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(SAARLAND UNIVERSITY, SAARBRÜCKEN)ATTUNING TO LINGUISTICALLY LESS-FLUENT
INTERLOCUTORS: EVIDENCE FROM CONVERGENCE
IN DANISH AND FINNISH FOREIGNER TALK

ABSTRACT

This paper presents the acoustic features of speech recorded during interactions with foreigners in Danish and Finnish languages in the light of Speech Accommodation Theory. It presents selective aspects of speech attuning to linguistically less-fluent interlocutors in temporal and spectral perspectives. Foreigner-directed speech and native talk were compared in a spectral (F0, vowel space and intensity) and a temporal domain (phones per second). The results were correlated with the participants' degree of exposure to foreigners and attitude towards them measured by means of a questionnaire. It was concluded that personal attitude towards interlocutors causes hyperarticulation. It was also shown, however, that the differences between the given instances of conversation are the strongest in the temporal domain, and not in the spectral domain.

KEYWORDS: SPEECH ACCOMMODATION, SOCIOPHONETICS, FOREIGNER TALK, DANISH, FINNISH

STRESZCZENIE

Artykuł przedstawia wyniki analizy akustycznej mowy kierowanej do obcokrajowców w językach duńskim i fińskim w świetle teorii akomodacji mowy. Praca omawia wybrane aspekty konwergencji w sygnale akustycznym, uzyskanym z nagrań rozmów z osobami o ograniczonej kompetencji językowej. Analizę przeprowadzono w dwóch perspektywach: częstotliwościowej (ton podstawowy, rozkład formantów, natężenie) i czasowej (liczba głosek na sekundę). Wyniki zostały skorelowane ze zmiennymi: kontakt z obcokrajowcami oraz stosunek do osób o niższej kompetencji językowej. Wykazano, że osobisty stosunek do rozmówcy wpływa na stopień hiperartykuacji. Dowiedziono również, że stopień hiperartykuacji jest zależny od stosunku do rozmówcy w perspektywie czasowej, nie częstotliwościowej.

SŁOWA KLUCZOWE: AKOMODACJA MOWY, SOCJOFONETYKA, MOWA KIEROWANA DO OBCOKRAJOWCÓW, DUŃSKI, FIŃSKI

INTRODUCTION

It is a human nature to adopt our style of speaking to our interlocutors. Several factors influence a degree of accommodation, e.g. fluency in a language of communication, ethnical belonging, prejudices and beliefs, level of education, socio-economic status, bilingualism and perhaps many still undiscovered aspects contribute to speech attuning. This paper presents the results of the investigation on speech convergence during map-based interactions with foreigners in Danish and Finnish languages compared with a native talk and seeks to correlate the acoustic differences in both registers with speakers' attitude to foreigners and exposure to interactions with linguistically less-fluent interlocutors.

The aim of the research is to compare pitch, vowel space and speech rate in phones per second between foreigner-directed speech and native talk and to estimate the degree of speech convergence in both registers. The secondary aim is to correlate obtained inter-register differences with subjects' personal attitude towards foreigners and their previous exposure to communication with linguistically less-fluent interlocutors. It is hypothesized that personal attitude to foreigners influences the degree of accommodation in interaction with linguistically less-fluent interlocutors in temporal and spectral domains causing different degrees of speech convergence. More specifically, it is assumed that a degree of hyperarticulation and speech rate can be positively correlated with speakers' attitude to foreigners measured by the means of a questionnaire.

Two general hypotheses will be tested in the present research: (1) conversations between native speakers and non-native speakers differ significantly in terms of segmental and suprasegmental characteristics in both the temporal and spectral domain. The features of foreigner-directed speech seem to have commonalities observed across languages, regardless of their phonetic inventories and vowel systems; (2) the attitude of speakers towards foreigners/immigrants and experience in talking to foreigners, estimated by the means of a questionnaire, influence a degree of speech convergence during conversations with foreigners, compared with similar talk between natives.

The following chapter presents the theoretical background and Speech Accommodation Theory framework. It outlines the concepts of convergence and divergence and introduces the terminology used in this work. It also covers the specificity of foreigner talk in terms of phonetic, morphological, syntactic and lexical changes and outlines the pioneering works in the field. The next part describes the material and methods. It provides the conventions of data selection and processing and draws the parallels between speech convergence and paralinguistic features of attuning. The third section is devoted to the experimental procedure and outlines the correlations of personal attitude and measured speech signal. The fourth part provides the results of statistical testing, whereas the last section contains the discussion and interpretation of the results.

SPEECH ACCOMMODATION

Speech attuning is a process of adjusting style of communication, driven by the observation of an interlocutor and aims to maintain, enlarge or shorten the distance between the parties. This process, consciously or not, intends to achieve the goals of communication. A degree of attuning is prone to many linguistic and extralinguistic factors. Accommodation can be predominantly one-sided or mutual. However, interaction in which one side does not clearly, and perhaps intentionally, attune can bring a sensation of an offensive attitude and lack of communicative and cultural competence (Myers et al. 2008).

Speech convergence has already been investigated in the frame of Communication Accommodation Theory and Speech Accommodation Theory (henceforth: CAT and SAT). These theories, established in the early seventies, cover a set of strategies allowing a participant or a target group to increase or decrease distance between parties of communication act, primarily by modifications of language. Previously, CAT/SAT were applied to explain the need for psychological distinctiveness. The strategies based on goals of subjects involve alternations not only in a lexical subsystem of a particular language, but also in a phonetic layer, morphology and syntax. The most common alternations refer to semantic simplifications; omissions of grammatical units subjectively perceived as difficult ones; lowering the speech rate; extending the vowel space etc. CAT/SAT frameworks are not limited to purely linguistic datasets and might cover some investigations of nonverbal messages as well. Even though SAT is a well-founded linguistic theory, the term 'accommodation' is often associated with influential works of the psychologist Jean Piaget, who concluded that accommodation in a broad sense is a process of modifying our existing knowledge/schemata to integrate new information.

