Vol. 16.2 2018

Research in Language

WYDAWNICTWO
UNIWERSYTETU
ŁÓDZKIEGO

RL Vol. 16.2 2018

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ŁÓDŹ 2018

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Printed directly from camera-ready materials provided to the Łódź University Press

Published by Łódź University Press

First Edition. W.09030.18.0.C

Printing sheets 8.25

ISSN 1731-7533
e-ISSN 2083-4616

Łódź University Press
90-131 Łódź, Lindleya 8
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e-mail: ksiegarnia@uni.lodz.pl
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WHICH PHONETIC FEATURES SHOULD PRONUNCIATION INSTRUCTIONS FOCUS ON? AN EVALUATION ON THE ACCENTEDNESS OF SEGMENTAL/SYLLABLE ERRORS IN L2 SPEECH

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Abstract
Many English language instructors are reluctant to incorporate pronunciation instruction into their teaching curriculum (Thomson 2014). One reason for such reluctance is that L2 pronunciation errors are numerous, and there is not enough time for teachers to address all of them (Munro and Derwing 2006; Thomson 2014). The current study aims to help language teachers set priorities for their instruction by identifying the segmental and structural aspects of pronunciation that are most foreign-accented to native speakers of American English. The current study employed a perception experiment. 100 speech samples selected from the Speech Accent Archive (Weinberger 2016) were presented to 110 native American English listeners who listened to and rated the foreign accentedness of each sample on a 9-point rating scale. 20 of these samples portray no segmental or syllable structure L2 errors. The other 80 samples contain a single consonant, vowel, or syllable structure L2 error. The backgrounds of the speakers of these samples came from 52 different native languages. Global prosody of each sample was controlled for by comparing its F0 contour and duration to a native English sample using the Dynamic Time Warping method (Giorgino 2009). The results show that 1) L2 consonant errors in general are judged to be more accented than vowel or syllable structure errors; 2) phonological environment affects accent perception, 3) occurrences of non-English consonants always lead to higher accentedness ratings; 4) among L2 syllable errors, vowel epenthesis is judged to be as accented as consonant substitutions, while deletion is judged to be less accented or not accented at all. The current study, therefore, recommends that language instructors attend to consonant errors in L2 speech while taking into consideration their respective phonological environments.

Keywords: accentedness, speech perception, pronunciation instruction

1. Introduction

Pronunciation, rather than vocabulary or grammar, has been found to be a major factor that impairs communication (Grant and Brinton 2014), and non-native

accent carries certain stigma that often leads to negative social and workplace outcomes (Gluszek and Dovidio 2010). English learners, therefore, place great importance on the correctness of their pronunciation. For example, most Polish students surveyed in (Waniek-Klimczak, Rojczyk and Porzuczek 2015) do not want non-English phonetic features to be present in their L2 English speech, and 94% of them desire to speak like a native English speaker. In other words, the learning objective for some learners is not only about achieving intelligibility, but also about speaking with a native-like accent. Although achieving a native-like accent is often conditioned by various extra-linguistic elements, recent research on pedagogy does show that accent can be reduced via explicit instruction of phonological forms (Couper 2006; Nair, Krishnasamy and De Mello 2006). However, instructional time is usually limited in conventional ESL classrooms, which makes it impossible for instructors to attend to individual difficulties of every student. Therefore, it could be more efficient to set priorities on correcting L2 phonetic features that are most "foreign" to native speakers. Previous studies on foreign accent indeed show that the degree of perceived foreign accent is affected by various phonetic cues (Munro and Derwing 2001). However, the relative importance of different segmental and syllable structural cues is not readily clear. The current study investigates whether different types of segmental and syllable structural cues differ in their relative impacts on accentedness perception. 110 native English speakers are recruited to provide accentedness ratings on 100 non-native English speech samples. Each speech sample is a short unsynthesized two-word audio snippet, containing only one segmental or syllable structure L2 pronunciation error. The results provide evidence showing that native English speakers do judge L2 errors differentially. The findings could potentially enable a more efficient curriculum for pronunciation instruction.

2. Segmental correlates of foreign accent

Foreign-accented speech displays a variety of phonetic characteristics that differentiate it from native speech. Indeed, "foreign accent" is usually considered an issue of perception, rather than production. Only those perceivable phonetic deviations in non-native speech are considered features of "foreign accent". As Munro and Derwing (1998) defined it, foreign accent is "the extent to which an L2 learner's speech is *perceived* to differ from native speaker norms". Therefore, research on foreign accents often relies on perception experiments to investigate the phonetic characteristics that might correlate with foreign accent. Among investigations on the segmental correlates of foreign accent, consonant errors are often found to be of vital importance. Several studies have found that VOT duration associates with perceptual accentedness in L2 English speech (Flege and Eefting 1987; McCullough 2013). Liquid errors might also associate with foreign accent. For example, the substitution of Japanese flap (i.e. [ɾ]) for English liquids

[ɹ] and [l] were considered accented by native English speakers (Riney Takada and Ota 2000).

