127 Hz
414 Hz
858 Hz
3016 Hz
218 ms
58 dB
Word
Segment
F0
F1
F2
F3
Duration
Intensity
(13/13)
1.241420
Visible part 1.242625 seconds
Total duration 1.242625 seconds
0
1.242625


1.212271
0.09241
0.005453
-0.07431
5000 Hz
0 Hz
500 Hz
75 Hz
hawed
[ɔ]
122 Hz
414 Hz
1014 Hz
3016 Hz
261 ms
59 dB
hawed
[ɔ]
122 Hz
390 Hz
888 Hz
2967 Hz
133 ms
58 dB
hawed
[ɔ]
137 Hz
291 Hz
830 Hz
2982 Hz
218 ms
58 dB
Word
Segment
F0
F1
F2
F3
Duration
Intensity
(13/13)
1.212271
Visible part 1.214500 seconds
Total duration 1.214500 seconds
0
1.214500

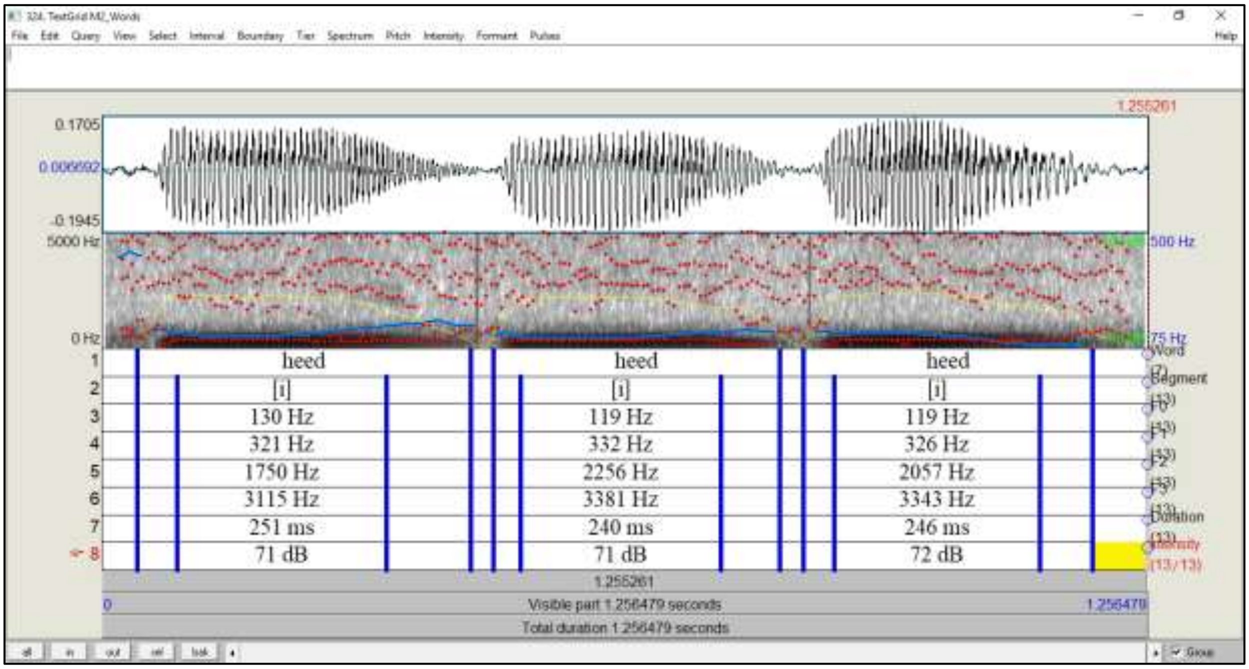

1.405823
0.08487
0.001007
-0.09897
5000 Hz
0 Hz
500 Hz
75 Hz
hoed
hoed
hoed
[o]
[o]
[o]
123 Hz
122 Hz
138 Hz
332 Hz
288 Hz
288 Hz
933 Hz
946 Hz
845 Hz
2907 Hz
2796 Hz
2767 Hz
264 ms
239 ms
229 ms
60 dB
60 dB
62 dB
1.405823
Visible part 1.407188 seconds
1.407188
Total duration 1.407188 seconds

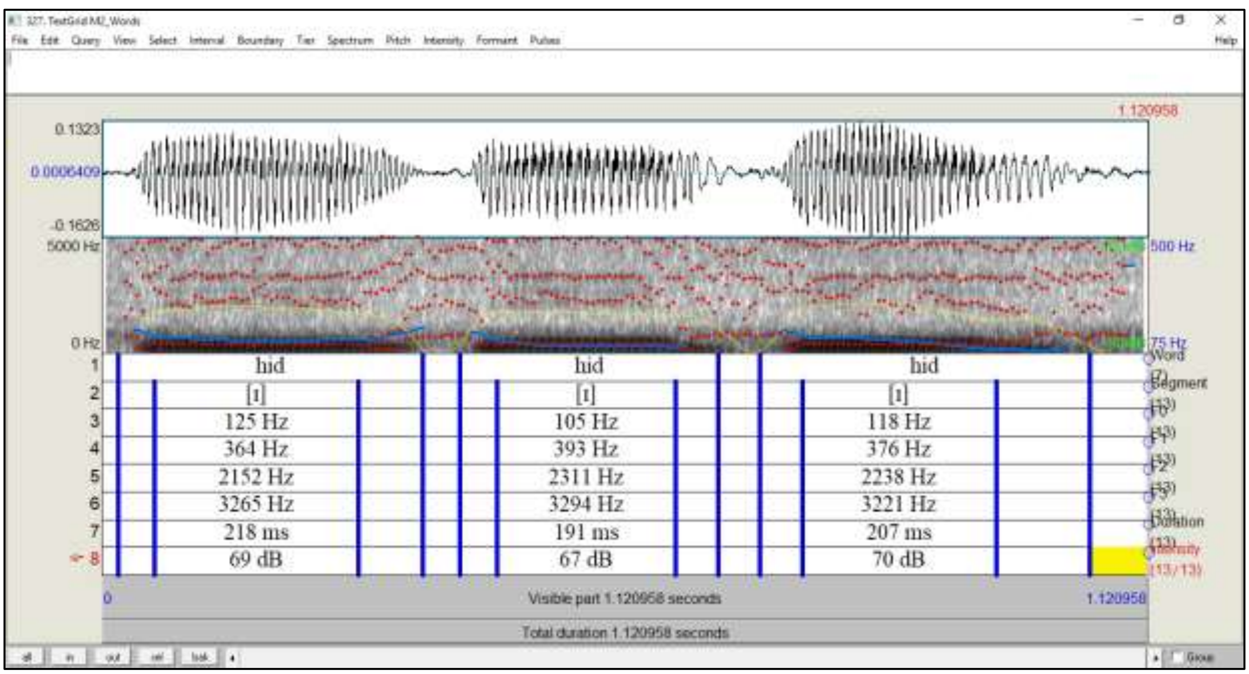

1.313250
0.07028
0.003845
-0.08768
5000 Hz
0 Hz
500 Hz
75 Hz
hood
hood
hood
[ʊ]
[ʊ]
[ʊ]
125 Hz
121 Hz
139 Hz
280 Hz
308 Hz
269 Hz
842 Hz
899 Hz
871 Hz
2658 Hz
2700 Hz
2667 Hz
224 ms
242 ms
193 ms
65 dB
60 dB
63 dB
Visible part 1.313250 seconds
1.313250
Total duration 1.313250 seconds

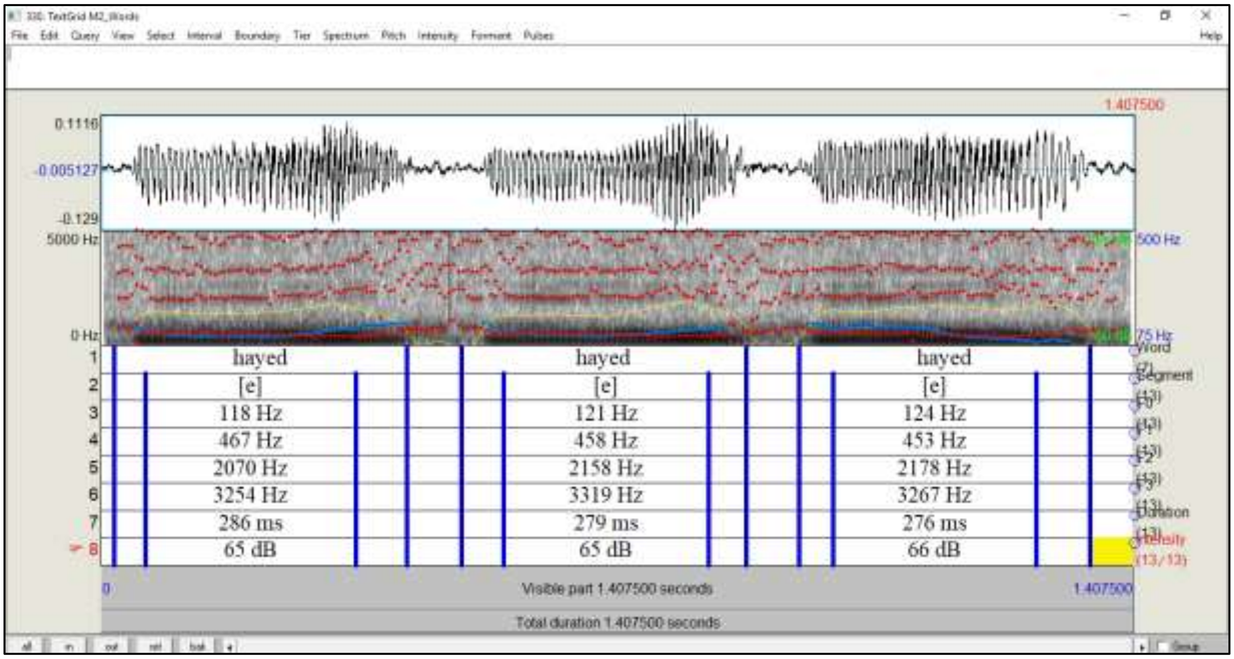

File Edit Query View Select Interval Boundary Tier Spectrum Pitch Intensity Formant Pulses Help
1.361429
0.08331
-0.001217
-0.08743
5000 Hz
0 Hz
500 Hz
75 Hz
who'd
who'd
who'd
[u]
[u]
[u]
125 Hz
122 Hz
138 Hz
279 Hz
281 Hz
266 Hz
837 Hz
889 Hz
856 Hz
2626 Hz
2742 Hz
2672 Hz
267 ms
182 ms
182 ms
65 dB
61 dB
64 dB
Word
Segment
F0
F1
F2
F3
Duration
Intensity
(13/13)
1.361429
Visible part 1.362750 seconds
1.362750
Total duration 1.362750 seconds

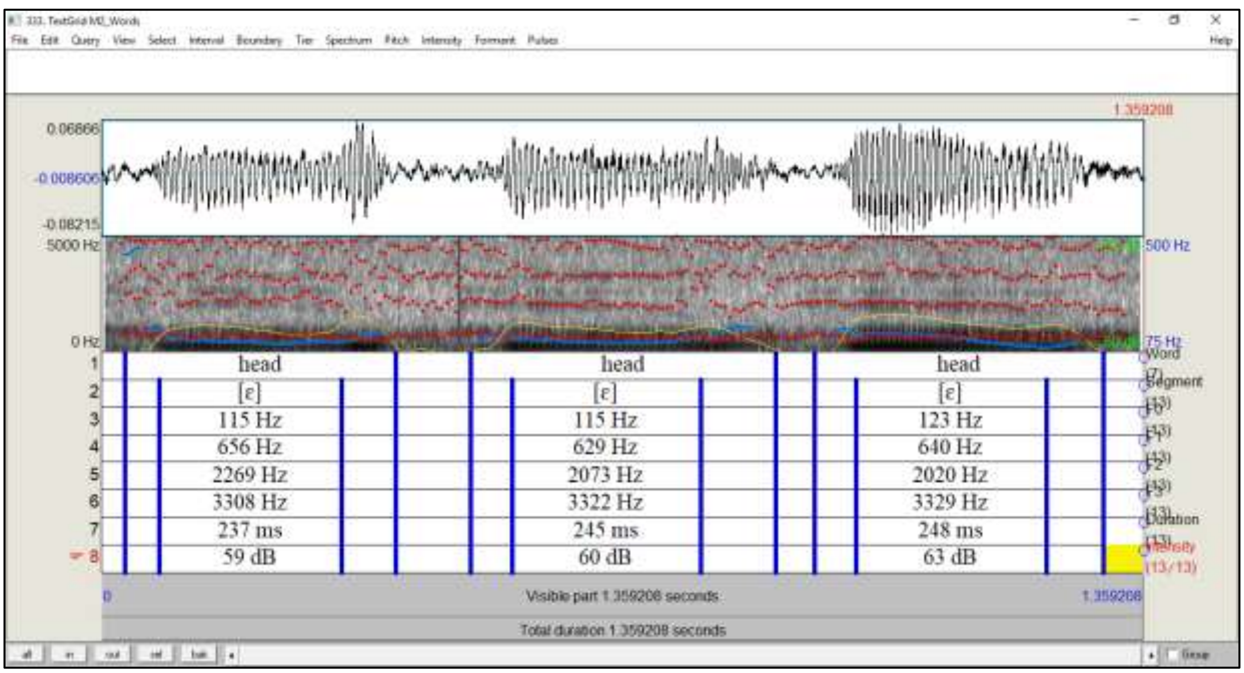

File Edit Query View Select Interval Boundary Tier Spectrum Pitch Intensity Formant Pulses Help
1.078200
0.06955
0.008606
-0.06792
5000 Hz
0 Hz
500 Hz
75 Hz
hud
hud
hud
[ʌ]
[ʌ]
[ʌ]
121 Hz
208 Hz
117 Hz
621 Hz
718 Hz
673 Hz
951 Hz
974 Hz
1144 Hz
2753 Hz
2835 Hz
2846 Hz
240 ms
207 ms
169 ms
60 dB
58 dB
56 dB
Word
Segment
F0
F1
F2
F3
Duration
Intensity
(13/13)
1.078200
Visible part 1.078313 seconds
1.078313
Total duration 1.078313 seconds

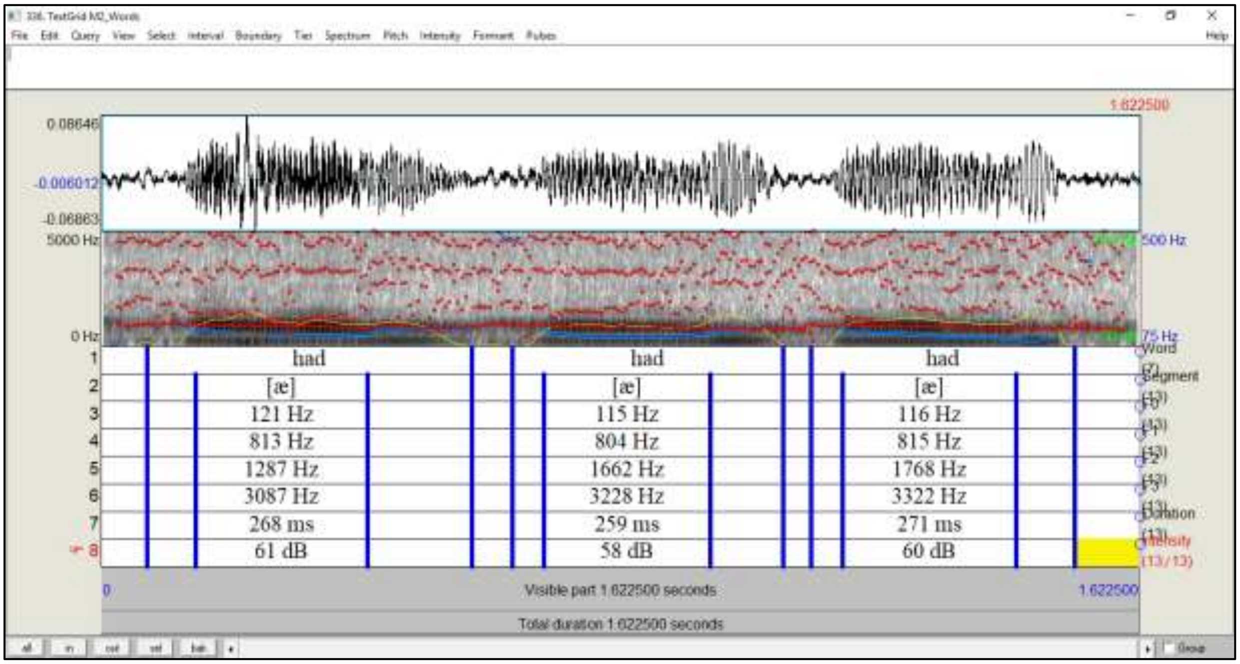
M2

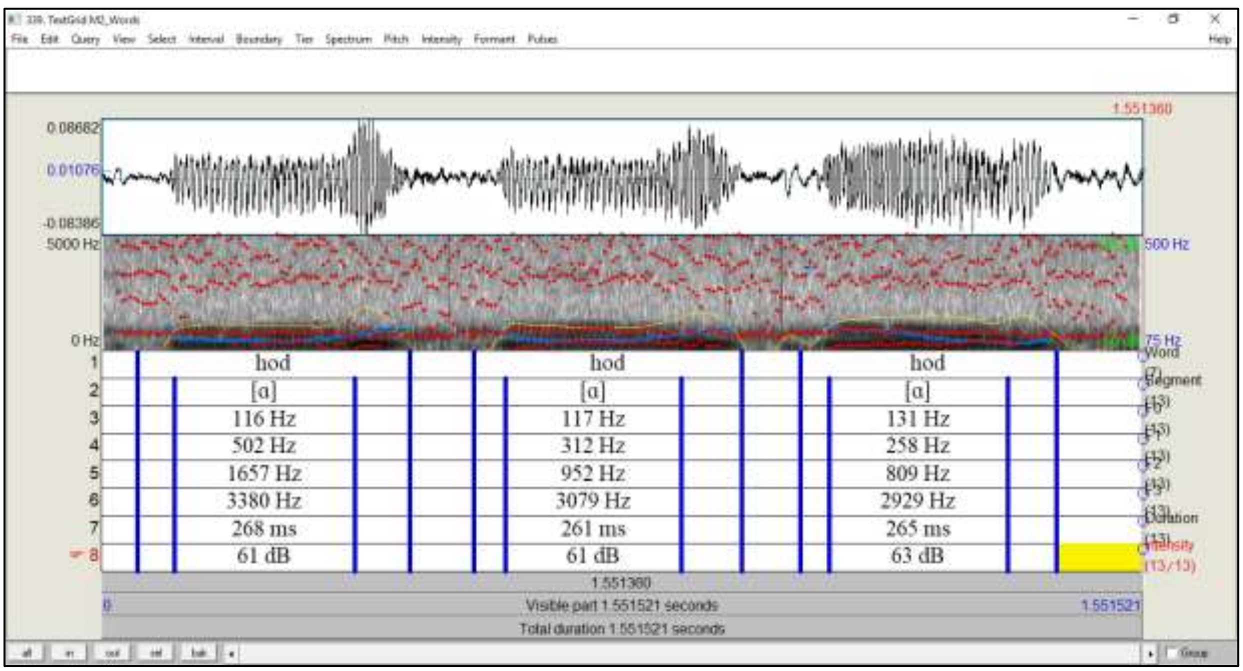

heed
heed
heed
[ɪ]
[ɪ]
[ɪ]
130 Hz
119 Hz
119 Hz
321 Hz
332 Hz
326 Hz
1750 Hz
2256 Hz
2057 Hz
3115 Hz
3381 Hz
3343 Hz
251 ms
240 ms
246 ms
71 dB
71 dB
72 dB

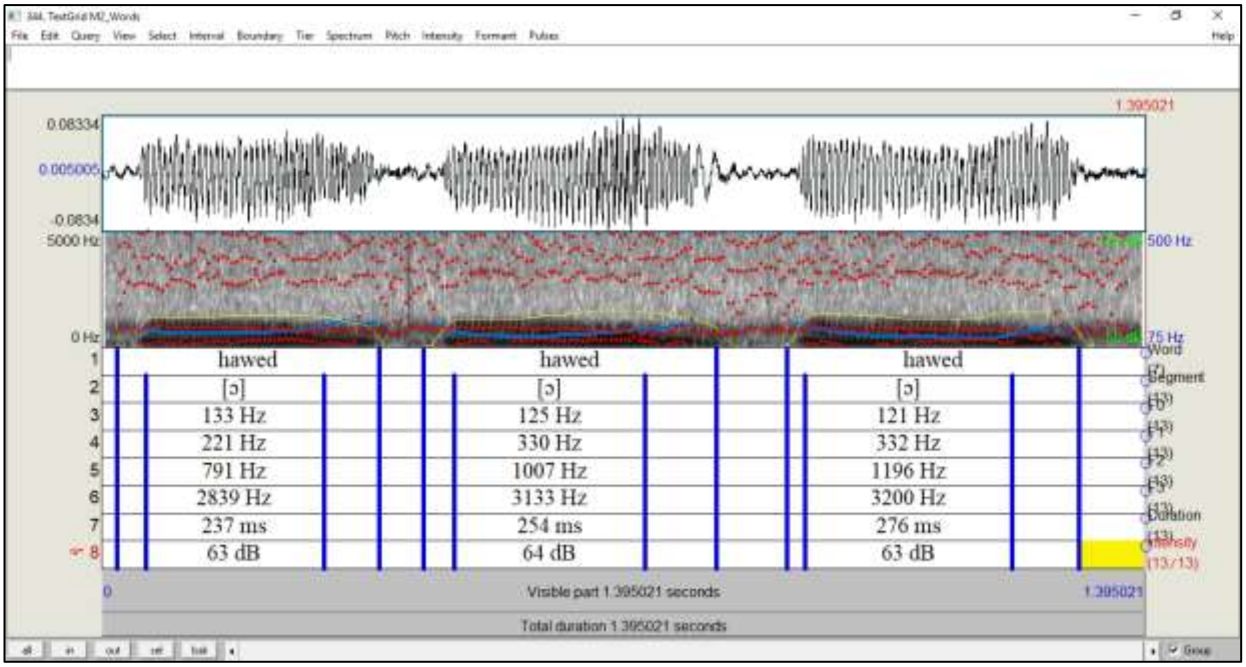

hid
hid
hid
[ɪ]
[ɪ]
[ɪ]
125 Hz
105 Hz
118 Hz
364 Hz
393 Hz
376 Hz
2152 Hz
2311 Hz
2238 Hz
3265 Hz
3294 Hz
3221 Hz
218 ms
191 ms
207 ms
69 dB
67 dB
70 dB


hayed
[e]
118 Hz
467 Hz
2070 Hz
3254 Hz
286 ms
65 dB
hayed
[e]
121 Hz
458 Hz
2158 Hz
3319 Hz
279 ms
65 dB
hayed
[e]
124 Hz
453 Hz
2178 Hz
3267 Hz
276 ms
66 dB
Visible part 1.407500 seconds
Total duration 1.407500 seconds

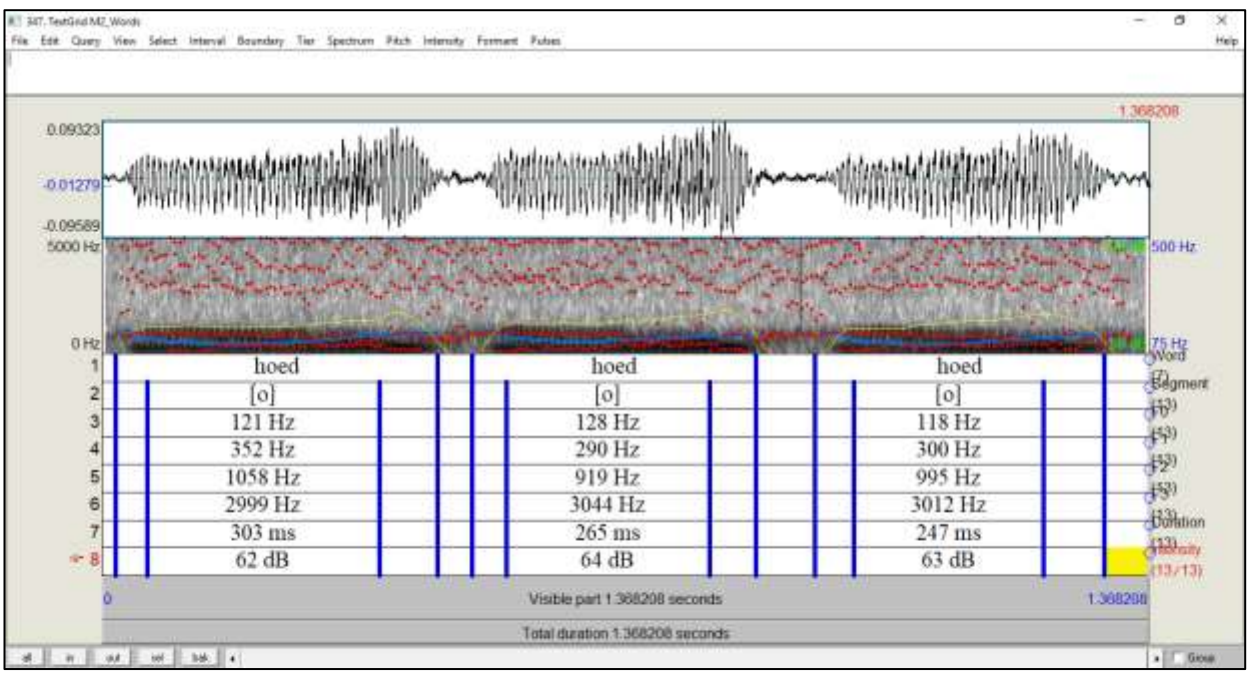

head
[ɛ]
115 Hz
656 Hz
2269 Hz
3308 Hz
237 ms
59 dB
head
[ɛ]
115 Hz
629 Hz
2073 Hz
3322 Hz
245 ms
60 dB
head
[ɛ]
123 Hz
640 Hz
2020 Hz
3329 Hz
248 ms
63 dB
Visible part 1.359208 seconds
Total duration 1.359208 seconds


1.622500
0.08646
-0.006012
-0.06863
5000 Hz
0 Hz
500 Hz
75 Hz
had
had
had
[æ]
[æ]
[æ]
121 Hz
115 Hz
116 Hz
813 Hz
804 Hz
815 Hz
1287 Hz
1662 Hz
1768 Hz
3087 Hz
3228 Hz
3322 Hz
268 ms
259 ms
271 ms
61 dB
58 dB
60 dB
Word
Segment
Duration
Intensity
(13/13)
Visible part 1.622500 seconds
Total duration 1.622500 seconds

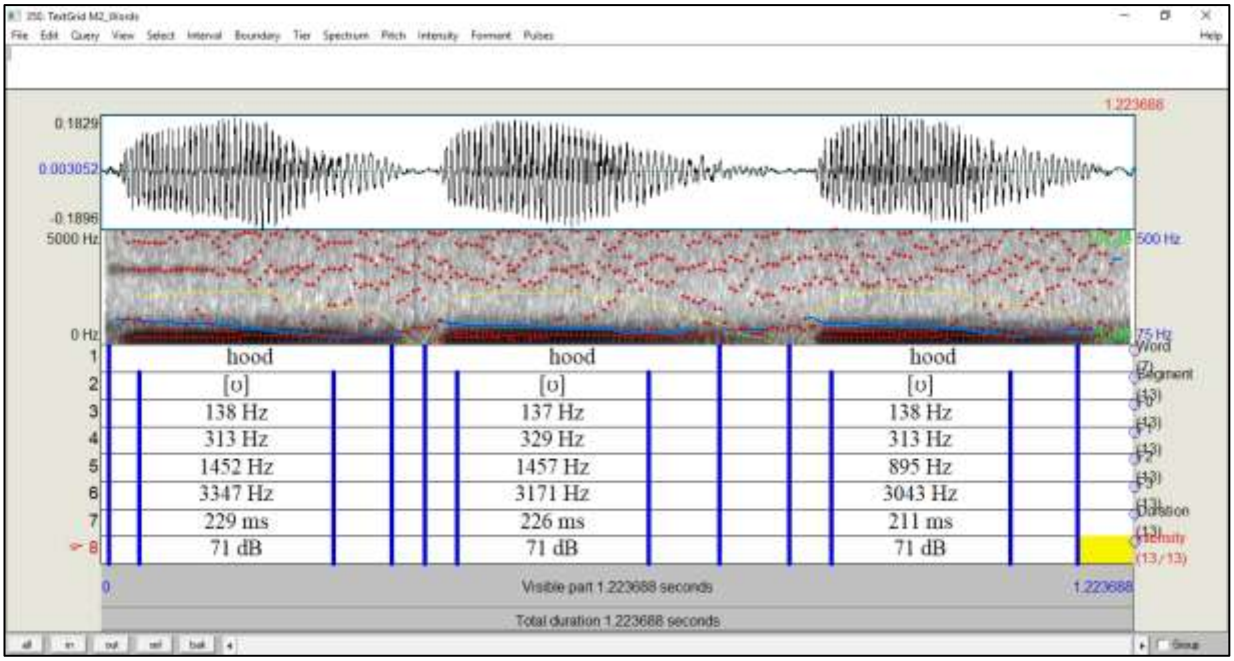

1.551360
0.08682
0.01076
-0.08386
5000 Hz
0 Hz
500 Hz
75 Hz
hod
hod
hod
[ɑ]
[ɑ]
[ɑ]
116 Hz
117 Hz
131 Hz
502 Hz
312 Hz
258 Hz
1657 Hz
952 Hz
809 Hz
3380 Hz
3079 Hz
2929 Hz
268 ms
261 ms
265 ms
61 dB
61 dB
63 dB
Word
Segment
Duration
Intensity
(13/13)
1.551360
Visible part 1.551521 seconds
Total duration 1.551521 seconds