CAT is 'one of the most influential behavioural theories of communication' (cf. Littlejohn / Foss 2005: 147) and presents a framework developed to identify and account for how individuals attune language as well as other communicative behaviour in various contexts (Gasiorek et al. 2015). A simple definition of Speech Accommodation was given by Giles, who says that SA is 'the adjustment of one's speech or other behaviours *vis-à-vis* the people with whom one is interacting' (cf. Bell 2006: 648). The studies based on theoretical framework of CAT also attempt to understand the motives for attuning in interaction (McGlone/ Giles 2011). CAT tries to provide details of communicative adjustments by relying mainly on experimental methods. It covers interpersonal and intergroup dimensions of communication (Giles et al. 1997; Gudykunst/ Kim 2003). CAT also aims to enlighten our motivations and consequences of convergence and divergence. In other words: tactics of shortening and extending a distance between parties (Giles/ Ogay 2013). This statement led to a broad sociolinguistic discussion on the need for dominance in conversation and resulted in many interesting studies, e.g. on the

effect of speakers' accents on the willingness to offer them help (Giles/ Ogay 2013: 231), or on the emotions such as irritation, joy and pride in the CAT context (Dorjee et al. 2011).

Even though SAT and CAT exhibit many similarities, the theoretical foundations of SAT primarily gravitate towards speech styles and define the main motivation of convergence as a need to win approval and social identification. The theoretic foundations of CAT, on the other hand, are mainly focused on the relationship between identity management and a maintenance of relationships (Coupland 2001). Recently, two ideas originating from CAT, namely: recipient design and membership categorization have been implemented into conversation analysis (Fisher 2016).

So far, scholars have investigated various datasets through the prism of speech convergence theories. Apart from the spoken modality, text-based communication was also included in the CAT framework (Riordan et al. 2013). Researchers extended the CAT by analyzing social media channels (Goode/ Robinson 2013; Reysen et al. 2010) and human-machine interactions (Oviatt et al. 2004; Gasiorek et al. 2015; Beckner et al. 2016; Gessinger et al. 2018). An interesting alternation of group membership understanding was approached by Giles and Gasiorek (2011), who investigated intergenerational interaction in the light of the CAT. It appeared that subjects tend to accommodate more to addressees of the same age than in circumstances in which the age gap between the interlocutors is greater. A summary of qualitative and quantitative studies on CAT was provided by Soliz and Bergquist (2016) as well as McGlone and Giles (2011).

Interestingly, not only interlocutors: human beings, imaginative confederates, machines etc. cause speech convergence but also bystanders and overhearers seem to have an impact on attuning. This concept of inequality of communication sides was introduced by Erving Goffman (cf. Fisher 2016: 19) and named as the Participation Structure. The so-called 'footing' or 'participant role', as Levinson suggests (1988), is 'the alignment of an individual to a particular utterance whether involving a production format, as in the case of a speaker, or solely a participation status, as in the case of a hearer'. This idea was further developed by Clark (1992) and the Participation Structure, having influence on speech attuning, evolved into a concept of Audience Design (Horton/ Gerrig 2002).

Other directions of research on communication attuning suggest that convergence is not exclusively a human phenomenon. A strong argument for universal character of vocalisations and calls comes from primatology. Research on behaviour of Old World primates (*Mandrillus sphinx*) discovered that vocalisations of mandrills are clearly modulated by their social environment (Levréro et al. 2015). Primates can modulate the vocalisations depending on the levels of kinship relation and familiarity – calculated as the number of years spent in the same group. This conclusion was also based on the temporal and spectral analysis of contact calls between three semi-free populations of southern Gabon (for a review see: Chapais/ Berman 2004).

ON CONVERGENCE AND DIVERGENCE

The ability to adapt one's speech to different communicative situations in order to make them more intelligible for recipients is of interest to linguists, psychologists and anthropologists. In the early studies by Giles (1973), linguistic differences in a communication with out-group members were called 'speech divergence'. In contrast, the modification of one's speech in order to resemble the characteristics of interlocutor's language was called 'speech convergence'. In further works (e.g. Giles et al. 1997), the focus was shifted to a group perspective and it was concluded that members of subordinate groups tend to converge their speech into the one used by participants from more dominant groups. On the other hand, speech divergence was pointed as a strategy of 'psychological distinctiveness' reflected in taking advantage of jargon, own dialect and accentuating a speech variation typical for own group in a purpose of manifestation of differences between the parties involved in a dialogue. These terms established back in the seventies are still important in an academic discourse. They create a fundament of CAT and SAT and engage not only linguistics but also psychologists and anthropologists. Convergence of communication should be treated as a superordinate term to speech communication referring to wider perspective and covering a desire for social approval, need of high communication efficiency, shared self-presentation and appropriate identity definition. Speech convergence could be then defined as a result of the above-mentioned needs reflected in speech with the aim to shorten the distance to an interlocutor. Speech and communication divergence, on the other hand, are motivated by a desire for contrastive self-image; a need to dissociate from the other participant or participants of interaction; change the speech behaviour of a recipient; and define the encounters in the intergroup terms. A thought-provoking division was introduced with regard to consciousness and convergence. If attuning is treated as an intentional process, then 'mirroring' refers to unconscious one. Research on body positioning in communication revealed that the CAT framework can be successfully applied in nonverbal communication studies. Phenomena such as 'postural echo' or 'postural convergence' introduce an interdisciplinary scope to a well-established field (Chandler/ Munday 2016). Apart from convergence vs. divergence dichotomy, another approach called 'maintaining' was described by Dragojevic et al. (2016: 37) after investigating short conversations between French and English-speaking sides in Montreal. Having mentioned speech convergence in sociolinguistic terms, the question of prestige of a certain register was raised. It was observed that communication often exhibits upward attuning to a 'more standard' register of a particular language and such phenomenon was called 'levelling' (Gasiorek et al. 2015).