Findings on the impact of vowel quality change on accentedness perception are not conclusive. McCullough (2013) finds that foreign accentedness associated with vowel formant changes. Greater formant frequency deviations (i.e. mean formant frequency) from native speaker norms leads to higher ratings of accentedness (i.e. more foreign accented). This finding is consistent with several other studies, which also show independent effects of both static F1 and dynamic/static F2 values on accentedness ratings (Munro 1993; Wayland 1997). However, conflicting findings have been reported elsewhere. Major (1987) found that foreign accentedness might associate with some vowels but not with others. Chan, Hall, and Assgari (2016) argue that it is vowel space, rather than deviations of format frequency, that correlates with foreign-accentedness.

3. Syllable structure correlates of foreign accent

Most research on foreign accent perception has focused on the impact of vowel, consonant and prosody. Fewer studies investigated the impact of syllable structure change on accentedness perception. L2 syllable production often involves some form of a simplification strategy, namely, segment epenthesis or segment deletion (Sato 1984; Hansen 2001). Some suggest that segment epenthesis is more important than consonant errors in L2 speech in signaling foreign accentedness. Epenthetic schwa, for example, was perceived as more accented than consonant feature changes (e.g. [tʃ] to [ʃ]) (Magen 1998). However, evidence is lacking on whether segment deletion could also be indicative of foreign-accentedness. After all, strategies such as obstruent coda deletion is also a prominent feature in native speech (Labov 1997; Tagliamonte and Temple 2005; Demuth, Culbertson and Alter 2006). Take t/d-deletion in English as an example. Native English speakers are more likely to delete /t/ or /d/ when they are past tense morphemes (e.g. /d/ in "called") than when they are part of the stem (e.g. /d/ in "hold") (Guy 1991). Non-native speakers' t/d-deletion strategy, however, does not seem to be bound by the grammatical conditions of /t,d/ (Hansen 2001; Edwards 2011). Although there are indeed differences between deletion strategies in native and non-native speech production, there is a paucity of evidence on whether the differences affect foreign accent perception.

4. Accentedness rankings of L2 errors

While most studies investigated only a few phonetic deviations, Magen (1998) and van den Doel (2006) compiled a list of L2 phonetic variants and directly compared their perceptual accentedness or severity. In Magen (1998), two Spanish speakers each recorded 96 sentences in English, from which 56 phrases

were selected for acoustic manipulation. For each phrase, Magen (1998) acoustically edited out one L2 error (e.g. editing out epenthetic schwa, or lengthening VOT duration on [pʰ]), which would ideally make the altered phrases less accented than the original ones. Ten native English speakers provided their accentedness judgment on the synthesized phrases and their unaltered counterparts. By comparing judgment ratings on the altered and unaltered phrases, Magen (1998) found that epenthetic schwa, vowel quality change (e.g. [ʃɪp] becomes [ʃip]), consonant manner change (e.g. [tʃ] becomes [ʃ]) significantly affect accentedness perception, while stop voicing (e.g. VOT shortening) does not. While Magen (1998) mainly focused on Spanish speakers' L2 English production, van den Doel (2006) focused on Dutch speakers' L2 English production. To provide natural sounding stimuli, van den Doel (2006) asked native English speakers to mimic L2 errors that are common among Dutch speakers (e.g. "bed" becomes "bet"). He then placed these stimuli in carrier phrases (e.g. she lay in bed/bet for most of the day.) and asked native English speakers to first identify the "error" presented in each phrase, and then provide a "severity" rating on each "error". The results showed that lexical stress shift and the uvularization of English [ɹ] are the most severe among all errors. Although various consonant errors (e.g. VOT shortening) and vowel errors (e.g. [æ] becomes [e]) were considered severe to native English speakers, consonant and vowel errors in general did not show any apparent difference in severity.

Magen (1998) and van den Doel (2006) both studied a specific group of L2 English speakers, and both provided an accentedness or severity ranking of different types of L2 errors. They both found that lexical stress shift and vowel epenthesis are indicative of accentedness, but they seemed to disagree on whether stop voicing changes (i.e. VOT changes) affects accentedness perception. The two studies also applied different approaches to achieve experimental control. Magen (1998) resorted to acoustic manipulations, while van den Doel (2006) had native English speakers mimic L2 errors. Both strategies have advantages and shortcomings. Acoustic manipulation could be quite precise in altering specific signals, but one might question the "naturalness" of the altered sound. Native speakers' mimicry of L2 errors might indeed achieve "naturalness". It however raises questions about whether the mimicry is truly representative of L2 speech. Both Magen (1998) and van den Doel (2006) placed stimuli in carrier phrases. However, the phonological environment of each target stimulus was not well controlled.