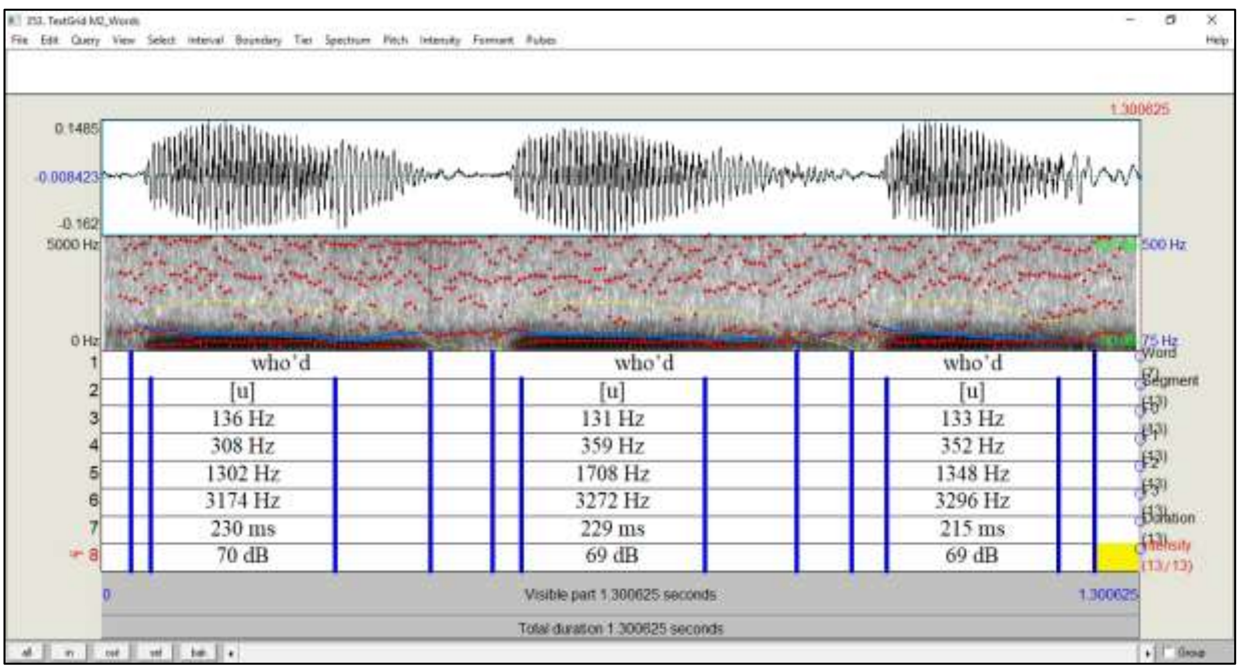


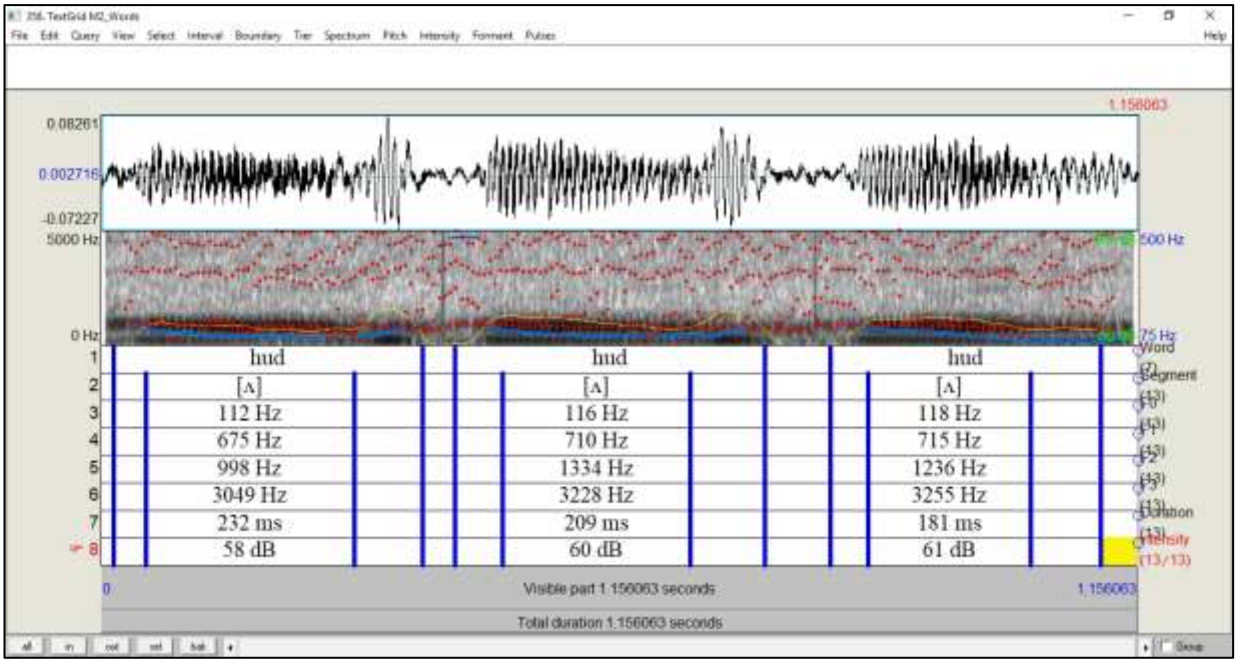
hawed
[ɔ]
133 Hz
221 Hz
791 Hz
2839 Hz
237 ms
63 dB
hawed
[ɔ]
125 Hz
330 Hz
1007 Hz
3133 Hz
254 ms
64 dB
hawed
[ɔ]
121 Hz
332 Hz
1196 Hz
3200 Hz
276 ms
63 dB



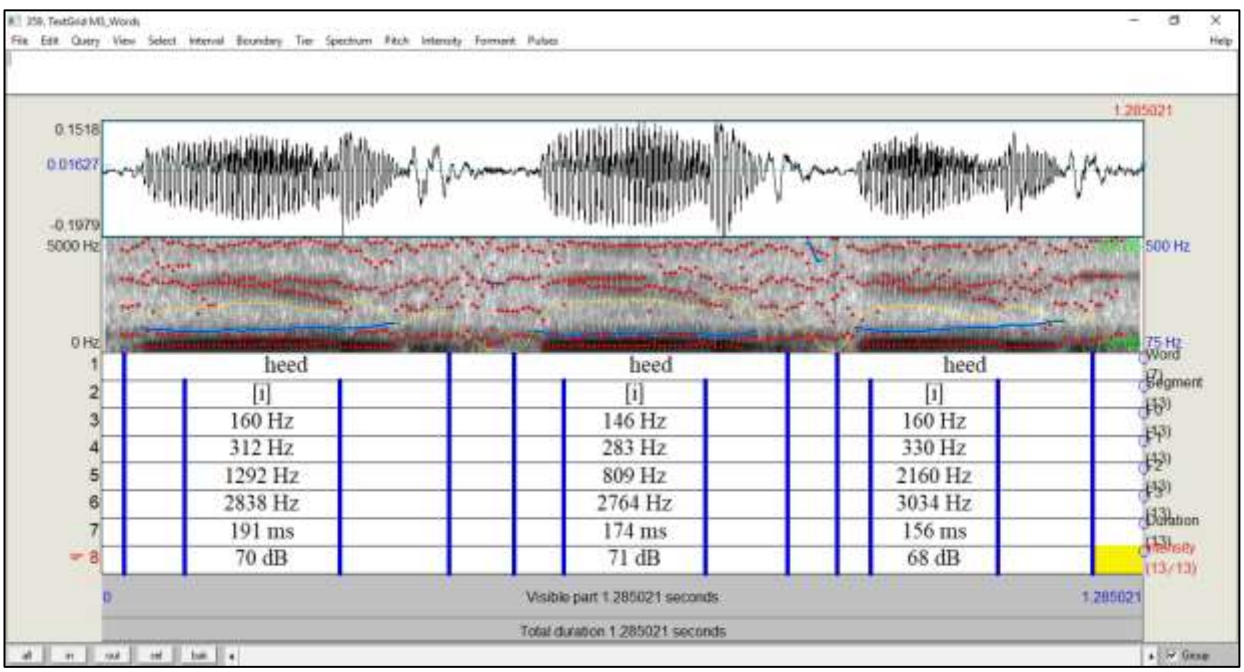
hoed
[o]
121 Hz
352 Hz
1058 Hz
2999 Hz
303 ms
62 dB
hoed
[o]
128 Hz
290 Hz
919 Hz
3044 Hz
265 ms
64 dB
hoed
[o]
118 Hz
300 Hz
995 Hz
3012 Hz
247 ms
63 dB

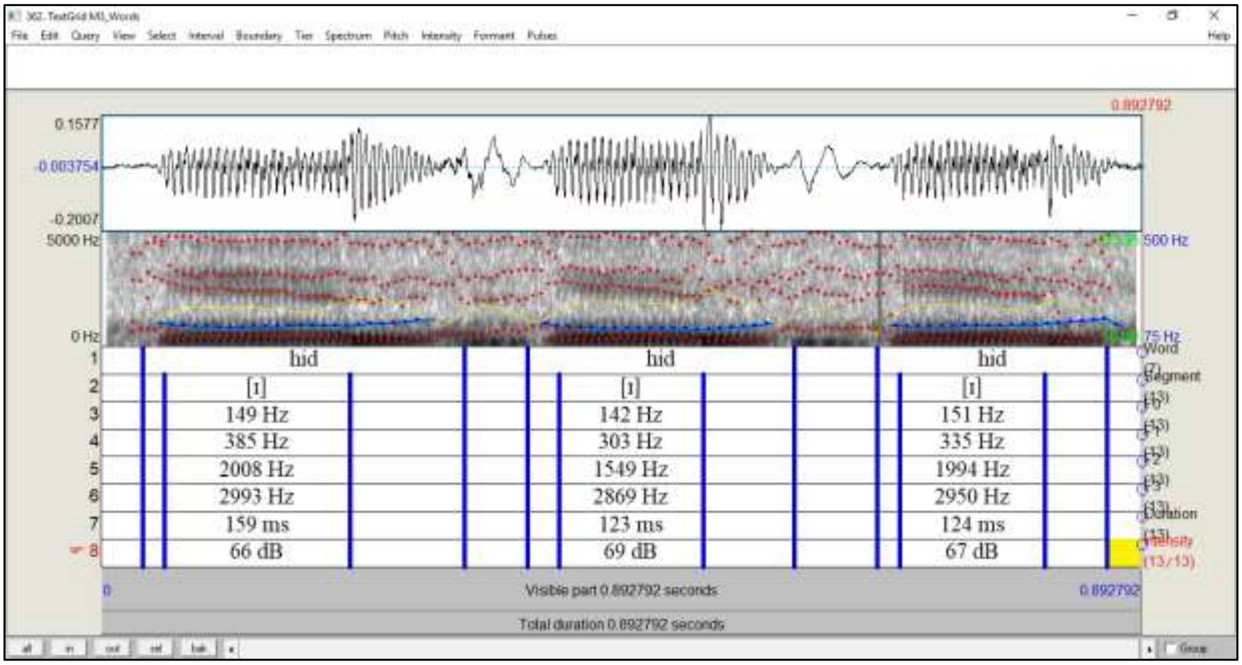

hood
[ʊ]
138 Hz
313 Hz
1452 Hz
3347 Hz
229 ms
71 dB
hood
[ʊ]
137 Hz
329 Hz
1457 Hz
3171 Hz
226 ms
71 dB
hood
[ʊ]
138 Hz
313 Hz
895 Hz
3043 Hz
211 ms
71 dB
Visible part 1.223688 seconds
Total duration 1.223688 seconds

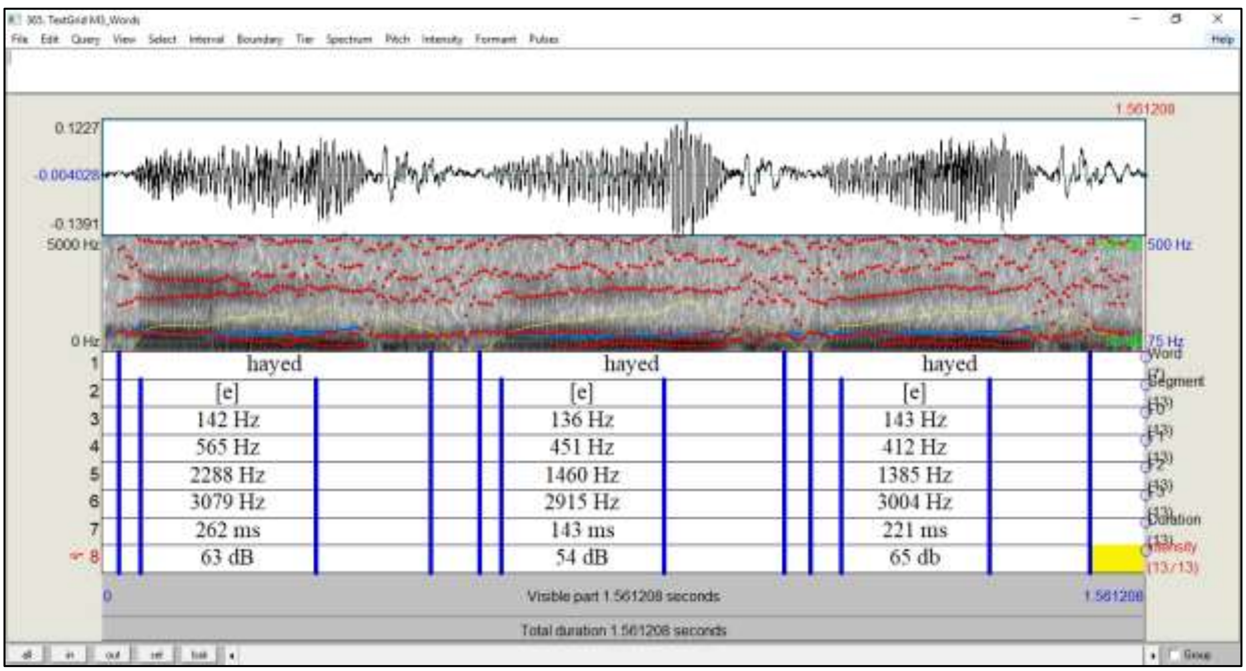

who'd
[u]
136 Hz
308 Hz
1302 Hz
3174 Hz
230 ms
70 dB
who'd
[u]
131 Hz
359 Hz
1708 Hz
3272 Hz
229 ms
69 dB
who'd
[u]
133 Hz
352 Hz
1348 Hz
3296 Hz
215 ms
69 dB
Visible part 1.300625 seconds
Total duration 1.300625 seconds

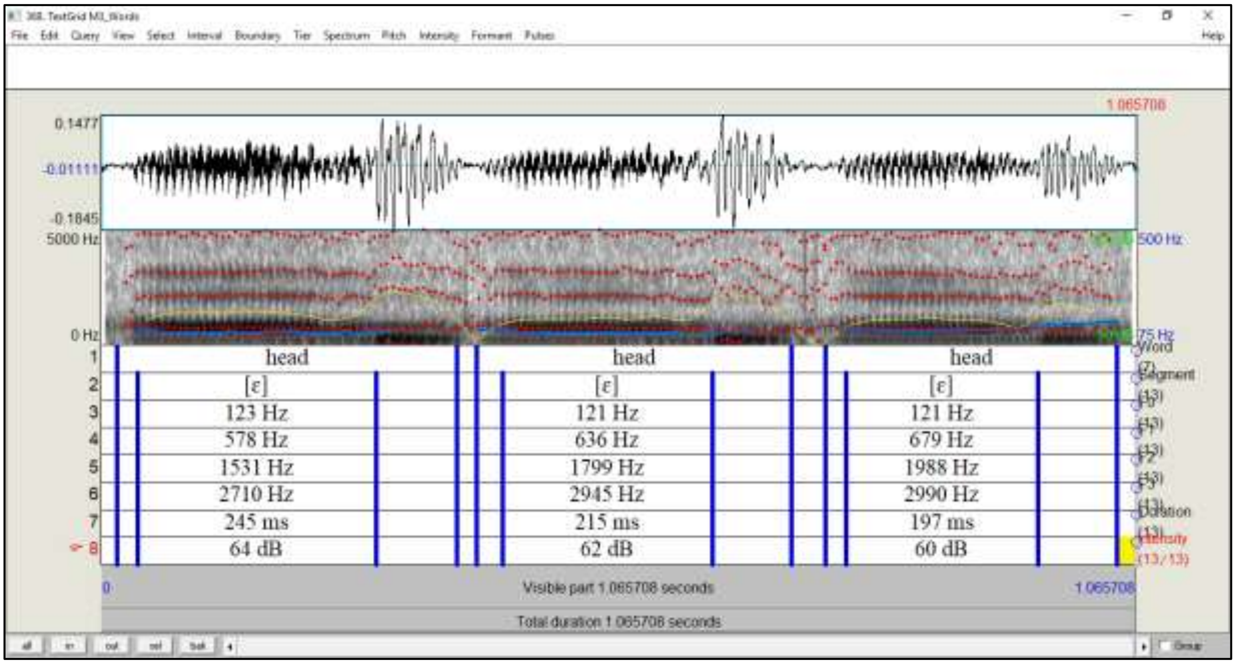

hud
[ʌ]
112 Hz
675 Hz
998 Hz
3049 Hz
232 ms
58 dB
hud
[ʌ]
116 Hz
710 Hz
1334 Hz
3228 Hz
209 ms
60 dB
hud
[ʌ]
118 Hz
715 Hz
1236 Hz
3255 Hz
181 ms
61 dB
Visible part 1.156063 seconds
Total duration 1.156063 seconds

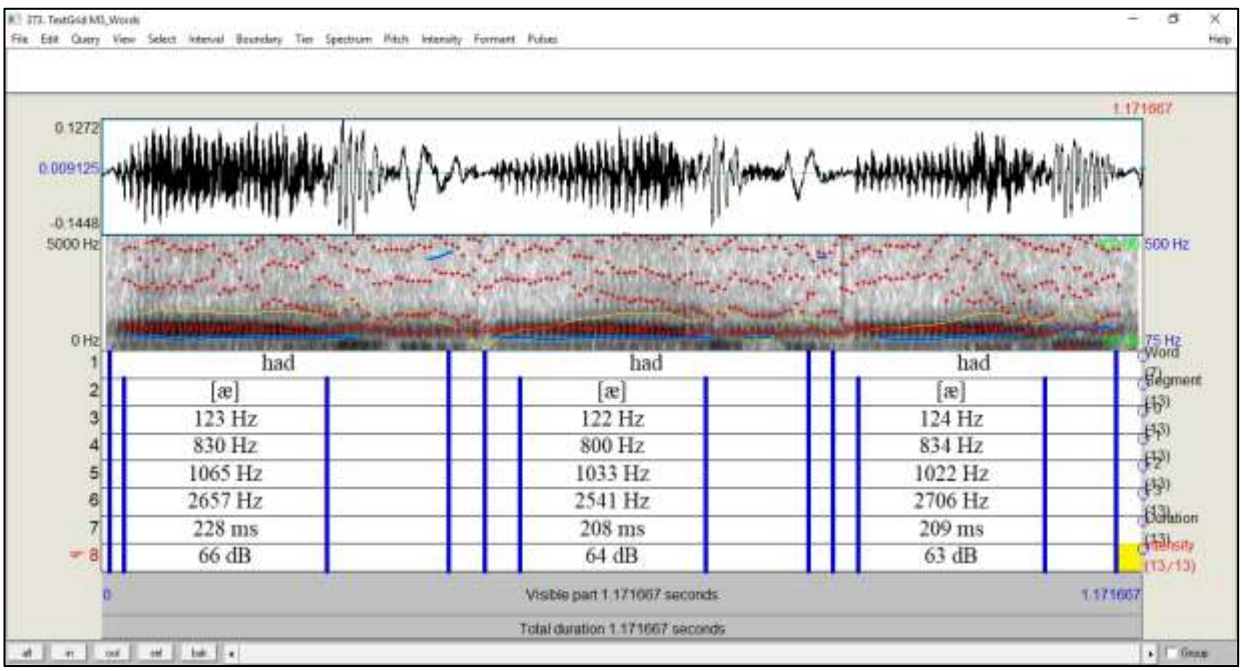
M3

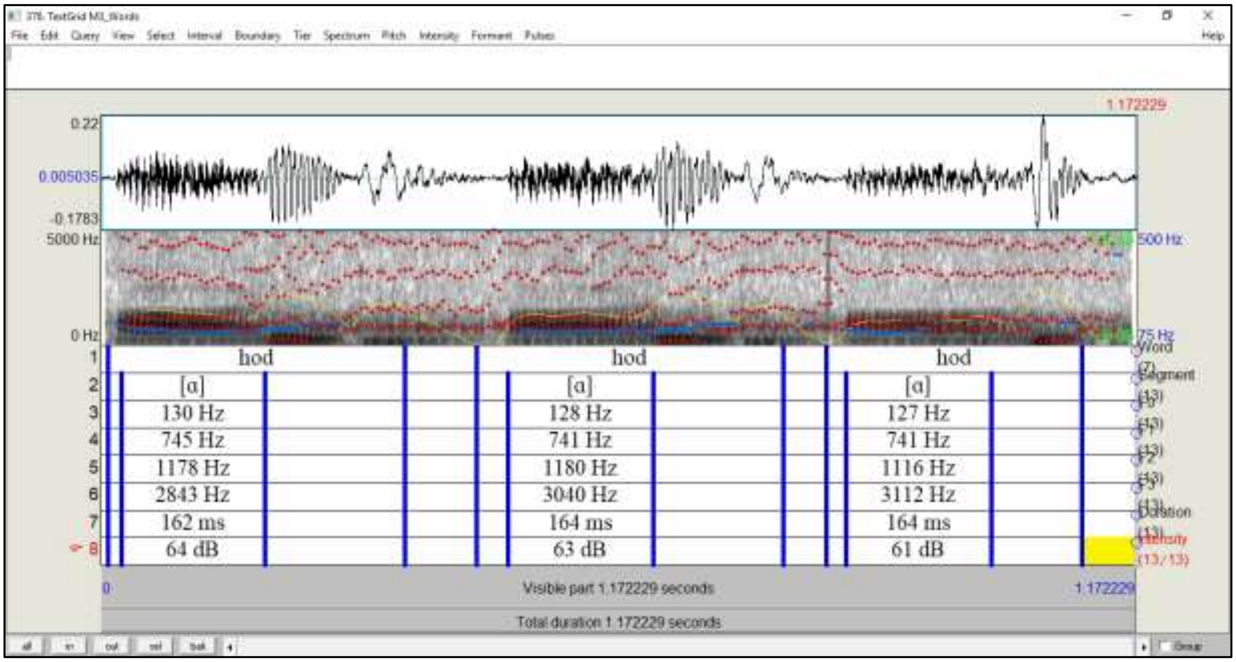

heed
[i]
160 Hz
312 Hz
1292 Hz
2838 Hz
191 ms
70 dB
heed
[i]
146 Hz
283 Hz
809 Hz
2764 Hz
174 ms
71 dB
heed
[i]
160 Hz
330 Hz
2160 Hz
3034 Hz
156 ms
68 dB
Visible part 1.285021 seconds
Total duration 1.285021 seconds

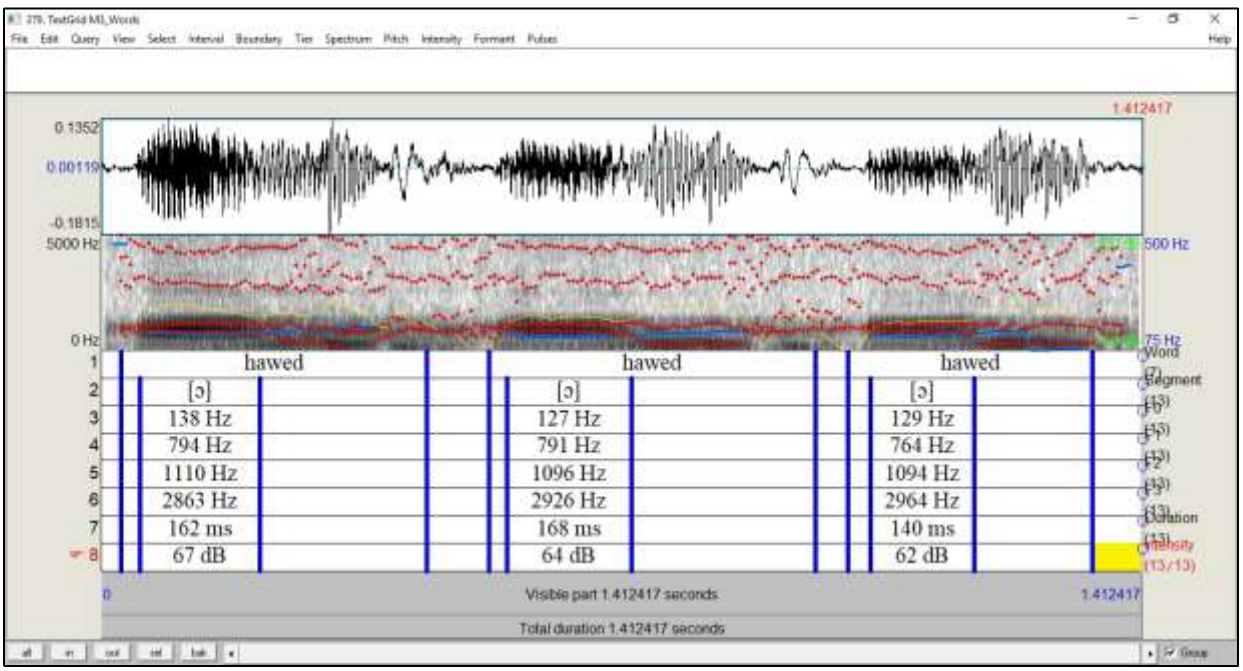

0.892792
0.1577
-0.003754
-0.2007
5000 Hz
0 Hz
500 Hz
75 Hz
hid
[ɪ]
149 Hz
385 Hz
2008 Hz
2993 Hz
159 ms
66 dB
hid
[ɪ]
142 Hz
303 Hz
1549 Hz
2869 Hz
123 ms
69 dB
hid
[ɪ]
151 Hz
335 Hz
1994 Hz
2950 Hz
124 ms
67 dB
Visible part 0.892792 seconds
Total duration 0.892792 seconds

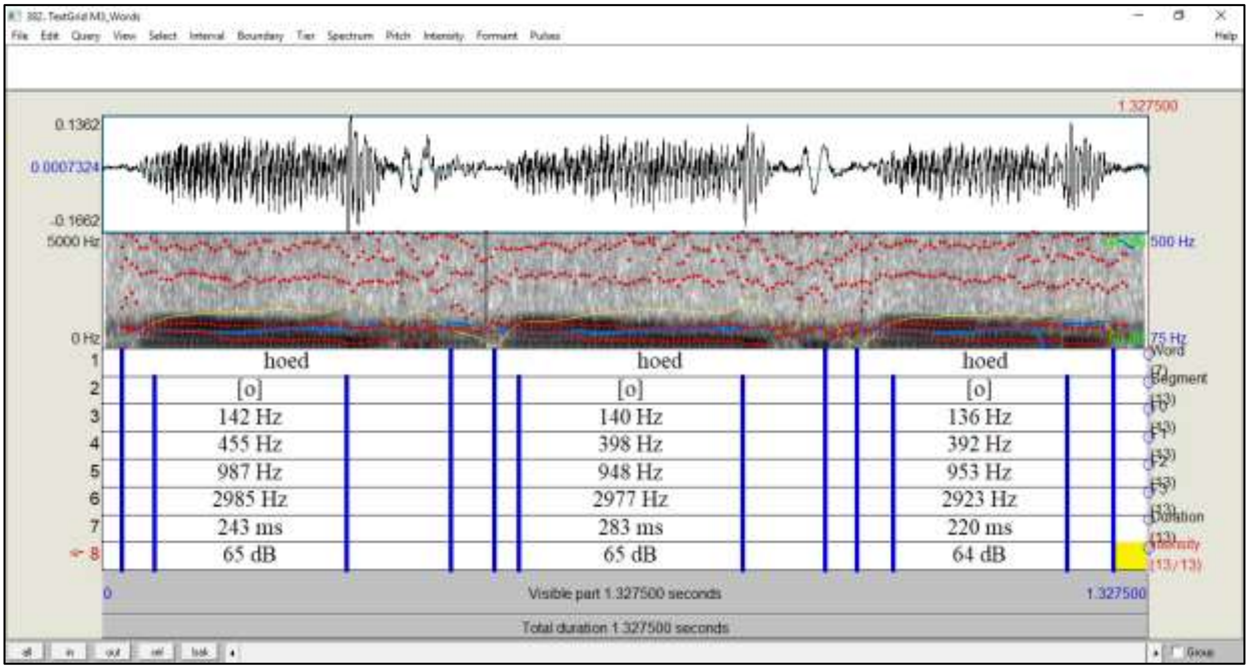

1.561208
0.1227
-0.004028
-0.1391
5000 Hz
0 Hz
500 Hz
75 Hz
hayed
[e]
142 Hz
565 Hz
2288 Hz
3079 Hz
262 ms
63 dB
hayed
[e]
136 Hz
451 Hz
1460 Hz
2915 Hz
143 ms
54 dB
hayed
[e]
143 Hz
412 Hz
1385 Hz
3004 Hz
221 ms
65 db
Visible part 1.561208 seconds
Total duration 1.561208 seconds

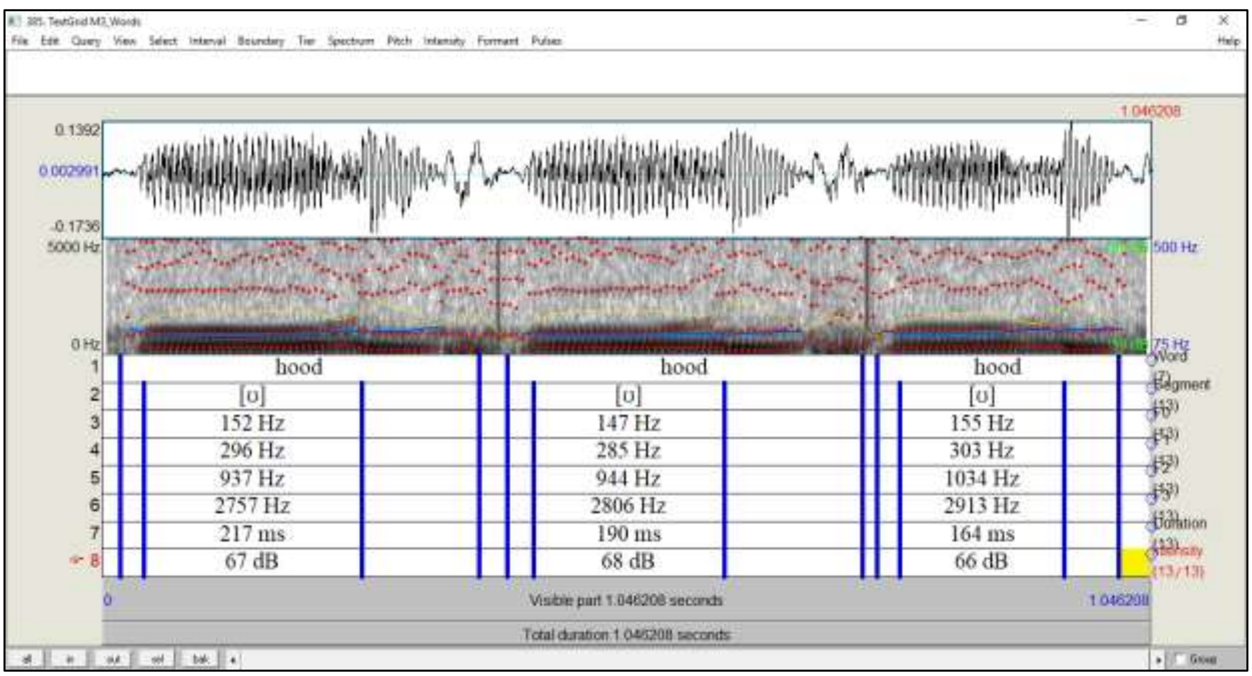

1.065708
0.1477
-0.01111
-0.1845
5000 Hz
0 Hz
500 Hz
75 Hz
head
head
head
[ɛ]
[ɛ]
[ɛ]
123 Hz
121 Hz
121 Hz
578 Hz
636 Hz
679 Hz
1531 Hz
1799 Hz
1988 Hz
2710 Hz
2945 Hz
2990 Hz
245 ms
215 ms
197 ms
64 dB
62 dB
60 dB
Visible part 1.065708 seconds
Total duration 1.065708 seconds

