Finns speaking English: Foreign accent on intonation and consonant clusters

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### Abbreviations

What follows are all abbreviations that are used in glosses throughout this thesis, arranged alphabetically.

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Meaning</th>
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<tr>
<td>3</td>
<td>Third person/Third</td>
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<tr>
<td>ADD</td>
<td>Addessive</td>
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<td>ALL</td>
<td>Allative</td>
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<td>Question particle</td>
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An addessive and an allative are two noun cases, which fall within the category of locatives in Finnish. Where the addessive traditionally indicates a location (at), the allative indicates a direction (towards). There is one occasion where there’s spoken about a third infinitive. This is an infinitive that is used in Finnish to indicate a direction for a verb, for example in ‘I’m going swimming’, when the actual action of ‘going’ is meant as a mean of transportation towards the swimming.
1. Introduction

This thesis will take a look at elements of foreign accent in Finns speaking English as a second language. The main elements that will be discussed are intonation and consonant clusters. Crystal (2008) defines intonation as “the distinctive use of patterns of pitch, or melody” (Crystal, 2008, p. 252). In everyday language, intonation is often called speech melody or sentence melody (Crystal, 2008). Firstly, a brief introduction to foreign accent and transfer will be given. Then there will follow a brief description of what is known about intonation patterns in Finnish and in English. There will also be an introduction to Finnish phonotactics in relation to consonant clusters. These introductions will serve as some background knowledge to the following questions that this thesis hopes to answer, as well as the associated hypotheses.

1.1 Foreign accent and transfer

When defining an accent, it is important to first state that an accent is not a dialect. Accent has to do with the way we sound when speaking a language. Moyer (2013) states that the way we sound has to do with many factors, such as age, gender, regional background, level of education and social class. The factor that has most to do with foreign accent is the regional background, and more specifically the regional linguistic background. It has to do with the way a native language affects the production of a second language, which leads to a non-native production of the second language you’re speaking. When a native language interferes with a second language, this is called transfer (Moyer, 2013). Transfer can be both positive and negative. Positive transfer occurs when a native sound is produced in the second language, but this has a positive outcome. An example of this is a native speaker of German speaking English and correctly producing an aspirated \(p^h\). This as opposed to a native speaker of Dutch, who doesn’t have the sound \(p^h\) in his native language. A Dutch speaker will pronounce the sound unaspirated as \(p\), which is a result of negative transfer. Negative transfer occurs when a native language falsely interferes with a second language. In this thesis, the focus will lie on negative transfer from Finnish as a native language to English as a second language. The specific areas in which the effects of transfer will be analysed will be intonation patterns of declarative sentences in broad focus and direct yes-no questions, as well as the production of word initial and word final consonant clusters. The reasons behind the choice of these elements will be further explained in the following sections.

1.2 Intonation Patterns of English

Following the hypothesis of Büring (2016), there is an unmarked pitch accent pattern for most, if not all, English sentences. This unmarked pitch accent pattern can be altered by granting focus to a constituent. By doing this, the meaning of the sentence is altered, because different constituents become more prominent. Differing the pitch accent pattern results in a different interpretation of the utterance by the listener, which means that this is a way of assigning meaning to intonation. It is difficult to describe an intuitive or neutral pitch accent
structure, since no sentence is free of emotional factors. Höhle (1982) has, however, formulated a theory that predicts a neutral accent pattern (if there is one), based on grammar. Basing his explanations on Höhle’s theory, Büring (2016) explains the prediction of default accent for English in the following steps, which he calls the ‘toy rules’ for assigning default accent. These are shown in Figure 1.

**Figure 1: Default accent assignment for English (Büring, 2016; p. 7)**

Büring (2016) defines open class elements (OCEs, later also called content words) as nouns, adjectives and main verbs. He also mentions that, in English, the final pitch accent is the strongest, meaning that the most prominent pitch accent will be, in an English neutral accent sentence, on the final OCE of a sentence. When speaking of default accent assignment, you can also speak about the sentence being in broad focus. When shifting certain constituents into focus, these elements are in narrow focus. Causes for elements being in narrow focus can be answering specific questions so that certain phrases receive more value for the listener (see example 1), but it can also be that the speaker needs to emphasize on a specific element in order for the reader to receive the wanted information or to correct a former misunderstanding (see example 2). Another reason for using narrow focus can be a contrast between certain elements (see example 3).

(1)  
a. John plays guiTAR  
b. – Who here plays guitar?  
   - JOHN plays guitar

(2)  
a. Jason Newsted was Metallica’s BASS player  
b. – Jason Newsted is Metallica’s bass player, right?  
   - No, Jason Newsted WAS Metallica’s bass player

(3)  
a. John plays guiTAR and Paul plays BASS  
b. – Who’s who again?  
   - JOHN plays guitar and PAUL plays bass

The capitalized elements in (1), (2) and (3) show the most prominent pitch accent of the expected pronunciation of these sentences. For 1a, 2a and 3a this is the expected neutral pattern of English. In 1b, 2b and 3b, the capitalization shows a non-neutral intonation pattern, meaning that the capitalized elements are in narrow focus in these sentences. These predictions are all based on declarative short sentences. In longer sentences, several sub-
clauses can have their own intonation pattern and sometimes have a pause in between, orthographically marked with a comma.

(4) If you hand me the PAPER, I will write my NAME on it

In both sub-clauses in (4), the prominent pitch accent is on the final OCE, where both sentences are separated by a comma and maybe a spoken pause. Furthermore, yes-no questions have a different intonation pattern than declarative sentences. Even though both declaratives and yes-no questions have a prominent pitch accent on the final OCE, yes-no questions are generally characterized by a rising end. The prominent pitch accent is present as the start of the final rise where a declarative prominent pitch accent is present as a high accent followed by a low end.

1.3 Intonation patterns of Finnish

According to Arnhold (2014), Finnish is generally described as a language with little variation in terms of intonational contours. Arnhold (2016) describes Finnish intonation contour in broad focus as a series of rise-falls, which appear on all content words except for the finite verb. The height of the rise-falls decreases throughout the sentence. It should also be noted that primary stress always falls on the first syllable in Finnish, which means that the pitch accent also lies on the first syllable of a content word. This then means that sentences starting with a content word have the prominent pitch accent at the first syllable of the sentence in Finnish. An example of this intonation pattern can be seen in figure 2, with an explanation of the sentence given in example 5.

(5) Leila men-i illa-lla ui-maan myllylle
Leila go-3.SG.PST evening-ADD swim-3.INF mill-ALL
“Leila went swimming in the evening near the mill”

Figure 2: intonation pattern of the sentence “Leila meni illalla uimaan myllylle” (Välimaa-Blum, 1988, pp. 103)

It is visible that there are rise-falls on all content words, except for meni, which is the finite verb. The rise-falls also decrease in height until the end of the sentence.

Arnhold (2014) has also found that Finnish can best be described as a phrase language, in the sense of Féry (2010). Féry describes phrase languages as languages that display little change
in tonal structure as an effect of information structure. “This kind of pragmatic meaning is expressed by morpho-syntactic variation rather than by local prosody, as is common in intonation languages” (Féry, 2010, p. 295). Féry sees intonation languages as languages with a “rich array of pragmatically triggered phrasal tones on top of pitch accent” (Féry, 2010, p. 291). They are furthermore described as languages where the form of tonal events varies and is flexible, and where changes of information structure affect prosody.

Arnhold (2016) has carried out a study which showed that Finnish can also show a larger F0 range, as well as longer duration, larger intensity range and be accompanied by more pauses when in narrow focus. However, in her research, the spoken sentences were already given. Participants were given example sentences which they had to use as answers to questions. Based on the type of question, different intonation patterns were expected and also shown by the participants, but they did not get the option to change the order of the words. This seems an illogical choice, when one of the reasons that Finnish generally does not have much variation in intonation, is the fact that word order is relatively free. The free word order can thus be a useful instrument for granting focus to certain elements. When moving an element to the front of the sentence, the intonation pattern can remain the same while the focus still shifts to that constituent.

Variation, such as a final rise, in Finnish intonation is said to be rare. According to Kallioinen (1968) there are, however, several situations where Finnish can have a final rise in colloquial speech, something that will be discussed more extensively in 6.1.3. Furthermore, final rise can occur in utterances ending on the word vai (or?) and in monosyllabic interrogative utterances such as niin (so?) or no (well?). In general, however, a rising pattern is unexpected in Finnish, also in direct questions. Finnish uses an interrogative particle –ko or –kö after the first word (generally the finite verb in questions) to indicate a question sentence. This particle is one of the examples of morpho-syntactic variation rather than local prosody, as described by Féry (2010). Iivonen (1998) adds that final rise can occur in so-called echo-questions, implying a request to repeat the previous utterance.