The current study aims to address the potential problems in previous research by obtaining stimuli that are both natural and representative of L2 speakers with various language backgrounds. Instead of acoustic manipulation, the current study employs a Dynamic Time Warping method (Giorgino 2009) to control for prosody in the least intrusive manner. The term "error" was used in previous studies (van den Doel 2006) to refer to any types of differences between L2 speech and its target. As these studies often show, some so-called "errors" were not considered

accented by native speakers. The term "error", therefore, does not necessarily imply "mistake". The current study adopts the term "L2 errors" used in previous studies to refer to differences between L2 speech and its target, while fully acknowledging that some "errors" could indeed be native-like.

5. The present study

The current study aims to investigate the relative importance of different segmental and syllable structure errors in foreign accent perception. 11 types of consonant errors, five types of vowel errors and two types of syllable structure errors from a large-scale speech archive are assembled to enable a more detailed comparison between different types of errors. This study will further explore whether consonant errors in general are more foreign accented than vowel errors or syllable structure errors. Human transcribers (i.e. professionally trained phoneticians) are recruited to identify the errors. Short audio snippets are used as stimuli without acoustic manipulation. That is, we have left nonnative prosody intact. Prosodic information is controlled for by calculating the DTW distance between nonnative F0 contours and native ones. Lexical stress is also controlled for by excluding any speech sample that involves the misplacement of lexical stress. The control stimuli in this study consisted of nonnative speech samples that have no segmental errors but may exhibit nonnative-like prosodic features. Native English speakers are recruited from Amazon Mechanical Turk to provide accentedness judgements on the stimuli. The results provide direct comparisons between consonant, vowel and syllable errors.

5.1. The experiment

5.1.1. Stimuli

The stimuli are audio speech samples extracted from the Speech Accent Archive (Weinberger 2016), which currently consists of 2,608 paragraph readings by speakers of various language backgrounds. All speakers were recorded reading the "Stella" passage at a university laboratory or their own residence (See Appendix A for the paragraph). 5 phrases were selected from the "Stella" passage for this experiment (Table 1). We opted to use General American English (GA) as the benchmark (See the "correct" condition in Table 1). Deviations from GA were considered "errors". 20 tokens of each phrase were chosen from the archive, five of which have only one consonant error, five of which have only one vowel error, five of which have only one syllable error, and another five were labeled as "correct", because they are representations of GA, yielding 100 audio snippets in total. The errors are all phonemic alternations. Sub-phonemic changes such as vowel lengthening are not included. The intensity of the 100 audio snippets were normalized to 75dB using PRAAT (Boersma and Weenink 2015).

The determination of errors was based on the IPA transcriptions available on the Speech Accent Archive. The transcriptions are relatively reliable because the transcribers were phonetically trained transcribers. The transcriptions were vetted by at least three transcribers before being uploaded online. A recent study recruited an additional 67 phonetically trained people to transcribe a selection of audio clips from the Speech Accent Archive (Weinberger et al. 2017). The results show that 72% of the 67 participants' transcriptions matched the vetted ones, which lend further support to the validity of the vetted transcriptions.

Table 1. Illustration of stimuli conditions

	consonant error	**vowel error**	**syllable error**	**correct**
please call	[bliz kʰɑl]	[pʰliz kʰol]	[pʰəliz kʰɑl]	[pʰliz kʰɑl]
ask her	[æsk hər]	[ɑsk həɹ]	[æs həɹ]	[æsk (h)əɹ]
six spoons	[sɪks spunʃ]	[siks spunz]	[sɪks əspunz]	[sɪks spunz]
five thick	[faɪv tɪk]	[fav θɪk]	[faɪvə θɪk]	[faɪv θɪk]
small plastic	[smɔl̩ pʰlæstɪk]	[smɔl pʰlæstik]	[smɔl pʰlæsɪk]	[smɔl pʰlæstɪk]

The vowel error condition consists of five types of vowel problems, namely vowel raising, vowel backing, vowel fronting, vowel lowering and vowel shortening. The vowel shortening error in this study refers specifically to the shortening from [aɪ] to [a] in word "five". There are two types of syllable errors, namely consonant deletion and vowel insertion. Consonant deletion refers to the deletion of a consonant at coda position (e.g. [kʰɑl] to [kʰɑ]) or within a consonant cluster (e.g. [pʰlæstɪk] to [pʰlæsɪk]). The deletion of /h/ in "ask her" was not treated as an error, because this type of /h/-dropping is also common in native speech (Milroy 1983). Vowel insertion involves prothesis (e.g. [spunz] to [əspunz]), anaptyxis (e.g. [pʰliz/ to /pʰəliz]) and paragoge (e.g. [æsk] to [æskə]). 11 types of consonant errors were included in this experiment, ranging from feature changing (e.g. [s] to [ʃ]) to consonant replacement (e.g. [θ] to [t]).