If reciprocal relations are questioned in the light of speech convergence, another pair of qualifiers can be assigned to communication, namely: 'symmetrical' vs. 'asymmetrical'. The former tactic of convergence refers to attuning intentions of both speakers; the second one, to one speaker only. This perspective was applied to

a wide range of studies covering shop assistant – customer interactions; interpreting men – women dialogues etc. (see Dragojevic et al. 2016).

In terms of modality, a dichotomy ‘unimodal’ vs. ‘multimodal’ adjustment was established. The first describes a situation in which only one linguistic layer undergoes attuning, e.g. lexis, but all other subsystems are maintained within an out-group register. It seems quite hazardous to stay in such an interaction without a risk of being accused of irony, sarcasm or even impoliteness. Multimodal attuning, on the other hand, reflects the situation in which multiple, often extra-linguistic, dimensions are attuned, e.g. body posture along with mimics and accent; however, apart from associating multimodal attuning with a high cultural competence, a risk of conformism clearly accompanies an exaggerated over-accommodation. If temporal perspective is investigated in the light of accommodation, momentary code-switching is a good example of partial attuning, whereas the shift from one language to another could refer to full attuning.

Questions of cultural specificity were also raised in research on speech convergence. Interestingly, studies on cultural nuances of foreigner-directed speech revealed that Japanese students consider code-switching as more cooperative than foreigner-talk (Ross/ Shortreed 1990). Furthermore, attuned foreigner-directed speech was marked as more polite than code-switching. Intersexual differences were also taken as a research variable and female students considered FDS as more internationally-minded than male subjects. It was also observed that individuals with a high degree of solidarity with their ethnic or national environment, tend to emphasize some typical, and perhaps stereotypical, linguistic markers of their groups.

As concluded by Fisher, full convergence, leading to native-like competency, is usually undesired by natives and non-natives (2016: 175). It might lead to problems with maintaining social identity and even to the lack of trust. Other factors can influence characteristics of foreigner-directed speech, e.g. cognitive overload, differences in personalities, stereotypes, emotional state, intoxication and health-related conditions, social expectations etc. Furthermore, etiquette and deeply embedded cognitive schemas play a crucial role in a degree of under-accommodation more often than over-accommodation and result in subjective evaluation of comfort and quality of conversation. Recent studies show that factors such as bilingualism and gender are also correlated with a degree of accommodation in listener-adapted speech (Hazan/ Baker 2011; Dewaele/ Wei 2012; Lorge/ Katsos 2018).

As shown above, speech convergence is a deeply complex phenomenon covering cultural factors along with personal intentions undertaken in communicative act. Attuning can then be seen as a canvas for positioning one’s identity in relation with own group and a group of an interlocutor or even overhearer. A diverging behaviour is clearly motivated by a need of distinctiveness (Bell 2006: 649). On the other hand, convergence can be treated as one of the symptoms of desire for approval.

FOREIGNER TALK: FEATURES AND FUNCTIONS

Having already mentioned basic concepts of multimodal speech attuning, we shall now turn to linguistic and paralinguistic features of particular casus of speech and communication convergence.

Foreigner-directed speech (FDS) is a term which emerged from the general phenomenon of speech accommodation and exists as a subdivision of recipient-directed talk. In the literature on speech convergence (e.g. Fisher 2016; Fedorova 2018), three subdivisions of speech-directing are established. Namely: (1) child-directed speech (CDS); (2) foreigner-directed speech (FDS); and the newest branch considering human-machine interaction – (3) robot-directed speech (RDS). From more general to more specific, similar terms like: ‘xenolect’; ‘foreigner-talk (FT)’; ‘native-speaker non-native-speaker conversation’ are mentioned in the literature. Following Long’s definition, FT is ‘a register of simplified speech [...] used by speakers of a language to outsiders who are felt to have very limited command of the language or no knowledge of it at all’ (cf. Long 1981: 259). Simplification in FT should also be defined perhaps in more precise way, since FT often takes advantage of reduplications, which are not obvious signs of pauperization of a certain register. Nevertheless, FT is often questioned in investigations of pidgins (e.g. Foley 2006).

Regarding a spectrum of languages in which elicited and observational FDS have been investigated, English, German and Dutch are among the most often represented ones (Long 1981: 260–1). Interestingly, one pioneering work on FDS was conducted in Finnish (Meisel 1977); however, with time, the research interest was shifted to English in which qualitatively and quantitatively the most representative material of FT is available. The methodology of research on FDS has been developed since 1975. The pioneering task, performed by Ferguson in the seventies, was based on a hypothetical situation. The task was to rephrase a sentence: ‘I have not seen the man like you are talking about’ in order to make it comprehensible for imaginary foreigner. The works of Ferguson (1981, 1982) popularized FT as a subordinate term related to communication with ‘strangers’. Another method from the early research on FDS was based on quasi-experimental settings by only imitating real conversations (i.e. Henzl 1973). However, studies conducted in controlled conditions should be always approached with a certain dose of caution, since usually they only attempt to mimic the natural interaction. Going deeper into the taxonomy of FDS studies, several methods of data gathering can be distinguished – starting from spontaneous speech, via quasi-spontaneous speech, to reading and repetition tasks. Regarding participants and interlocutors – imaginary confederates, professional actors, machines, human beings of different ages, sexes, and ethnicities, exhibiting various SES and cultural backgrounds were considered as dependent variables in many previous studies on FDS.