1.4 Consonant clusters

It is often said that there are no word initial consonant clusters in Finnish and traditionally this is true. This is visible in a lot of old loan words where consonant clusters are reduced by deleting the first consonant(s) until one remains. Examples are the words tuoli (chair) from Swedish stol and ranta (beach) from Swedish strand. This strategy for reducing a consonant cluster is very unexpected and not in line with theories about syllable structures. Linguists agree that the preferred syllable type follows the Sonority Sequencing Principle (Clements, 1990; Carlisle, 2001). This means that a syllable generally becomes more sonorous towards the nucleus and then decreases in sonority again onto the coda. A principle that is illustrated in a model in figure 3.
This translates to complex onsets, saying that the cluster should grow in sonority towards the nucleus. This means that the initial consonant should always be less sonorous than the next, so a combination of a stop and a liquid is better and easier than a combination of a liquid and a stop. In English, the biggest allowed complex onset is one of three consonants. When there are three consonants, the first one should always be /s/, the second one must then be /p/, /t/ or /k/ and the third consonant must be an approximant /w/, /j/, /r/ or /l/ (Cox, Harrington & Mannell, n.d.). The constraint that wants a stop in second position and an approximant in the third follows the Sonority Sequencing Principle, but the initial /s/ does not. The need for an initial /s/ in three-consonant clusters is present in more languages, such as Dutch and German. Many linguists consider this /s/ not to be part of the cluster, but more as a coda of a previous syllable of which the nucleus is omitted (e.g. Kaye, 1992). Others consider it to be a syllable-preceding appendix (e.g. Goad & Rose, 2004). When looking at child language for reduction strategies, it is found that the least sonorous element of the cluster is remained, regardless of where this element appears in the cluster (Goad & Rose, 2004). This means that a cluster of /sp/ would be pronounced as [p] and a cluster of /str/ would be pronounced as [t] by someone having trouble with a cluster. As is shown in the examples of Finnish loan words above, Finnish does not use this strategy. Traditionally, the last consonant of the cluster remains, regardless of its sonority.

In the previous section it was stated that Finnish does not have word initial clusters. It seems, however, that word initial combinations are becoming more frequent and accepted in Finnish loanwords, such as presidentti (president), planeetta (planet), klarinetti (clarinet). It seems there is a preference for a combination of a stop and a liquid when allowing word initial clusters. Karlsson (1983) already stated this and mentioned that these combination seem to belong to the core of the language, because they feel genuine. Pöchtrager (2001) questions this, however, because he looks at consonant clusters on a higher level than syllables. Finnish often has multiple consonants placed after each other, but most of the time, there is a syllable boundary between them. When not taking that into account, Pöchtrager (2001) noticed that combinations of plosives and liquids are not the most represented group. He also noticed that most of the plosive-liquid combinations are actually loans. However, looking at word initial clusters, one can safely say that the combination of a plosive and a liquid seems to be more accepted than other combinations in Finnish. There are rare cases of initial clusters of three consonants, but they appear only in recent loanwords that are part of slang or internet
language. Examples for this are *striimata* (to stream), *striitti* (the streets) and *skriini* (screen). Consonant clusters in Finnish seem to follow the same rules and constraints as English, considering the Sonority Sequencing Principle. This includes the exception of the word initial /sl/. Word final clusters are also traditionally non-existent in Finnish, with the exception of loanwords and interjections. Less formal spoken language is often full of word final consonant clusters, though, because of vowel omission (Sulkala & Karjalainen, 1992). This is visible, for example, in the elative ending of –sta or –stä, meaning ‘away from the inside of’, or expressing opinion, when assigned to a personal pronoun. The final vowel is often omitted in colloquial language resulting in words ending with –st. Another cause for word final clusters is the question particle of –ko or –kō. This particle is added to the first word of a sentence (usually the finite verb in questions) to indicate a question. In spoken language this particle is often reduced to –ks, as is shown in example 5.

(5)  

a. Mennä-än-kö?  
Go-PASS-Q  
‘Shall we go?’

b. Mennä-ä-ks?  
Go-PASS-Q  
‘Shall we go?’

Above that, final vowels are often omitted in general, creating word final consonant clusters. *Kanssa* (together with) becomes *kans*, *paitsi* (except for) becomes *paits* and *anteeksi* (excuse me) becomes *anteeks*. Altogether consonant clusters are not non-existent in Finnish, but they are still most prominent in recent loan words. There is also still a preference for word final clusters over word initial clusters. For word initial clusters a preference for a combination of a plosive and a liquid seems to be existent.
2. Research questions and hypotheses

The information on intonation patterns in English and Finnish shows a couple of differences. A big difference seems to lie in the area of the prominent pitch accent. For English broad focus, it lies at the final content word of the sentence. For Finnish, however, it appears at the first content word. Another big difference is the fact that Finnish does not need word order in a grammatical context, because of a very detailed case system. This means that the word order can easily be altered to give certain elements more focus, resulting in not needing to change the intonation pattern for assigning focus. This contributes to a situation in which Finnish has little variation in intonation patterns, as opposed to Germanic languages such as English. This is also the case for yes-no questions, where English usually shows a final rise. Finnish uses a combination of a particle and verb fronting to indicate a question and usually doesn’t alter the intonation pattern. The main question of this thesis is: is there visible foreign accent on intonation and consonant clusters when native speakers of Finnish speak English? For intonation patterns, only broad focus will be taken into account, because broad focus is easier to predict than narrow focus. Even though interesting hypotheses can be formulated about narrow focus, this can be left for potential future research. The main question of this thesis focuses on intonation patterns, but also on consonant clusters. Because Finnish traditionally does not have word initial consonant clusters, these could easily cause problems because of transfer from the native language. Historically, the first consonants have been omitted in loan words, leaving only the last consonant of a cluster to pronounce. This could be a strategy Finns would still use to pronounce clusters when speaking a foreign language that does allow clusters. The following hypotheses can be formulated, based on the preceding information.

1. In declarative sentences and wh-questions in broad focus, Finnish speakers will often show a high pitch accent at the start of a sentence instead of on the last content word, when speaking English.
2. In yes-no questions, Finns will often show a final fall instead of a final rise when speaking English.
3. When Finns have trouble pronouncing a consonant cluster, they will omit one or more consonants, rather than inserting extra vowels.
4. Finns will show more consonant deletion in word initial clusters than in word final clusters.
5. Finns will show less consonant deletion for combinations of a stop and a liquid, than in every other combination.
3. Relevance

Finland is a bilingual country. Both Finnish and Swedish are official languages in Finland. However, in 2016, only 5.3% of the population spoke Swedish as a native language. This corresponds to approximately 300,000 speakers out of a 5.5 million population. 88.3% or approximately 4.85 million speakers have Finnish as a native language in Finland (OSF). But Swedish is traditionally taught as a mandatory subject in Finnish schools and almost everything is offered in two languages. However, according the Eurobarometer language survey, published in 2012, 45% of the Finnish population knows English where only 34% knows Swedish. Zooming in to people within the age range of 15 to 34, these numbers are 55% for English and 36% for Swedish (Language Knowledge EU). This means that English is a bigger language than Swedish in Finland. This is understandable, considering globalization and the popular strategy of using English as a Lingua Franca when people with different language backgrounds communicate. It also means that the importance of proper education of the English language keeps growing. To educate properly, it is important to understand where the troubles lie in learning a new language. These troubles do not merely lie in differences in morphology and syntax, but also in phonological areas. The main goal of language is communication, so when learning a new language it is important to be able to understand the language, but also to make yourself understood. By analysing trouble areas in the production of a second language, these problems could decrease in the future.
4. Method