100 audio snippets were collected from 93 different non-native speakers. 52 different L1s were represented in the stimuli. To ensure that the stimuli are produced by nonnative English speakers, only late learners' speech samples are selected. 91 of the speakers started to learn English after age six. One speaker started to learn English at age five; one started at age four. The last two speakers were considered nonnative English speakers because they reported to have acquired English in academic settings, and their speech samples do show nonnative-like patterns. Previous studies show that native speakers are generally able to tell the native language of a nonnative speaker from his/her L2 speech (Kunath and Weinberger 2010). It is possible that one's bias for or against a certain language might affect one's accentedness judgement on speech samples produced by people of that language group. This potential confound is not accounted for in the current study. However, raters of this study might not be able

to successfully classify the L1 backgrounds of the speakers, because each stimulus is considerably short and contains only one segmental error.

Prosodic cues have been found to be important in identifying foreign accent (Munro and Derwing 2001; Kang Rubin and Pickering 2010; Morrill and Gao 2016). However, given the stimuli in this study are very short, it is unlikely that prosodic characteristics will be of much importance. Nevertheless, the current study controlled for prosody of the stimuli with a Dynamic Warping Method (DTW). The DTW is a non-linear algorithm that looks for the dissimilarity between two temporal sequences of data and calculates the costs to align one with the other (Rilliard Allauzen and de Mareüil 2011). It generates a DTW score that represents the dissimilarity between the two sets of data. The larger the DTW score, the more dissimilar the two sets of data are. In the current study, the DTW algorithm takes F0 values of a native speech sample[1] as the reference, and F0 values of a nonnative speech sample as the input. A DTW score, thus, represents the intonational dissimilarity between the native and nonnative speech samples. A native English speech sample was chosen from the Speech Accent Archive. The same five phrases as listed in Table 1 were extracted from the native speech sample as references. For each phrase, the F0 value at each millisecond was extracted in Praat with the auto-correlation algorithm (Boersma and Weenink 2015). Artifacts were removed by smoothing with a bandwidth of 5Hz. The F0 values were then converted to semitones relative to 1 Hz. The same process was carried out for all the 100 snippets produced by nonnative speakers. To allow for cross-speaker comparison, the semitones were then normalized for each speaker. The DTW function was then implemented in R with the DTW package (Giorgino 2009) to calculate the warping costs between each of the 100 snippets and its corresponding native speech sample. The DTW scores were then used in the analysis to account for prosodic information of the snippets.

5.1.2. Procedure

Participants (i.e. raters) listened to each of the 100 audio snippets and were then asked to judge the degree of the accent exhibited in the snippet on a 9-point Likert-like scale. Following the practice of similar studies (McCullough 2013; Huang and Jun 2015), only the endpoints of the scale were marked. A rating of one means the speaker has no foreign accent at all. A rating of nine means the speaker has a very strong foreign accent. To reduce the order-effect, the presentation of the stimuli was randomized. The 100 audio snippets were first divided into five blocks, each of which contains one token per condition per phrase, yielding 20 stimuli per block (five phrases x four conditions). The interface of the experiment provides a button and a 9-point rating scale. The stimulus is played once the participants hit the button, after which the rating scale will appear. Participants provide their accentedness judgement by choosing a number from one to nine on the rating scale, and then move on to the next trial.

[1] The native speech sample was provided by a 42-year-old male native GA English speaker from Pittsburgh, PA.

Unlike van den Doel (2006), raters in the current study were not required to identify or locate the error in each stimulus, because the error had already been pointed out by the vetted transcriptions. There are 100 trials in total. At the end of the experiment, the raters were asked to take a demographic survey, which collected information on the raters' age, gender, L1/L2, occupation, current residence and birth place. The maximum time allowed for completing this experiment was 30 minutes. Raters on average spent 12.34 minutes (SD=3.20) on the experiment. The experiment was programmed with HTML. Trial randomization was achieved via JavaScript.

5.1.3. Participants

Participants (i.e. raters) were 110 adult native English speakers recruited via Amazon Mechanical Turk (MTurk), a web-application that allows researchers to conduct survey-based experiments. Previous literature has shown that results of behavioral experiments conducted on MTurk were comparable to results of similar experiments conducted in lab settings (Sprouse 2010; Enochson and Culbertson 2015). Difallah, Filatova and Ipeirotis (2018) recently showed that there are about 2,000 participants being active on MTurk at any given time. 51% of them are female, 49% of them are male. About 75% of the participants are from the United States. Indian participants represent 16% of the population. The rest are from Canada, Great Britain, Philippines and Germany. Since the current study aims to investigate accentedness judgement of American English speakers. The experiment was made accessible only to people with a U.S. IP address. To increase the reliability of responses, the experiment required participants to have an approval rating of at least 95%. That is, the participants' previous work on MTurk has been approved at least 95% of the time. Of the 110 recruited participants, 62 were female, 46 were male, and another 2 participants did not report their gender. All of them reported to be born and currently residing in the United States. All of them reported that that they were native speakers of English. We therefore assume that the participants are native speakers of American English. All participants were paid $0.50 upon completion of the experiment. two of the participants reported having speech or hearing related disorders. Responses from these two participants were thus removed, yielding 108 participants in total. The age of participants ranged from 20 to 66. The mean age was 33.50 (SD=12.51).