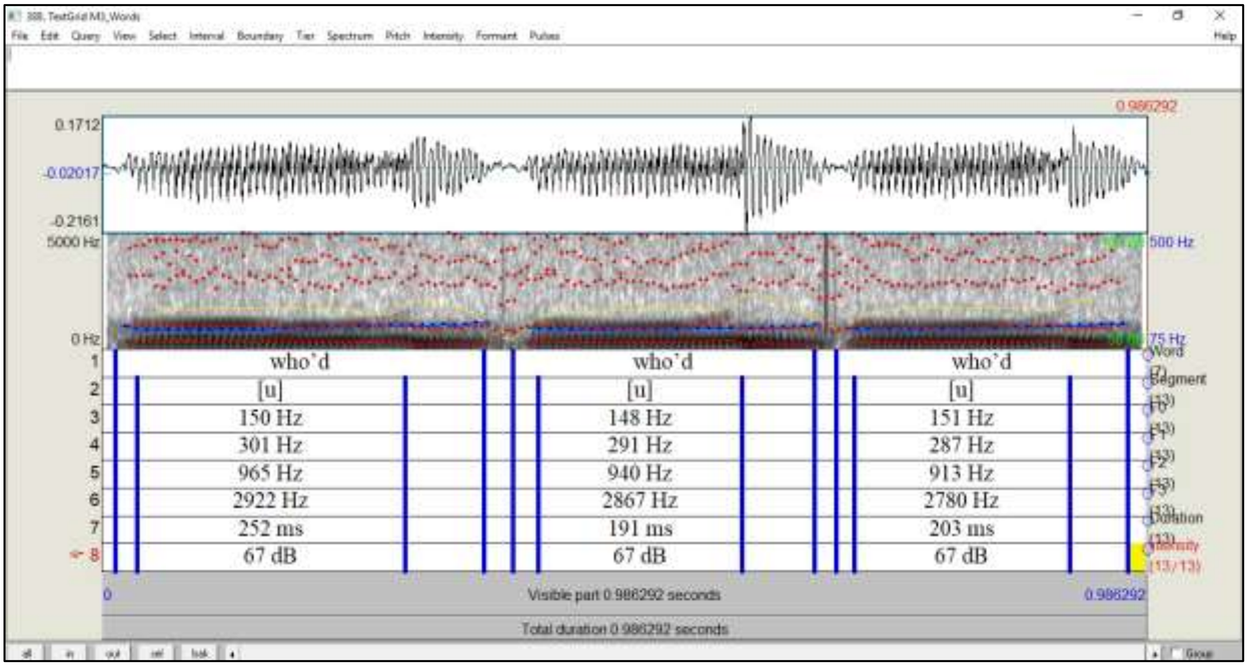

1.171667
0.1272
0.009125
-0.1448
5000 Hz
0 Hz
500 Hz
75 Hz
had
had
had
[æ]
[æ]
[æ]
123 Hz
122 Hz
124 Hz
830 Hz
800 Hz
834 Hz
1065 Hz
1033 Hz
1022 Hz
2657 Hz
2541 Hz
2706 Hz
228 ms
208 ms
209 ms
66 dB
64 dB
63 dB
Visible part 1.171667 seconds
Total duration 1.171667 seconds

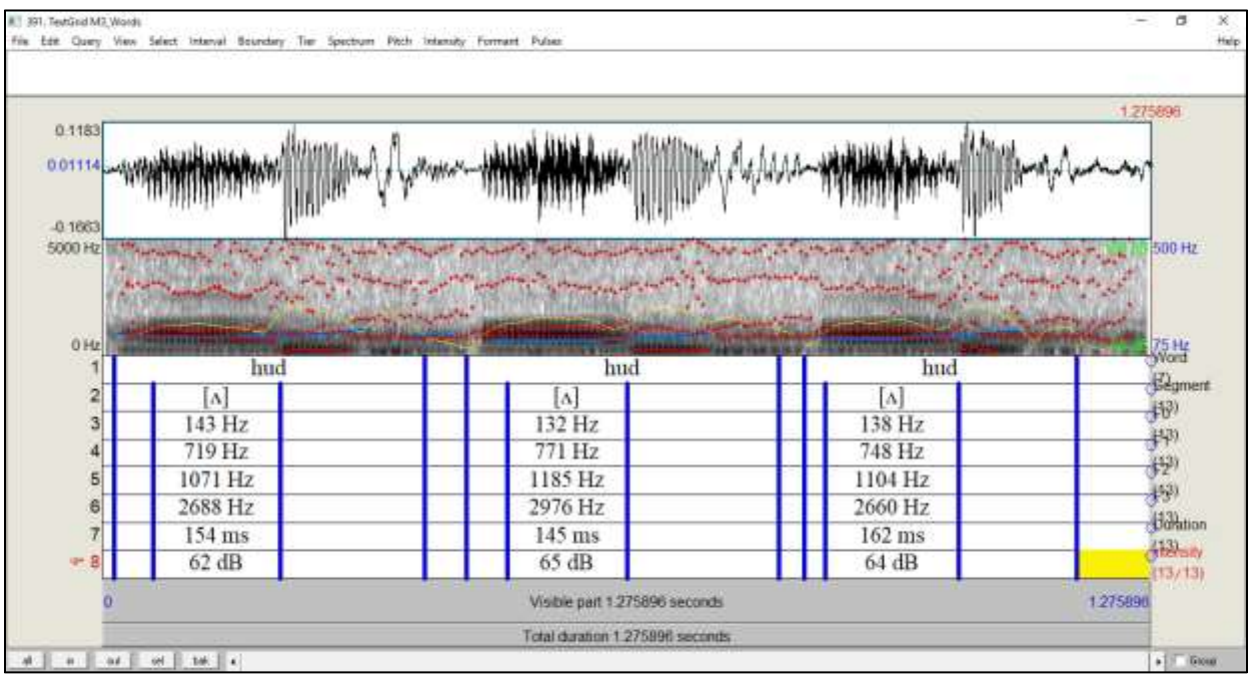

hod
[ɑ]
130 Hz
745 Hz
1178 Hz
2843 Hz
162 ms
64 dB
hod
[ɑ]
128 Hz
741 Hz
1180 Hz
3040 Hz
164 ms
63 dB
hod
[ɑ]
127 Hz
741 Hz
1116 Hz
3112 Hz
164 ms
61 dB
Visible part 1.172229 seconds
Total duration 1.172229 seconds


hawed
[ɔ]
138 Hz
794 Hz
1110 Hz
2863 Hz
162 ms
67 dB
hawed
[ɔ]
127 Hz
791 Hz
1096 Hz
2926 Hz
168 ms
64 dB
hawed
[ɔ]
129 Hz
764 Hz
1094 Hz
2964 Hz
140 ms
62 dB
Visible part 1.412417 seconds
Total duration 1.412417 seconds

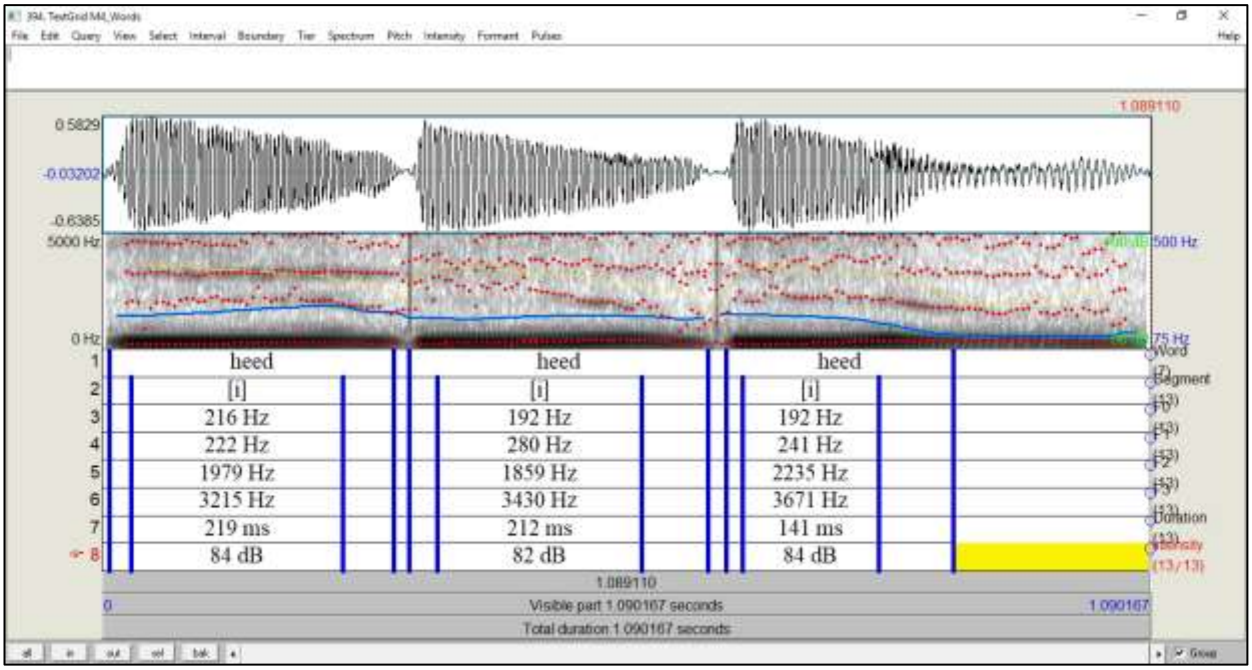

hoed
[o]
142 Hz
455 Hz
987 Hz
2985 Hz
243 ms
65 dB
hoed
[o]
140 Hz
398 Hz
948 Hz
2977 Hz
283 ms
65 dB
hoed
[o]
136 Hz
392 Hz
953 Hz
2923 Hz
220 ms
64 dB


hood
[ʊ]
152 Hz
296 Hz
937 Hz
2757 Hz
217 ms
67 dB
hood
[ʊ]
147 Hz
285 Hz
944 Hz
2806 Hz
190 ms
68 dB
hood
[ʊ]
155 Hz
303 Hz
1034 Hz
2913 Hz
164 ms
66 dB

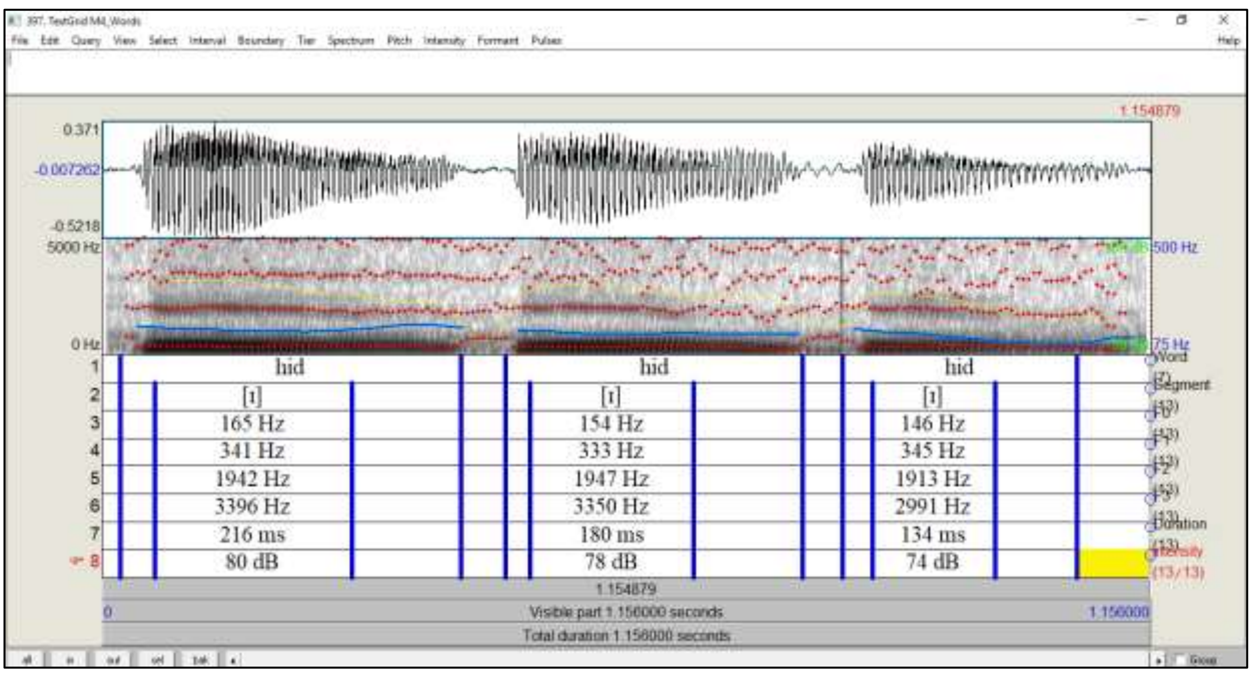

who'd
[u]
150 Hz
301 Hz
965 Hz
2922 Hz
252 ms
67 dB
who'd
[u]
148 Hz
291 Hz
940 Hz
2867 Hz
191 ms
67 dB
who'd
[u]
151 Hz
287 Hz
913 Hz
2780 Hz
203 ms
67 dB
Visible part 0.986292 seconds
Total duration 0.986292 seconds


hud
[ʌ]
143 Hz
719 Hz
1071 Hz
2688 Hz
154 ms
62 dB
hud
[ʌ]
132 Hz
771 Hz
1185 Hz
2976 Hz
145 ms
65 dB
hud
[ʌ]
138 Hz
748 Hz
1104 Hz
2660 Hz
162 ms
64 dB
Visible part 1.275896 seconds
Total duration 1.275896 seconds

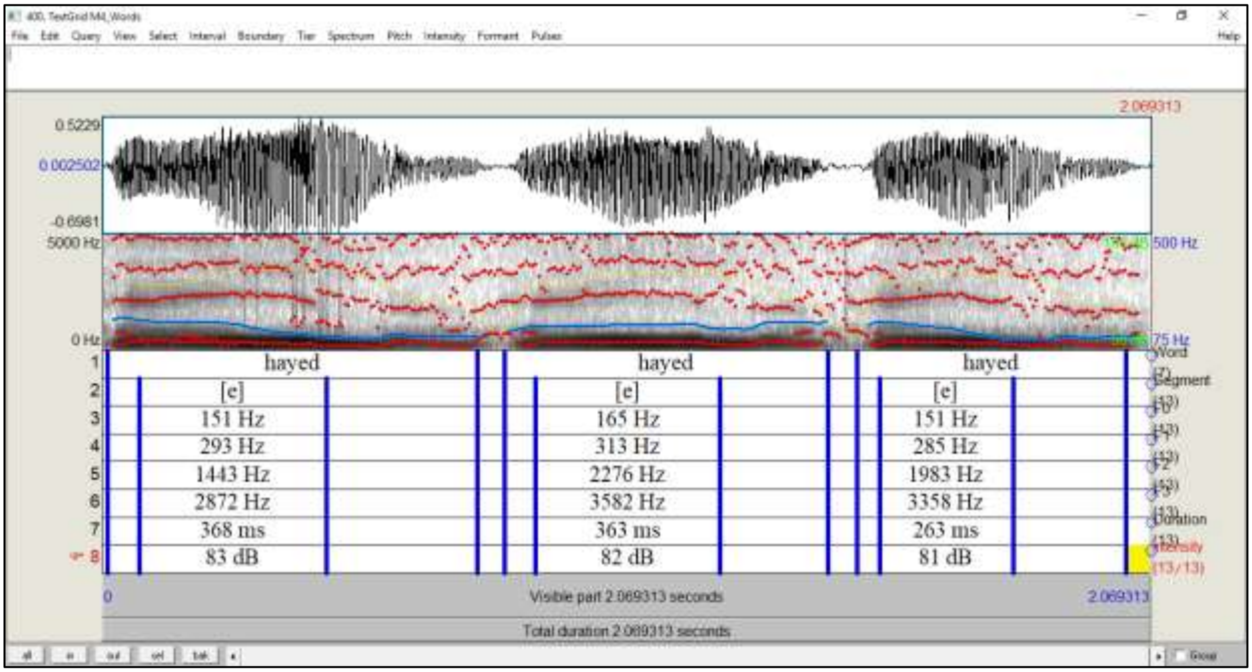
M4



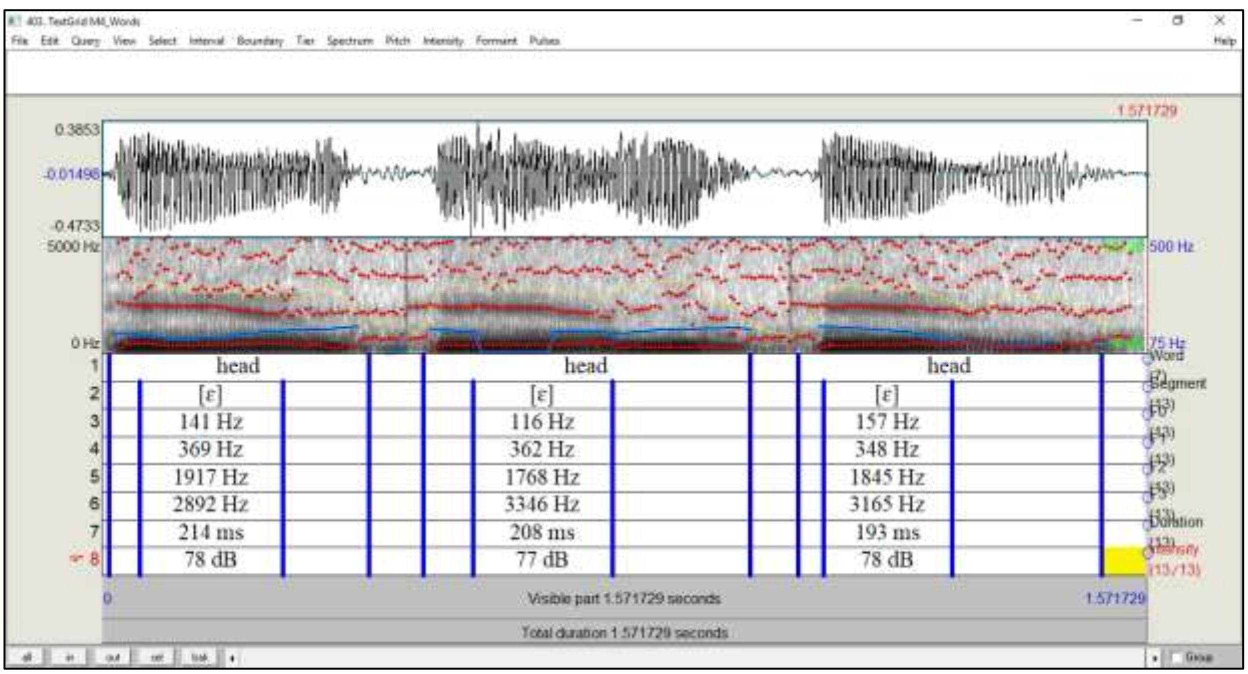
0.5829
-0.03202
-0.6385
5000 Hz
0 Hz
500 Hz
75 Hz
1.089110
heed
heed
heed
[i]
[i]
[i]
216 Hz
192 Hz
192 Hz
222 Hz
280 Hz
241 Hz
1979 Hz
1859 Hz
2235 Hz
3215 Hz
3430 Hz
3671 Hz
219 ms
212 ms
141 ms
84 dB
82 dB
84 dB
Word
Segment
F0
F1
F2
F3
Duration
Intensity
(13/13)
1.089110
0
Visible part 1.090167 seconds
1.090167
Total duration 1.090167 seconds



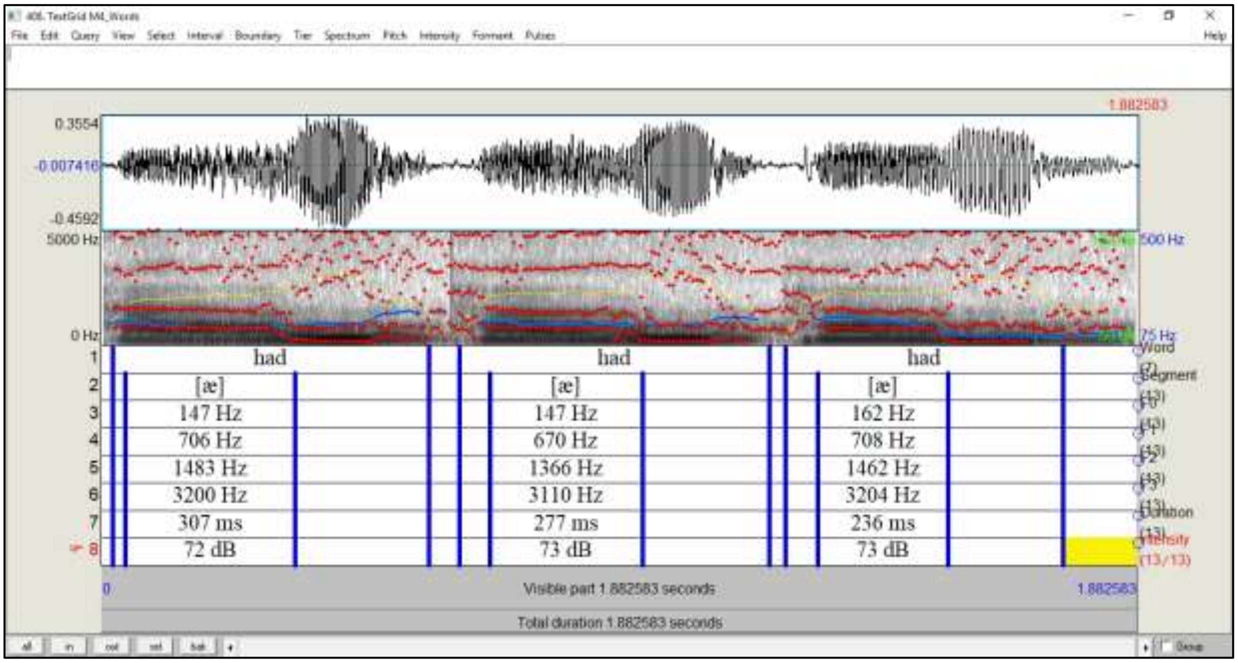
0.371
-0.007262
-0.5218
5000 Hz
0 Hz
500 Hz
75 Hz
1.154879
hid
hid
hid
[ɪ]
[ɪ]
[ɪ]
165 Hz
154 Hz
146 Hz
341 Hz
333 Hz
345 Hz
1942 Hz
1947 Hz
1913 Hz
3396 Hz
3350 Hz
2991 Hz
216 ms
180 ms
134 ms
80 dB
78 dB
74 dB
Word
Segment
F0
F1
F2
F3
Duration
Intensity
(13/13)
1.154879
0
Visible part 1.156000 seconds
1.156000
Total duration 1.156000 seconds



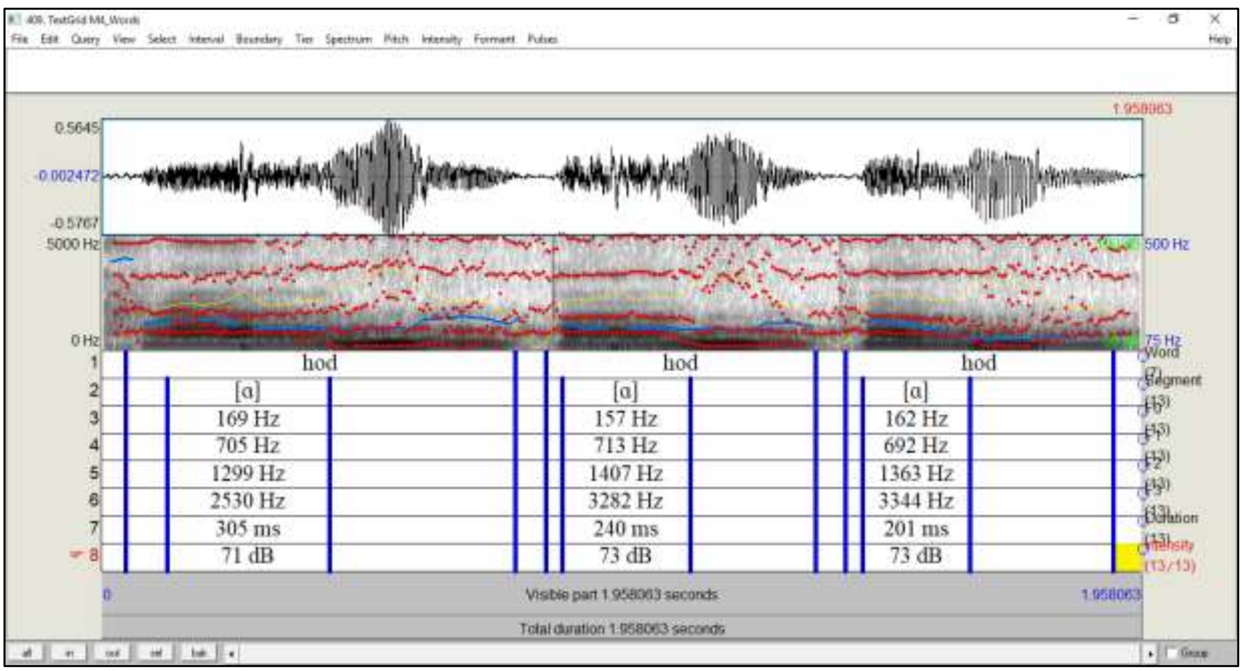
hayed
[e]
151 Hz
293 Hz
1443 Hz
2872 Hz
368 ms
83 dB
hayed
[e]
165 Hz
313 Hz
2276 Hz
3582 Hz
363 ms
82 dB
hayed
[e]
151 Hz
285 Hz
1983 Hz
3358 Hz
263 ms
81 dB



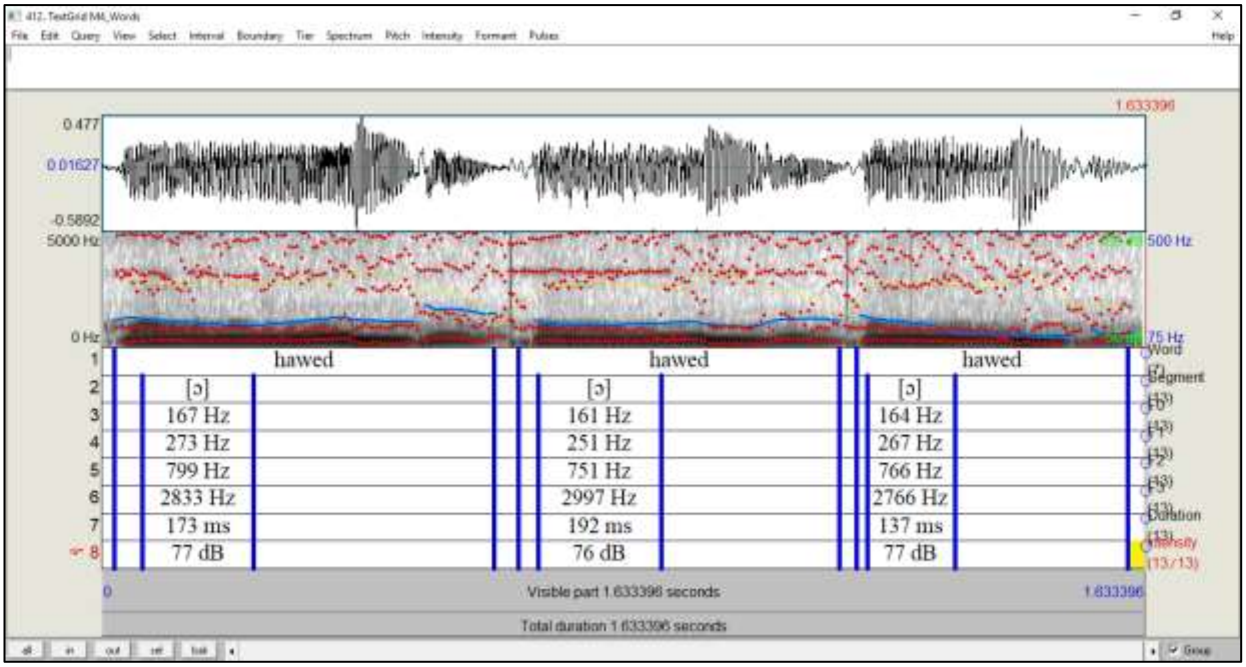
head
[ɛ]
141 Hz
369 Hz
1917 Hz
2892 Hz
214 ms
78 dB
head
[ɛ]
116 Hz
362 Hz
1768 Hz
3346 Hz
208 ms
77 dB
head
[ɛ]
157 Hz
348 Hz
1845 Hz
3165 Hz
193 ms
78 dB