To answer the main question and test the hypotheses, English speaking Finns were analysed. The choice was made to look at already existing data, instead of creating data by asking Finns to interact in English. This was done because these data were easier to achieve, but also because the recorded speech that was used, was produced in a spontaneous way; something that is hard to achieve in a testing setting. The used data were downloaded from the website www.twitch.tv, which is a platform for live streaming video games. It allows anyone to create a live stream of themselves playing a video game and to interact with viewers who can type in a chat, while most broadcasters have their own microphone to respond in real time. The interactive setting makes that English is almost always the used language, because both the audience and the streamers can have lots of different language backgrounds. This makes the live streaming gaming community an excellent example of the growth of the use of English as a Lingua Franca in the world. Viewers of streams can have lots of different nationalities, differing from the Unites States to Germany, from Japan to Brazil and from South Africa to Finland. The live streams are temporarily saved as video’s afterwards, which means that the videos can be downloaded and the audio files converted to wav-files. Then the wav-files can be normalized through Adobe Audition and specific parts can be saved separately to later analyse the spectrograms and intonation patterns in PRAAT. This was done for four separate speakers, using a total of six videos of stream sessions. The next step was to listen to all six recordings and make a selection of specific part in the recordings to save for further analysis. There were two sets of possible reasons for saving a spoken utterance by the streamer. The first reason was for it being a declarative sentence or a wh-question in broad focus, which meant that the intonation pattern could be analysed to compare it with the expected broad focus intonation pattern of an English declarative sentence. The second reason was when the streamer asked a yes-no question to his audience, because by studying the intonation patterns of these questions, it could become visible whether the questions ended in a final rise or not. Finally, the same sentences were studied a second time to take a closer look at the consonant clusters that were present in these sentences. This made it possible to see if the Finnish streamers had problems with producing consonant clusters, either at the beginning or at the end of words. First, all intonation patterns were studied and a log was kept to keep track of the different patterns used by the speakers. All intonation patterns were also extracted from PRAAT in the form of pictures. Several of these pictures will be included in the description of the results. All of the pictures will also be presented in the appendix. Secondly, a log was kept for the production of consonant clusters for both the beginning and the end of words, as well as the combination of consonants in the English word. This way, combination that are possibly easier than others would become more easily visible. A representation of every word initial and word final cluster that was analysed will be presented in the results section, together with a representation of every manner in which these clusters were pronounced by the participants.
4.1 Participants

As is said before, recordings of four participants were used. All participants were told that their material would be used for this study and they agreed to this, even though some of the recordings were already made before the start of this study, since they were retrieved from their saved files. All participants were male, had Finnish as a native language and spoke only English on their recordings. The recordings of the videos ranged from May 2016 to April 2017. The participants’ age ranged from 23 to 29 and all participants were born and raised in Finland. The areas where they lived and had lived before were Uusimaa, Etelä-Karjala and Kymenlaakso, which are all located in the South or South-East of Finland. All participants had started learning English in the third year of primary school, which is around the age of 10 in Finland. Some participants added, however, that they really started perfecting their English by using it frequently by speaking English on their streams and by writing in English on websites and chats. Three out of four participants, being participants 1, 2 and 4, stream so-called speedruns of single-player games, in which they challenge themselves to beat a game as quickly as possible. The other participant (participant 3) plays a game in which you challenge other players online in a dual. For all participants the spoken communication consisted of either commenting on their own performance or reacting to statements or questions from viewers in the chat. Rarely, the streamers themselves asked questions to their audience. The setting of online gaming makes that there is a multi-tasking situation of playing a video game at a high level and speaking simultaneously. Some effects of the multi-tasking are visible in the recordings and will also be mentioned in the results section. Because of this setting, it might seem unfavourable to speak much during stream sessions. But more interaction is considered to have more entertainment value for the viewers and the viewers make that these streamers can remain doing what they do. This also explains the direct questions asked by the streamer to the audience, since they are often a method to include the viewers in the streamers mind set, or to stimulate chat interaction. Speaker 1 seemed relatively shy in his speech. His speech was quite soft and he didn’t speak too often. He didn’t use long sentences, and when sentences became longer they often included a pause in the middle. His English didn’t have many errors, however, but the sentences were chosen quite safely it seemed. Speaker 2 seemed a lot more confident than the first speaker. He spoke a lot more utterances, although his production of the sounds seemed to come with a thicker accent. His sentences were longer than those of the first speaker though and there were little hesitations or grammatical errors. All in all he seemed to have a good command of English, but his vocabulary wasn’t large. The third speaker spoke the most of all participants, but also seemed to have the thickest accent at first glance. At times his accent was so thick that it was difficult to understand what he meant. His grammar was correct though and he didn’t avoid long sentences containing sub-clauses and his speech was fast and fluent. The fourth speaker also didn’t say much. His utterances were grammatically correct, but very limited in terms of sentence structure and vocabulary. He also spoke very slowly, which could mean he had to think much about his sentence while producing it. The first impression was that the command of English of the third speaker was the best, although he also seemed to have the heaviest accent of all participants.
5. Results

5.1 Declarative broad focus

The first participant had 25 usable sentences in broad focus. Some sentences became unusable because of too much game interference, as was the case for several sentences of all participants. An interesting result of this speaker was that there were eight occasions of him showing a final rise. An example of this is figure 4. From here on, all pitch contours will be accompanied by a transcription of the spoken utterance. Sometimes there were pieces of game audio captured in the recording. These are labelled with either the word ‘game’, ‘game sound’ or the abbreviation ‘g.s.’, often put in between hyphens. This kind of game interference was allowed, since it was in the middle of a sentence, but not during speech. The logical solution for this was to mark it and not consider this part of the contour as data. Secondly, several words appear in between asterisks. This means that these words were spoken in vocal fry and, therefore, they do not have a pitch contour and are not represented in the picture.

Figure 4: Rising pitch at the end of a declarative sentence (speaker 1)

In most occasions (14 out of 25 utterances) the highest pitch accent was at the start of the sentence, or at least on the first content word. Most of these utterances did not show the exact typical Finnish intonation pattern, but are closer to a Finnish contour than an English one. Figure 5 shows an example of a somewhat expected pattern for someone speaking Finnish. The only difference with Finnish is that the highest pitch accent lies on the finite verb, while
Finnish usually does not have a pitch accent on the finite verb. The overall pattern does match the Finnish pattern though, with a high left pitch accent and the pitch accents following that getting lower throughout the sentence.

![Finnish pitch accent pattern](image)

**Figure 5: Expected Finnish intonation pattern on an English sentence (speaker 1)**

Only rarely a real expected pattern was visible in the results. One example of this is figure 6, in which the speaker has the main pitch accent on the final content word, being the word ‘house’. There was a slight pause in the middle of the sentence, which happened quite often to all speakers. This is probably due to two reasons. The first is that it’s casual speech so the speakers are probably not a hundred percent sure what the end of their sentence is going to be when they start it, especially since it’s not their native language. The second reason might be that they are multi-tasking, playing a video game while talking. When their attention is drawn to the game, they can take their time before finishing the sentence.
Another problem that occurred was the fact that a pitch accent was given to a syllable that does not have stress in English. In Finnish, every word has stress on the first syllable, which also means that only the first syllable of a word can have a pitch accent in Finnish. English has more rules when it comes to syllable structure and this can clearly give Finnish speakers some problems assigning stress. This is visible, for example, in figure 7. Figure 7 shows the pitch contour for the sentence ‘If I don’t mess up anything, this could be a world record’. For the word ‘record’, there is a visible pitch accent on the last syllable, where normally the stress lies on the first syllable. This does not seem like transfer from Finnish, since it would be logical for a Finnish speaker to assign stress on the first syllable. However, the fact that stress is not as fixed in English as in Finnish might be troublesome for a Finnish speaker in general, resulting in wrongly assigned stress also when it’s supposed to be on the first syllable.

Figure 6: Expected English intonation pattern, with a pitch accent on the final content word (speaker 1)
The second participant had 49 useful utterances in broad focus. Just as the first participant, the second also showed many occasions of a final rise in a declarative sentence. Participant two did this in 21 occasions, which is a little under half of all utterances. An example of this is visible in figure 8.

*Figure 7: Pitch accent on a normally unstressed syllable in ‘record’ (speaker 1)*
Figure 8: Rising pitch at the end of a declarative sentence (speaker 2)

Most declaratives by speaker two had the highest pitch accent on the far left, which is to be expected when speaking Finnish. An example of this is figure 9, where the highest pitch accent lies on the starting word ‘people’. After that, the pitch drops throughout the sentence.

Figure 9: Expected Finnish intonation pattern, with the highest accent on the far left (speaker 2).
Just as the first speaker did, the second speaker had several occasions where a pitch accent was assigned to a normally unstressed syllable. Figure 10 shows an example of this, where the word ‘capable’ gets a pitch accent on the second syllable. This second syllable is normally unstressed and because of vowel reduction, it should be pronounced as a schwa. In the case of this speaker, however, the syllable is stressed and the vowel is pronounced as [eɪ]. Figure 11 shows a second occasion of assigning a pitch accent to a normally unstressed syllable. This time the word is ‘controller’, in which stress should lie on the second syllable, but the pitch accent appears on the first syllable in this example.

Figure 10: pitch accent on a normally unstressed syllable in ‘capable’ (speaker 2)
The third speaker produced 21 useful declarative utterances in broad focus. The first major difference between speaker 3 and the first two speakers is the fact that he did hardly produce any final rises. There are only two occasions where a small rise is visible at the end of a sentence. What was striking in this speaker, was the number of sentences with very little variation in intonation. Figure 12 shows an example of an utterance by this speaker, in which it is visible that there is little variation; it’s rather monotone and does not have any distinctive pitch accents. There were a total of five sentences in the recordings of this speaker that were similar to figure 12. This corresponds to 23.8% of all the material for this specific participant.