5.2. Results

5.2.1. Segmental influences

The mean ratings across all 4 conditions (where each audio snippet was rated on a scale from 1 to 9) was 4.81 (SD =2.21). The larger the number, the more accented a snippet was judged. As expected, the participants assigned higher ratings for snippets with segmental and syllable structure errors (M=5.10, SD=2.15) than for snippets without segmental or syllable structure errors

(M=3.94, SD=2.16). Ratings for consonant errors (M=5.66, SD=2.04) are on average higher than ratings for syllable structure errors (M=4.96, SD=2.17), which is on average higher than vowel errors (M=4.69, SD=2.13). Figure 1 demonstrates the mean ratings of each condition, where the error bars represent the 95% confidence intervals.

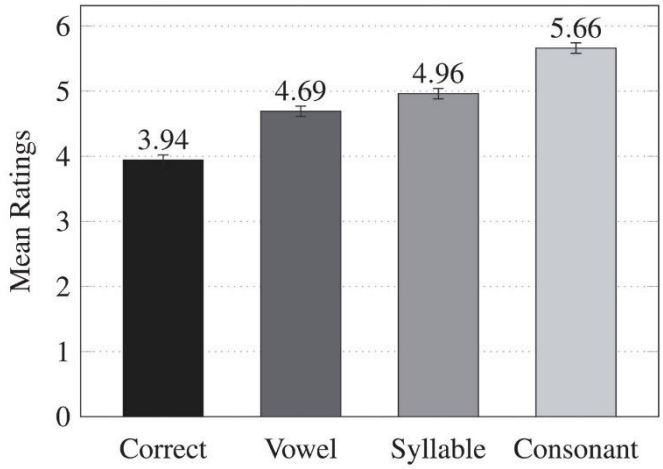

Figure 1. Mean ratings by error type on the scale from 1 to 9.

Linear mixed effects models were employed with the lme4 package in R (Bates et al., 2014) to investigate the segmental and syllable structure influences on foreign accent perception. The conditions were contrast coded to examine the effects of segmental errors (i.e. consonant vs. syllable, syllable vs. vowel, vowel vs. correct). To investigate accentedness ratings across the 100 trials, trial numbers were included as a fixed effect. The three condition contrasts and the interactions between trial numbers and each contrast were included as fixed effects. To control for prosody, the logarithmic DTW score (DTW henceforth) of each stimulus was included as another fixed effect. The two-way interactions between DTW and the contrasts, the two-way interaction between DTW and trial numbers, and the three-way interactions between DTW, the contrasts, and the trial numbers were also included as fixed effects. Raters were included as a random effect with the five phrases as its random slope. Stimuli were included as another random effect.

Model comparisons showed that the contribution of DTW to model fit is not significant (χ^2 = 2.64, p =0.104) and none of the interactions involving DTW achieved significant contribution to model fit, suggesting that the intonation of the audio snippets might not have affected accentedness ratings. The contrast between consonant and syllable errors significantly contributes to model fit (χ^2 = 18.83, p < .001), showing that stimuli with consonant errors were perceived as more accented than stimuli with syllable errors in general. The contrast between syllable

and vowel errors also significantly contributes to model fit ($\chi^2 = 17.26$, $p < .001$), showing that stimuli with syllable errors were perceived as more accented than stimuli with vowel errors. In addition, the contrast between stimuli with vowel errors and stimuli without segmental errors also contributes significantly to model fit ($\chi^2 = 13.32$, $p < .001$), showing that stimuli with vowel errors were perceived as more foreign-accented than stimuli without segmental errors.

These results suggest that all the 3 types of errors contributed to the perception of foreign-accent. However, stimuli with consonant errors were perceived as being more accented than the other two. Among the 3 types of errors, stimuli with vowel errors were perceived to be the least accented.

5.2.2. Phonological environment

The analysis above showed that consonant errors are judged to be more accented in general. It might be too hasty to draw the conclusion that all consonant errors are more accented than the other two types of errors. As mentioned in previous sections, individual errors were placed in different phonological context, which might be of some importance in identifying errors and consequently influencing accentedness ratings. Vowel reduction, for example, might be considered an error if the vowel belongs to a stressed syllable. It might not be an error if the vowel is not stressed. In the case of monosyllabic function words or pronouns (e.g. "to", "her"), vowel reduction is often obligatory (Selkirk 2011); using full vowels could instead be nonnative-like. The analyses on individual segmental errors were thus carried out for each of the 5 contexts.