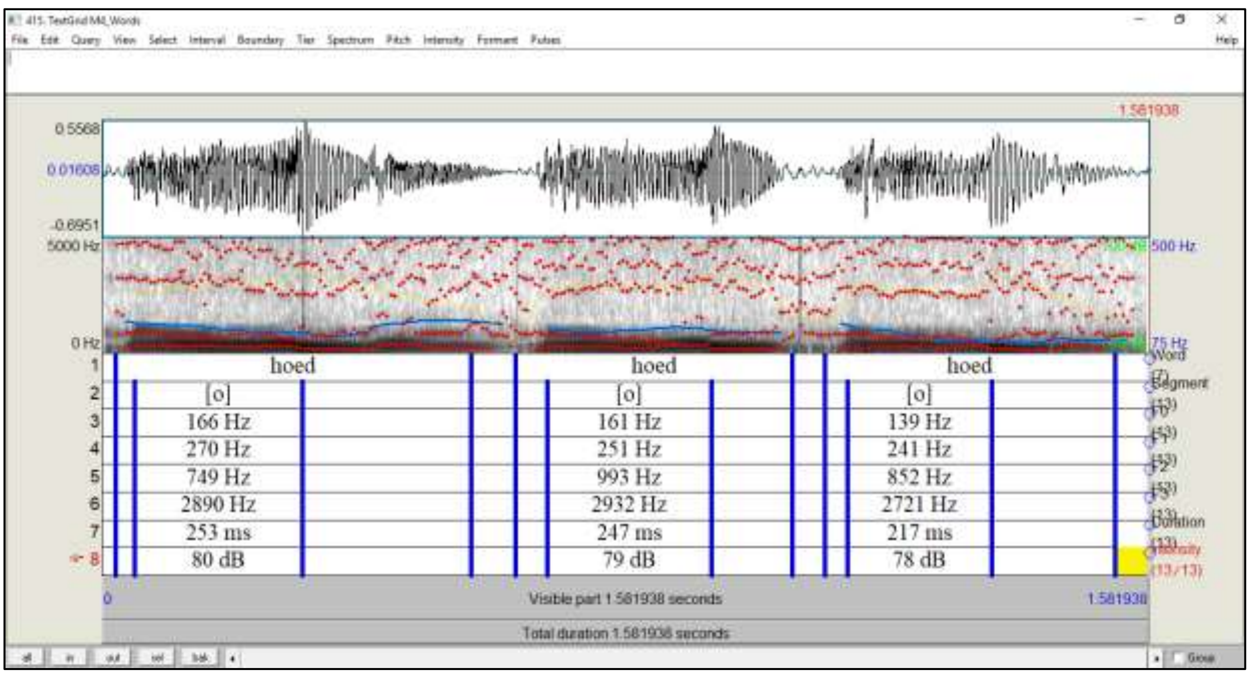


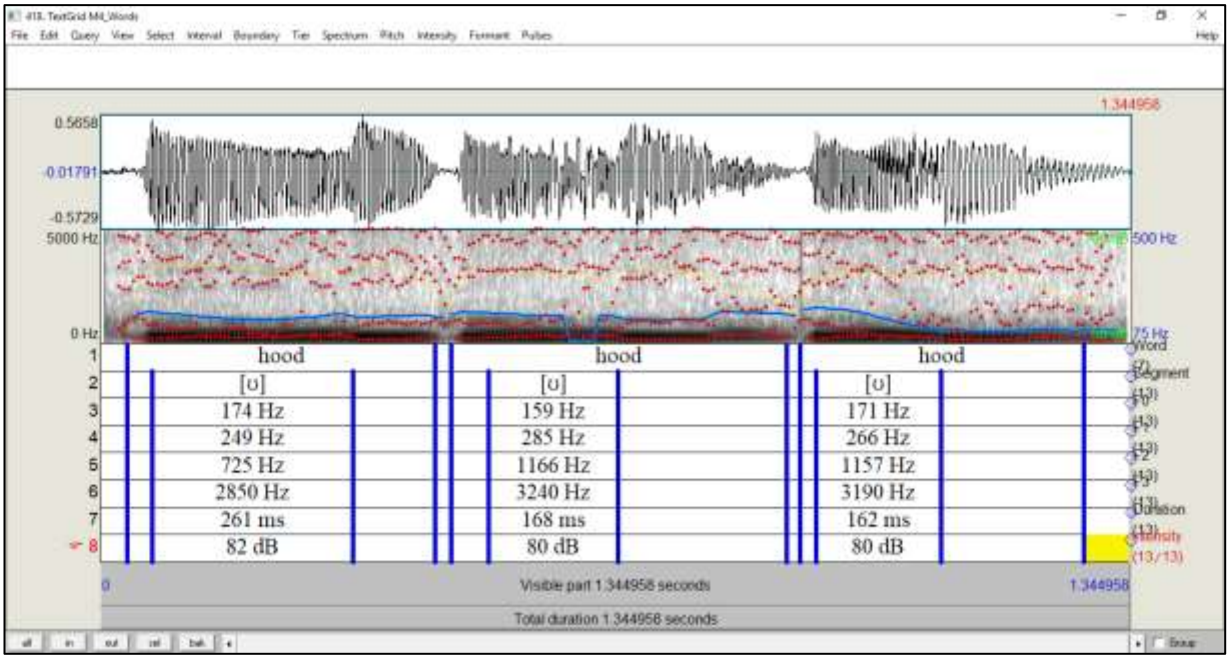
File Edit Query View Select Interval Boundary Tier Spectrum Pitch Intensity Formant Pulses
Help
1.882583
0.3554
-0.007416
-0.4592
5000 Hz
0 Hz
500 Hz
75 Hz
had
had
had
[æ]
[æ]
[æ]
147 Hz
147 Hz
162 Hz
706 Hz
670 Hz
708 Hz
1483 Hz
1366 Hz
1462 Hz
3200 Hz
3110 Hz
3204 Hz
307 ms
277 ms
236 ms
72 dB
73 dB
73 dB
Word
Segment
F0
F1
F2
F3
Duration
Intensity
(13/13)
Visible part 1.882583 seconds
Total duration 1.882583 seconds

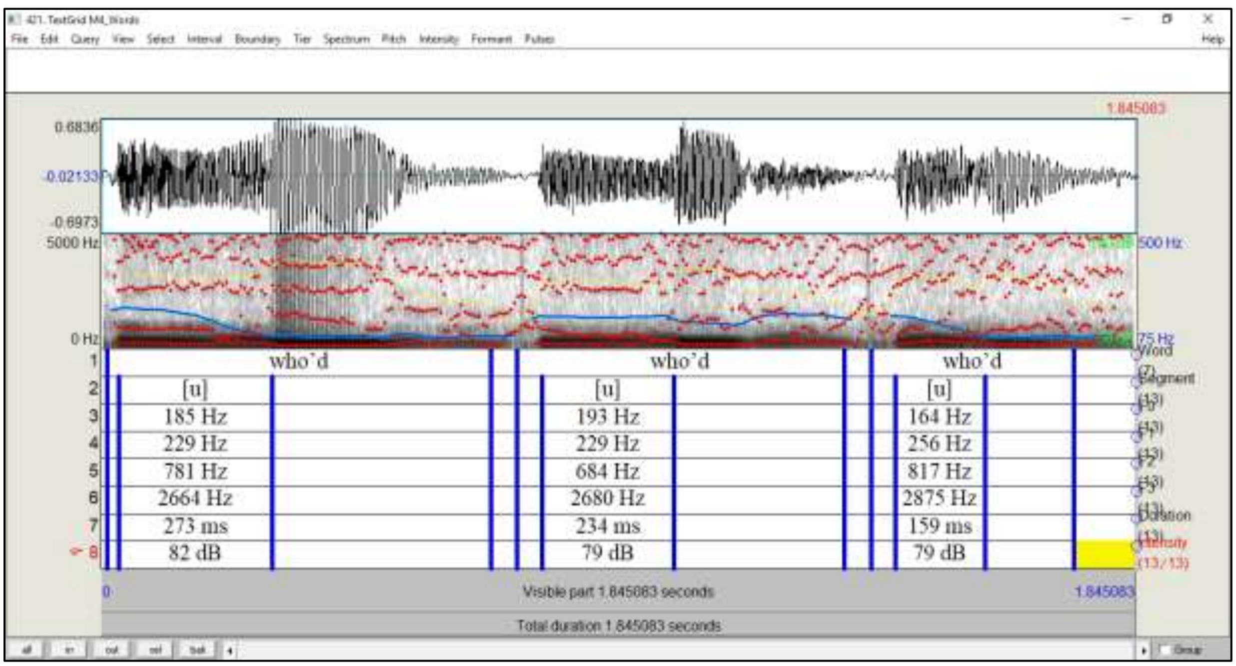


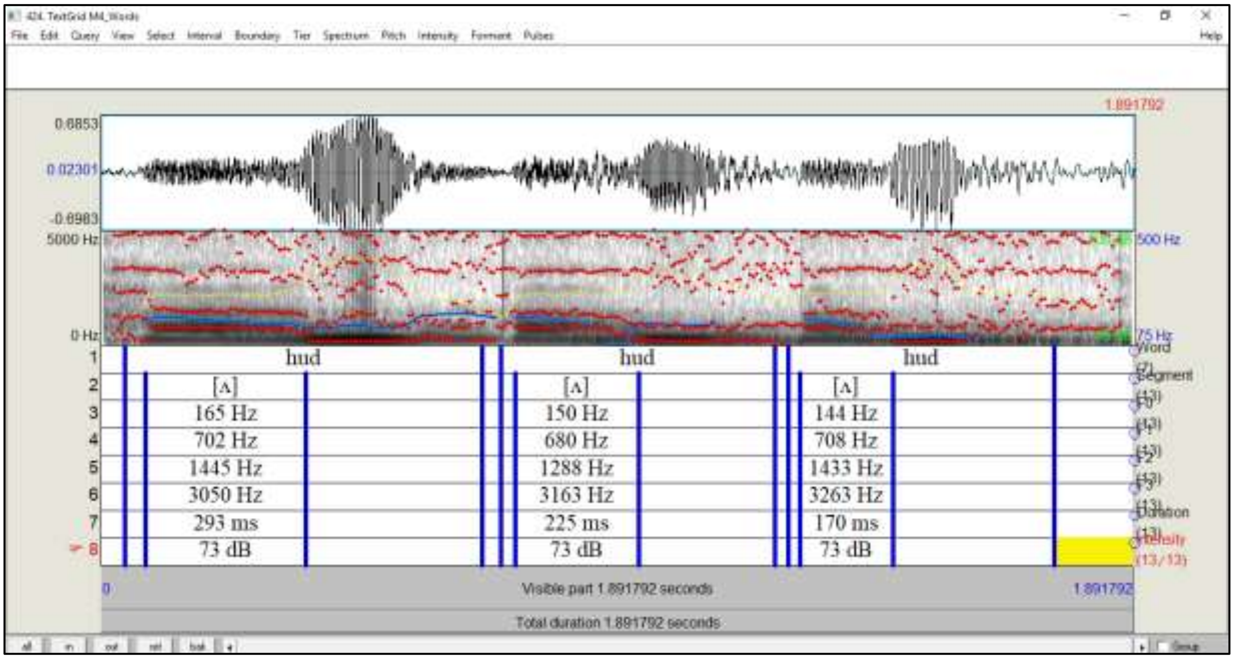
File Edit Query View Select Interval Boundary Tier Spectrum Pitch Intensity Formant Pulses
Help
1.958063
0.5645
-0.002472
-0.5767
5000 Hz
0 Hz
500 Hz
75 Hz
hod
hod
hod
[ɑ]
[ɑ]
[ɑ]
169 Hz
157 Hz
162 Hz
705 Hz
713 Hz
692 Hz
1299 Hz
1407 Hz
1363 Hz
2530 Hz
3282 Hz
3344 Hz
305 ms
240 ms
201 ms
71 dB
73 dB
73 dB
Word
Segment
F0
F1
F2
F3
Duration
Intensity
(13/13)
Visible part 1.958063 seconds
Total duration 1.958063 seconds


hawed
[ɔ]
167 Hz
273 Hz
799 Hz
2833 Hz
173 ms
77 dB
hawed
[ɔ]
161 Hz
251 Hz
751 Hz
2997 Hz
192 ms
76 dB
hawed
[ɔ]
164 Hz
267 Hz
766 Hz
2766 Hz
137 ms
77 dB

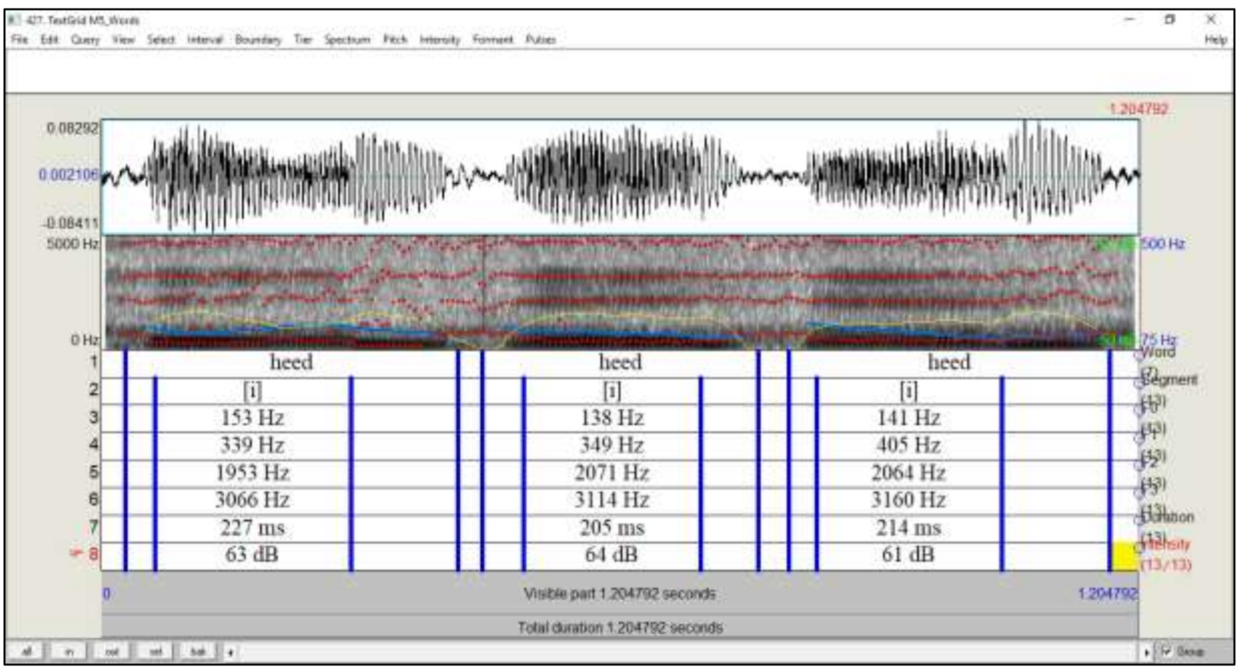

hoed
[o]
166 Hz
270 Hz
749 Hz
2890 Hz
253 ms
80 dB
hoed
[o]
161 Hz
251 Hz
993 Hz
2932 Hz
247 ms
79 dB
hoed
[o]
139 Hz
241 Hz
852 Hz
2721 Hz
217 ms
78 dB

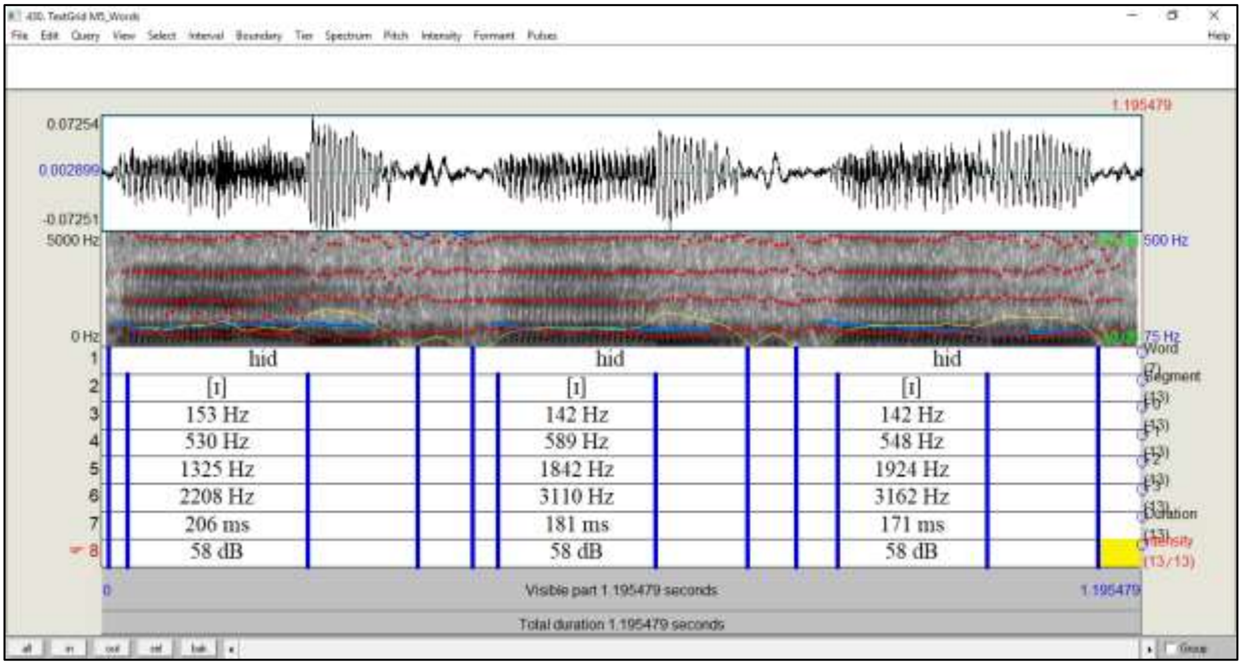

hood
hood
hood
[ʊ]
[ʊ]
[ʊ]
174 Hz
159 Hz
171 Hz
249 Hz
285 Hz
266 Hz
725 Hz
1166 Hz
1157 Hz
2850 Hz
3240 Hz
3190 Hz
261 ms
168 ms
162 ms
82 dB
80 dB
80 dB
Visible part 1.344958 seconds
Total duration 1.344958 seconds

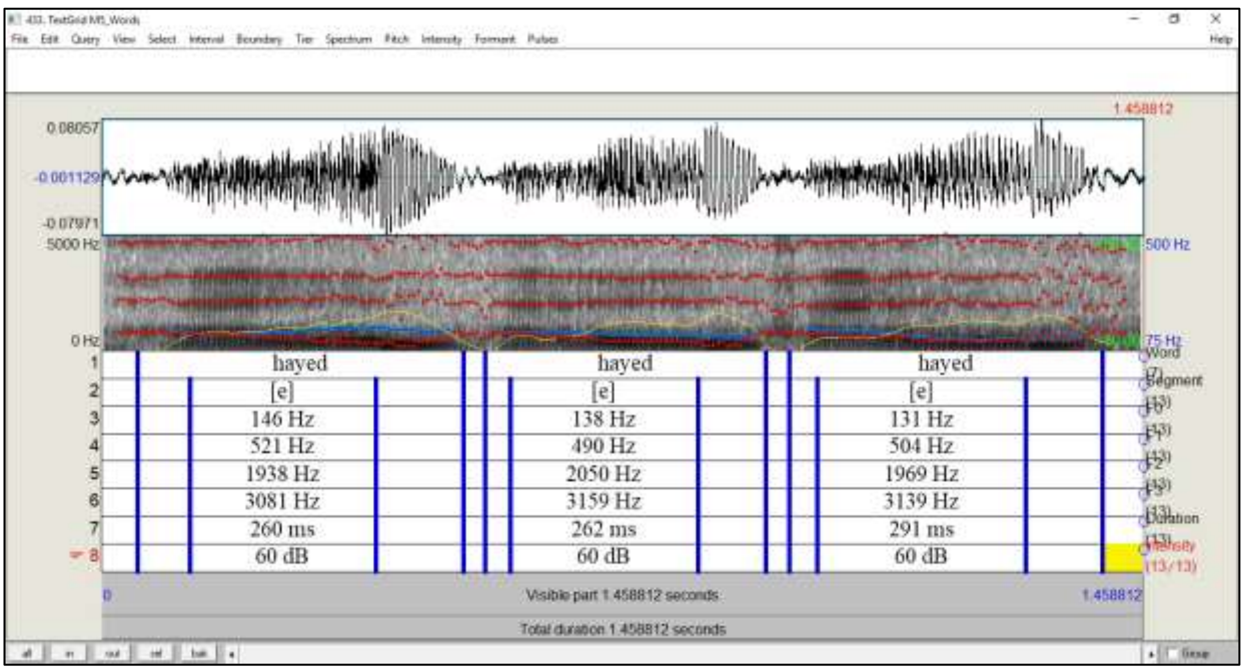

who'd
who'd
who'd
[u]
[u]
[u]
185 Hz
193 Hz
164 Hz
229 Hz
229 Hz
256 Hz
781 Hz
684 Hz
817 Hz
2664 Hz
2680 Hz
2875 Hz
273 ms
234 ms
159 ms
82 dB
79 dB
79 dB
Visible part 1.845083 seconds
Total duration 1.845083 seconds

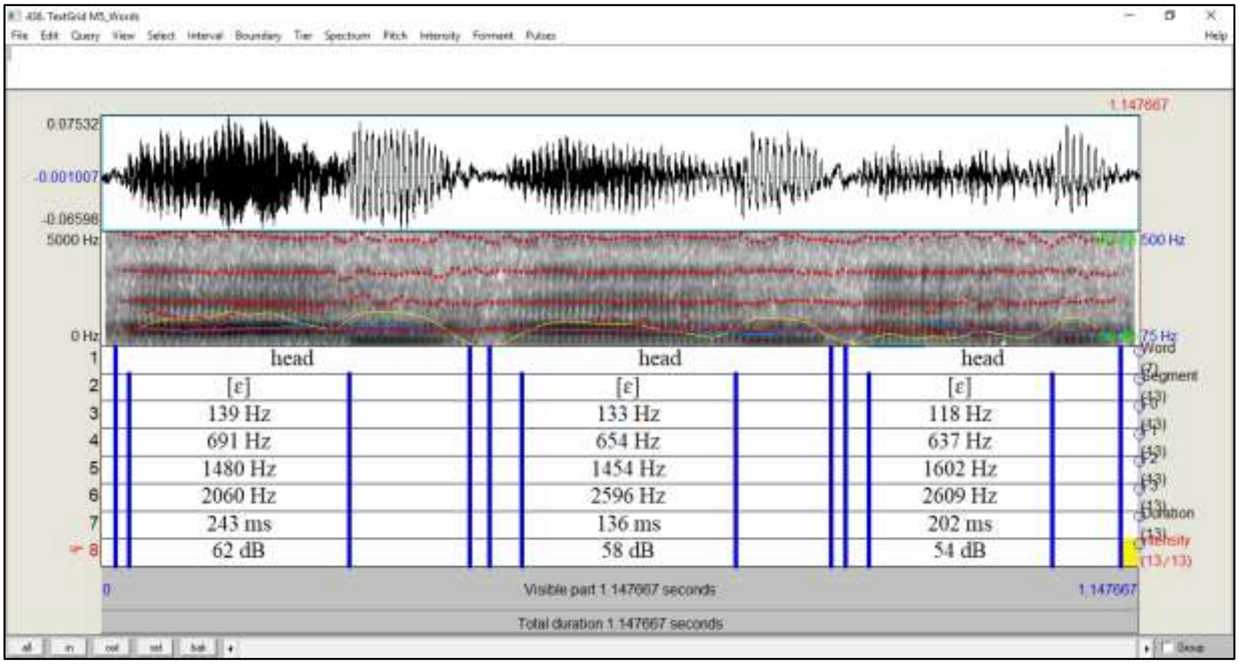

hud
[ʌ]
165 Hz
702 Hz
1445 Hz
3050 Hz
293 ms
73 dB
hud
[ʌ]
150 Hz
680 Hz
1288 Hz
3163 Hz
225 ms
73 dB
hud
[ʌ]
144 Hz
708 Hz
1433 Hz
3263 Hz
170 ms
73 dB
Visible part 1.891792 seconds
Total duration 1.891792 seconds

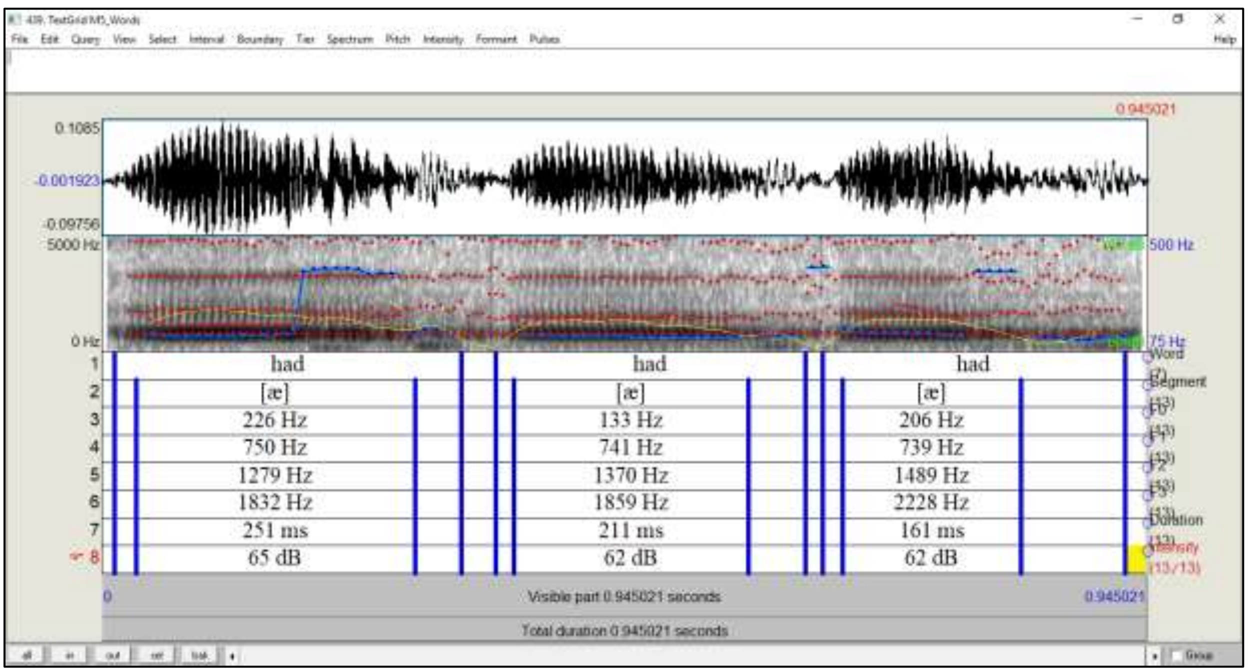
M5

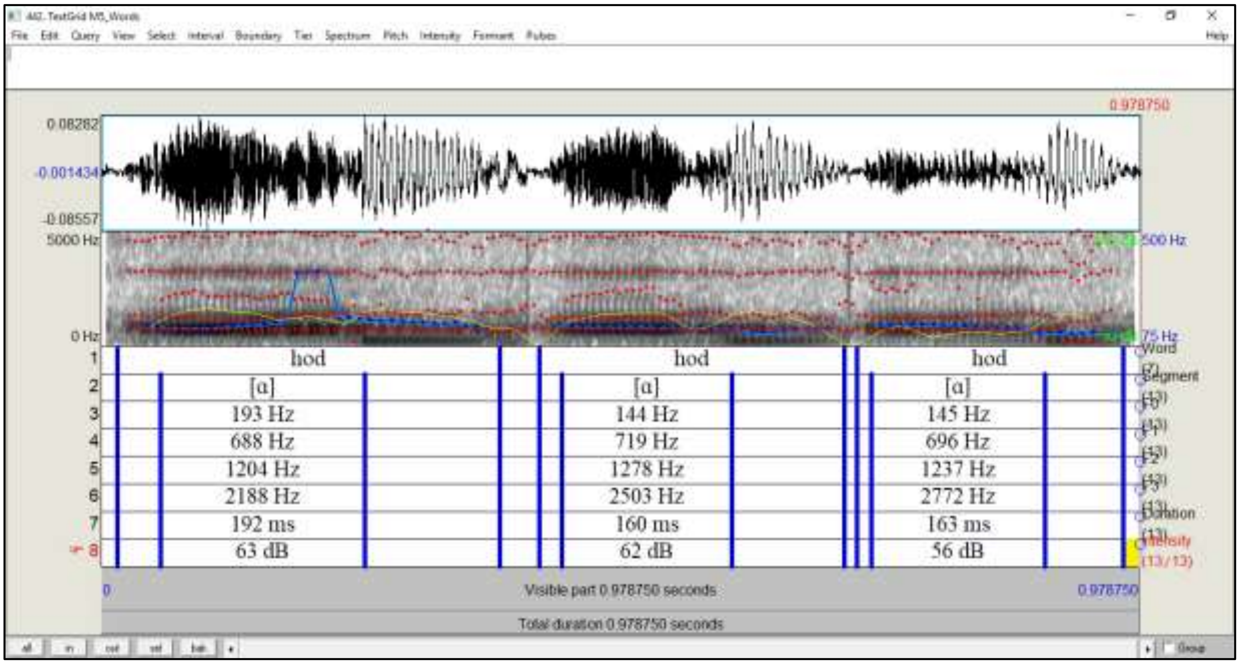

heed
[i]
153 Hz
339 Hz
1953 Hz
3066 Hz
227 ms
63 dB
heed
[i]
138 Hz
349 Hz
2071 Hz
3114 Hz
205 ms
64 dB
heed
[i]
141 Hz
405 Hz
2064 Hz
3160 Hz
214 ms
61 dB
Visible part 1.204792 seconds
Total duration 1.204792 seconds


File Edit Query View Select Interval Boundary Tier Spectrum Pitch Intensity Formant Pulses
Help
1.195479
0.07254
0.002899
-0.07251
5000 Hz
0 Hz
500 Hz
75 Hz
hid
hid
hid
[ɪ]
[ɪ]
[ɪ]
153 Hz
142 Hz
142 Hz
530 Hz
589 Hz
548 Hz
1325 Hz
1842 Hz
1924 Hz
2208 Hz
3110 Hz
3162 Hz
206 ms
181 ms
171 ms
58 dB
58 dB
58 dB
Word
Segment
F0
F1
F2
F3
Duration
Intensity
(13/13)
0
Visible part 1.195479 seconds
1.195479
Total duration 1.195479 seconds