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Figure 11: pitch accent on a normally unstressed syllable in ‘controller’ (speaker 2)
Throughout his other recordings, the speaker showed several intonation patterns. In 14 out of 21 cases, there was a high pitch accent at the start of the sentence and a lower ending. He also tended to have less pitch variation near the end of a sentence. Figure 13 shows a sentence with a high pitch accent at the start and a low end with little variation.

Figure 12: Monotone utterance with little variation in the pitch contour (speaker 3)

Figure 13: Expected Finnish intonation pattern with a high left pitch accent and a low end with little variation (speaker 3)
Finally, the fourth speaker had 20 useful, declarative utterances in broad focus. Just as the third speaker, this participant did not have staggering examples of final rises. Only two sentences show a small rise at the end. A bigger difference with the other participants lies in the fact that there were only five occasions of the highest pitch accent lying at the start of the sentence. This is less than with the other participants. An example of this is figure 14.

Figure 14: Expected Finnish intonation pattern, with a high pitch accent at the far left (speaker 4)

Figure 13 and 14 show two occasions of speaker four showing the expected intonation pattern for the English sentences, having the biggest pitch accent on the final content word in the sentence. This word is ‘equipped’ for figure 15 and ‘superslides’ for figure 16.
Figure 15: Expected English intonation pattern, with a pitch accent on the last content word of the sentence (speaker 4)

Figure 16: Expected English intonation pattern, with a pitch accent on the last content word of the sentence (speaker 4)
Table 1 shows all results in different categories after analysing the data about intonation patterns in declarative sentences and wh-questions for these four participants.

<table>
<thead>
<tr>
<th></th>
<th>Speaker 1</th>
<th>Speaker 2</th>
<th>Speaker 3</th>
<th>Speaker 4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PA on last OCE</strong></td>
<td>6/24%</td>
<td>8/16%</td>
<td>0/0%</td>
<td>10/50%</td>
</tr>
<tr>
<td><strong>High left</strong></td>
<td>10/40%</td>
<td>16/33%</td>
<td>17/81%</td>
<td>2/10%</td>
</tr>
<tr>
<td><strong>Final rises</strong></td>
<td>8/32%</td>
<td>21/43%</td>
<td>2/10%</td>
<td>2/10%</td>
</tr>
<tr>
<td><strong>PA on unstressed</strong></td>
<td>3/12%</td>
<td>5/10%</td>
<td>1/5%</td>
<td>2/10%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>25/100%</td>
<td>49/100%</td>
<td>21/100%</td>
<td>20/100%</td>
</tr>
</tbody>
</table>

Table 1: results of all participants on four features of intonation patterns for declaratives and wh-questions.

The first category (PA on last OCE) shows the number and percentage of utterances that had a clear pitch accent on the final content word. In other words, this shows the instances of an unmarked English intonation pattern and would count as the closest as one could judge a pattern as being correct. The percentages fluctuate between the participants. Both speaker 1 and speaker 2 score lower than 25%. Speaker 4 scores 50% which is high in comparison. Speaker 3 did not have a pitch accent on the final content word at all and scores 0%. The second category shows instances where the start of the sentence is considerably high in comparison to the rest of the sentence. A high start with a low end is typical for Finnish intonation, so this category counts as the most Finnish intonation pattern. Utterances that had a high start, but did not drop too much in pitch, thus did remain at more or less the same level, were not counted towards this category. The third category shows the number of utterance that showed a final rise. Declaratives normally don’t have a rising end, which is why it was noted for this study. The table shows that every speaker has cases of final rise, in the case of speaker 2 this even occurs in 43% of his utterances. The topic of uptalk will be discussed later, in 6.1.3. Finally, the fourth category shows the number of times a pitch accent appeared on an unstressed syllable. As has been stated before, Finnish has a fixed stress system which always has stress on the first syllable. English has a more complicated stress system than Finnish. As Kijak (2009) states “English belongs to the group of West Germanic languages with a word stress system largely predictable from phonological factors, but also partly lexical and morphologically conditioned in morphologically complex words” (Kijak, 2009, pp. 46-47). In underived nouns, English can generally have main stress on one of three syllables at the end of the word. Even though it is largely predictable, it is understandable that speakers with a Finnish language background can have trouble assigning stress to the correct syllable. An unstressed syllable cannot have a pitch accent. The fourth category shows the times when an unstressed syllable did receive a pitch accent from a Finnish speaker, which thus automatically shows an error in assigning stress. It must be noted that the occasions when a pitch accent was assigned to an unstressed syllable of the final content word, this was counted towards both the first and the fourth category.
5.2 Direct questions

Speaker 1, 2 and 3 had several occasions in which they asked a direct question towards their audience. These questions were also analysed in PRAAT to see if they ended in a final rise. As was discussed in 1.2, English normally has a final rise in a direct question, where Finnish doesn’t. The absence of a final rise could thus be an example of foreign accent as a result of transfer from Finnish to English. As a direct question were counted all questions that could be answered with either ‘yes’ or ‘no’, even when these are rhetorical questions or questions asked to no one in particular or to the speaker himself. The fourth speaker, unfortunately, did not produce any direct questions.

Figure 17 shows an example of a direct question with a final rise.

![Figure 17: Direct question with a final rise (speaker 2)](image)

As a contrast, figure 18 shows an example of a direct question without a final rise.
**Figure 18: Direct question without a final rise (speaker 3)**

Table 2 now shows the results of all appearances of a question and whether they ended in a final rise or not.

<table>
<thead>
<tr>
<th></th>
<th>Speaker 1</th>
<th>Speaker 2</th>
<th>Speaker 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>+ Final rise</td>
<td>3/75%</td>
<td>6/100%</td>
<td>1/14%</td>
</tr>
<tr>
<td>No Final rise</td>
<td>1/25%</td>
<td>0/0%</td>
<td>6/86%</td>
</tr>
<tr>
<td>Total</td>
<td>4/100%</td>
<td>6/100%</td>
<td>7/100%</td>
</tr>
</tbody>
</table>

Table 2: results of all participants on final rise in direct questions.

Again, the participants show different results. The first speaker has only one direct question without a final rise, and the second speaker even has none. The third speaker, however, only has one question with a final rise, the rest either drops or remains monotone. Again, all pictures of the intonation patterns will be attached in the appendix.
5.3 Consonant clusters

To take a closer look at the production of consonant clusters, all words with word initial and/or word final clusters, taken from the utterances that were also analysed for intonation, were analysed. A total number of 81 word initial clusters were produced and a total number of 177 word final clusters. These 81 word initial clusters consisted of 17 different types, of which 15 types were two-sound combinations (such as /sp/ or /tr/) and two types were three-sound combinations (/spl/ and /str/). The word final clusters consisted of 26 (or 29) types. From these, there were 18 (or 21) two-sound combinations (such as /ts/ or /lf/), 7 three-sound combinations (such as /nds/ or /rdl/), and one four-sound combination (/rldsl/). The categories of /st/ and /sd/ were counted as a single category, as was the case with /nt/ and /nd/ and /ld/ and /lθ/. This decision was made because of general troubles of voicing final consonants by the speakers, so in practice these categories were pronounced the same, even though they would be different categories for a native speaker. In the case of /ld/ and /lθ/; they were counted as a single category because of the troubles of pronouncing [θ]. Both combinations were pronounced as [lt] in practice. Since the relevant factor in this study was whether or not all the consonants were produced by the speaker, the production of [nt] for /nd/ was counted as correct, since both consonants were pronounced. This was counted the same way for every other voiceless-voiced combination. The same goes for sounds that are traditionally not present in Finnish phonology. Speakers often produced the closest sound that exists in their native languages. This is also known as phonetic-phonemic substitution and this is a form of negative transfer. Examples of this are the production of [k] instead of /ɡ/, [t] instead of /θ/ and [s] for /ʃ/. Every cluster was closely examined to see and hear the production of it. All instances of a correct (according to the ‘rules’ stated above) production were counted. For every incomplete production, the actual production was noted in the database, and these were also counted. Finally, it should be noted that final clusters in the words ‘want’ and ‘don’t’ were left out of the study in the constructions ‘want to’ and ‘don’t know’. They were left out because of native-like progressive assimilation resulting in the productions of [wana] and [dæəʊ]. Tables 3 and 4 show the results of all speakers for the production of word initial and word final clusters.