Apart from the field of phonetic studies on FDS, some interesting measures of differentiating FDS from the other registers are established: e.g. content measures

including target-words to optional-modifiers ratio; MLU; redundancy measure counted in repetitions; syllables-per-second etc. (e.g. Lorge/ Katsos 2018). However, in the history of research on speech accommodation, not only objective measures have been applied. It appears that factors such as communicative warmth expressed by the amount of respect, encouragement, affect or friendliness can also be examined among different registers (DePaulo/ Coleman 1986).

Evidence from cross-linguistic research allow for a conclusion on universal characteristics of alternations between FDS and native talk. These alternations are visible in every subsystem of language. As suggested by Long (1981: 259–278), via a prism of phonetics and phonology, FDS is often characterized by: clear articulation, or even exaggerated pronunciation and hyperarticulation; occasional addition of vocalic segment after a word-final consonant; slower speech rate – which is rather a paralinguistic factor, highly dependent on subjects' characteristics such as emotional state etc.; reduplications; longer intrasentential pauses; altered VOT and loudness. Regarding lexis, FT can differ from conversations between native speakers in several aspects such as: occasional occurrence of loanwords, synonyms taken as substitutions of nouns, analytic paraphrases (i.e. 'where' > 'which place'); significantly decreased MLU. Grammatical alternations of FT, firstly established by analyzing material from Ferguson's study (1975) on stereotypes referring to talking to 'apparently undereducated non-Europeans' cover: presence of reduplications; article omissions; limited inflection; avoidance of subordinate clauses; no conjunction; increased amount of question-tags; shortened sentences; determiner deletion (Snow et al. 1981); simplified negation and special lexicon with paraphrases and reduced possessive pronouns. Other typical alternations appear in various languages, regardless of their typological classification. Among the most common are: loss of copula, which was reported by Ferguson (1971) as a universal FDS feature (with an exception of Russian users who exhibit additional, redundant copula 'есть' in FT; see Fedorova 2018); lapses of conjunctions and subject pronouns; expansions by addition of redundant tags; insertions of a subject pronoun 'you' before imperative forms; 'no' followed by negating item: 'no like'; replacements of subjects with object pronouns: 'him go'; conversions of noun + object + pronoun constructions, e.g.: 'for my sister' > 'sister me'; deletions of auxiliary verbs etc. Questioning sentences in FDS are preferred in uninverted form, with noticeable rising intonation, which is perhaps considered to be more universal and more widely comprehensible way of interrogating than word order reversal. However, the most common patterns of raising intonation in questions are not present in the Finnish language; thus, this statement should be rather limited to language-specific observations. Statistical analysis of NS-NNS conversations revealed lower TTR along with higher average lexical frequency of nouns and verbs (Long 1981, 268). Mean length of utterances directed to non-native speakers is significantly decreased when compared with those uttered in conversation with native speakers. Interestingly, some studies stress

common features of FDS and children talk, caretaker speech, or so-called motherese.

Broader analysis showed differences in statement-to-interrogative ratios between both registers as well (Long 1981). On the basis of Russian material, Fedorova (2018: 141) concluded that nominative forms along with infinitives tend to be more comprehensible for linguistically less-fluent interlocutors. By generalizations of results from several studies, some cross-linguistic features of attuned speech could be pointed as typical for foreigner talk, i.e.: presence of comprehension checks, both – in verbal and non-verbal forms; reformulations; exemplifications; paraphrases; clarifications requests or topic-related questions; plethora of non-verbal events including mimics; advantage of yes-no questions over wh-questions; gestures indicating hesitations or analyzing; more present than past temporal marking of verbs; repetitions with shifts of cadence and hesitation-marking vocalisations. Certainly, many of the above-mentioned characteristics share a common ground with known pidgins and creoles, hence speech attuning constitutes an important unit possibly leading to language grammaticalization.

SPECTRAL DOMAIN

The acoustic-phonetic studies of FDS recordings covered not only linguistic experience of interlocutors but also variables such as talking to imaginary vs. real foreigner (Scarborough et al. 2007). Experimental data show that spectral hyperarticulation is typical not only for speech directed to real foreigners but also to foreign imaginary speakers. Studies on F0 in ADS (adult [native speaker] directed speech) and FDS discovered that fundamental frequency significantly differs in both registers (Knoll/ Costal 2015). As reported by Englund (2018), F0 measured in vowels is significantly increased in infant directed speech. Additionally, more-front articulation was noticed as well as lengthening of measured vocalic segments in comparison with ADS, taken as a control. Hence, it was concluded that IDS register causes more hyperarticulation than FDS. Studies on pitch in listener-adapted speech revealed not only greater pitch range, compared with so-called ‘normal’ register; but also discovered sharper pitch contours (cf. Lorge/ Katsos 2018: 3–24). Bilinguals seem to extend pitch range significantly more than monolinguals in FDS. The same phenomenon was observed among female subjects. It was reported (Biersack et al. 2005) that F0 maxima and pitch range were greater in conversations with foreigners compared to neutral registers. A comparison of pitch in attuned speech seems particularly interesting within a cross-linguistic perspective in the light of findings (e.g. Granlund et al. 2012) that native speakers of languages which do not take advantage of lexical stress or pitch accent tend not to alter the F0 range, peak and minimum in clear speech and casual speech. The vowels’ expansion and slower speech rate were discovered as a speech accommodation feature in conversation

influenced by participants' command of language. Interestingly, similar phenomena were discovered in speech directed at native speakers with hearing loss.