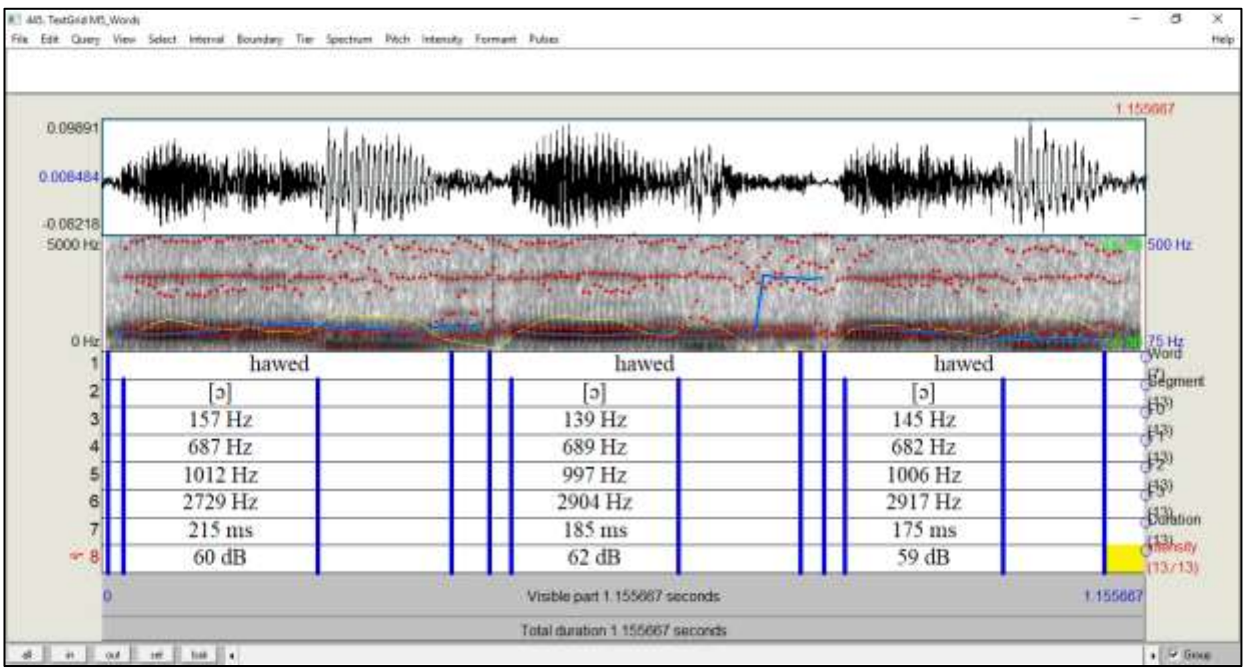

File Edit Query View Select Interval Boundary Tier Spectrum Pitch Intensity Formant Pulses
Help
1.458812
0.08057
-0.001129
-0.07971
5000 Hz
0 Hz
500 Hz
75 Hz
hayed
hayed
hayed
[e]
[e]
[e]
146 Hz
138 Hz
131 Hz
521 Hz
490 Hz
504 Hz
1938 Hz
2050 Hz
1969 Hz
3081 Hz
3159 Hz
3139 Hz
260 ms
262 ms
291 ms
60 dB
60 dB
60 dB
Word
Segment
F0
F1
F2
F3
Duration
Intensity
(13/13)
0
Visible part 1.458812 seconds
1.458812
Total duration 1.458812 seconds


0.07532
-0.001007
-0.06598
5000 Hz
0 Hz
1.147667
500 Hz
75 Hz
head
[ɛ]
139 Hz
691 Hz
1480 Hz
2060 Hz
243 ms
62 dB
head
[ɛ]
133 Hz
654 Hz
1454 Hz
2596 Hz
136 ms
58 dB
head
[ɛ]
118 Hz
637 Hz
1602 Hz
2609 Hz
202 ms
54 dB
Visible part 1.147667 seconds
Total duration 1.147667 seconds

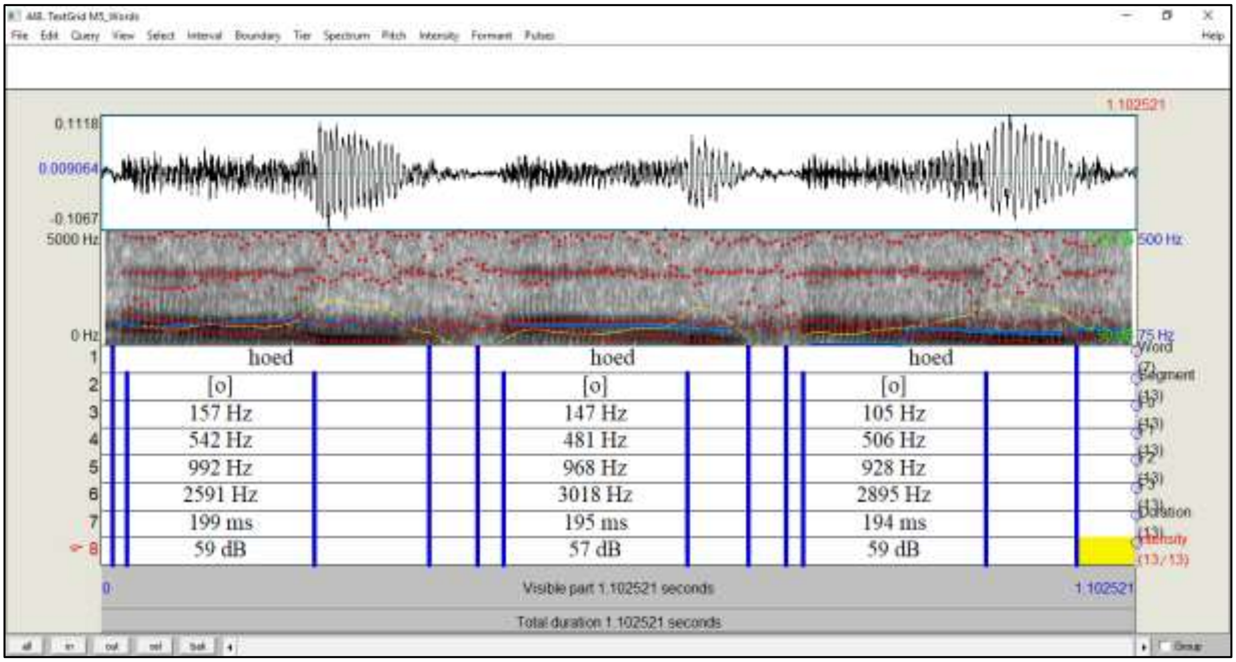

0.1085
-0.001923
-0.09756
5000 Hz
0 Hz
0.945021
500 Hz
75 Hz
had
[æ]
226 Hz
750 Hz
1279 Hz
1832 Hz
251 ms
65 dB
had
[æ]
133 Hz
741 Hz
1370 Hz
1859 Hz
211 ms
62 dB
had
[æ]
206 Hz
739 Hz
1489 Hz
2228 Hz
161 ms
62 dB
Visible part 0.945021 seconds
Total duration 0.945021 seconds

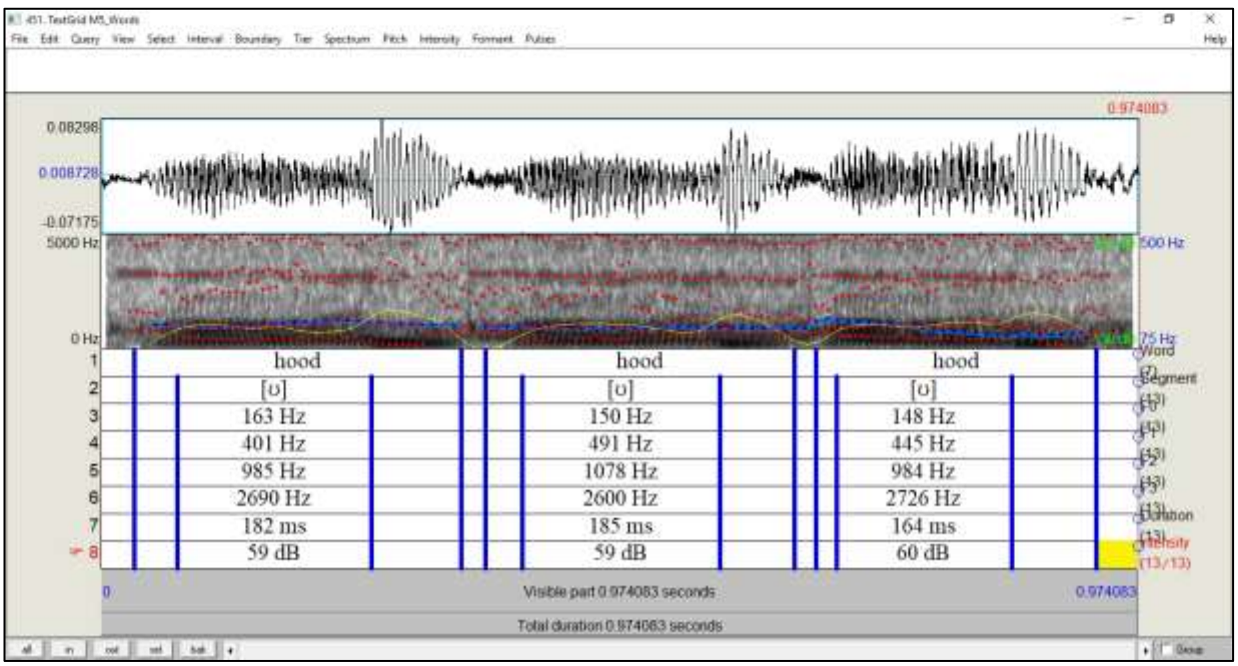


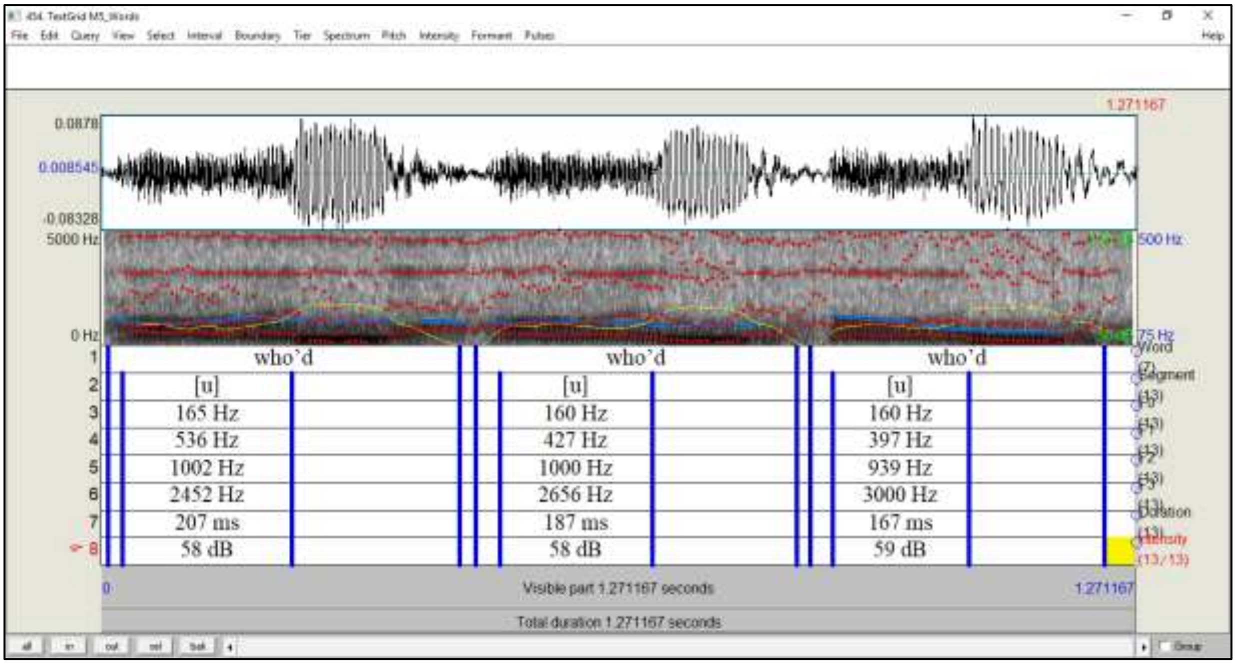
hod
[ɑ]
193 Hz
688 Hz
1204 Hz
2188 Hz
192 ms
63 dB
hod
[ɑ]
144 Hz
719 Hz
1278 Hz
2503 Hz
160 ms
62 dB
hod
[ɑ]
145 Hz
696 Hz
1237 Hz
2772 Hz
163 ms
56 dB
Visible part 0.978750 seconds
Total duration 0.978750 seconds

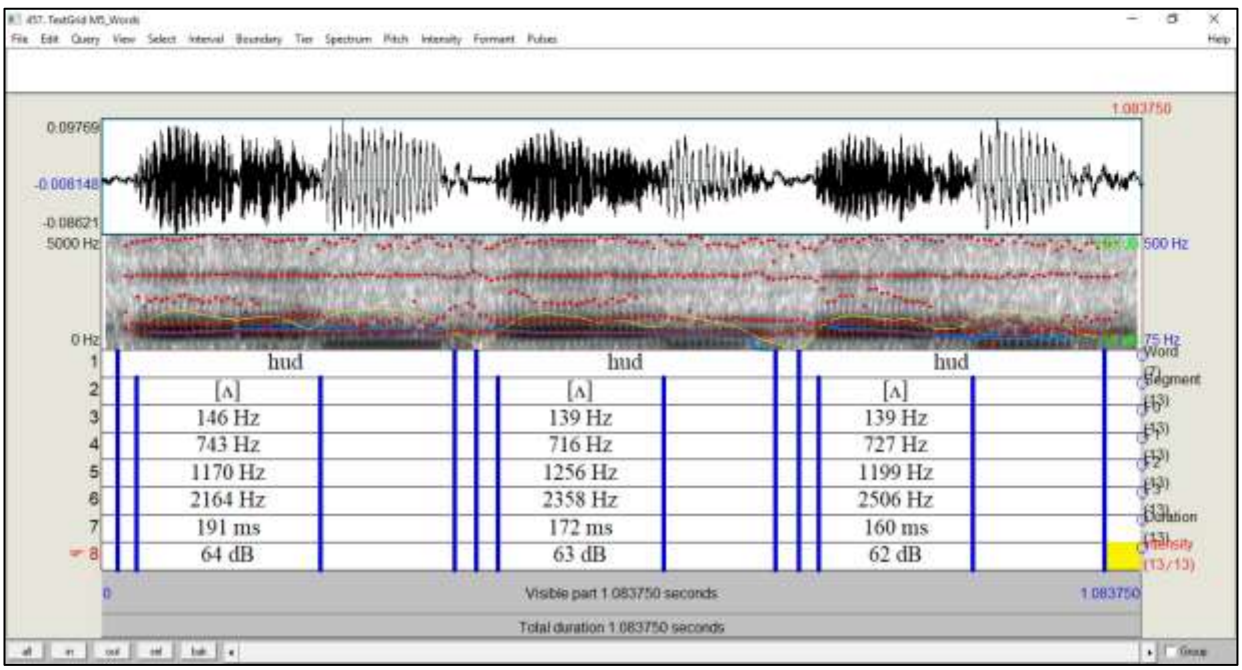


hawed
[ɔ]
157 Hz
687 Hz
1012 Hz
2729 Hz
215 ms
60 dB
hawed
[ɔ]
139 Hz
689 Hz
997 Hz
2904 Hz
185 ms
62 dB
hawed
[ɔ]
145 Hz
682 Hz
1006 Hz
2917 Hz
175 ms
59 dB
Visible part 1.155667 seconds
Total duration 1.155667 seconds

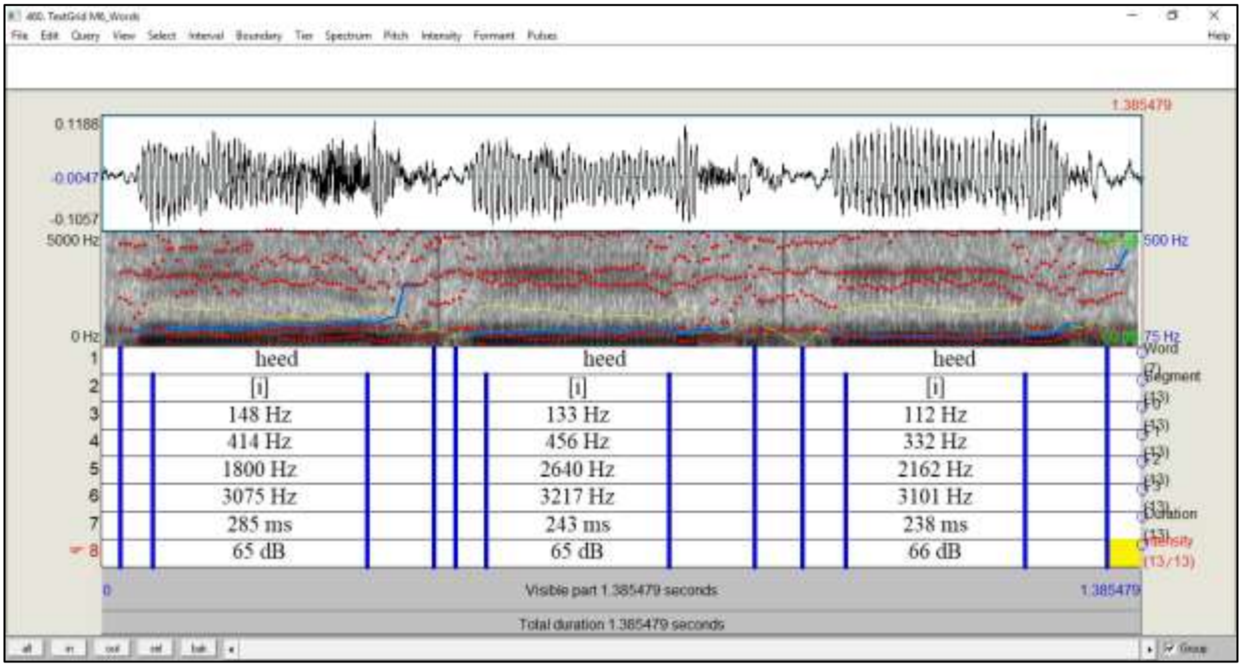

1.102521
0.1118
0.009064
-0.1067
5000 Hz
0 Hz
500 Hz
75 Hz
hoed
hoed
hoed
[o]
[o]
[o]
157 Hz
147 Hz
105 Hz
542 Hz
481 Hz
506 Hz
992 Hz
968 Hz
928 Hz
2591 Hz
3018 Hz
2895 Hz
199 ms
195 ms
194 ms
59 dB
57 dB
59 dB
Word
Segment
Duration
Intensity
(13/13)
0
Visible part 1.102521 seconds
1.102521
Total duration 1.102521 seconds

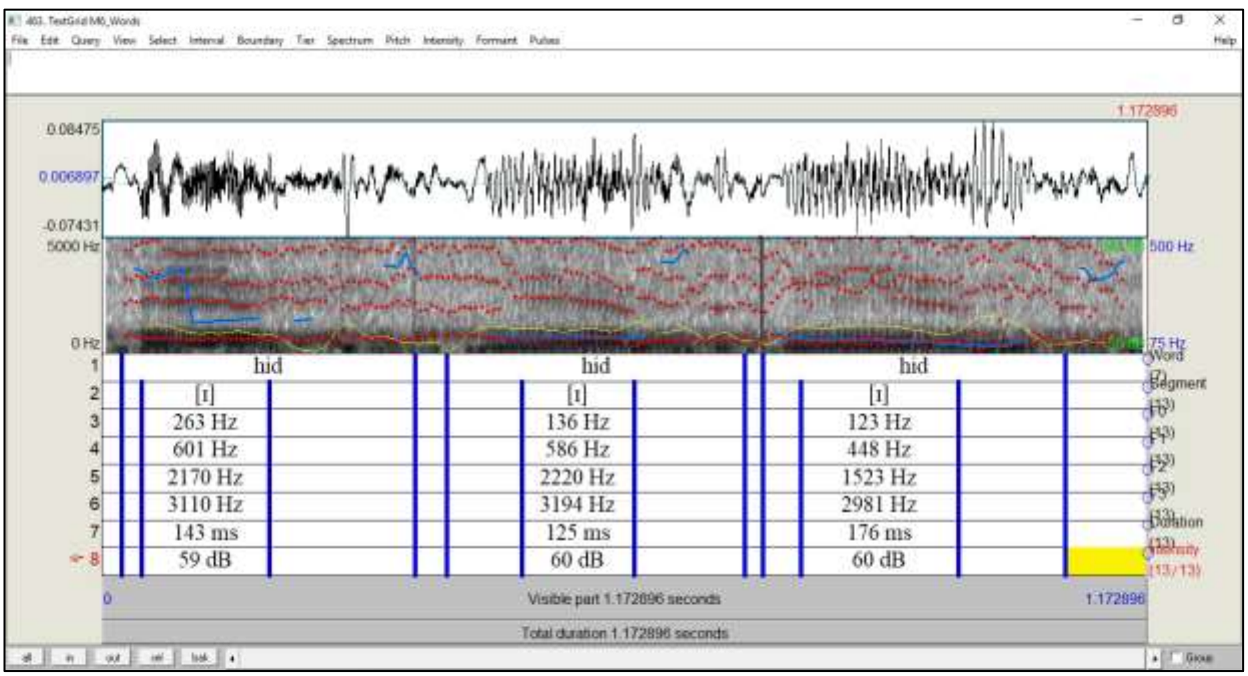

0.974083
0.08298
0.008728
-0.07175
5000 Hz
0 Hz
500 Hz
75 Hz
hood
hood
hood
[ʊ]
[ʊ]
[ʊ]
163 Hz
150 Hz
148 Hz
401 Hz
491 Hz
445 Hz
985 Hz
1078 Hz
984 Hz
2690 Hz
2600 Hz
2726 Hz
182 ms
185 ms
164 ms
59 dB
59 dB
60 dB
Word
Segment
Duration
Intensity
(13/13)
0
Visible part 0.974083 seconds
0.974083
Total duration 0.974083 seconds

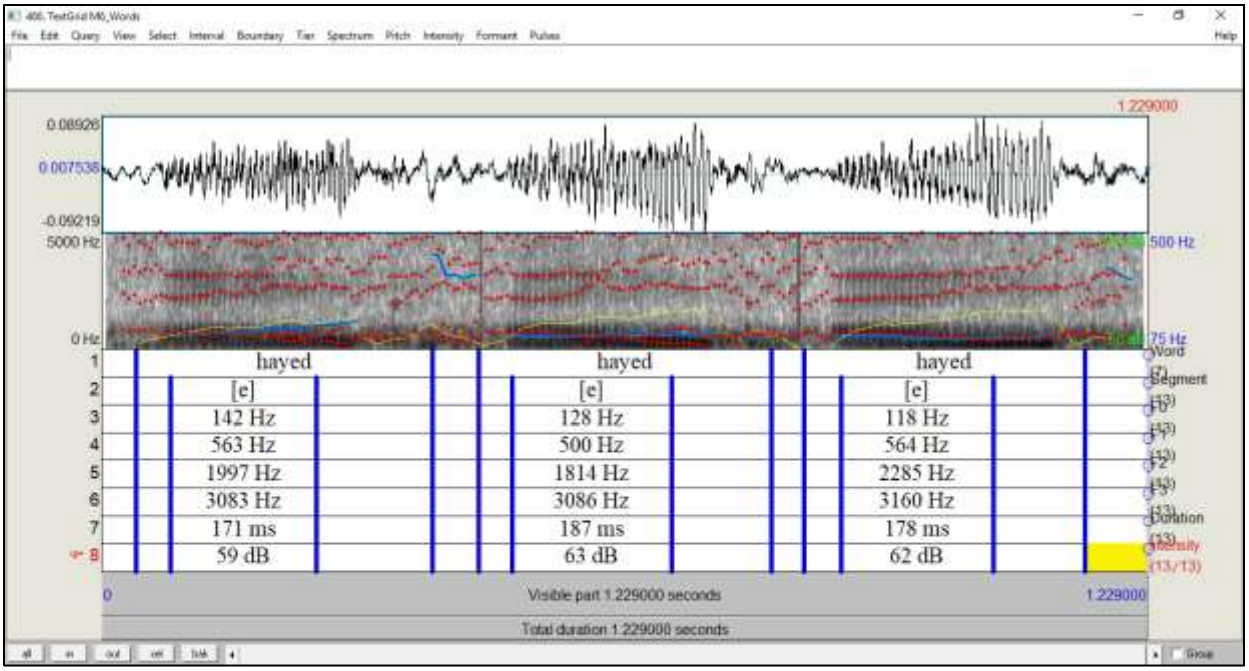

who'd
[u]
165 Hz
536 Hz
1002 Hz
2452 Hz
207 ms
58 dB
who'd
[u]
160 Hz
427 Hz
1000 Hz
2656 Hz
187 ms
58 dB
who'd
[u]
160 Hz
397 Hz
939 Hz
3000 Hz
167 ms
59 dB
Visible part 1.271167 seconds
Total duration 1.271167 seconds

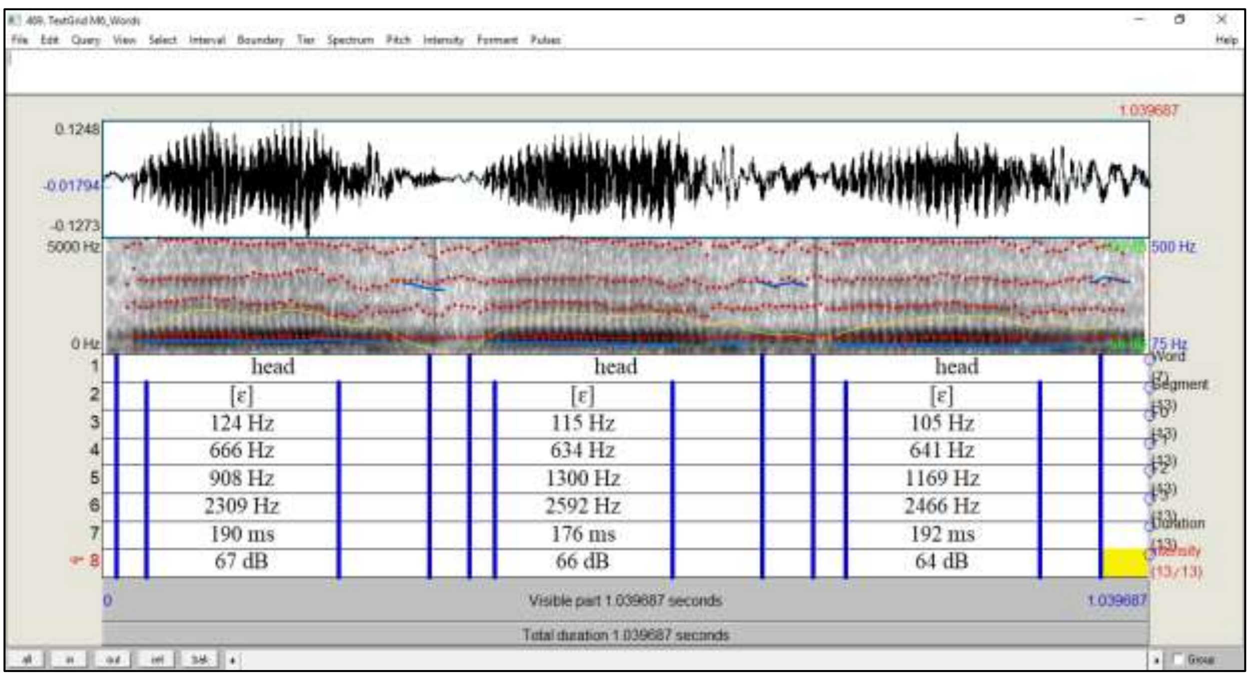

hud
[ʌ]
146 Hz
743 Hz
1170 Hz
2164 Hz
191 ms
64 dB
hud
[ʌ]
139 Hz
716 Hz
1256 Hz
2358 Hz
172 ms
63 dB
hud
[ʌ]
139 Hz
727 Hz
1199 Hz
2506 Hz
160 ms
62 dB
Visible part 1.083750 seconds
Total duration 1.083750 seconds