<table>
<thead>
<tr>
<th></th>
<th>Speaker 1</th>
<th>Speaker 2</th>
<th>Speaker 3</th>
<th>Speaker 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/% correct</td>
<td>18/90%</td>
<td>38/90%</td>
<td>8/67%</td>
<td>7/64%</td>
</tr>
<tr>
<td>N/% incorrect</td>
<td>2/10%</td>
<td>4/10%</td>
<td>4/33%</td>
<td>4/36%</td>
</tr>
<tr>
<td>Total</td>
<td>20/100%</td>
<td>42/100%</td>
<td>12/100%</td>
<td>11/100%</td>
</tr>
</tbody>
</table>

Table 3: results for all participants on the production of word initial clusters

<table>
<thead>
<tr>
<th></th>
<th>Speaker 1</th>
<th>Speaker 2</th>
<th>Speaker 3</th>
<th>Speaker 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/% correct</td>
<td>23/45%</td>
<td>42/49%</td>
<td>4/27%</td>
<td>16/64%</td>
</tr>
<tr>
<td>N/% incorrect</td>
<td>28/55%</td>
<td>44/51%</td>
<td>11/73%</td>
<td>9/36%</td>
</tr>
<tr>
<td>Total</td>
<td>51/100%</td>
<td>86/100%</td>
<td>15/100%</td>
<td>25/100%</td>
</tr>
</tbody>
</table>

Table 4: results for all participants on the production of word final clusters
The first thing these tables show is that speakers had less trouble with producing word initial clusters than word final clusters. The only exception on this is speaker 4, who has the exact same percentages for initial clusters as for final clusters. For the first three speakers, the differences are very large (90-45, 90-49 and 67-27).

Tables 5 and 6 show all the clusters that appeared and every way they were produced and how often they were produced in this way.

<table>
<thead>
<tr>
<th>Sound</th>
<th>Produced correctly as (N)</th>
<th>Produced as (N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>/br/</td>
<td>/br/ /pr/ (6)</td>
<td>/r/ (1)</td>
</tr>
<tr>
<td>/pr/</td>
<td>/pr/ (8)</td>
<td>/r/ (4)</td>
</tr>
<tr>
<td>/fl/</td>
<td>/fl/ (2)</td>
<td></td>
</tr>
<tr>
<td>/fr/</td>
<td>/fr/ (4)</td>
<td>/f/ (1)</td>
</tr>
<tr>
<td>/st/</td>
<td>/st/ (11)</td>
<td>/s/ (1)</td>
</tr>
<tr>
<td>/spl/</td>
<td>/spl/ (1)</td>
<td>/pl/ (1)</td>
</tr>
<tr>
<td>/sl/</td>
<td>/sl/ (4)</td>
<td>/s/ (1)</td>
</tr>
<tr>
<td>/sw/</td>
<td>/sw/ (1)</td>
<td></td>
</tr>
<tr>
<td>/tw/</td>
<td>/tw/ (1)</td>
<td></td>
</tr>
<tr>
<td>/pl/</td>
<td>/pl/ (8)</td>
<td></td>
</tr>
<tr>
<td>/str/</td>
<td>/str/ (2)</td>
<td>/sr/ (2)</td>
</tr>
<tr>
<td>/tr/</td>
<td>/tr/ (4)</td>
<td>/r/ (1)</td>
</tr>
<tr>
<td>/sp/</td>
<td>/sp/ (17)</td>
<td></td>
</tr>
<tr>
<td>/gl/</td>
<td>/kl/ (1)</td>
<td></td>
</tr>
<tr>
<td>/bl/</td>
<td></td>
<td>/l/ (1)</td>
</tr>
<tr>
<td>/sk/</td>
<td>/sk/ (1)</td>
<td></td>
</tr>
<tr>
<td>/0r/</td>
<td></td>
<td>/r/ (1)</td>
</tr>
</tbody>
</table>

Table 5: All found word initial consonant clusters and the way they were produced
<table>
<thead>
<tr>
<th>Sound</th>
<th>Produced correctly as (N)</th>
<th>Produced as (N)</th>
<th>Produced as (N)</th>
<th>Produced as (N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>/st/ or /sd/</td>
<td>[st]/<a href="15">sd</a></td>
<td><a href="12">s</a></td>
<td></td>
<td></td>
</tr>
<tr>
<td>/ks/</td>
<td><a href="2">ks</a></td>
<td><a href="1">s</a></td>
<td></td>
<td></td>
</tr>
<tr>
<td>/nt/ or /nd/</td>
<td>[nt]/<a href="10">nd</a></td>
<td><a href="18">n</a></td>
<td><a href="2">t</a></td>
<td><a href="3">Ø</a></td>
</tr>
<tr>
<td>/ts/</td>
<td><a href="8">ts</a></td>
<td><a href="6">t</a></td>
<td><a href="6">s</a></td>
<td><a href="1">Ø</a></td>
</tr>
<tr>
<td>/nds/</td>
<td></td>
<td><a href="10">ns</a></td>
<td></td>
<td></td>
</tr>
<tr>
<td>/rs/</td>
<td><a href="19">rs</a></td>
<td><a href="1">s</a></td>
<td></td>
<td></td>
</tr>
<tr>
<td>/rn/</td>
<td><a href="1">rn</a></td>
<td>[s]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>/rld/</td>
<td><a href="4">ld</a></td>
<td><a href="1">rd</a></td>
<td><a href="1">d</a></td>
<td></td>
</tr>
<tr>
<td>/rd/</td>
<td>[rd]/<a href="10">rt</a></td>
<td><a href="3">r</a></td>
<td><a href="1">d</a></td>
<td></td>
</tr>
<tr>
<td>/ŋk/</td>
<td><a href="2">ŋk</a></td>
<td><a href="1">ŋ</a></td>
<td></td>
<td></td>
</tr>
<tr>
<td>/kst/</td>
<td><a href="1">kst</a></td>
<td><a href="2">ks</a></td>
<td><a href="1">s</a></td>
<td></td>
</tr>
<tr>
<td>/sts/</td>
<td><a href="1">sts</a></td>
<td><a href="1">st</a></td>
<td></td>
<td></td>
</tr>
<tr>
<td>/ld/ or /l0/</td>
<td>[ld]/<a href="3">l0</a></td>
<td><a href="4">d</a></td>
<td></td>
<td></td>
</tr>
<tr>
<td>/ms/</td>
<td><a href="5">ms</a></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>/ns/</td>
<td><a href="3">ns</a></td>
<td><a href="1">n</a></td>
<td><a href="1">s</a></td>
<td></td>
</tr>
<tr>
<td>/lk0/</td>
<td><a href="1">lk0</a></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>/rlds/</td>
<td><a href="1">rlds</a></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>/p0/</td>
<td><a href="1">p0</a></td>
<td><a href="1">d</a></td>
<td></td>
<td></td>
</tr>
<tr>
<td>/tfd/</td>
<td><a href="1">ts</a></td>
<td></td>
<td><a href="1">sd</a></td>
<td></td>
</tr>
<tr>
<td>/tl/</td>
<td><a href="2">l</a></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>/g0/</td>
<td><a href="1">g0</a></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>/ŋs/</td>
<td><a href="1">ŋs</a></td>
<td></td>
<td><a href="1">s</a></td>
<td></td>
</tr>
<tr>
<td>/ls/</td>
<td><a href="1">ls</a></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>/rks/</td>
<td><a href="1">rks</a></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>/ps/</td>
<td><a href="1">ps</a></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>/kt/</td>
<td><a href="1">t</a></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 6: All found word final consonant clusters and the way they were produced

The first thing to notice in these tables is the fact that an incorrect pronunciation by these Finnish speakers is always a matter of consonant deletion, never vowel insertion. It seems, however, not completely predictable which consonant will be deleted. Traditionally, in Finnish loanwords, the first consonant(s) would be deleted when there is a matter of an initial cluster. Table 5 shows that, in the 14 cases of incomplete pronunciation of initial clusters, nine of them resulted in the deletion of the initial consonant. The other five were a deletion of the second consonant, so deletion of the first consonant seems favourable, but not by much. When looking at final clusters, there were 92 instances of incomplete production of a cluster. 50 of these were a result of deletion from only the final consonant, which is 54%. This seems to be the most favourable method of not having to produce the full cluster. The other 43 instances are the result of removing one or more of the other consonants. It is also notable that it is not necessarily the least sonorous sound that remains in the reduced cluster. It seems that the Finnish tradition of removing the ‘outside’ consonants of a cluster has more influence on their speech than the Sonority Sequencing Principle.

With these data, a new table can be created showing the combinations that are the easiest to
pronounce and which ones are the hardest. This can be done by using the percentages of correct pronunciations. These data can be seen in table 7.