Not only fundamental frequency, but also extended vowel space along with speech rate correspond to hyperarticulation. It is assumed that extreme articulation is a result of one's prediction that the receiver of a message finds difficulties with predicting a content. Normal hearing surroundings along with receiver's availability to decode a message according to the sender's intention, cause hypoarticulation and hypospeech – a phenomenon described by unexaggerated, relaxed speech with more assimilation (Lindblom et al. 1990; Pettinato 2016; Englund 2018: 68); in contrast to hyperspeech – in which production is effortful. Previous studies concerning speech accommodation and hyperarticulation in Danish revealed that corner vowels /i/, /a/ and /u/ are uttered with hyperarticulation in IDS and FDS compared with normal speech, directed at adult native speakers (Bohn 2013; Uther et al. 2007). Previously, a didactic function of hyperarticulation was concluded on a basis of studies where increased vowel space was correlated with the ability to discriminate vowels (Liu et al. 2003). It was discovered that hyperarticulation positively influences word-learning processes (Ma et al. 2011). Hyperarticulation of vowels was reported in listener-adapted speech register along with fewer reductions of consonants and vowels (Bradlow/ Bent 2002; Ferguson/ Kewley-Port 2002). Another factor hypothesized to distinguish two registers is intensity. Intensity in foreigner talk was investigated by several studies (Rodriguez-Cuadrado 2018; Wooldridge 2001; Scarborough et al. 2007) and its variation is considered one of the global characteristics of FDS.

TEMPORAL DOMAIN

Even though some studies include the duration of vowels as a variable in FDS (e.g. Knoll et al. 2011), in this study duration of vocalic segments will not be considered due to intrinsic differences between Finnish and Danish vocalic systems. Some scholars (e.g. Sundberg/ Lacerda 1999) contrasted the duration of vowels in FDS and IDS (Infant Directed Speech) and by referring to MIPhI model (Mother-Infant Phonetic Interaction) concluded that as well as the other phonetic aspects of attuned speech, temporal representations of segments are not constant and tend to alter. Speech rate is a quasilinguistic parameter corresponding to amount of speech production units (i.e. in phones, syllables, words, sentences) per time unit – usually a second. It is highly dependent on subjects' speech style and emotions, arousal, speakers' health, communication mode etc.

Even intuitively, slower speech is considered easier to comprehend. However, Smith et al. (1991) showed that speech can be slower when directed at natives and faster in conversation with foreigners. Some other measures were introduced to examine the ways of slowing speech down. Not only the pauses in between words, but also vowels prolongation influence a speech tempo and both of mentioned

measures could differ in FDS/NDS. It was discovered (Biersack et al. 2005) that speech rate was significantly lowered in FDS than in CDS. Furthermore, speech rate is also correlated with hyperarticulation. Slower than usual speaking rate leads to greater opening of jaw, which in consequence leads to articulatory extremes (Van Son/ Pols 1990).

The majority of studies with a focus on characteristics of speech directed to real or imaginary foreigner repeated the early findings of Ferguson (1975). Clear and hyperclear pronunciation was discovered along with slower speech rate. Some studies also pointed to unexpected characteristics of FT, e.g. a lack of disfluencies and hesitation markers (cf. Fisher 2016) and lack of fluency – which might, counter-intuitively, cause certain difficulties in perception by recipient and lead to fossilization. Some researchers also concluded that foreigner talk, as well as teacher-directed speech do facilitate second language learning, in a similar way as child directed speech facilitates first language acquisition (Fisher 2016: 162).

MATERIAL AND METHODS

The experiment consisted of three stages. The first step covered spontaneous speech between two native speakers of Danish/Finnish languages. The second round was similar in task but different in interlocutor. Here, the road instructions were given to a person with a significantly lower command of Danish/Finnish. In the last step, after the recording session, a questionnaire was handed to all participants. As stated by Long (1981), one of the factors highly influencing FDS is a previous experience of native speaker in communicating with foreigners; hence, it appeared important to estimate the speakers' personal attitudes towards foreigners. The aim of a survey was to examine the correlation between the degree of speech accommodation, understood as a difference between NDS and FDS, and subjects' personal attitudes towards out-group members.

RECORDINGS

Subjects were given a task to describe the route provided in a form of a map. Target words with desirable segments were marked on a map as landmarks. In the second phase, conversations between linguistically less-fluent interlocutors and native Finns and Danes were recorded. The participants were given a task to explain the route to a person with a significantly low degree of Danish/Finnish command – level A2 according to Common European Framework of Reference for Languages (Council of Europe 2001). The A2 level refers to people's ability to deal with simple, straightforward information and to begin to express oneself in familiar and predictable contexts. When A2 level is reached, simple conversation can be

conducted based on frequently used expressions related to the areas of most immediate relevance (*ibid.*, 24). The CEFR classification provided local geography as one possible topic in which a dialogue can be successful. Direct exchange of information is achievable and simple description of an immediate need plausible. Hence, in order to control the language familiarity factor, the experiment design should precisely correspond to the skills mastered at A2 level. The speaker's linguistic fluency, estimated at L2 tests as A2, ensures that native speakers of Danish and Finnish would immediately notice relatively low command of a language and therefore start to attune the way of giving route instructions to be the most comprehensible. In this experiment, a foreigner started the dialogue by asking for road instructions. The exchange of information at the beginning of the conversation is crucial in the light of the findings that FDS seems to be governed more by feedback from the foreigner (Biersack et al. 2005; Warren-Leubecker/Bohannon 1982) than by initial expectations.