Liner mixed effects models were implemented to compare accentedness ratings on each individual error within a given context. For example, 6 types of stimuli were represented in context "please call", namely, vowel insertion (i.e. [pʰliz] to [pʰəliz]), VOT shortening (i.e. [pʰ,kʰ] to [p,k]), final devoicing (i.e. [pʰliz] to [pʰlis]), vowel raising (i.e. [kʰɑl] to [kʰol]), coda deletion (i.e. [kʰɑl] to [kʰɑ]) and stimuli with no segmental or syllable structure errors. The models took "stimuli type" as a fixed effect. Trial number, and the interaction between trial number and stimuli type were also included as fixed effects. Participants were included as a random effect with condition as its random slope. Stimuli were entered as a second random effect. To enable the comparison between ratings on any two given types of stimuli (e.g. VOT shortening vs. vowel raising), the condition variable was contrast coded (e.g. VOT shortening vs. vowel raising, VOT shortening vs. no error, etc.). The results of model comparisons for each context are summarized in the following tables, where ">>" shows the direction of significant differences. The types of errors on the left of ">>" received significant higher ratings than types on the right of ">>". Ratings for the types of errors on the same side of ">>" did not differ significantly from one another.

Table 2. Hierarchy of relative impacts of individual errors in the phrase "please call"

1.	Vowel insertion, VOT shortening >>Vowel raising >> no error
2.	Vowel insertion, VOT shortening, Final devoicing >> Coda deletion
3.	Final obstruent coda devoicing, Vowel raising >> Coda deletion, no error

Table 3. Hierarchy of relative impacts of individual errors in the phrase "ask her"

1.	Vowel insertion, vowel backing, r-trilling >> vowel raising, vowel fronting, vowel lowering, no error
2.	Vowel insertion, vowel backing, r-trilling, Coda /k/ deletion >> no error

Table 4. Hierarchy of relative impacts of errors in phrase "small plastic"

1.	[ɬ] retroflexing, [ɬ] to [r] >> [s] voicing, [t] deletion, VOT shortening, vowel lowering, vowel tensing, vowel raising, no errors,

Table 5. Hierarchy of relative impacts of errors in phrase "six spoons"

1.	[z] to [ʃ] >> [sp] to [sp^{h}], [n] deletion>> vowel laxing, no errors
2.	[z] to [ʃ] >> [n] deletion, vowel insertion, vowel tensing, vowel fronting,
3.	[sp] to [sp^{h}] >> vowel insertion, vowel tensing, vowel fronting, vowel laxing, no errors

Table 6. Types of stimuli for phrase "five thick"

1.	[θ] to [st] >> [θ] to [t], [θ] to [f], coda [v] deletion, no errors
2.	[θ] to [st] >> vowel shortening, vowel insertion, vowel tensing>>[θ] to [t] >> [θ] to [f]
3.	Vowel shortening, vowel insertion, vowel tensing >> [θ] to [f], coda [v] deletion, no errors

Several notable generalizations can be drawn from the observations on individual types of errors. First, stimuli with consonant errors do seem to be perceptually more accented than stimuli with vowel errors in all five contexts, but phonological environment affects the accentedness of some consonant errors. For example, accentedness of VOT shortening might be affected by the phonological context where the shortening happens as illustrated in Figure 2, where * marks the statistically significant difference between accentedness ratings of a given stimulus (e.g. [pl]) and its target form (e.g. [p^{h}l]).

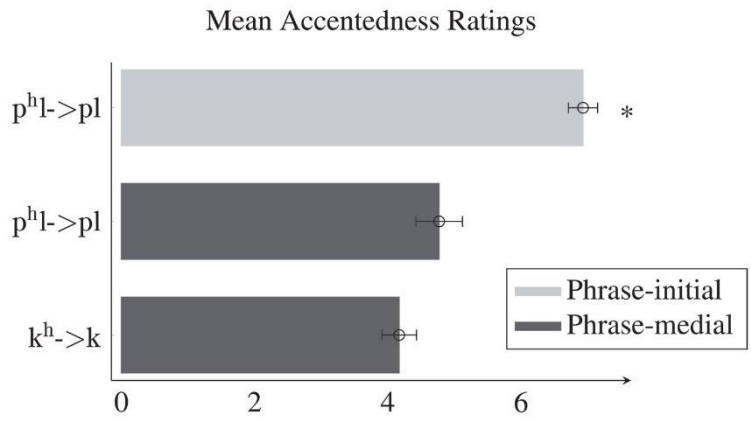

Figure 2. Mean Accentedness Ratings on VOT shortening

VOT shortening in "please call" (i.e. [pʰl] to [pl]) was assigned higher ratings than stimuli without segmental or structural errors (i.e. control stimuli). However, ratings on VOT shortening in "call" (i.e. [kʰ] to [k]) and in "small plastic" (i.e. [pʰl] to [pl]) was not significantly higher than stimuli without segmental or syllable structure errors. The reason might be that [pʰl] in "please call" is the initial segment of the whole utterance, which usually carries a longer VOT in native speech, as a result of prosodic domain-initial strengthening (Keating et al., 2004). Therefore, the shortening of [pʰl] in "please call" is not only a consonant alternation, but also defies rules in the prosodic domain, which might have led to higher accentedness ratings.