<table>
<thead>
<tr>
<th></th>
<th>Word initial</th>
<th></th>
<th>Word final</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sound(N)</td>
<td>N/% correct</td>
<td>Sound(N)</td>
<td>N/% correct</td>
<td></td>
</tr>
<tr>
<td>/sp/(17)</td>
<td>17/100%</td>
<td>/ms/(5)</td>
<td>5/100%</td>
<td></td>
</tr>
<tr>
<td>/pl/(8)</td>
<td>8/100%</td>
<td>/rn/(1)</td>
<td>1/100%</td>
<td></td>
</tr>
<tr>
<td>/fl/(2)</td>
<td>2/100%</td>
<td>/ls/(1)</td>
<td>1/100%</td>
<td></td>
</tr>
<tr>
<td>/gl/(1)</td>
<td>1/100%</td>
<td>/rks/(1)</td>
<td>1/100%</td>
<td></td>
</tr>
<tr>
<td>/sw/(1)</td>
<td>1/100%</td>
<td>/ps/(1)</td>
<td>1/100%</td>
<td></td>
</tr>
<tr>
<td>/tw/(1)</td>
<td>1/100%</td>
<td>/rs/(20)</td>
<td>19/95%</td>
<td></td>
</tr>
<tr>
<td>/sk/(1)</td>
<td>1/100%</td>
<td>/rd/(14)</td>
<td>10/71%</td>
<td></td>
</tr>
<tr>
<td>/st/(12)</td>
<td>11/92%</td>
<td>/nk/(3)</td>
<td>2/67%</td>
<td></td>
</tr>
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<td>/br/(7)</td>
<td>6/86%</td>
<td>/ks/(3)</td>
<td>2/67%</td>
<td></td>
</tr>
<tr>
<td>/sl/(5)</td>
<td>4/80%</td>
<td>/ns/(5)</td>
<td>3/60%</td>
<td></td>
</tr>
<tr>
<td>/fr/(5)</td>
<td>4/80%</td>
<td>/st/ or /sd/(27)</td>
<td>15/56%</td>
<td></td>
</tr>
<tr>
<td>/tr/(5)</td>
<td>4/80%</td>
<td>/ns/(2)</td>
<td>1/50%</td>
<td></td>
</tr>
<tr>
<td>/pr/(12)</td>
<td>8/67%</td>
<td>/pd/(2)</td>
<td>1/50%</td>
<td></td>
</tr>
<tr>
<td>/str/(4)</td>
<td>2/50%</td>
<td>/sts/(2)</td>
<td>1/50%</td>
<td></td>
</tr>
<tr>
<td>/spl/(1)</td>
<td>1/50%</td>
<td>/ld/ or /l0/(7)</td>
<td>3/43%</td>
<td></td>
</tr>
<tr>
<td>/bl/(1)</td>
<td>0/0%</td>
<td>/ts/(21)</td>
<td>8/38%</td>
<td></td>
</tr>
<tr>
<td>/0r/(1)</td>
<td>0/0%</td>
<td>/nt/ or /nd/(33)</td>
<td>10/30%</td>
<td></td>
</tr>
<tr>
<td>/kst/(4)</td>
<td>1/25%</td>
<td>/kt/(1)</td>
<td>0/0%</td>
<td></td>
</tr>
<tr>
<td>/kt/(1)</td>
<td>0/0%</td>
<td>/gd/(1)</td>
<td>0/0%</td>
<td></td>
</tr>
<tr>
<td>/gd/(1)</td>
<td>0/0%</td>
<td>/ld/(1)</td>
<td>0/0%</td>
<td></td>
</tr>
<tr>
<td>/rlds/(1)</td>
<td>0/0%</td>
<td>/lf/(2)</td>
<td>0/0%</td>
<td></td>
</tr>
<tr>
<td>/lf/(2)</td>
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<td>/tfd/(2)</td>
<td>0/0%</td>
<td></td>
</tr>
<tr>
<td>/tfd/(2)</td>
<td>0/0%</td>
<td>/rld/(6)</td>
<td>0/0%</td>
<td></td>
</tr>
<tr>
<td>/nds/(10)</td>
<td>0/0%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 7: All clusters ordered in percentage of correct pronunciations.

Interestingly, the easiest initial cluster is not a combination of a plosive and a liquid, but rather the combination of a fricative and a plosive. However, this cluster starts with an /sl/, which means that the initial consonant should be judged as an appendix or a separate syllable. This is backed up by the fact that all two-consonant clusters starting with an /sl/ are pronounced correctly 80%-100% of the time. The combinations of plosives and liquids do not necessarily score higher than combinations of fricatives and liquids. The plosive-liquid combination of /bl/ scores zero percent, for example, but this is based on a single occurrence. It is also clear that the two initial clusters of three consonants (/str/ and /spl/) appear low in the table and seem to be harder to pronounce than smaller clusters. This also comes forward from the table of final clusters. The only combination of four consonants (/rlds/) scores zero percent and all but one three-consonant clusters appear in the bottom half of the table. The one cluster that appears higher (/rks/) is based on a single occurrence so the accuracy of its high ranking is up for debate.
6. Discussion

6.1 Intonation patterns

As was showed in the Results section, the pictures of intonation patterns were judged on four categories, which were presented in table 1 and are available below in table 8.

<table>
<thead>
<tr>
<th></th>
<th>Speaker 1</th>
<th>Speaker 2</th>
<th>Speaker 3</th>
<th>Speaker 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>PA on last OCE</td>
<td>6/24%</td>
<td>8/16%</td>
<td>0/0%</td>
<td>10/50%</td>
</tr>
<tr>
<td>High left</td>
<td>10/40%</td>
<td>16/33%</td>
<td>17/81%</td>
<td>2/10%</td>
</tr>
<tr>
<td>Final rises</td>
<td>8/32%</td>
<td>21/43%</td>
<td>2/10%</td>
<td>2/10%</td>
</tr>
<tr>
<td>PA on unstressed</td>
<td>3/12%</td>
<td>5/10%</td>
<td>1/5%</td>
<td>2/10%</td>
</tr>
<tr>
<td>Total</td>
<td>25/100%</td>
<td>49/100%</td>
<td>21/100%</td>
<td>20/100%</td>
</tr>
</tbody>
</table>

Table 8: results of all participants on four features of intonation patterns for declaratives and wh-questions.

This section will include a deeper insight in the meaning of the results of these categories.

6.1.1 PA on last OCE

The first category comes closest to judging a speech pattern as ‘correct’. This would be the expected intonation pattern of a native speaker of English. The results show that none of the participants score higher than 50% here and speaker 3 even scores 0%. Three out of four participants score lower than 25% on native-like intonation patterns. This means that foreign accent is visible on declarative intonation patterns for all participants. Speaker 4 performed the best here and speaker 3 performed the worst.

6.1.2 High left

The ‘high left’ category shows instances of a considerably high start of the sentence in comparison to the rest. A lowering pitch pattern throughout the sentence, towards the end, is an expected pattern for a Finnish speaker in his native language. A high percentage on this category, especially combined with a low percentage of the first category, can be a clear indicator of foreign accent on intonation. The first three participants score considerably higher on this category than on the first one. Especially the third speaker, who shows a Finnish intonation pattern on 81% of his utterances. The fourth speaker is the only participant who scores lower on the second category than on the first. He already scored the highest on the first category, which generally means he shows the least foreign accent of all participants. The third speaker has the lowest number in the first category and the highest on the second category, which means that he shows a lot of foreign accent in his intonation.
6.1.3 Final rises / Uptalk

In the results of table 1 or 8, it shows there are many occasions of a final rise in a declarative sentence. Especially the first two participants show many examples of this. A final rise in a declarative sentence is a phenomenon which is known as uptalk. Oxford Dictionaries describes uptalk as “A manner of speaking in which declarative sentences are uttered with rising intonation at the end, as if they were questions” (www.oxforddictionaries.com). The general opinion towards uptalk seems to be rather negative. Opinions range from it being described as irritating as well as not credible. It is often associated with the speech of young females and may be associated with uncertainty, lack of confidence or social powerlessness (Warren, 2016). He describes uptalk for several English varieties, as English is the main language for which this phenomenon has been described. He later devotes a chapter to findings of uptalk in other languages, though, and describes findings in Germanic and Romance languages, but also in Japanese, Arabic languages and Austronesian languages. For Finnish, Ogden & Routarinne wrote a paper in 2005 on final rises. They found that final rises are fairly common in Finnish and occur approximately twice a minute in declaratives. They argue that uptalk in Finnish has two main interactional functions: “they provide a place for a coparticipant to mark recipiency, and they project more talk by the current speaker” (Ogden & Routarinne, 2005; pp. 160). Even though their study shows that uptalk is not a rare phenomenon in Finnish, their study focussed on female teenagers, which is the group for whom uptalk is the most expected. Their study also focussed on Finnish speakers in their native language, whereas table 8 shows results of uptalk in an L2, by male speakers in their twenties. The uptalk from the Finnish participants might be a result of insecurity of speaking in a second language and not feeling completely proficient in it. Another explanation might lie in the setting of speech. Although the speakers are aware that an audience is listening and they get a notification of the number of viewers, they can never be certain of how many viewers are listening to what they’re saying and if they are actually interested in the topics introduced by the speaker. This could also be a source of insecurity which would raise the number of final rises. This explanation can be partly backed up by looking at the number of followers every speaker has. The number of followers for every streamer is presented in table 9.