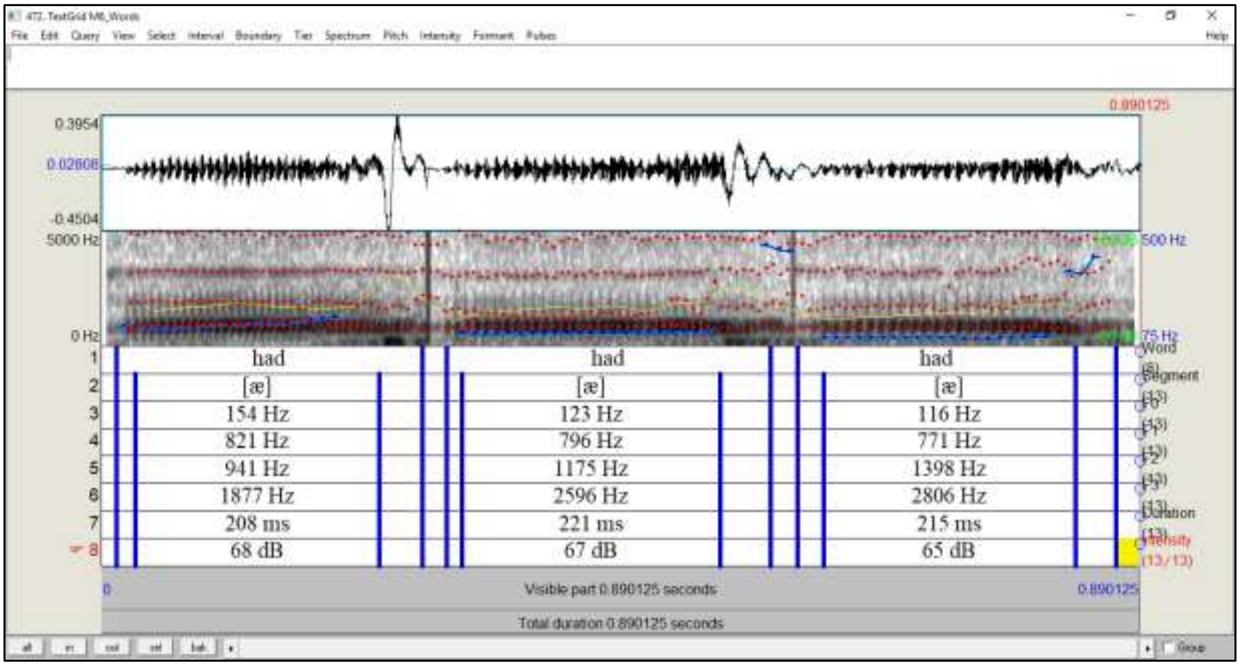
M6

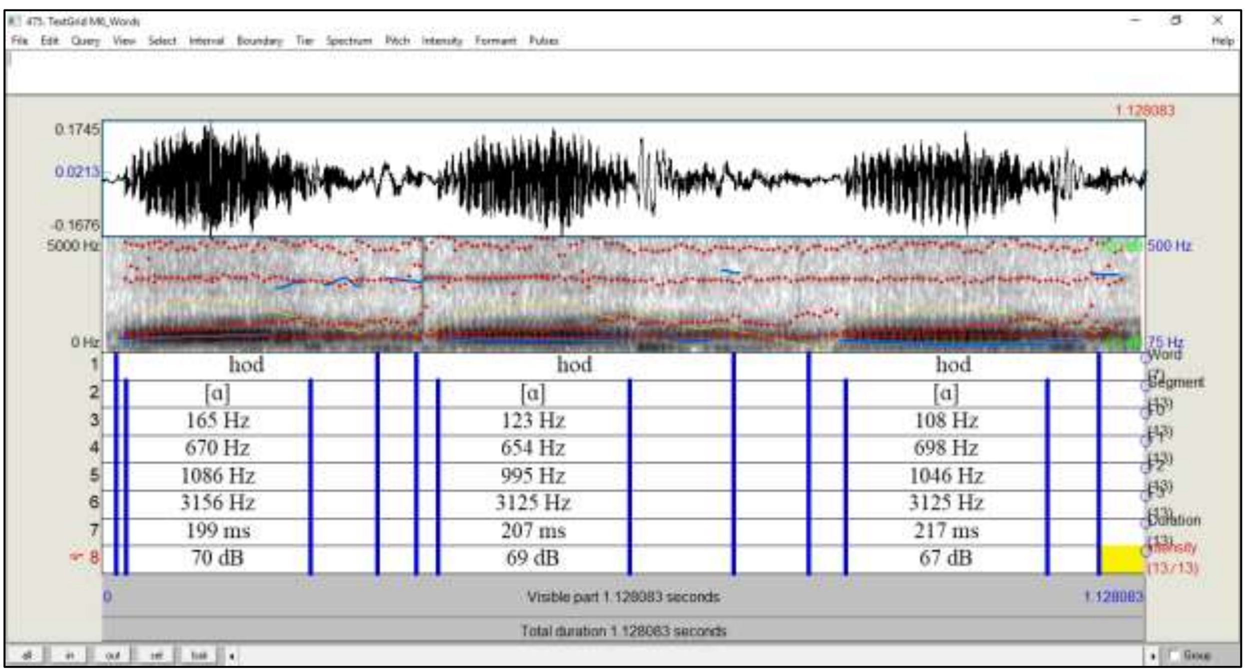

heed
[i]
148 Hz
414 Hz
1800 Hz
3075 Hz
285 ms
65 dB
heed
[i]
133 Hz
456 Hz
2640 Hz
3217 Hz
243 ms
65 dB
heed
[i]
112 Hz
332 Hz
2162 Hz
3101 Hz
238 ms
66 dB
Visible part 1.385479 seconds
Total duration 1.385479 seconds

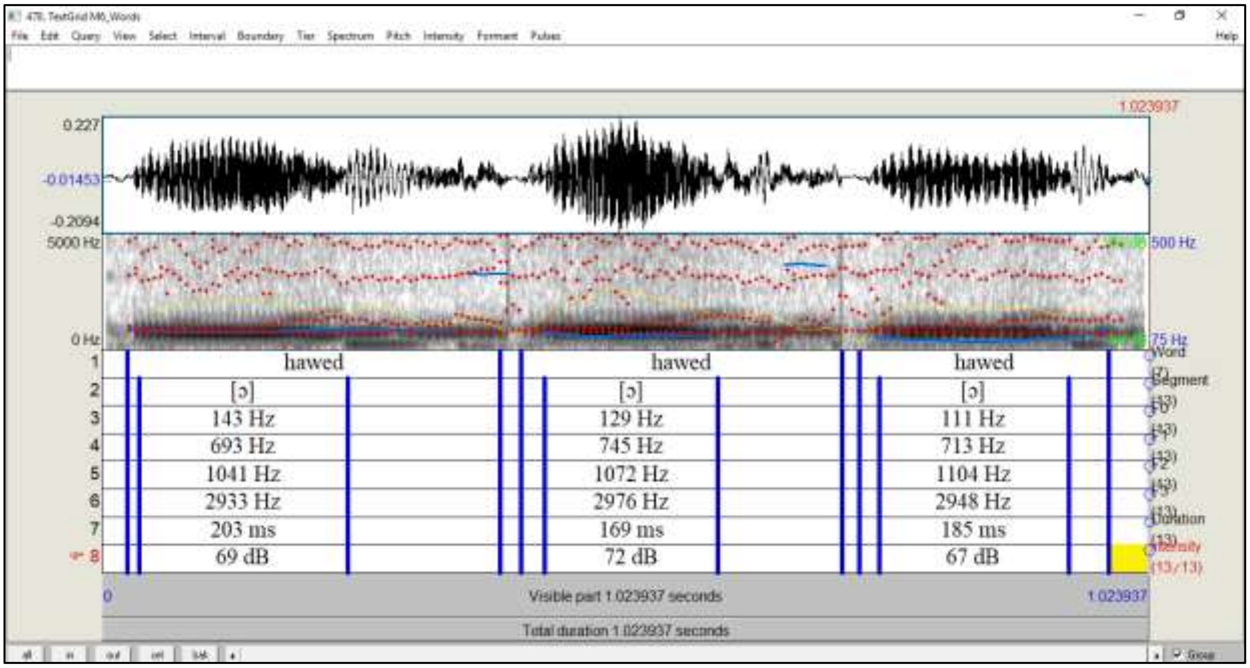

hid
[ɪ]
263 Hz
601 Hz
2170 Hz
3110 Hz
143 ms
59 dB
hid
[ɪ]
136 Hz
586 Hz
2220 Hz
3194 Hz
125 ms
60 dB
hid
[ɪ]
123 Hz
448 Hz
1523 Hz
2981 Hz
176 ms
60 dB
Visible part 1.172896 seconds
Total duration 1.172896 seconds


0.08926
0.007538
-0.09219
5000 Hz
0 Hz
500 Hz
75 Hz
1.229000
hayed
[e]
142 Hz
563 Hz
1997 Hz
3083 Hz
171 ms
59 dB
hayed
[e]
128 Hz
500 Hz
1814 Hz
3086 Hz
187 ms
63 dB
hayed
[e]
118 Hz
564 Hz
2285 Hz
3160 Hz
178 ms
62 dB
Visible part 1.229000 seconds
Total duration 1.229000 seconds

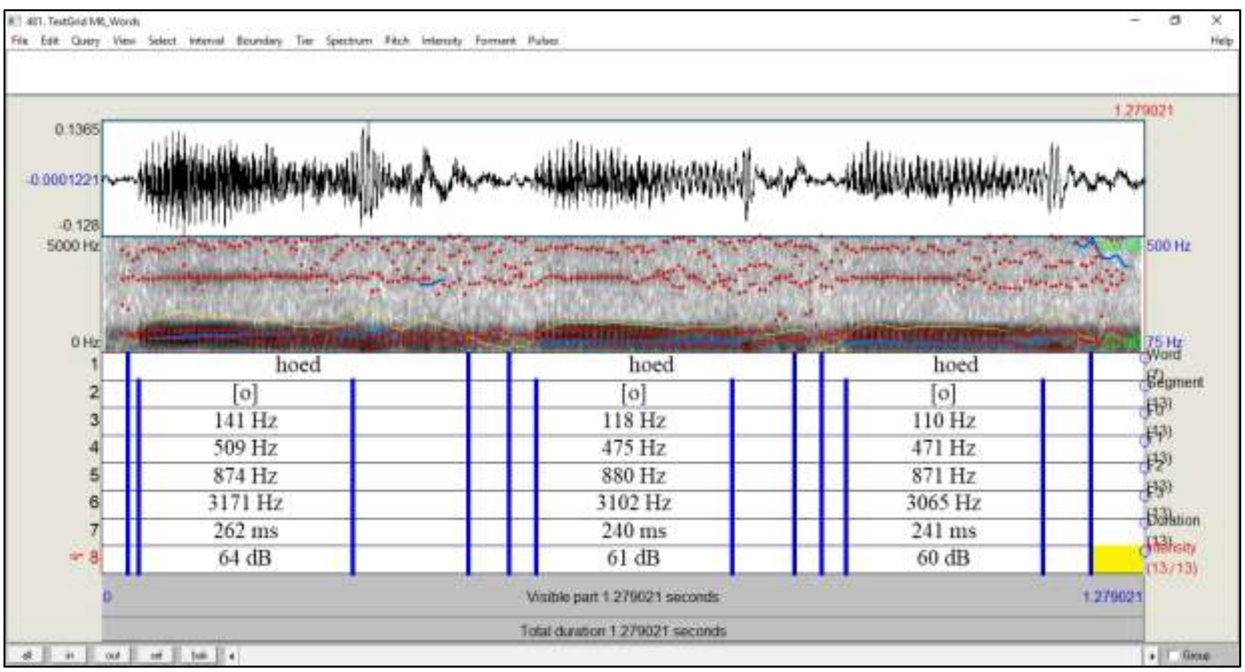

0.1248
-0.01794
-0.1273
5000 Hz
0 Hz
500 Hz
75 Hz
1.039687
head
[ɛ]
124 Hz
666 Hz
908 Hz
2309 Hz
190 ms
67 dB
head
[ɛ]
115 Hz
634 Hz
1300 Hz
2592 Hz
176 ms
66 dB
head
[ɛ]
105 Hz
641 Hz
1169 Hz
2466 Hz
192 ms
64 dB
Visible part 1.039687 seconds
Total duration 1.039687 seconds


0.890125
0.3954
0.02808
-0.4504
5000 Hz
0 Hz
500 Hz
75 Hz
had
had
had
[æ]
[æ]
[æ]
154 Hz
123 Hz
116 Hz
821 Hz
796 Hz
771 Hz
941 Hz
1175 Hz
1398 Hz
1877 Hz
2596 Hz
2806 Hz
208 ms
221 ms
215 ms
68 dB
67 dB
65 dB
Word
Segment
F0
F1
F2
F3
Duration
Intensity
(13/13)
Visible part 0.890125 seconds
Total duration 0.890125 seconds

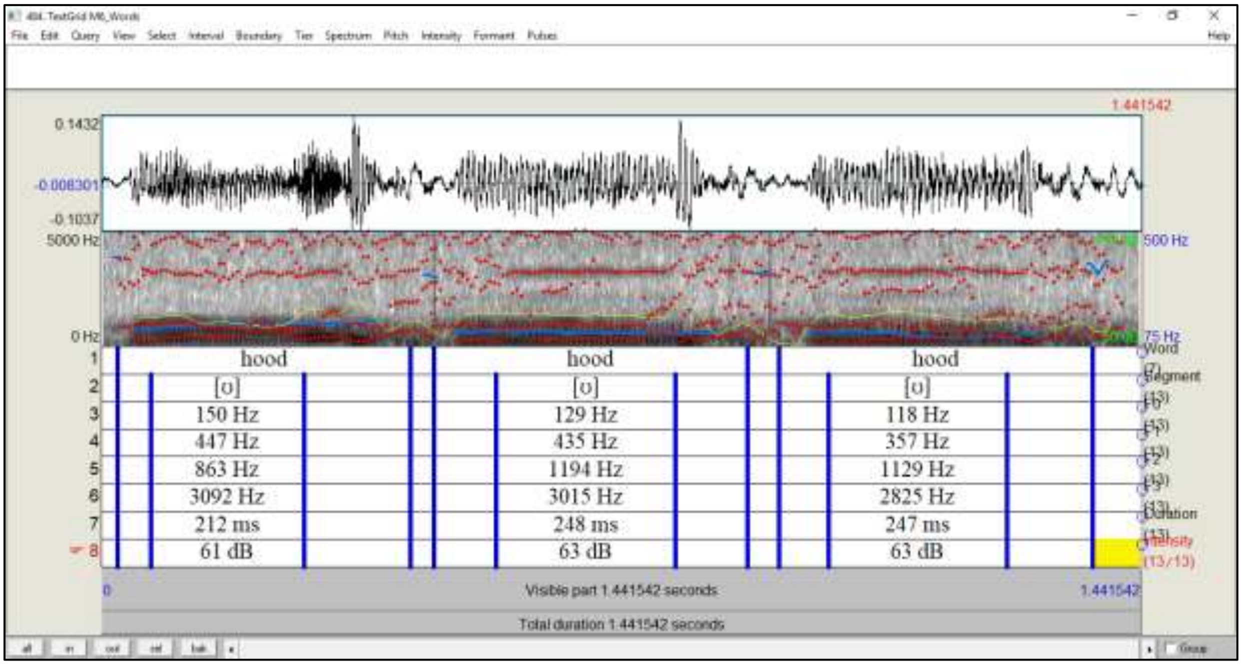

1.128083
0.1745
0.0213
-0.1676
5000 Hz
0 Hz
500 Hz
75 Hz
hod
hod
hod
[ɑ]
[ɑ]
[ɑ]
165 Hz
123 Hz
108 Hz
670 Hz
654 Hz
698 Hz
1086 Hz
995 Hz
1046 Hz
3156 Hz
3125 Hz
3125 Hz
199 ms
207 ms
217 ms
70 dB
69 dB
67 dB
Word
Segment
F0
F1
F2
F3
Duration
Intensity
(13/13)
Visible part 1.128083 seconds
Total duration 1.128083 seconds



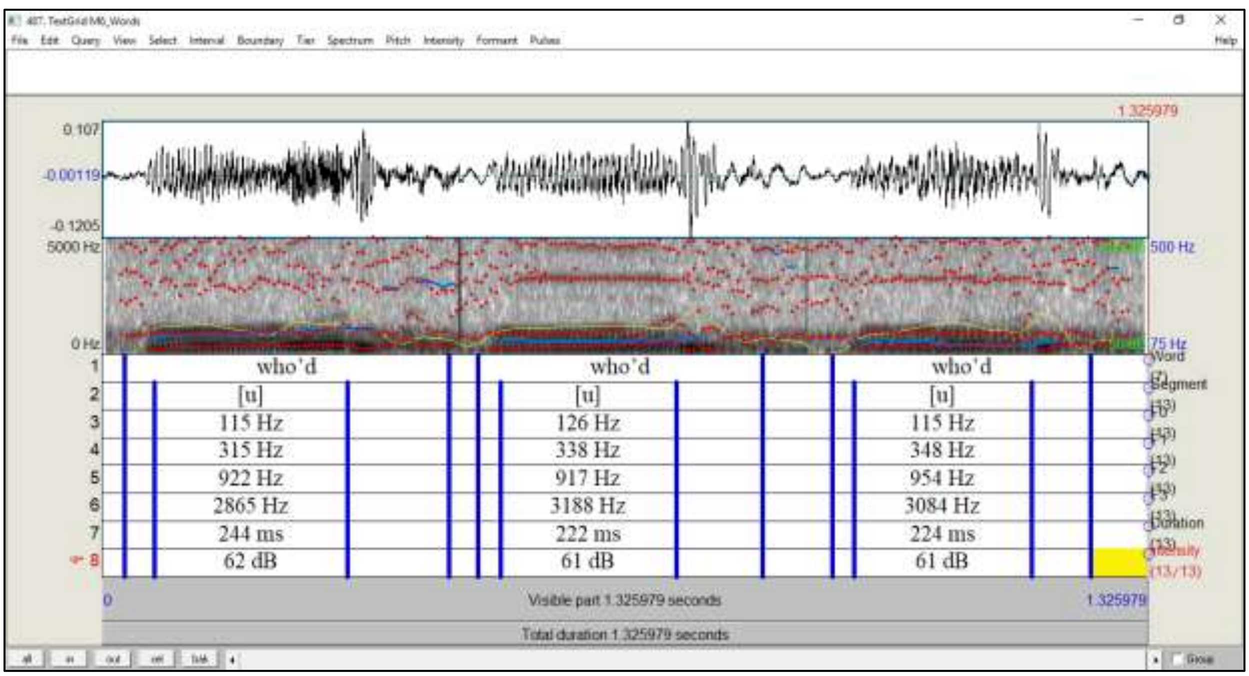
File Edit Query View Select Interval Boundary Tier Spectrum Pitch Intensity Formant Pulses
Help
1.023937
0.227
-0.01453
-0.2094
5000 Hz
0 Hz
500 Hz
75 Hz
hawed
hawed
hawed
[ɔ]
[ɔ]
[ɔ]
143 Hz
129 Hz
111 Hz
693 Hz
745 Hz
713 Hz
1041 Hz
1072 Hz
1104 Hz
2933 Hz
2976 Hz
2948 Hz
203 ms
169 ms
185 ms
69 dB
72 dB
67 dB
Word
Segment
F0
F1
F2
F3
Duration
Intensity
(13/13)
Visible part 1.023937 seconds
Total duration 1.023937 seconds



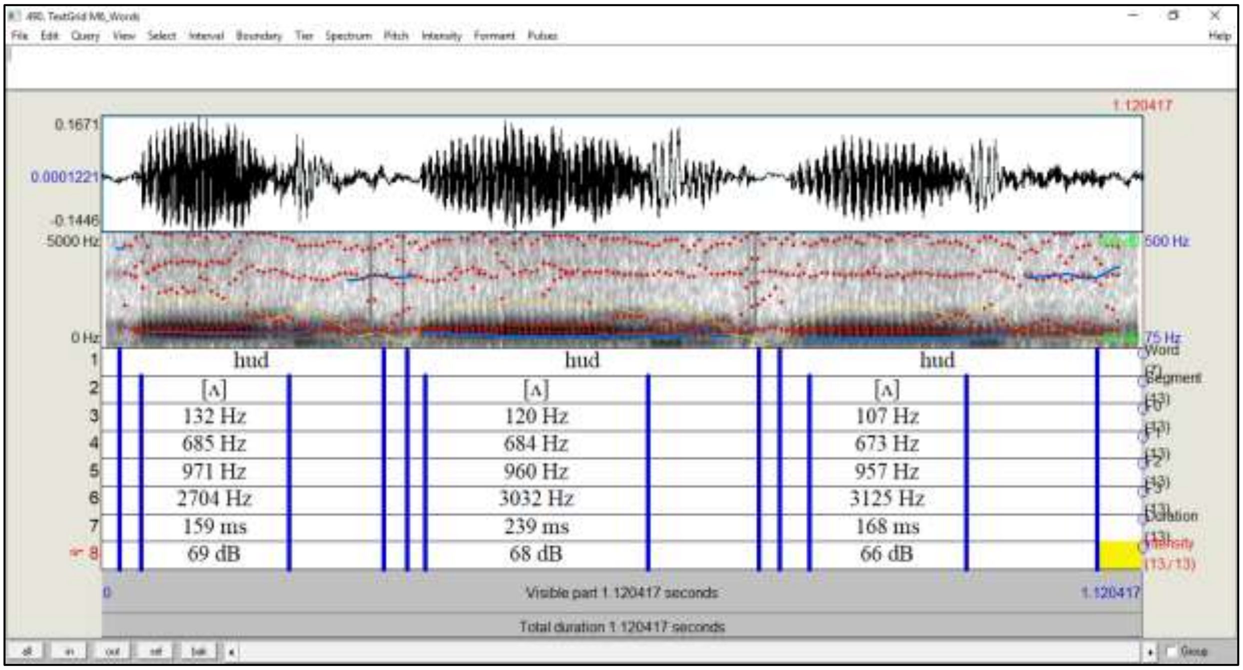
File Edit Query View Select Interval Boundary Tier Spectrum Pitch Intensity Formant Pulses
Help
1.279021
0.1365
-0.0001221
-0.128
5000 Hz
0 Hz
500 Hz
75 Hz
hoed
hoed
hoed
[o]
[o]
[o]
141 Hz
118 Hz
110 Hz
509 Hz
475 Hz
471 Hz
874 Hz
880 Hz
871 Hz
3171 Hz
3102 Hz
3065 Hz
262 ms
240 ms
241 ms
64 dB
61 dB
60 dB
Word
Segment
F0
F1
F2
F3
Duration
Intensity
(13/13)
Visible part 1.279021 seconds
Total duration 1.279021 seconds



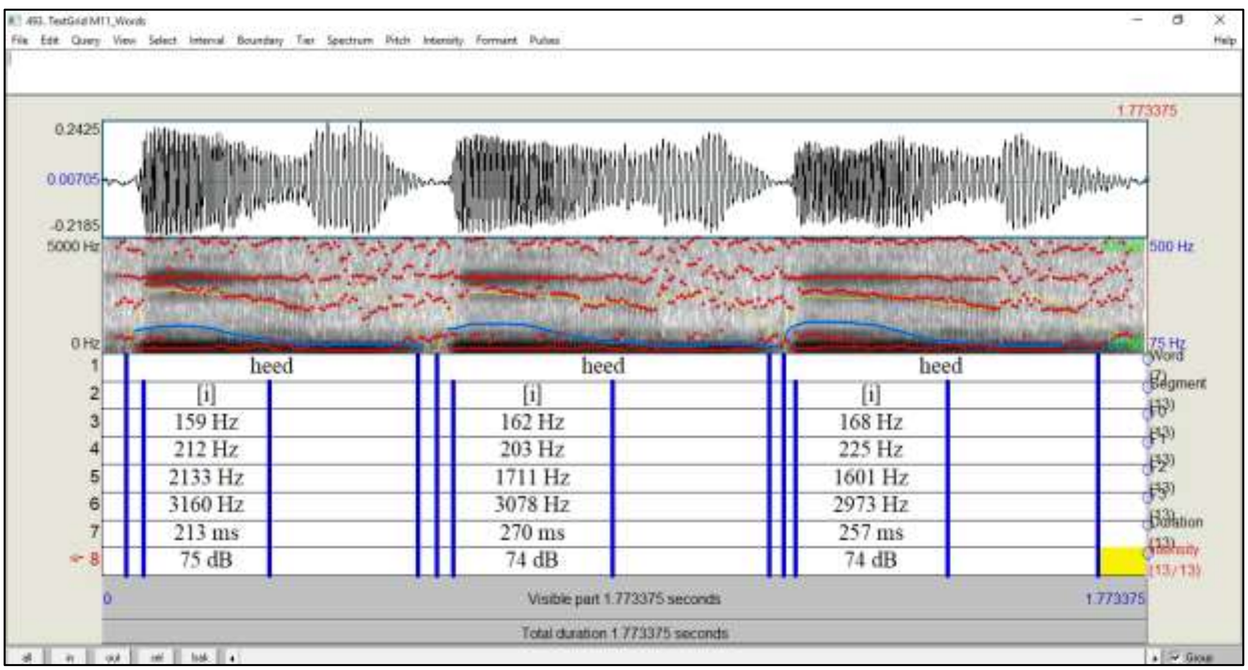
File Edit Query View Select Interval Boundary Tier Spectrum Pitch Intensity Formant Pulses
Help
1.441542
0.1432
-0.008301
-0.1037
5000 Hz
0 Hz
500 Hz
75 Hz
hood
hood
hood
[ʊ]
[ʊ]
[ʊ]
150 Hz
129 Hz
118 Hz
447 Hz
435 Hz
357 Hz
863 Hz
1194 Hz
1129 Hz
3092 Hz
3015 Hz
2825 Hz
212 ms
248 ms
247 ms
61 dB
63 dB
63 dB
Word
Segment
F0
F1
F2
F3
Duration
Intensity
(13/13)
0
Visible part 1.441542 seconds
1.441542
Total duration 1.441542 seconds

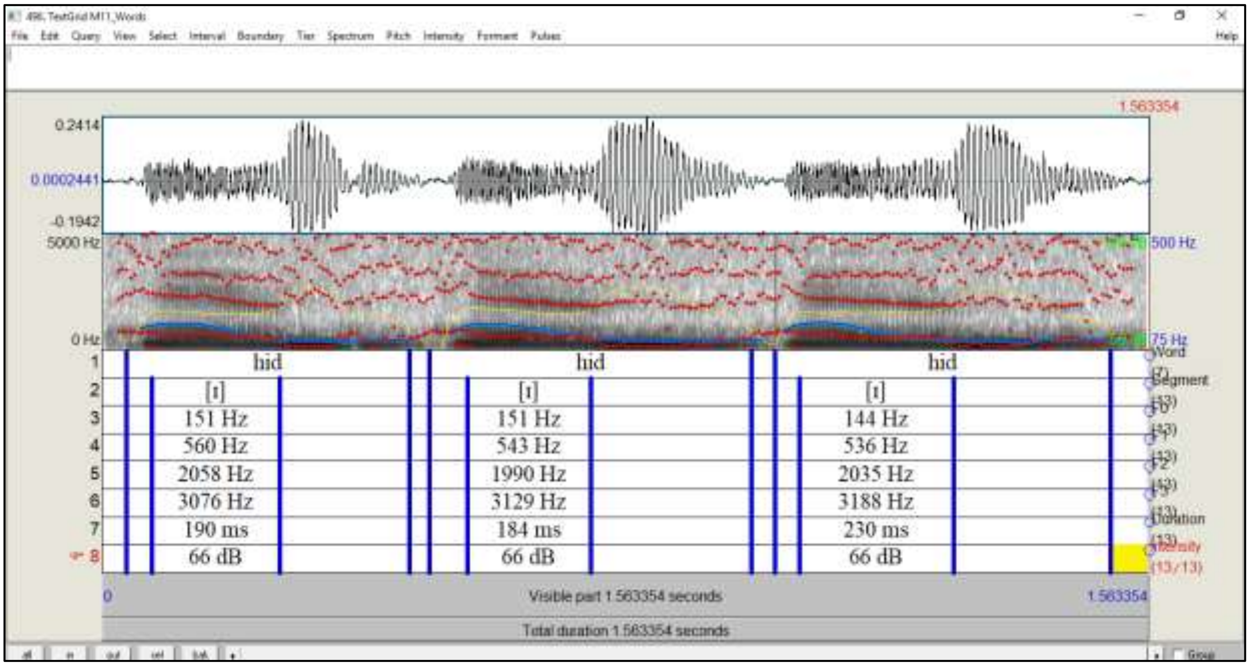


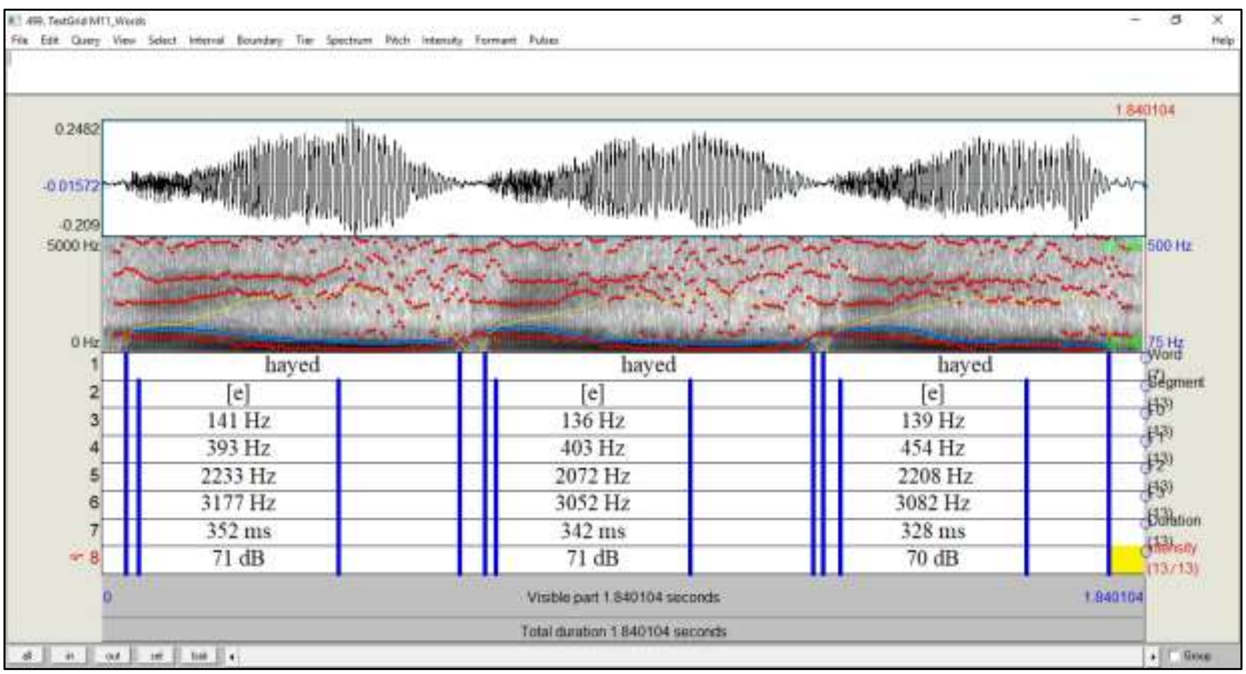
File Edit Query View Select Interval Boundary Tier Spectrum Pitch Intensity Formant Pulses
Help
1.325979
0.107
-0.00119
-0.1205
5000 Hz
0 Hz
500 Hz
75 Hz
who'd
who'd
who'd
[u]
[u]
[u]
115 Hz
126 Hz
115 Hz
315 Hz
338 Hz
348 Hz
922 Hz
917 Hz
954 Hz
2865 Hz
3188 Hz
3084 Hz
244 ms
222 ms
224 ms
62 dB
61 dB
61 dB
Word
Segment
F0
F1
F2
F3
Duration
Intensity
(13/13)
0
Visible part 1.325979 seconds
1.325979
Total duration 1.325979 seconds