Due to application of selected target words, i.e. landmarks it was possible to control the phonemic surroundings of vocalic segments and to a relatively high degree control the influence of coarticulation of neighboring segments. All investigated clusters from the target words consisted of voiceless stops, a stressed vowel followed by voiceless stop, due to the anticipatory influence of stops on F0 of the preceding segment (Colantoni et al. 2015). This method allows to excerpt segmental data from particular clusters and provides a set of samples with sufficient-size dataset.

Manual annotation of collected samples was conducted in Praat (Boersma/Weenink, 2018). All segment boundaries were set to the nearest zero crossing and their F0, F1, F2 from vowel mid-position were measured. Measurement of tokens intensity was conducted as well. It was confirmed that apart from speech register and utterance addressee, vowel space is highly dependent on factors such as age, sex and ease of communication (Pettianto 2016). Some researchers claim that corner vowels should be taken into consideration in vowel space measuring (e.g. Englund 2018); therefore, not all of vowels from the extraordinary repertoire of Danish vowel system (Bohn 2013; Stielen/Bohn 1999) were analyzed.

ATTITUDE AND EXPOSURE

In the last step of the investigation, after the recording sessions, simple questionnaires were handed to all Danish and Finnish native speakers who took a part in the experiment. This stage of the investigation aimed to estimate the attitude of participants towards out-group members. Two factors called Attitude and Exposure were calculated as a sum of answers to questions regarding frequency and mode of subjects' exposure to foreigners, as well as participants' personal attitudes to immigrants. By answering several questions regarding the position of foreigners in Danish and Finnish societies (e.g. equal status of foreigners and Danes/ Finns, rights to benefit from healthcare systems, equal work opportunities etc.), an

estimation of Attitude factor was calculated. Another factor, named Exposure was calculated on the basis of answers to questions regarding the amount of contact with foreigners, the frequency of conversations with linguistically less-fluent speakers, the estimated amount of face-to-face conversations with foreigners as well as other contacts with immigrants. Then, the above factors were represented on a numerical scale and correlated with differences in acoustic representations of NDS and FDS registers. Personal data, gathered from the subjects covered: age, gender, education and foreign language fluency, however no correlations within different clusters were conducted.

PARTICIPANTS

In total 23 participants aged 21–27 took a part in the recording sessions. The pre-requirement for participation and the inclusionary variable was native fluency in Finnish/Danish. All subjects were students enrolled in undergraduate or graduate programmes at University of Eastern Finland (Finnish native speakers) and Aarhus University (Danish natives). All subjects taking part in a first stage of experiment were equally familiar with each other – they attended the same courses within the studies programme. Hence, the differences in familiarity between interlocutors were excluded from a set of experiment uncontrolled variables in a first stage of recordings. In order to exclude dialectical variations, speakers whose speech was chosen for the analysis came from the same regions, namely: Joensuu and Aarhus.

RESULTS

As previously stated, two domains of analysis of speech signal were applied in this research: temporal and spectral. Basic and descriptive statistics were calculated along with the Shapiro-Wilk test; correlation analysis with Pearson's *r*-test, and Student *t*-test for dependent samples. Classical statistical significance level $\alpha = 0.05$ was applied in the analysis. The results within the range: $.05 < p < .1$ were considered as relevant on the level of statistical tendency. In total, 375 vocalic segments in similar phonological surroundings were extrapolated and measured in terms of their fundamental frequency, first and second formant values, and intensity; delivering 1500 values in NDS and FDS registers.

DANISH FOREIGNER TALK: SPECTRAL AND TEMPORAL SCOPE

Firstly, the main premise on NDS and FDS differences was tested. The Danish samples showed no statistical significance in differences of fundamental frequency between NDS and FDS registers. The accommodation of F0 did not reach a threshold of statistical significance.

Intensity was another factor taken into consideration and contributing to hyperarticulation. Higher values of SPL [dB] were noticed in FDS for /i/ ($p = .003$; Cohen's $d = 1.18$), /e/ ($p = .005$; $d = 1.11$), /y/ ($p = .007$; $d = 1.05$) and /ø/ ($p = .037$; $d = .75$). The effect was very strong for /i/, /e/, /y/ and moderately strong for /ø/. Additionally, one difference was noticed at the level of statistical tendency. The intensity of /a/ segment was higher in FDS compared with NDS ($p = .086$; $d = .6$). The rest of tokens did not differ significantly in statistical testing.

Regarding vowel quality, only two segments excerpted from Danish recordings appeared to be different between NDS and FDS registers. Segments /o/ and /u/ exhibited significantly higher F1 values in FDS compared to NDS, ($p = .018$; $d = .88$) and ($p = .038$; $d = .75$) respectively. Values excerpted from the other segments were not close to statistical tendency levels. In the light of statistical analysis, F2 values turned out to be even less diverged across registers. Only one segment /e/ had higher second formant values different in both communicative situations ($p = .039$, $d = .74$).

On the other hand, in the temporal domain, speech rate differences between both registers in Danish reached statistical significance threshold. Higher results, hence increased tempo of speech was noticed in NDS condition, which was in line with the research premises. Thus, the hypothesis on differences in speech tempo between NDS and FDS can be accepted in the light of statistical testing. Detailed results are presented in Table 1.

Table 1. Danish speech rate in NDS and FDS

	NDS		FDS		<i>t</i>	<i>p</i>	95% CI		Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			<i>LL</i>	<i>UL</i>	
Speech rate	10.98	1.01	9.87	1.71	2.67	.022	0.20	2.02	0.84

M – mean; *SD* – standard deviation; *t* – Student's *t*; *p* – *p*-value; *CI* – confidence interval; *LL* – lower limit; *UL* – upper limit

INFLUENCE OF ATTITUDE AND EXPOSURE

In order to answer the second research question, the following factors named: Attitude and Exposure were estimated individually for each participant.