<table>
<thead>
<tr>
<th>Speaker</th>
<th>Number of followers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>425</td>
</tr>
<tr>
<td>2</td>
<td>27864</td>
</tr>
<tr>
<td>3</td>
<td>363778</td>
</tr>
<tr>
<td>4</td>
<td>467</td>
</tr>
</tbody>
</table>

Table 9: All speakers and their number of followers on twitch

Table 9 shows that the third speaker has by far the most followers and should be the most confident with speaking to a large audience. He also shows the least percentage of final rises, together with speaker 4. Speaker 4, however, performs considerably better on the general intonation patterns with 50% of the pitch accents on the final OCE and only 10% of high pitch accents at the far left. Speaker 3 scores 0% on final OCE pitch accents and 81% of his
utterances had a high far left pitch accent. This means that the third speaker showed the most transfer from Finnish on his English intonation, but had the least final rises. The absence of final rises might thus be explained by his confidence in speaking to a large audience, due to his high follower count. A comparison with native speakers of English in the same setting could have given more insight on these data. The factor of insecurity about language would then be excluded and clearer connections with the follower count could be made. Unfortunately, no recordings of native speakers were analysed, but this could be an interesting topic for future research. The rising pattern in declaratives could indicate an intonation pattern, popular for the live streaming setting. Another explanation could be a continuation pattern. Incomplete utterances tend to have a rise before the pause, indicating that the utterance is not finished yet. Since the speech of these participants was spontaneous, it could be the case that the speakers were intending on extending the sentences, even though they never did. The incompletion of these utterances could lie in possible interruptions by the viewers or something asking their attention in the video game. The language barrier could also be a factor here, as they might not know how they want to proceed a sentence if they are looking for words. Again, future research with a native English speaking control group could give more insights on this topic.

6.1.4 PA on unstressed

This category shows the number and percentage of times a pitch accent was assigned to a syllable that is traditionally unstressed. This means that there was an error made in assigning stress, since only stressed syllables are supposed to get a pitch accent. Finnish has a very fixed stress system. Stress always falls on the first syllable of every word, except for short grammatical words. This stress system is so strong that it also applies to loanwords and foreign names (Korpela, 2014). Although English has a predictable stress system as well, stress in English is dependent on more variables than in Finnish, which makes it harder to predict for a non-native speaker. These speakers seemed to have little problems with assigning stress, although all of them showed at least one occasion of wrongly assigned stress. The highest percentage for this category was 12%, but it is still a noteworthy result of foreign accent in the speech of these participants. Even though the wrongly assigned stress was not always put on the first syllable, this still seems to be an influence of the L1. In a case of direct transfer, one would expect that a Finnish L1-speaker would assign stress on the first syllable, even when it should not be on that syllable in English. This was not the case, as some sentences were examples of stress being assigned to the second syllable when it should have been on the first. It can still be seen as a result of transfer though, since the fact that a mistake was made, is probably the result of Finns having to overthink where stress should go, because they don’t have to think about stress assigning rules in their native language.

6.2 Question intonation

Table 2, re-presented below as table 10, shows the results of the speakers on the intonation patterns of direct questions.
The table shows that most of the questions were produced with a final rise, as one would expect from a native speaker of English. Speaker 1 did this 75% of the time, speaker 2 even did this 100% of the time. Speaker 3, however, only produced one final rise in a total of 7 direct questions. The third speaker also showed the most Finnish intonation patterns on declaratives and seems to be a clear example of a speaker with transfer from Finnish on both categories. Most of his utterances were rather monotone and showed little variation in intonation patterns, no matter what kind of sentence structure there was. Speaker 4 showed the least transfer on declarative intonation patterns, which makes it unfortunate that he did not produce any direct questions so no data could be collected on this topic.

### 6.3 Consonant clusters

The results on consonant clusters showed that the speakers had generally less trouble with pronouncing initial clusters than with pronouncing final clusters. The hypothesis was that the troubles would occur especially in word initial clusters, because of the growing acceptance of word final clusters in Finnish language, compared to the acceptance of word initial clusters. An explanation for this unexpected result might lie in the information structure of words. A listener extracts the most information from the initial part of a word, compared to the final part (Broerse & Zwaan, 1966). This means that the speakers might be putting more effort in the pronunciation of the beginning of the word than in the end, in order to not lose information in communication. Furthermore, it is clearly visible that speakers had more trouble when there were more consonants in a cluster. Other than that there is little evidence for preferred consonant combinations. The hypothesis was that initial clusters would be easiest for Finns when they consisted of a plosive and a liquid. The results do show that the combination /pl/, and /gl/ score a 100%, but so does a combination of a fricative and a liquid /fl/. Aside from that, the plosive-liquid combination of /bl/ scored 0% and the combination of /pr/ also appeared low on the table with 67%. The strategy for not pronouncing full clusters was always to delete consonants, preferably the first one in an initial clusters and the last one in a final cluster, rather than the deletion of the most sonorous consonants. An incomplete production of a cluster was never the result of vowel insertion.
6.4 Other found elements of foreign accent

Aside from the elements of intonation patterns and consonant clusters, some other elements of foreign accent were noticeable while analysing the recordings. A clear example of this is the production of sounds that are traditionally not a part of the Finnish language. When confronted with these sounds, most of them were pronounced as the closest sound that is present in Finnish. A couple of examples are listed below in table 11.

<table>
<thead>
<tr>
<th>English sound</th>
<th>Closest sound in Finnish</th>
</tr>
</thead>
<tbody>
<tr>
<td>/ɡ/</td>
<td>[k]</td>
</tr>
<tr>
<td>/b/</td>
<td>[p]</td>
</tr>
<tr>
<td>/θ/</td>
<td>[t]</td>
</tr>
<tr>
<td>/ʃ/</td>
<td>[s]</td>
</tr>
<tr>
<td>/ʃ/</td>
<td>[ɛ]</td>
</tr>
<tr>
<td>/ð/</td>
<td>[d]/[t]</td>
</tr>
</tbody>
</table>

*Table 11: English sounds that are not present in Finnish and the way they were often produced by the Finnish speakers.*

Another difficult feature of English were voiced final consonants. Most of these were produced as their unvoiced equivalents, when they were in a final position.
7. Conclusion

In this thesis, an analysis of foreign accent was made in the language combination of Finnish as an L1 and English as an L2. By examining audio recordings and spectrograms of native speakers of Finnish, speaking English to an international audience in a casual way, the specific characteristics of Finnish accent in English speech could be marked and analysed. For the feature of intonation patterns in declaratives and wh-questions in broad focus, participants only produced the expected native-like intonation pattern a maximum of half of the time. One participant even scored 0% on this. Instead, most participants scored higher on an intonation pattern with a high far left pitch accent, which is more characteristic for their native language, Finnish. Transfer from Finnish intonation to English speech definitely seemed to occur on this feature. Aside from this, there were several occasions in which speakers assigned pitch accents to traditionally unstressed syllables, which should not be possible. This seems to be a result of transfer because of a different stress system in both languages English and Finnish. Another sign of transfer occurred in direct questions, which expect the answers ‘yes’ or ‘no’. An English direct question would often expect a final rise to indicate the question sentence. Finnish does not normally have a final rise in this type of questions, because morphology already indicates a question sentence at the start of one. One participant in particular tended to end his question in a fall, which is typical for Finnish, but not for English. Not all participants showed this type of transfer, but it was visible in the results. Finally, there were signs of transfer when looking at consonant clusters. Clusters do normally not occur in Finnish, but they are somewhat accepted in recent loan words, especially in the word final position. Interestingly, the participants performed better on word initial clusters than on word final clusters. This could be the result of the most information lying at the start of the word. This could then mean that the participants made more effort in correctly pronouncing the start of words in order not to lose any information in the communication. The participants clearly had more trouble with bigger clusters than with two sound clusters. When not fully pronouncing a cluster, the strategy of consonant deletion was always applied, rather than vowel insertion; a strategy that is traditionally used when accepting new loan words in the Finnish language. When deleting a consonant, most often the consonant at the word boundary was deleted. This means that this was most often the first consonant for initial clusters, and often the last consonant for final clusters, rather than keeping the least sonorous consonant, which would be predicted by the Sonority Sequencing Principle. Aside from these three elements that were closely studied, throughout the examining of the recordings several other elements of transfer were audible and visible. Examples of this were final de-voicing and pronouncing different consonants when English sounds are not present in Finnish phonology. Concluding, traces of transfer were visible in all three examined features, but not as strongly for all four participants. The hypotheses about consonant clusters were not backed up by the results. Although the results show participants having trouble pronouncing English consonant clusters, evidence has not been found for the hypothesis that Finns would have less trouble pronouncing a consonant cluster of a plosive and a liquid, since these combinations scored just as high as several other combinations, such
as a fricative and a liquid. The results also show that word final clusters proved to be more troublesome to pronounce than word initial clusters. The hypotheses about intonation, however, are backed up by the results. Examples were found of high far left pitch accents for all speakers and several examples of final falls were found in direct question, where a final rise was expected. In the end, every single participant showed examples of expected effects of transfer, but some effects were more distinct than others, and some participants showed more transfer than others.
References