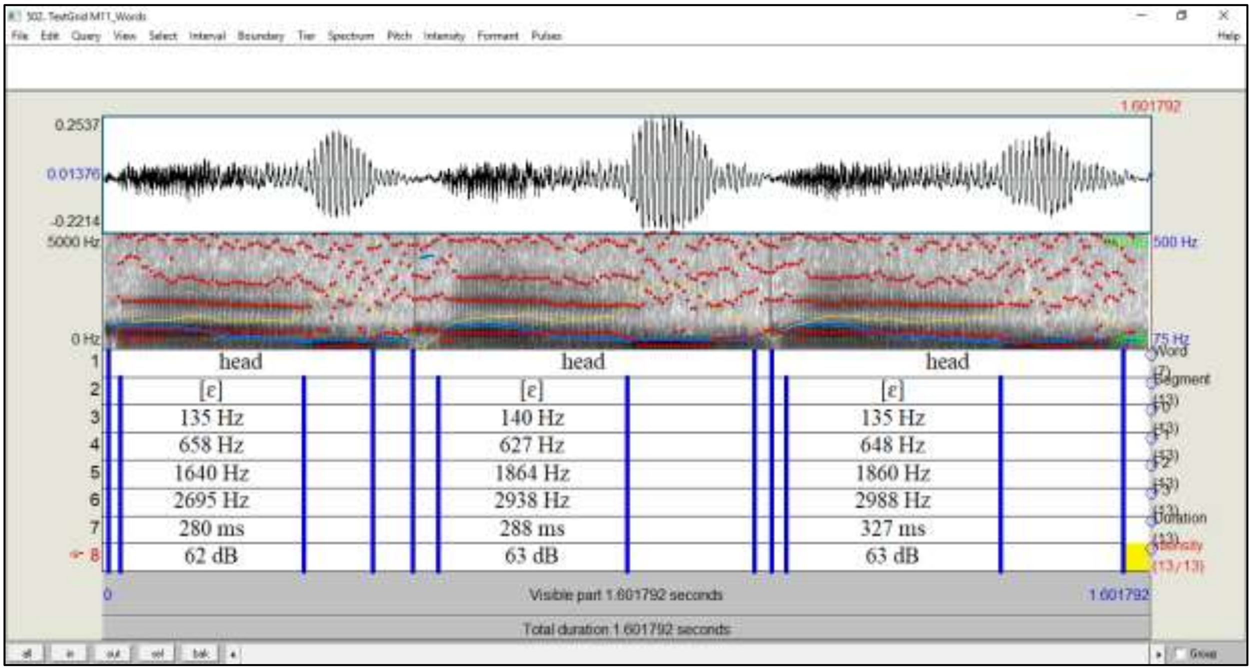

1.120417
0.1671
0.0001221
-0.1446
5000 Hz
0 Hz
500 Hz
75 Hz
hud
hud
hud
[ʌ]
[ʌ]
[ʌ]
132 Hz
120 Hz
107 Hz
685 Hz
684 Hz
673 Hz
971 Hz
960 Hz
957 Hz
2704 Hz
3032 Hz
3125 Hz
159 ms
239 ms
168 ms
69 dB
68 dB
66 dB
Word
Segment
F0
F1
F2
F3
Duration
Intensity
Visible part 1.120417 seconds
Total duration 1.120417 seconds

M7

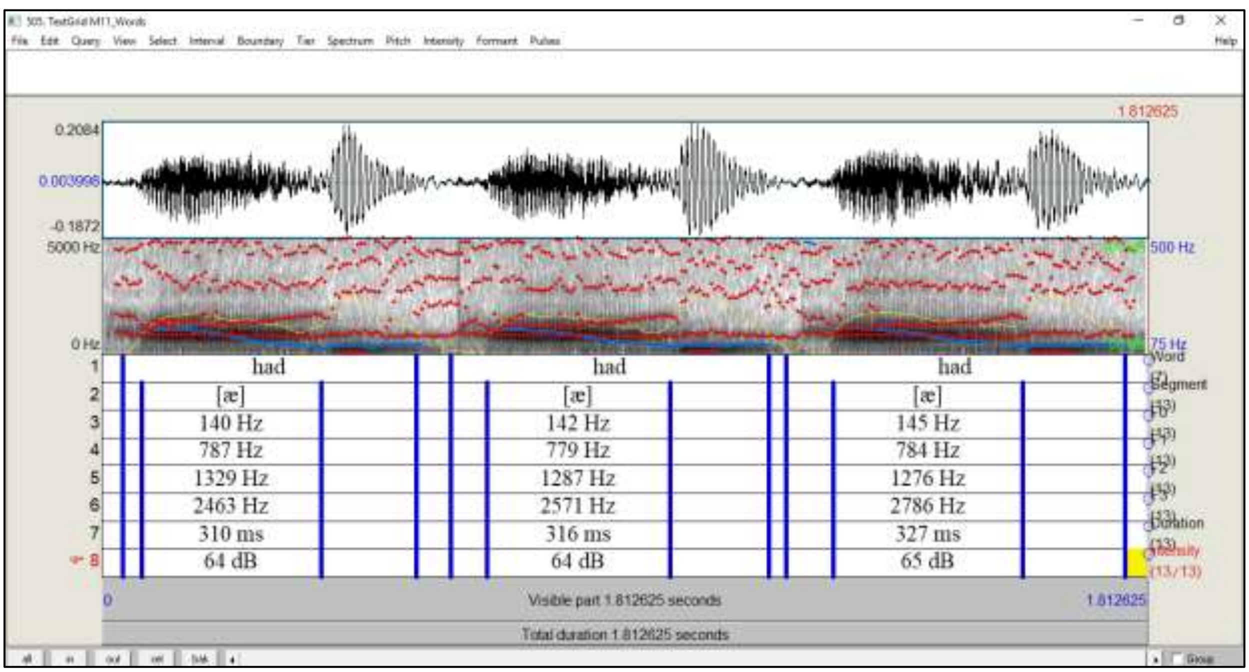

1.773375
0.2425
0.00705
-0.2185
5000 Hz
0 Hz
500 Hz
75 Hz
heed
heed
heed
[i]
[i]
[i]
159 Hz
162 Hz
168 Hz
212 Hz
203 Hz
225 Hz
2133 Hz
1711 Hz
1601 Hz
3160 Hz
3078 Hz
2973 Hz
213 ms
270 ms
257 ms
75 dB
74 dB
74 dB
Word
Segment
Duration
Intensity
Visible part 1.773375 seconds
Total duration 1.773375 seconds


hid
[ɪ]
151 Hz
560 Hz
2058 Hz
3076 Hz
190 ms
66 dB
hid
[ɪ]
151 Hz
543 Hz
1990 Hz
3129 Hz
184 ms
66 dB
hid
[ɪ]
144 Hz
536 Hz
2035 Hz
3188 Hz
230 ms
66 dB
Visible part 1.563354 seconds
Total duration 1.563354 seconds

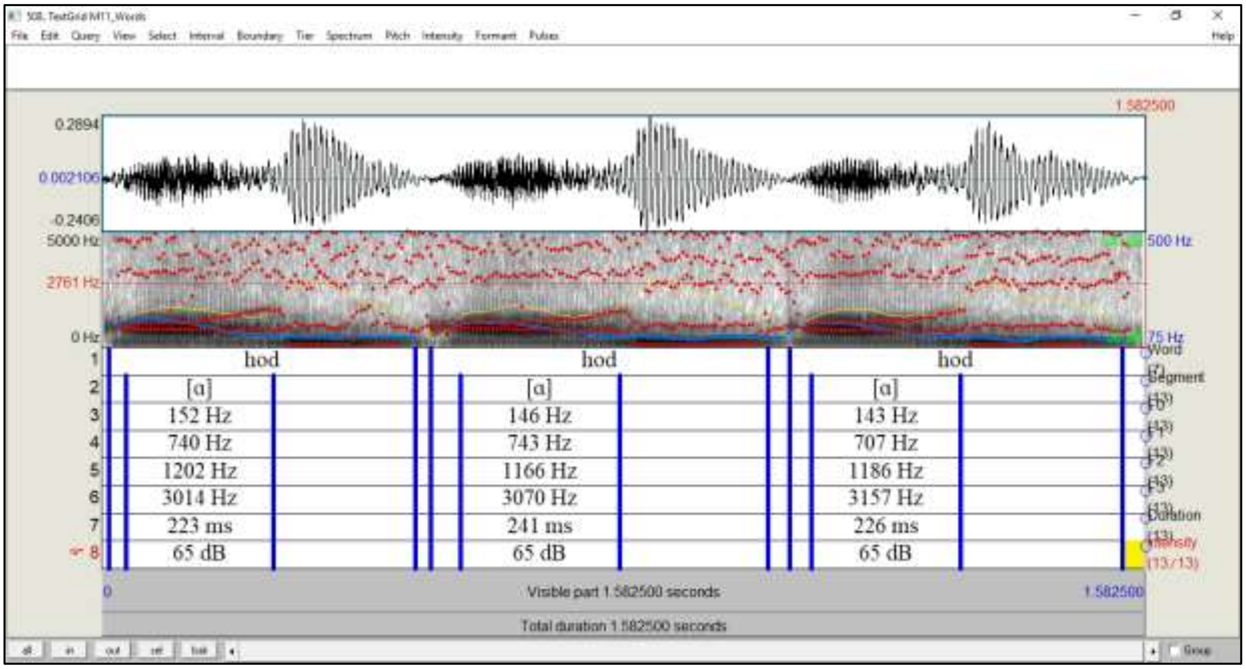

hayed
[e]
141 Hz
393 Hz
2233 Hz
3177 Hz
352 ms
71 dB
hayed
[e]
136 Hz
403 Hz
2072 Hz
3052 Hz
342 ms
71 dB
hayed
[e]
139 Hz
454 Hz
2208 Hz
3082 Hz
328 ms
70 dB
Visible part 1.840104 seconds
Total duration 1.840104 seconds

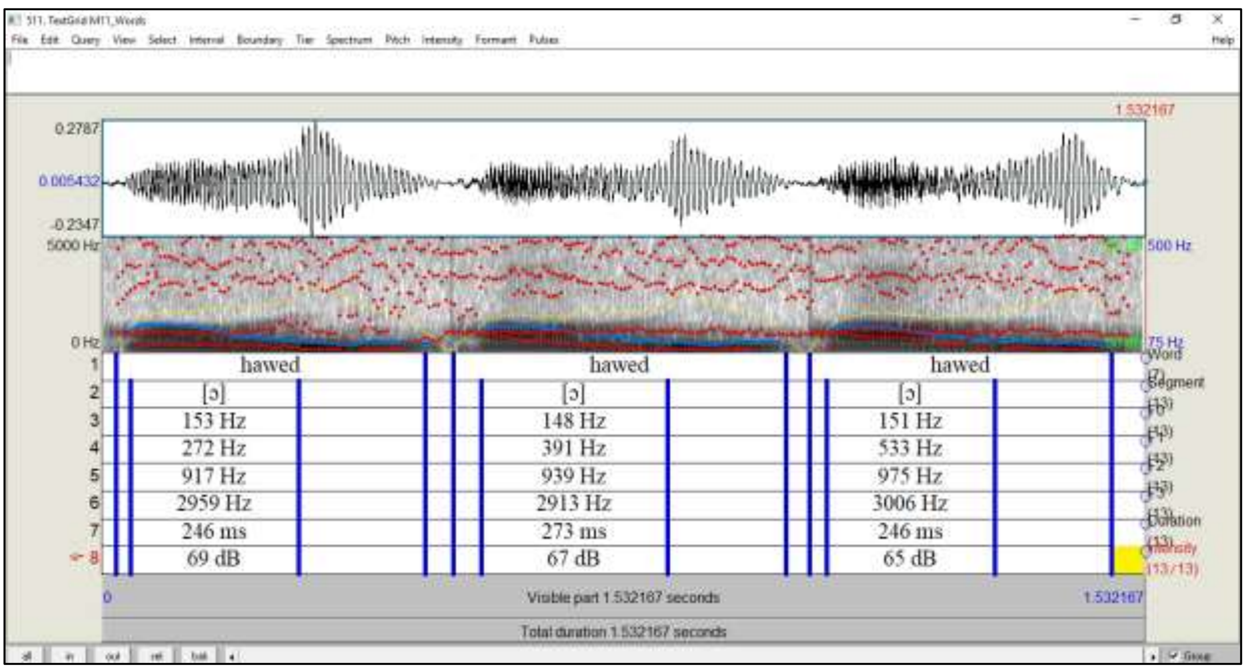


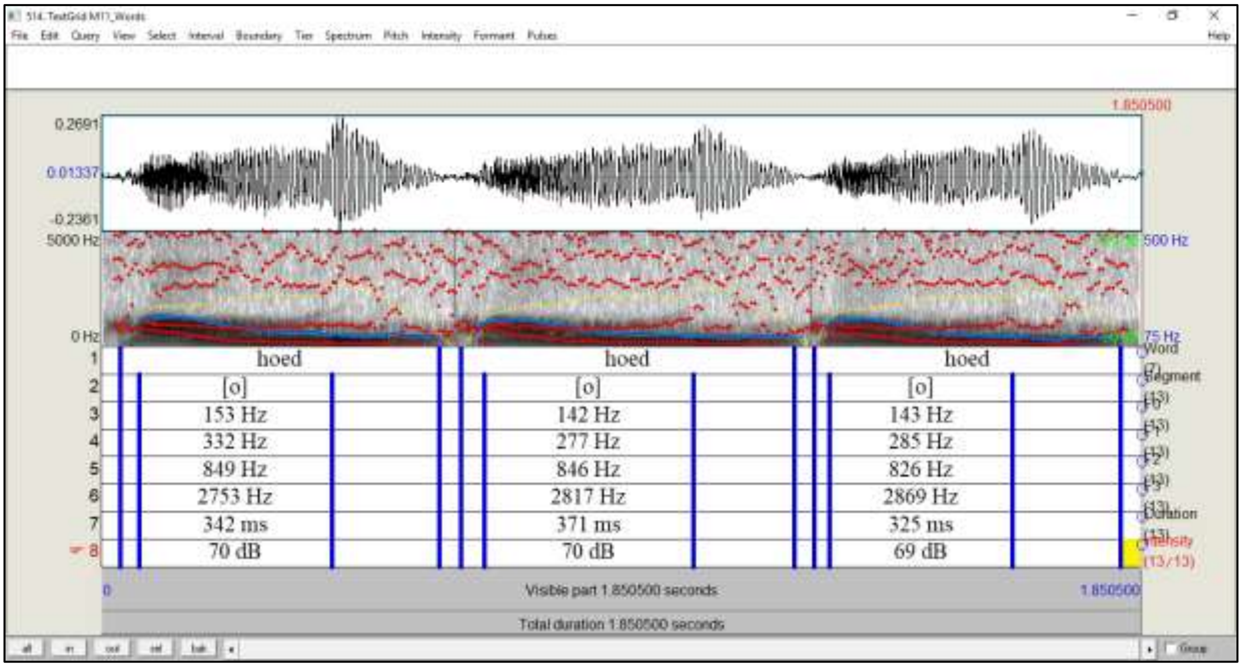
File Edit Query View Select Interval Boundary Tier Spectrum Pitch Intensity Formant Pulses
Help
1.601792
0.2537
0.01376
-0.2214
5000 Hz
0 Hz
500 Hz
75 Hz
head
head
head
[ɛ]
[ɛ]
[ɛ]
135 Hz
140 Hz
135 Hz
658 Hz
627 Hz
648 Hz
1640 Hz
1864 Hz
1860 Hz
2695 Hz
2938 Hz
2988 Hz
280 ms
288 ms
327 ms
62 dB
63 dB
63 dB
Word
Segment
Duration
Intensity
(13/13)
0
Visible part 1.601792 seconds
1.601792
Total duration 1.601792 seconds

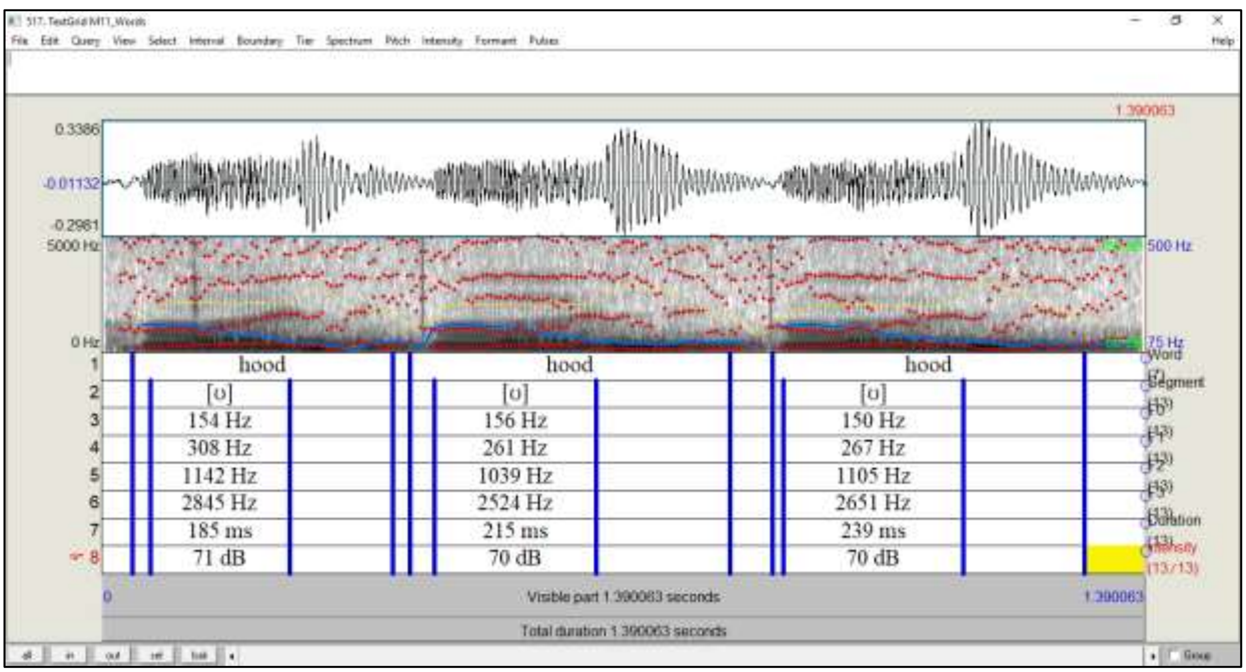


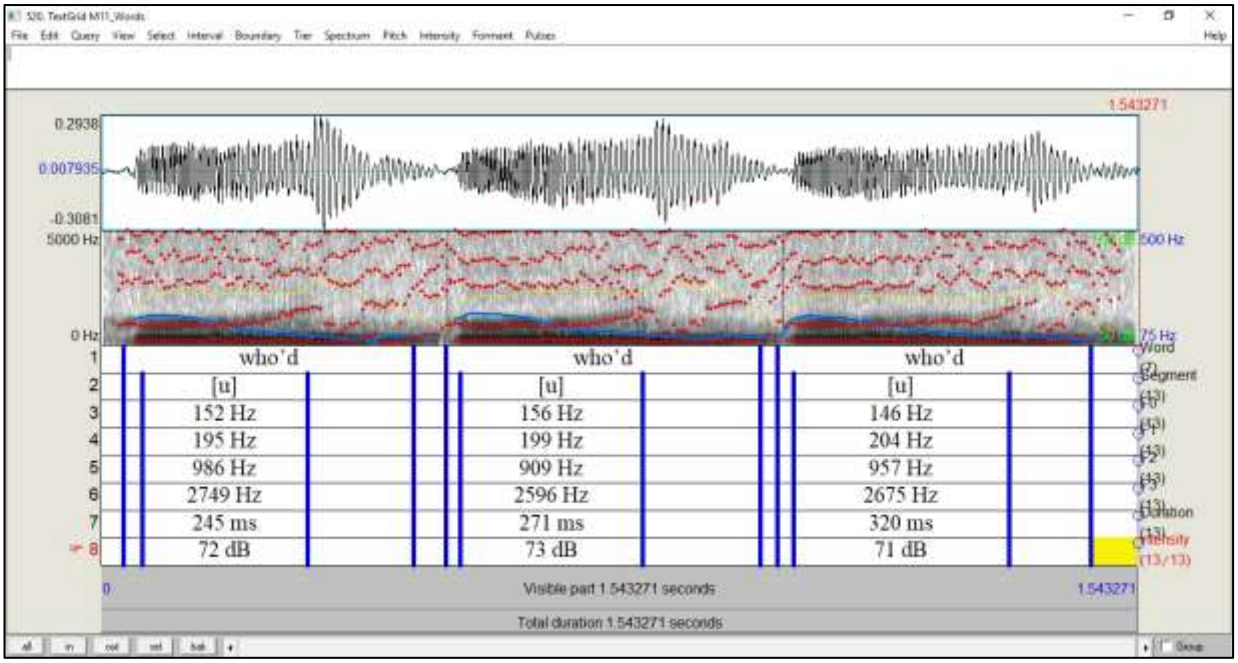
File Edit Query View Select Interval Boundary Tier Spectrum Pitch Intensity Formant Pulses
Help
1.812625
0.2084
0.003998
-0.1872
5000 Hz
0 Hz
500 Hz
75 Hz
had
had
had
[æ]
[æ]
[æ]
140 Hz
142 Hz
145 Hz
787 Hz
779 Hz
784 Hz
1329 Hz
1287 Hz
1276 Hz
2463 Hz
2571 Hz
2786 Hz
310 ms
316 ms
327 ms
64 dB
64 dB
65 dB
Word
Segment
Duration
Intensity
(13/13)
0
Visible part 1.812625 seconds
1.812625
Total duration 1.812625 seconds


hod
[ɑ]
152 Hz
740 Hz
1202 Hz
3014 Hz
223 ms
65 dB
hod
[ɑ]
146 Hz
743 Hz
1166 Hz
3070 Hz
241 ms
65 dB
hod
[ɑ]
143 Hz
707 Hz
1186 Hz
3157 Hz
226 ms
65 dB
Visible part 1.582500 seconds
Total duration 1.582500 seconds

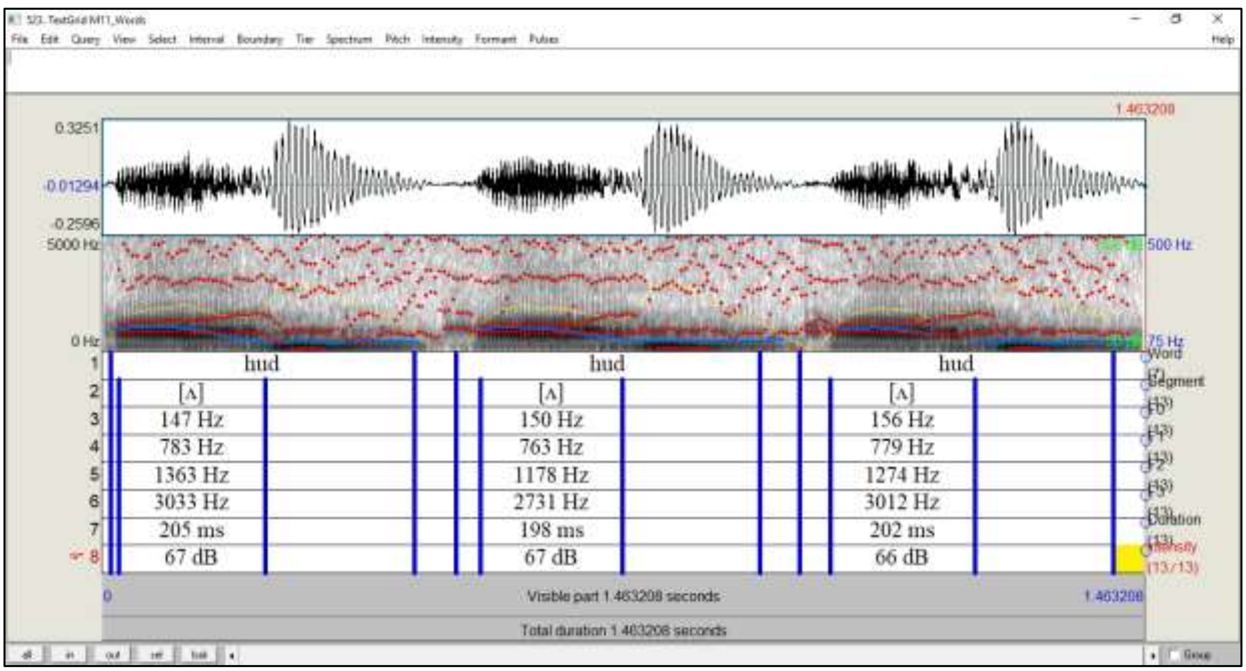

hawed
[ɔ]
153 Hz
272 Hz
917 Hz
2959 Hz
246 ms
69 dB
hawed
[ɔ]
148 Hz
391 Hz
939 Hz
2913 Hz
273 ms
67 dB
hawed
[ɔ]
151 Hz
533 Hz
975 Hz
3006 Hz
246 ms
65 dB
Visible part 1.532167 seconds
Total duration 1.532167 seconds


1.850500
0.2691
0.01337
-0.2361
5000 Hz
0 Hz
500 Hz
75 Hz
hoed
hoed
hoed
[o]
[o]
[o]
153 Hz
142 Hz
143 Hz
332 Hz
277 Hz
285 Hz
849 Hz
846 Hz
826 Hz
2753 Hz
2817 Hz
2869 Hz
342 ms
371 ms
325 ms
70 dB
70 dB
69 dB
Visible part 1.850500 seconds
Total duration 1.850500 seconds


1.390063
0.3386
-0.01132
-0.2981
5000 Hz
0 Hz
500 Hz
75 Hz
hood
hood
hood
[ʊ]
[ʊ]
[ʊ]
154 Hz
156 Hz
150 Hz
308 Hz
261 Hz
267 Hz
1142 Hz
1039 Hz
1105 Hz
2845 Hz
2524 Hz
2651 Hz
185 ms
215 ms
239 ms
71 dB
70 dB
70 dB
Visible part 1.390063 seconds
Total duration 1.390063 seconds

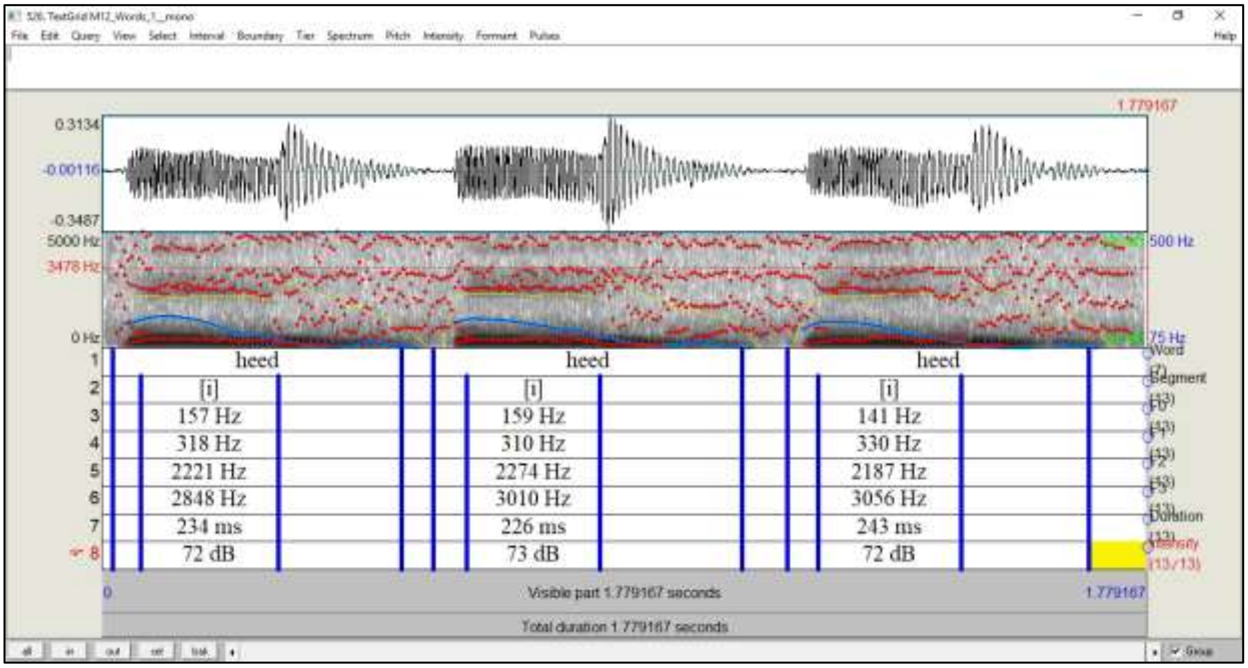


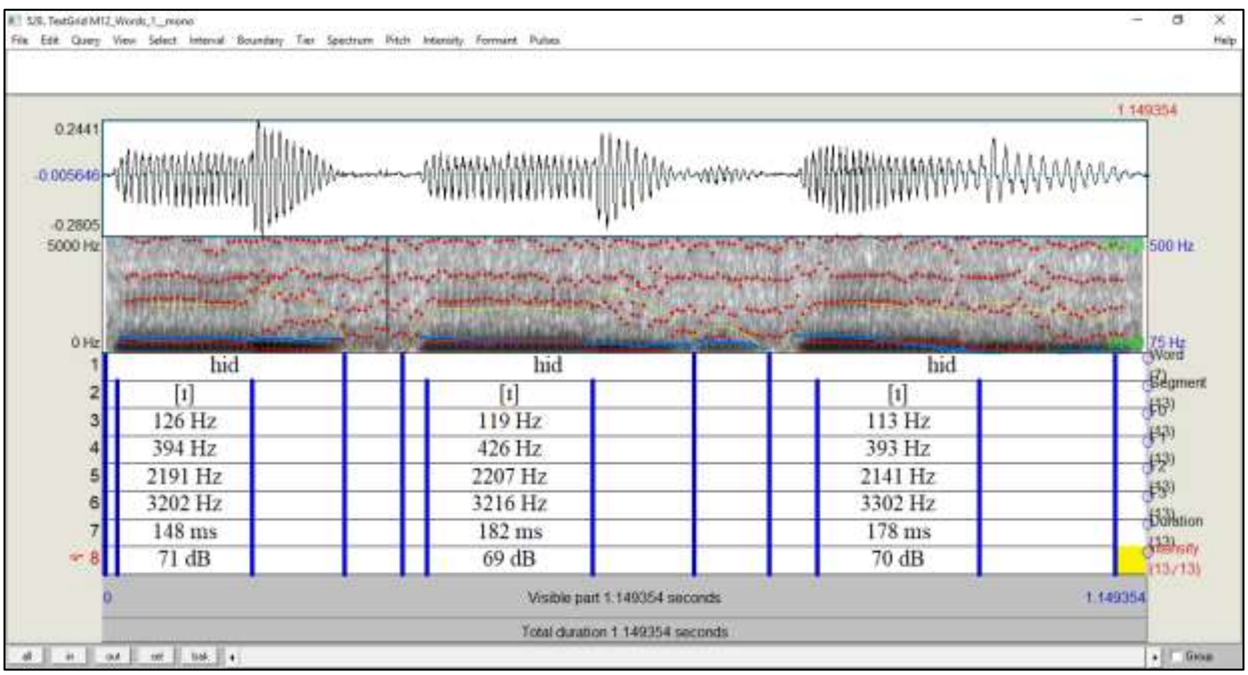
File Edit Query View Select Interval Boundary Tier Spectrum Pitch Intensity Formant Pulses
Help
1.543271
0.2938
0.007935
-0.3081
5000 Hz
0 Hz
500 Hz
75 Hz
who'd
who'd
who'd
[u]
[u]
[u]
152 Hz
156 Hz
146 Hz
195 Hz
199 Hz
204 Hz
986 Hz
909 Hz
957 Hz
2749 Hz
2596 Hz
2675 Hz
245 ms
271 ms
320 ms
72 dB
73 dB
71 dB
Word
Segment
Duration
(13/13)
Visible part 1.543271 seconds
Total duration 1.543271 seconds