Differences of F0 in both registers were positively correlated only in the case of /u/ segment (Exposure: Person's $r = .620$, $p = .031$; Attitude: $r = .596$, $p = .041$).

In the following step, similar calculations of correlations were made for the intensity of segments in both communicative circumstances. Only two correlations reached the level of statistical tendency. The Attitude level correlated with difference between NDS and FDS for segment /o/ only ($r = .574$, $p = .051$). Furthermore, the Exposure level correlated with the difference at /i/ segment ($r = .510$, $p = .090$). Both correlations were positive and exhibited considerable statistical strength.

Regarding vowel quality, differences in F1 between two registers did not reach the statistical significance threshold within any of the segments from the target tokens. The second formant value was positively correlated with Attitude levels for segments /ø/ only at the level of statistical tendency ($r = .536$, $p = .072$).

The last stage covered the correlation of differences of speech rate in FDS and NDS with the levels of Exposure and Attitude. A relation on the level of statistical tendency was discovered between the NDS-FDS difference and the Attitude level ($r = -.521$; $p = 0,083$). The correlation of Exposure level differences between investigated registers did not gravitate towards statistical tendency threshold ($r = 0,110$; $p = 0,735$).

FINNISH FOREIGNER TALK: SPECTRAL AND TEMPORAL SCOPE

After calculating basic statistics and verifying the Gaussian distribution of results, the general hypothesis on differences in Finnish FDS and NDS measured in F0 was rejected, similarly to the Danish recordings. None of the measured segments in both communicative circumstances reached a threshold of statistical significance.

The measures of intensity levels revealed only one significant difference between two registers: segments /e/ had higher intensity levels in FDS than in NDS ($p = .011$; Cohen's $d = .99$).

In terms of vowel quality, statistically significant differences in F1 between NDS and FDS, with higher results in FDS were obtained for /a/ ($p = .040$; $d = .75$) and /u/ ($p = .039$; $d = .75$) segments only. The strength of the effect was moderate. In a further step, measures of F2 were compared across registers. The results showed that F2 values were higher in FDS than NDS only for /ä/ segments ($p = .023$; $d = .85$). The strength of effect was considerable. Additionally, one result appeared to reach the level of statistical tendency. Second formant values of /o/ segments were higher in FDS than in NDS ($p = .095$; $d = .58$) with moderate strength of effect. Differences in other segments did not reach the threshold of statistical significance.

On the other hand, speech rate – calculated in phones per second – again appeared to be different in both communicative situations. A higher speech tempo was observed in conversations between Finnish native speakers, which corresponds with the results obtained for Danish native talk as well. Results of Finnish speech rate in NDS and FDS are presented in the Table 2 below.

Table 2. Finnish speech rate in NDS and FDS

	NDS		FDS		<i>t</i>	<i>p</i>	95% <i>CI</i>		Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			<i>LL</i>	<i>UL</i>	
Speech rate	11.19	1.36	10.32	1.35	2.33	.042	0.04	1.71	0.74

M – mean; *SD* – standard deviation; *t* – Student's *t*; *p* – *p*-value; *CI* – confidence interval; *LL* – lower limit; *UL* – upper limit

INFLUENCE OF ATTITUDE AND EXPOSURE

In order to verify the influence of speakers' Attitude and Exposure levels on speech convergence, firstly fundamental frequency was tested. Among the F0 values, two results appeared to reach the statistical significance threshold. The difference between FDS and NDS was positively correlated with the Attitude level for /u/ ($r = .721$; $p = .012$) and /y/ ($r = .649$; $p = .031$) vocalic segments. Additionally, two results reached the level of statistical tendency. Participants' Exposure to foreigners resulted in positive correlation with register differences for vocalic segment /ö/ ($r = .565$; $p = .070$), whereas subjects' Attitude towards foreigners was positively correlated with differences for /e/ vowels ($r = .527$; $p = .096$). The strength of both relations was considerable. The other correlations do not appear close to statistical tendency levels.

In the following step, the intensity of extrapolated segments was correlated with the subjects' Attitude and Exposure to foreigners. Only one correlation reached the level of statistical tendency. The differences between NDS and FDS were positively correlated with exposure for /ö/ segments ($r = .524$; $p = .098$).

The differences in quality of vowels, measured in F1 were correlated with Exposure and Attitude levels in the following stage. No statistical significance was reached at this stage. In terms of F2, only one correlation reached the level of statistical tendency. Subjects' Attitude towards foreigners was positively correlated with NDS-FDS difference for segments /ø/ ($r = .580$; $p = .062$). Therefore, the more positive the Attitude the greater difference between both registers. The strength of correlation was considerable.

The last stage of correlations between the results from questionnaires and differences measured between NDS and FDS was based on a comparison of speech tempo, in phones per second. The correlation on the level of statistical tendency was discovered between participants' Attitude towards foreigners and their speech rate ($r = -.902$; $p < .001$). The correlation between subjects' Exposure to foreigners and speech rate was not close to statistical tendency thresholds ($r = -.381$; $p = .247$).

DISCUSSION

In the group of Finnish respondents, one conversation was dismissed from the acoustic analysis due to the fact that subject did not use target words to describe the route. One participant apparently underestimated the interlocutor's command of the Finnish language and focused on non-verbal communication based on gestures and body language instead. In this case, the subject's creativity was higher than expected and unfortunately excluded this recording session from further analysis. Thus, 12 recordings in Danish were compared to only 11 sessions with native Finns. The amount of extrapolated vocalic segments was, despite one dismissed interaction, sufficient for conducting statistical testing. In order to verify the general hypotheses, the values of segments as well as speech rate were compared on the NDS and FDS recordings. The specific hypotheses were verified by the correlation of differences between NDS and FDS acoustic features with the subjects' attitude towards foreigners and exposure to communication with linguistically less-fluent speakers.