Goad, H. & Rose, Y. (2004). *Input elaboration, head faithfulness and evidence for representation in the acquisition of left-edge clusters in West Germanic*. Memorial University of Newfoundland, Newfoundland.


Välimaa-Blum, R.M. (1988). *Finnish existential clauses – their syntax, pragmatics and intonation*. Ohio State University, Ohio

Appendix (PRAAT pictures)

Speaker 1

At least I didn’t fail box mega

Because I don’t have the Goron Bracelet
But to be honest that’s .... already pretty fast

But that’s fine
I almost went into the house

I cannot pick up the bomb ... bomb flowers
I could shave off a couple of seconds from that rainbow

I was just wondering if there's a way to ...(musical tone) prevent that happening

I was just wondering if there’s a way to ... (musical tone) prevent that happening
I watched ya P, yooooor PB ... to learn that method

I was watching your pb to learn that method

I'm losing some time on this split

I'm losing some time on this split
If I don't mess up anything this could be a world record

My PB is ... uhh nineteen fifty-four
Oh_I_lost_over_ten_seconds

0.699664633 2.40522078

I-lost over ten seconds

Oh_yeah_the_sum_of_bests_is_now_sub_34

0.645379264 4.67299723

the sum of bests is now ***game sounds*** sub thirty-four
Okay let’s go

Okay let’s go

Okay no bubble hits

Okay no bubble hits
That Was Still Better Than Last Time

This Is PB Again
For one moment I thought I missed the switch.

I missed the ocarina.
I’ll probably mess up something

Run-game-is starting-to get better
So I cannot say about that one

That's a good game
QUESTIONS

Yeah I don't know

Could we get the wah?

*could* we get the WAAAAH
Could we get the double?

Do you know why that happens?

I got the text twice, do you know why that happens?
Speaker 2

Playing Link between worlds?

Doosney’s strat saves five seconds
The controller costs more than the game.

Well I'll take 1:18 then.
For movies I don’t want I don’t want *to* get spoiled either

__be_avoiding_spoilers_from_breath_of_the_wild

*you’d* be avoiding anything about zelda breath of the wild
8_people_are_playing_it

All_I_have_seen_is_trailers
Because I-don't care 'bout their opinion

But I didn't think about it because I didn't know what was the spoiler in that trailer.
Every mistake that happens *is because of me*

How do I avoid spoilers
I call it game design 'cause I sideflip t’ corner

I can lose *those five seconds* to corona

I call it game design because I sideflipped a corner

I can lose those 5 secs to corona
I do hate hate spoilers like I said

*I* don’t know what-I’m tal *king* about
I don't like this time.

I don't think channel two is gonna have like any sequel meaning.
I don't understand how can people enjoy watching spoiler

I like to have colored controllers
I lost two seconds

I play the game

I play the game nobody else plays the game for me
I really have to practice this shine

I want *that* game so bad
I'm not gonna say
75
175
100
120
140
160
Pitch (Hz)
Time (s)
0.3963 1.198
0.39884131 1.19183376

I'm not into reviews, you know... that much
0.2118 1.651
0.211791407 1.64952941
I'm so glad I managed to stay spoiler free for that game.

I've been avoiding gameplay videos.
If I wouldn't have messed up gs I would have golded this split.

If your battery dies the game will automatically save all the progress you made.
It shows how what I am capable of

It's more fun to play *on* stream -g.s.- than alone
Yeah it's really hard to avoid spoilers like anywhere.

Most likely I *think it's* *gano..* ganon but I might be wrong.
My opinion matters the most

Nobody can say this game is *good*
People like different things you know

Somehow I managed to stay spoiler-free from that game for years
That spoiled me ## and I don't *like* I didn't like that

That's how you make your own favourite games guys
That’s kinda true when I remember most of the stars

That’s why don’t take reviews seriously at all
The game was released 8 years ago or something

Then they will make up numbers
This review was just his or her opinion.

Tomorrow is March the third for me so I won't get it tomorrow.
*you* can't compare it.

You need t'have two health bars.

You can't compare it—spoilers, well there's no spoilers in real life.
Do_you_mean_pirates_of_the_caribbean_5

It_s_good_for_you_but_is_it_good_for_me

You mean Pirates-of-the-caribbean Fi-ive?

But-is-it for me?
Well is it for these people?

For these-uh these people?
Speaker 3

---

—Iz has to choose his poison

---

seven six was good because of his anaconda
But I still like I beat those grease

But I think I still have to go for the power game
But Sath doesn’t really get him anywhere.

Depends on the next _de*stroy_ cavana getman-hour.
He only has so many wildspin slayers

I might pick up a servant
It'd be a good test to find the golla controller

It's certainly gonna freeze so I really wanna say that we could win
Maybe he’s trying out something different

No I will I will not play that
Now I'm gonna get punished

That's not how the card works
The healing is pretty much overhealing but it's still amazing.

The next thin honor can defend Ysera.
And the one damage on this phase wouldn't matter.

The weaker player is like number one.
These are at one health so they kinda do die.

<table>
<thead>
<tr>
<th>Time (s)</th>
<th>Pitch (Hz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.3144</td>
<td>175</td>
</tr>
<tr>
<td>2.938</td>
<td>0</td>
</tr>
</tbody>
</table>

Why don't you use Jade Blossom's drawing late-game.

<table>
<thead>
<tr>
<th>Time (s)</th>
<th>Pitch (Hz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2.492</td>
<td>2.49239323</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Why don’t you use</th>
<th>Jade Blossom’s drawing late-game</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>2.492</td>
</tr>
</tbody>
</table>
Questions

Do-you-have the adrian now?

Why is Fire fueler running fire flies

0.7488 3.275
0.748765931 3.26248804
Does that count?

He’s still gettin’ like half the trade right?
Is that acceptable?

Is there anyway *to get this in* slow motion?
Or did it have to be them?

Pitch (Hz)

0.1089 1.111
0.108883518 1.11053639

Or did it have to be them?

Time (s)

Or did it have to be them?

Should I save this for Adrian?

Pitch (Hz)

0.1538 1.429
0.153849531 1.4294291

Should I save this for Adrian?

Time (s)

Should I save this for Adrian?
**Speaker 4**

Almost_broke_my_stick

Time (s) 0.7221 1.887
0.7221 1.887

An_error_occurred_while_processing_your_request

Time (s) 0.4524 3.058
0.452396449 3.05479773

Almost broke my stick

An error occurred while processing your request
And-I already have them equipped at that point

And this run is pretty good

And_I_already_have_them_equiped_at_that_point

And_this_run_is_pretty_good
Hopefully my game sound VOD isn't messed up now

How am I losing time
And I can do superslides even

I can do superslides even

Mean it's like five seconds slower

I mean it's like five seconds slower
I need to do the block skip

It's just loading
just hope I can finish this one

just might use the bugs
It's saying it's reconnecting in two seconds

Mayb' because I picked up the bombs
Not a lot of mistakes in it

0.454 2.002
0.453996824 2.00119657

I can’t do it cause I don’t have a sword

1.018 3.199
1.02519083 3.19888889

Oh yeah I can’t do it cause I don’t have a sword
That way I'll have like 3 extra bombs

That’s always something something to improve on
This run is actually pretty good though

Yeah it’s always when you get all the hard stuff