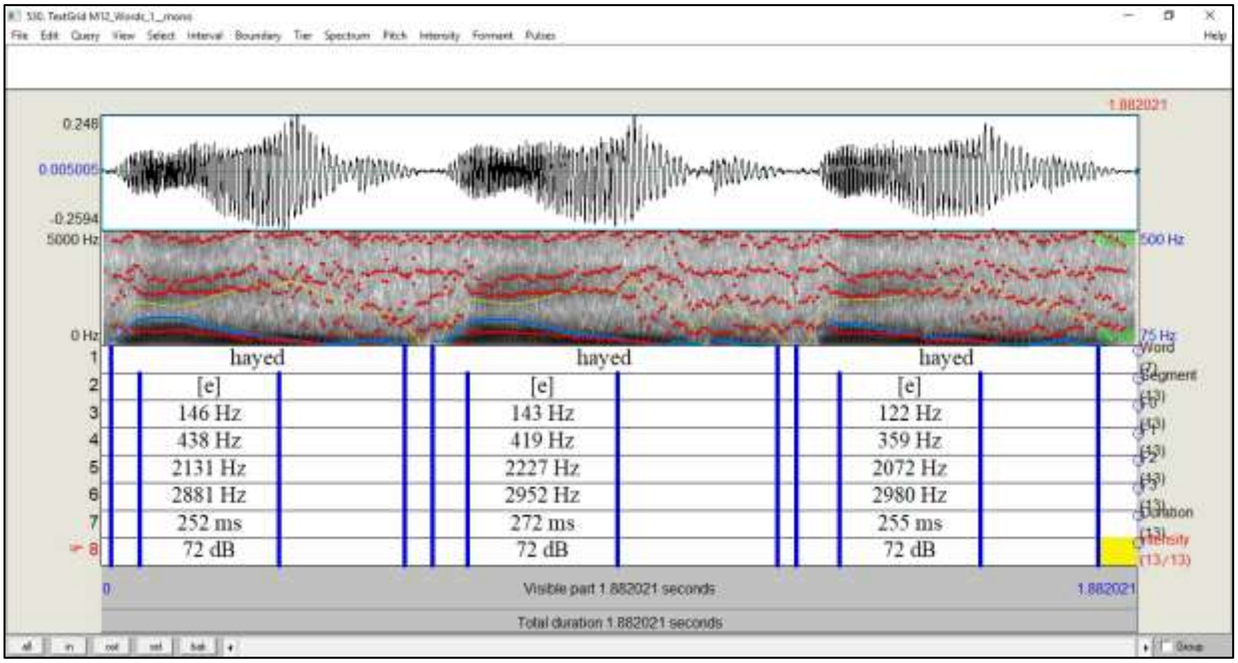


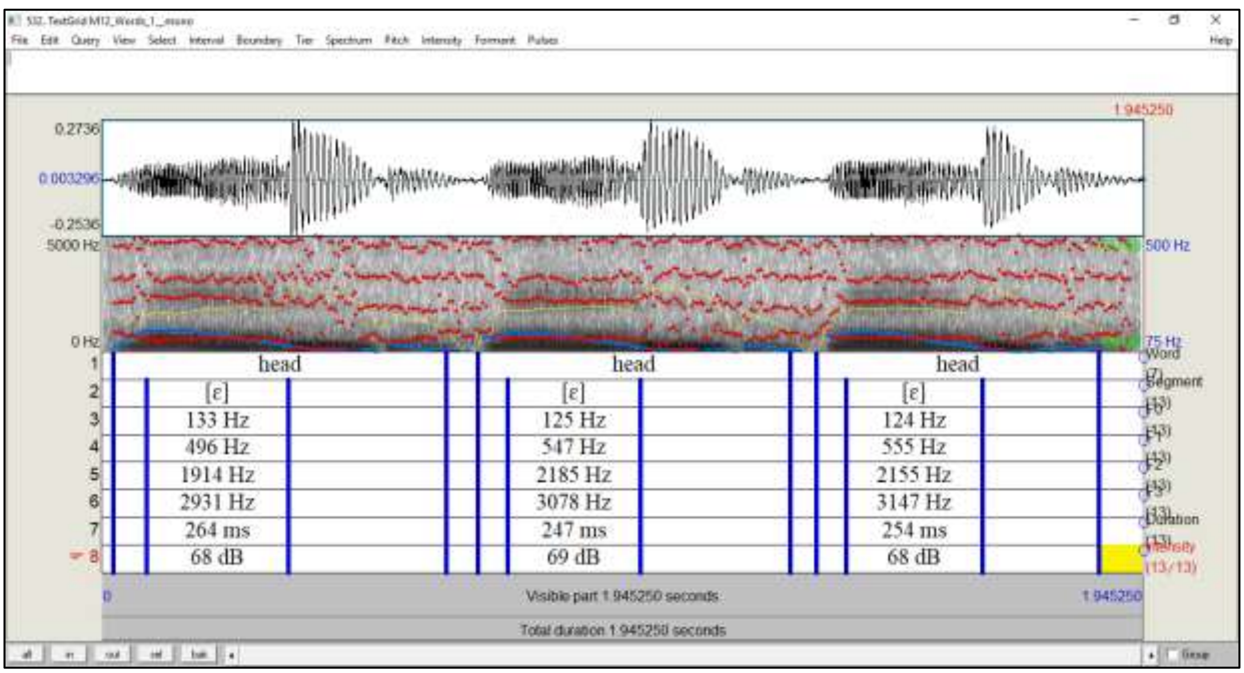
File Edit Query View Select Interval Boundary Tier Spectrum Pitch Intensity Formant Pulses
Help
1.463208
0.3251
-0.01294
-0.2596
5000 Hz
0 Hz
500 Hz
75 Hz
hud
hud
hud
[ʌ]
[ʌ]
[ʌ]
147 Hz
150 Hz
156 Hz
783 Hz
763 Hz
779 Hz
1363 Hz
1178 Hz
1274 Hz
3033 Hz
2731 Hz
3012 Hz
205 ms
198 ms
202 ms
67 dB
67 dB
66 dB
Word
Segment
Duration
(13/13)
Visible part 1.463208 seconds
Total duration 1.463208 seconds

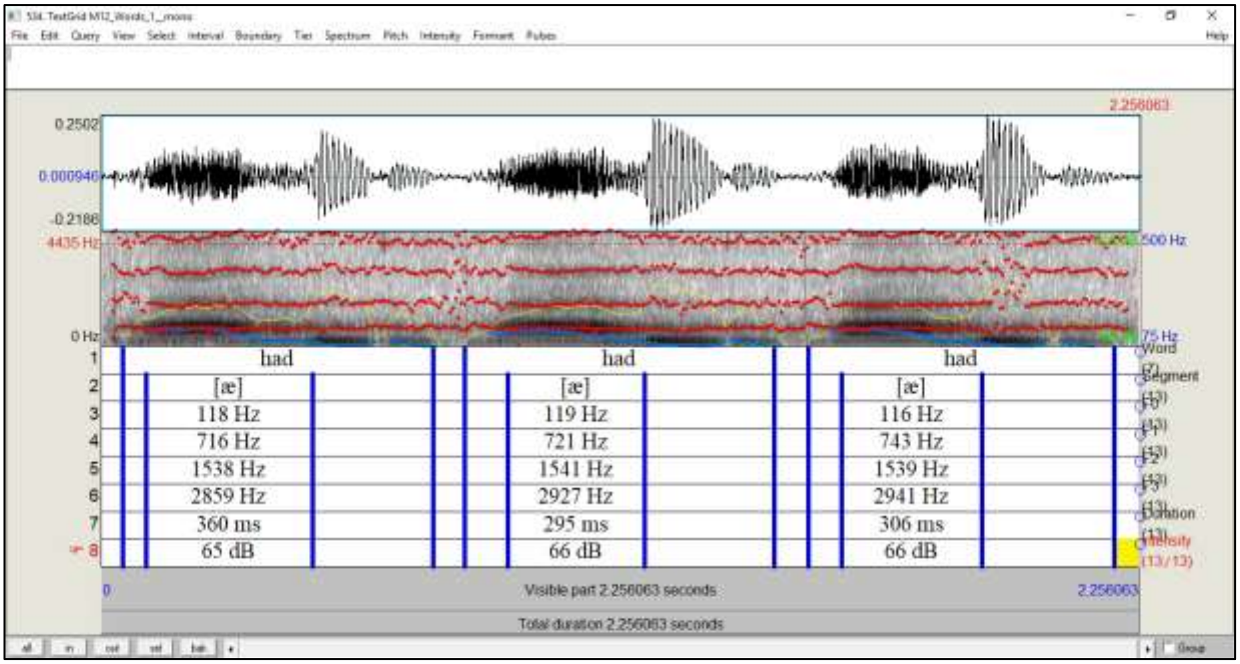
M8


heed
[i]
157 Hz
318 Hz
2221 Hz
2848 Hz
234 ms
72 dB
heed
[i]
159 Hz
310 Hz
2274 Hz
3010 Hz
226 ms
73 dB
heed
[i]
141 Hz
330 Hz
2187 Hz
3056 Hz
243 ms
72 dB
Visible part 1.779167 seconds
Total duration 1.779167 seconds

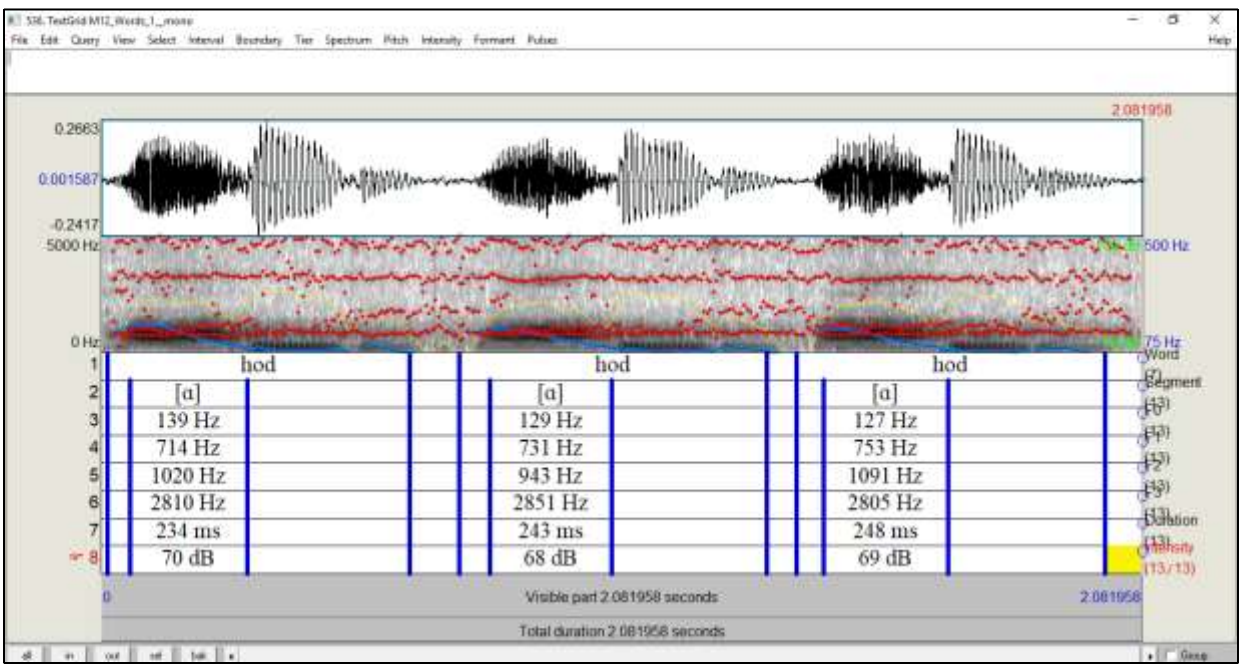

hid
[ɪ]
126 Hz
394 Hz
2191 Hz
3202 Hz
148 ms
71 dB
hid
[ɪ]
119 Hz
426 Hz
2207 Hz
3216 Hz
182 ms
69 dB
hid
[ɪ]
113 Hz
393 Hz
2141 Hz
3302 Hz
178 ms
70 dB
Visible part 1.149354 seconds
Total duration 1.149354 seconds


1.882021
0.248
0.005005
-0.2594
5000 Hz
0 Hz
500 Hz
75 Hz
hayed
[e]
146 Hz
438 Hz
2131 Hz
2881 Hz
252 ms
72 dB
hayed
[e]
143 Hz
419 Hz
2227 Hz
2952 Hz
272 ms
72 dB
hayed
[e]
122 Hz
359 Hz
2072 Hz
2980 Hz
255 ms
72 dB
Word
Segment
F0
F1
F2
F3
Duration
Intensity
(13/13)
Visible part 1.882021 seconds
Total duration 1.882021 seconds

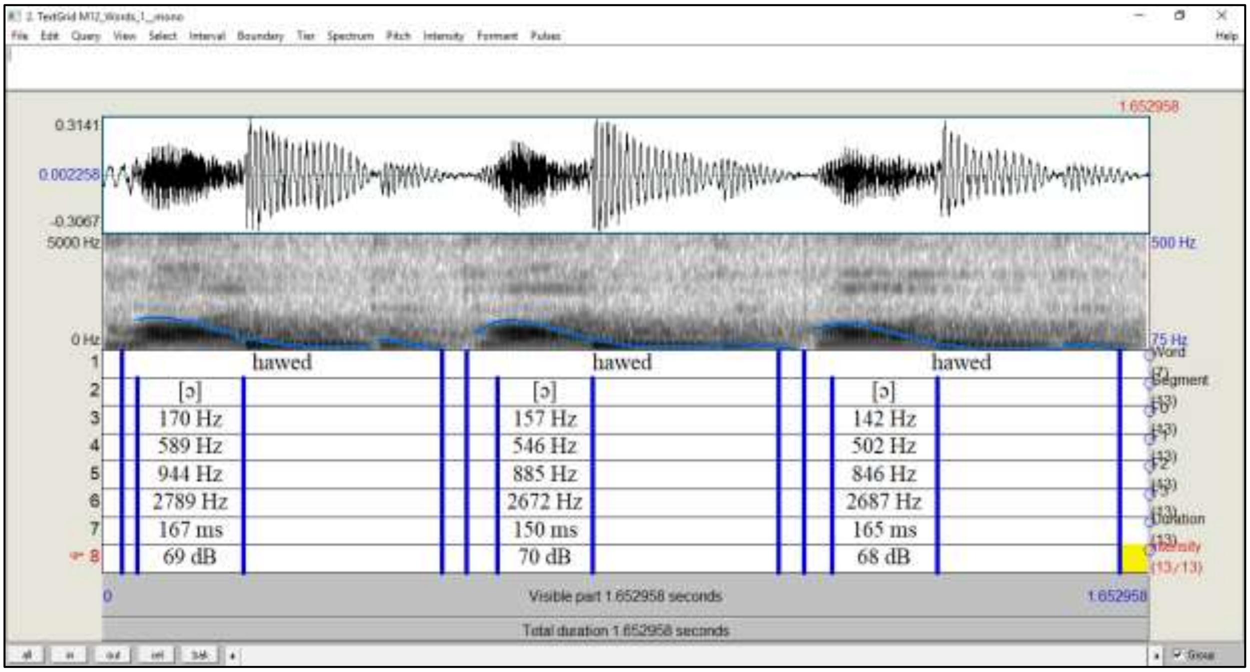

1.945250
0.2736
0.003296
-0.2536
5000 Hz
0 Hz
500 Hz
75 Hz
head
[ɛ]
133 Hz
496 Hz
1914 Hz
2931 Hz
264 ms
68 dB
head
[ɛ]
125 Hz
547 Hz
2185 Hz
3078 Hz
247 ms
69 dB
head
[ɛ]
124 Hz
555 Hz
2155 Hz
3147 Hz
254 ms
68 dB
Word
Segment
F0
F1
F2
F3
Duration
Intensity
(13/13)
Visible part 1.945250 seconds
Total duration 1.945250 seconds

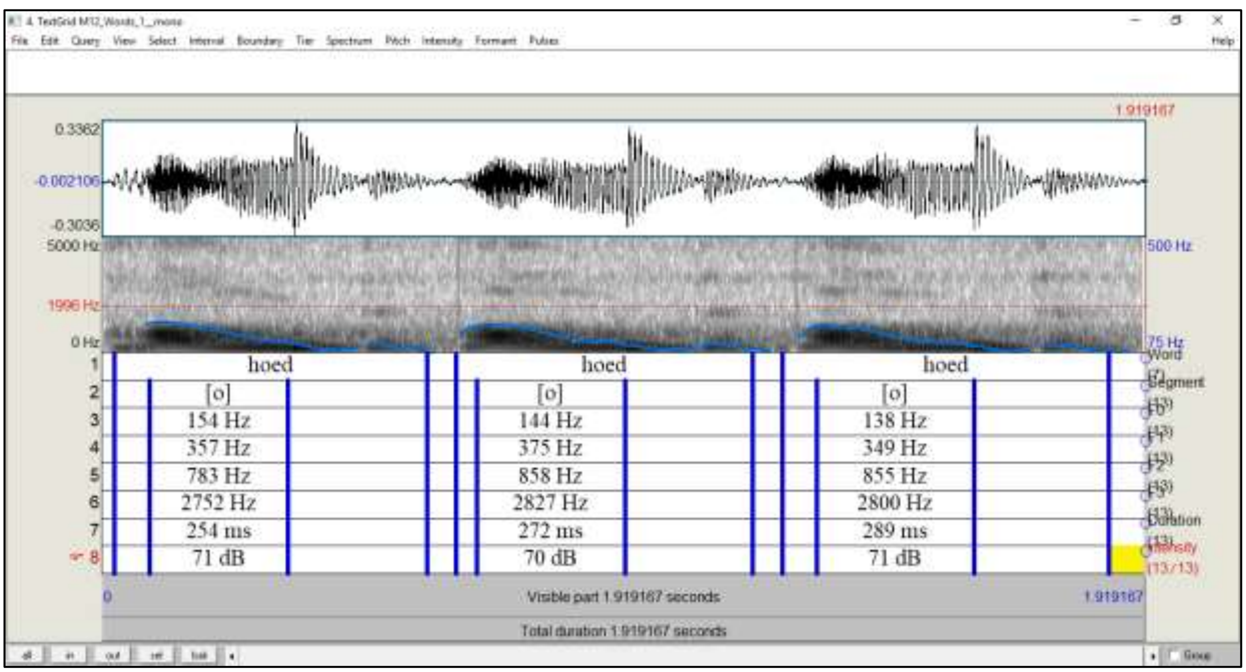


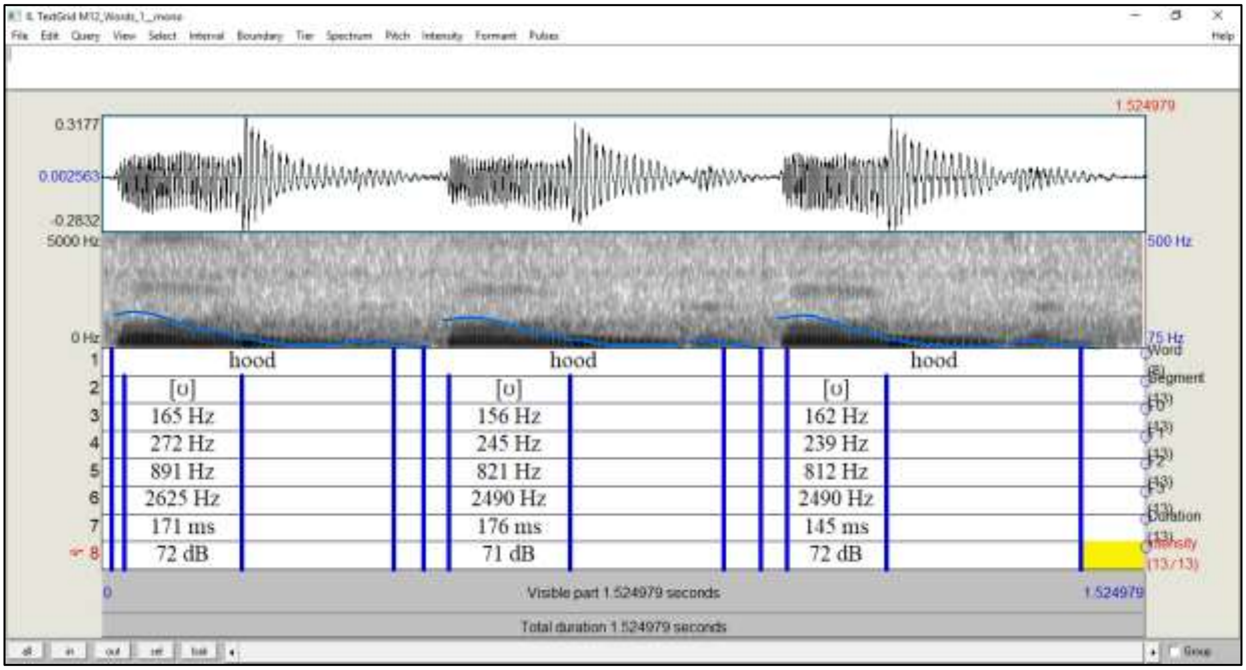
2.256063
0.2502
0.000946
-0.2186
4435 Hz
0 Hz
500 Hz
75 Hz
had
had
had
[æ]
[æ]
[æ]
118 Hz
119 Hz
116 Hz
716 Hz
721 Hz
743 Hz
1538 Hz
1541 Hz
1539 Hz
2859 Hz
2927 Hz
2941 Hz
360 ms
295 ms
306 ms
65 dB
66 dB
66 dB
Word
Segment
Duration
(13/13)
Visible part 2.256063 seconds
Total duration 2.256063 seconds

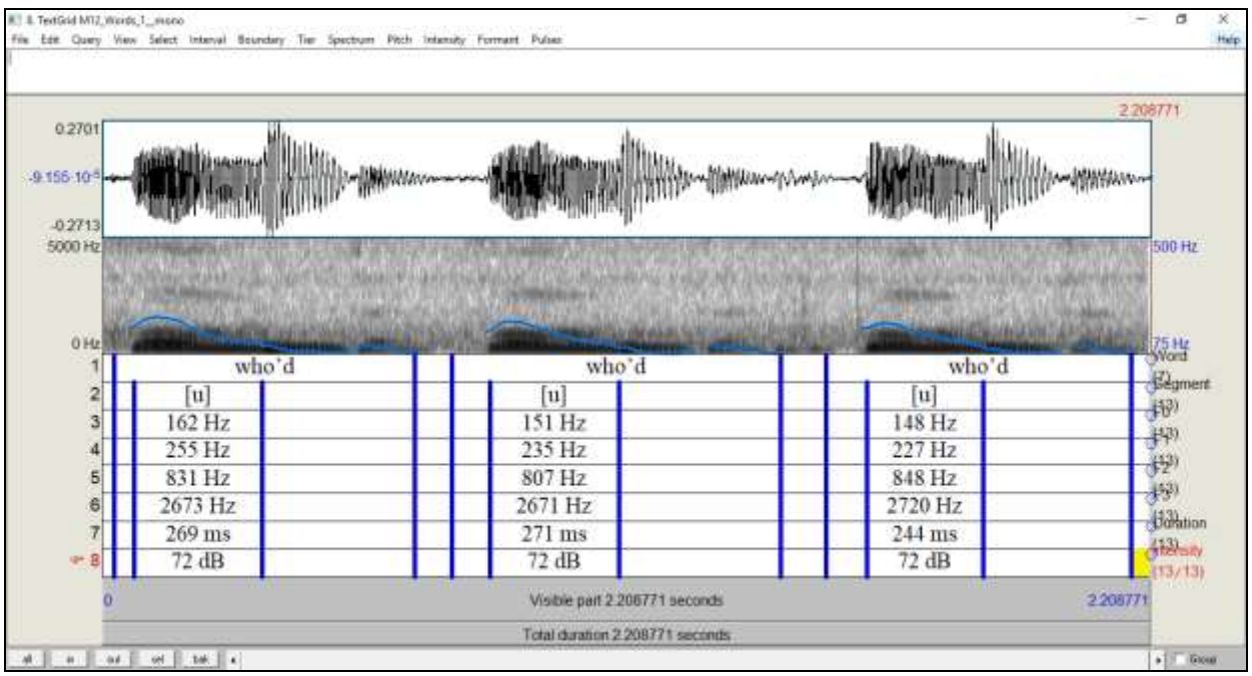


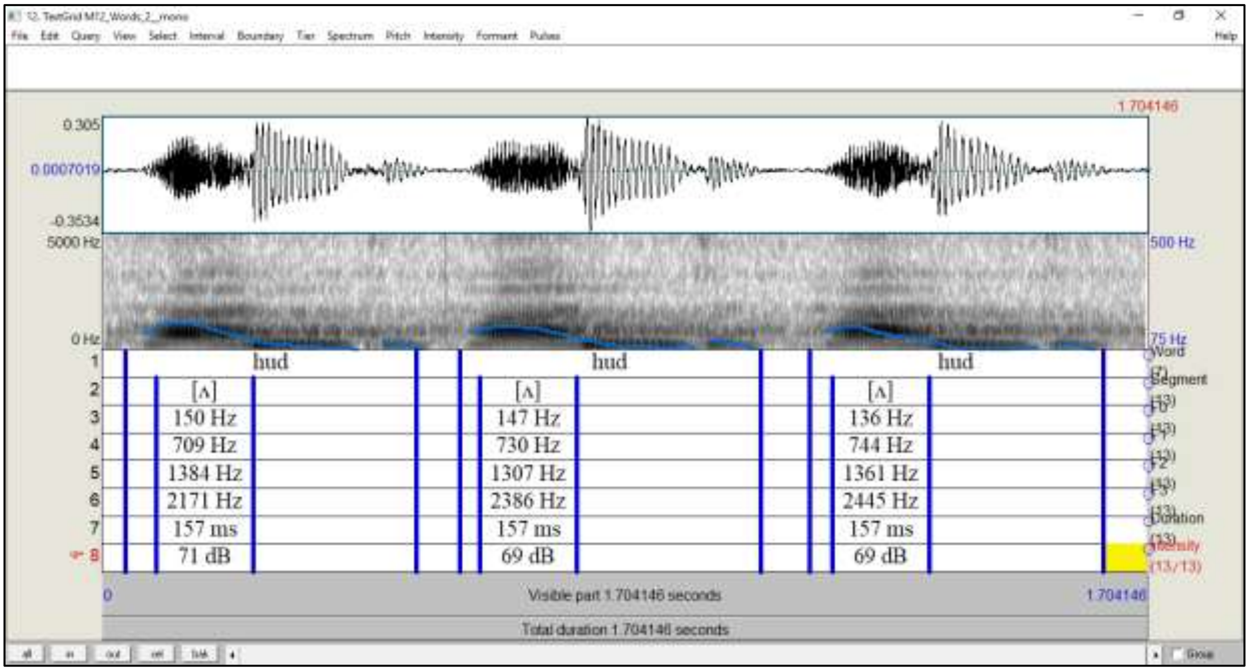
2.081958
0.2663
0.001587
-0.2417
5000 Hz
0 Hz
500 Hz
75 Hz
hod
hod
hod
[ɑ]
[ɑ]
[ɑ]
139 Hz
129 Hz
127 Hz
714 Hz
731 Hz
753 Hz
1020 Hz
943 Hz
1091 Hz
2810 Hz
2851 Hz
2805 Hz
234 ms
243 ms
248 ms
70 dB
68 dB
69 dB
Word
Segment
Duration
(13/13)
Visible part 2.081958 seconds
Total duration 2.081958 seconds


1.652958
0.3141
0.002258
-0.3067
5000 Hz
0 Hz
500 Hz
75 Hz
hawed
hawed
hawed
[ɔ]
[ɔ]
[ɔ]
170 Hz
157 Hz
142 Hz
589 Hz
546 Hz
502 Hz
944 Hz
885 Hz
846 Hz
2789 Hz
2672 Hz
2687 Hz
167 ms
150 ms
165 ms
69 dB
70 dB
68 dB
Word
Segment
Duration
Intensity
(13/13)
0
Visible part 1.652958 seconds
1.652958
Total duration 1.652958 seconds


1.919167
0.3362
-0.002106
-0.3036
5000 Hz
1996 Hz
0 Hz
500 Hz
75 Hz
hoed
hoed
hoed
[o]
[o]
[o]
154 Hz
144 Hz
138 Hz
357 Hz
375 Hz
349 Hz
783 Hz
858 Hz
855 Hz
2752 Hz
2827 Hz
2800 Hz
254 ms
272 ms
289 ms
71 dB
70 dB
71 dB
Word
Segment
Duration
Intensity
(13/13)
0
Visible part 1.919167 seconds
1.919167
Total duration 1.919167 seconds


hood
[ʊ]
165 Hz
272 Hz
891 Hz
2625 Hz
171 ms
72 dB
hood
[ʊ]
156 Hz
245 Hz
821 Hz
2490 Hz
176 ms
71 dB
hood
[ʊ]
162 Hz
239 Hz
812 Hz
2490 Hz
145 ms
72 dB
Visible part 1.524979 seconds
Total duration 1.524979 seconds


who'd
[u]
162 Hz
255 Hz
831 Hz
2673 Hz
269 ms
72 dB
who'd
[u]
151 Hz
235 Hz
807 Hz
2671 Hz
271 ms
72 dB
who'd
[u]
148 Hz
227 Hz
848 Hz
2720 Hz
244 ms
72 dB
Visible part 2.208771 seconds
Total duration 2.208771 seconds


12. TextGrid M12_Words_2_mono
File Edit Query View Select Interval Boundary Tier Spectrum Pitch Intensity Formant Pulses Help
1.704146
0.305
0.0007019
-0.3534
5000 Hz
0 Hz
500 Hz
75 Hz
hud
hud
hud
[ʌ]
150 Hz
709 Hz
1384 Hz
2171 Hz
157 ms
71 dB
[ʌ]
147 Hz
730 Hz
1307 Hz
2386 Hz
157 ms
69 dB
[ʌ]
136 Hz
744 Hz
1361 Hz
2445 Hz
157 ms
69 dB
Word
Segment
Duration
(13/13)
Visible part 1.704146 seconds
Total duration 1.704146 seconds