Apart from the scope of acoustic analysis, some general features of foreigner talk were noticeable, e.g. presence of repetitions, lexical simplifications, long pauses etc. Due to repetitions, more segments were observed in FDS register than in NDS. Interestingly, repetitions, if occurred in closest neighborhood, exhibited a lowered degree of hyperarticulation (F1-F2), and a significantly lower intensity than the first occurrence of the target word, but not necessarily lower speech rate. In many cases repeated target words were uttered faster than the average speech tempo. Furthermore, speech rate was different in NDS and FDS both, in Finnish and Danish. The strength of effect was considerable in Danish and moderate in Finnish. Not surprisingly, the results showed that the speech tempo, measured in phones per second, was greater in native talk compared with FDS, which confirms the assumption of specific hypothesis.

The differences in fundamental frequency values did not reach the statistical significance thresholds in Finnish, nor in Danish; hence – having in mind all the complexities of pitch perception – F0 levels did not alter significantly between NDS and FDS in both languages. It appeared, in contrast to e.g. speech directed to children, that fluctuations of pitch were not typical feature in assembled database, which contradicts many of the previous findings on pitch in attuned speech.

Different results were obtained for the intensity levels. One relation was statistically significant in Finnish, with considerable strength of effect, and four results reached test threshold in Danish. In the second case, three effects exhibited considerable strength, whereas one was moderately strong. Additionally, one effect in Danish reached the level of statistical significance. All of the values were higher in FDS – which is also coherent with the specific hypothesis. In terms of intensity levels, Danish participants revealed two positive correlations which reached the statistical tendency threshold. The Attitude levels positively correlated with NDS-FDS intensity differences. The effect of correlation was strong. Among

the Finnish results, only one correlation with Exposure levels was discovered in NDS-FDS intensity differences. The correlation was strong and positive.

The increased values of F1 discovered on the Danish recordings were higher in foreigner-directed speech in two cases. The strengths of effects were moderate. In Finnish, a similar situation was discovered with two statistically significant results with considerable strength of effect.

Responding to specific hypotheses on the vowels' quality, differences in NDS-FDS for the values of first formant frequency were correlated with the answers from the questionnaires. None of the investigated segments recorded among Finns and Danes reached the statistical tendency threshold. The assumption of F1 correlation with Exposure and Attitude levels, in the light of statistical testing, was rejected. The second formant value was correlated only once in the set of the Danish and once in the Finnish recordings.

Interestingly, the results obtained from temporal analysis of recorded material showed that in both languages very strong and positive correlation of speech rate and Attitude was present. On the other hand, the levels of Exposure were not close to statistical tendency thresholds. Based on the results it might be concluded that the more positive personal attitude to foreigners the lower speech rate in conversations with them.

FINAL REMARKS

The proposed research on speech accommodation in foreigner talk compared with native talk was focused on spectral and temporal perspective of speech signal and correlations of differences with participants' attitude to foreigners and exposure to foreigner talk. The innovation of this study laid in the correlation of acoustic features of vocalic segments along with speech rates with speakers' attitude towards foreigners and their exposure to conversations with linguistically less-fluent interlocutors. In several cases, speakers' attitude to foreigners was positively correlated with increased values of first and second formant, intensity and fundamental frequency.

The subjects' exposure to conversations with linguistically less-fluent speakers was not strongly correlated with the differences in quality of vocalic segments between registers. Interestingly, speech rate was positively correlated with levels estimated by the answers provided on the questionnaire in both languages. The limited dataset, as well as the number of participants, do not allow to draw conclusions on universal tendencies across languages; however, this study might be treated as an introductory attempt to correlate personal attitudes with acoustic segmental and suprasegmental features. The study might also serve as a methodological inspiration for testing a larger set of languages with involvement of a greater number of participants. Another inspiration for further studies, which the

already created dataset could serve for, might cover the simplifications of language-dependent constructions in FDS compared with NDS. The collected corpus of conversations might also be investigated to address the needs of various communication studies. The dataset contains many interesting constructions, which are believed to be – by subjects providing the road instructions – more comprehensible for their interlocutors who exhibit lower fluency in Danish and Finnish. The general hypothesis on differences in between NDS and FDS measured in temporal domain was confirmed; however, specific premises were not confirmed entirely in the light of a proposed study and showed more complex phenomena. Not all of variables were positively or negatively correlated with levels of exposure of subjects to verbal communication with foreigners. Interestingly, the attitude of subjects towards out-group members appeared to have a greater impact on speech attuning than the degree of exposure to speakers with lower command of a language of interaction.

Clear cross-linguistic correlations were discovered in terms of speech tempo. Both groups of respondents altered the rate of given instructions depending on the linguistic fluency of their interlocutor. Intensity of speech signal differed only in several cases in NDS and FDS in Danish and Finnish. It was reported that attitude towards interlocutors correlates with differences between NDS and FDS mostly in the temporal domain. It modifies a degree of speech accommodation in relation – the more positive attitude – the greater difference between two registers. It seems dangerous to conclude on general tendencies of speech accommodation based on the proposed dataset. Therefore, in order to avoid oversimplifications, the final remarks should be limited only to specific communicative situations. The open character of assembled corpus of foreigner talk in Finnish and Danish allows for further comparative investigations and leaves the debate on segmental and suprasegmental features of speech accommodation wide open.

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