The effect of phonological environment was also observed on the accentedness of vowel errors. Figure 3 shows the accentedness ratings of vowel tensing (i.e. [ɪ] to [i]) in 3 environments. Only vowel tensing in "thick" was perceived as more accented than the control stimuli. The reason could be that sound sequence [θik] is not as common as [stik] or [sik] in English. In other words, English phonotactics could have affected accentedness perception. According to Vitevitch and Luce (2004)'s calculation, sound sequence [θik] has a 9% probability to occur in English context, while the probabilities for [tik] and [sik] to occur are 21% and 27%. The low phonotactic probability of [θik] could have given rise to the impression of foreignness.

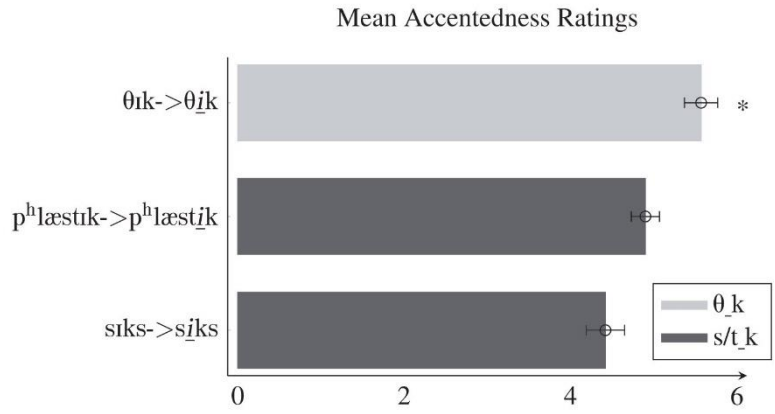

Figure 3. Mean Accentedness Ratings on Vowel Tensing

Similar effects of phonological environments have been found on syllable structure errors. Coda deletion is often allowed in native speech. In most contexts, coda deletion was indeed perceived to be less accented than other errors. Vowel insertion, on the other hand, is not normally allowed in native speech. Vowel insertion was indeed perceived as more accented than other types of errors. Interestingly, obstruent coda deletion in "ask her" (i.e. [æsk] to [æs]) was rated as accented, showing that native speakers of English are sensitive to the environment where coda deletion could happen.

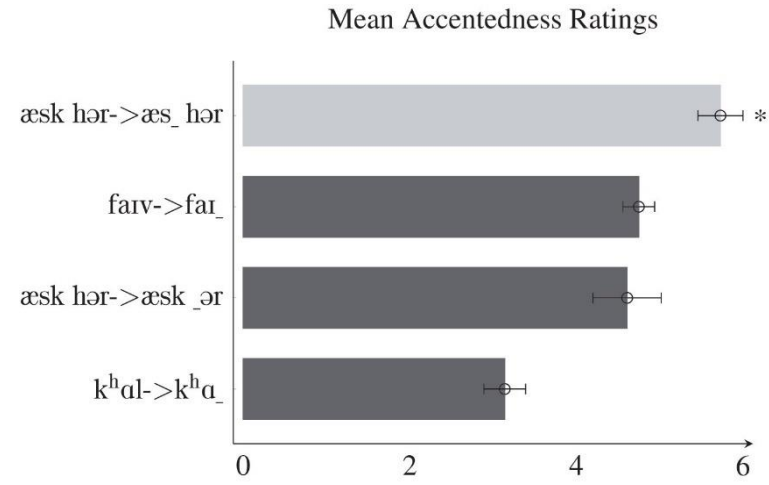

Figure 4. Accentedness Ratings on Coda Deletion

Stimuli with cluster internal epenthesis (i.e. [pʰl] to [pʰəl]) and stimuli with coda epenthesis (i.e. [æsk] to [æskə]) are more accented than stimuli with consonant errors in their respective contexts. Prothesis of s-clusters was not as accented as the other 2 types of epenthesis. The reason can be attributed to the perceptual similarities between the s-clusters with prothesis (i.e. [əsp]) and the unaffected one (i.e. [sp]) since [əsp] preserves the falling sonority profile of [sp] (Gouskova 2001). Word final epenthesis in "ask", on the other hand, changed the falling sonority (i.e. [sk]) to a rising one (i.e. [kə]). These results show that the effect of syllable errors on accentedness concerns both the specific type of errors and the environment the errors are in.

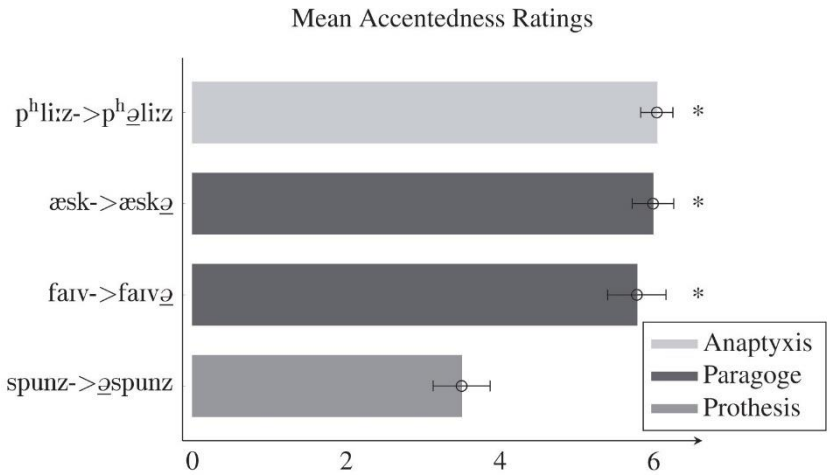

Figure 5. Accentedness Ratings on Vowel Epenthesis

5.3. Summary

The first part of the analyses focused on ratings on four types of stimuli, namely stimuli with consonant errors, vowel errors, syllable structure errors, and stimuli without errors. The results show that stimuli with consonant errors were rated as more accented than stimuli with vowel and syllable structure errors, which in turn were rated as more accented than stimuli without errors. Consonant errors were always rated higher than other types of error. Stimuli with no segmental or syllable structure errors always received lower accentedness ratings. Syllable structure and vowel errors were always rated lower than consonant errors and higher than stimuli without segmental errors. However, further analysis showed that accentedness ratings on the same type of errors may vary depending on the phonological context of the errors.

6. General discussion and conclusion

This study finds that General American English stimuli with consonant errors are, in general, judged to be more accented than stimuli with vowel or syllable structure errors. However, different consonant errors do not carry equal weight in foreign accent perception. As shown in the discussion above, the most accented stimuli were the ones with a nonnative sound (e.g. retroflex [ɻ], and trill [r]). In comparison, the alternations between native consonant phonemes were rated as relatively less accented (i.e. [θ] to [f]). The degree of acoustic distinctions between a substitute and its target sound might also attribute to the degree of foreign accent. For example, [θ] to [t] was rated as more accented than [θ] to [f]. The current study also shows that the effect of VOT shortening on foreign accent perception is much more prominent phrase-initially than phrase-medially. The reason for such phenomenon was attributed to native speakers' sensitivity to the existence/absence of the domain-initial strengthening effect on domain-initial aspirated plosives, which might also account for conflicting findings on the accentedness of VOT shortening/lengthening in previous literature (Gonzalez-Bueno 1997; Magen 1998; Riney and Takagi 1999). The effect of vowel errors on accentedness perception is not as clear as that of consonant errors. Several reasons might account for the mixed findings presented here. First, accentedness of some vowel errors was also affected by phonological environment. Second, vowel quality change might often be perceived as dialectal rather than foreign accented. Depending on the raters' own dialects and their exposure to other varieties of English, many types of "errors" could be native-like.

Although stimuli with syllable errors were in general less accented than stimuli with consonant errors, and more accented than stimuli without segmental errors, different types of syllable errors seem to affect accentedness rating differently. For example, stimuli with cluster internal epenthesis (i.e. [pʰl] to [pʰəl]) and stimuli with coda epenthesis (i.e. [æsk] to [æskə]) are more accented than stimuli with consonant errors in their respective contexts. Prothesis of s-clusters was not as accented as the other 2 types of epenthesis. The reason can be attributed to the perceptual similarities between the protheized s-cluster (i.e. [əsp]) and the original one (i.e. [sp]). Consonant deletion also exhibited different degree of impact on accentedness perception. Coda [v] deletion in "five thick" and coda [ɬ] deletion in "please call" did not contribute much to accentedness ratings. However, coda [k] deletion in "ask her" was considered accented. These results show that the accentedness of syllable errors associates with both the specific type of errors and the environment the errors are in.

Given these findings, it might be beneficial for pronunciation instructions to set priorities on correcting consonant errors and vowel epentheses, while taking into account phonological environment. As shown in the current study and some previous research (Munro and Derwing 2006; Wilson and Davidson 2013), phonological environment and English phonotactics do have an impact on accentedness perception. The reason for such observation could be further pursued

along two lines of research. First, the distribution of the substituted segment and its substitution (Munro and Derwing, 2006). For example, substituting /n/ for /l/ was found to be perceptually more accented than substituting /ð/ for /d/, because /n/ and /l/ participate more frequently in minimal pairs in word initial and final positions, while the /ð/-/d/ contrast distinguishes relatively few minimal pairs. A detailed survey on the distribution of the substituted segment and its substitutions is needed to further investigate which substitution is perceptually more accented. Second, the finding that consonant errors are more accented coincides with early research on speech perception, which often finds that consonant perception is categorical and vowel perception is relatively continuous. Sensitivity peaks were found at boundaries of consonant phonemes, but not always at boundaries of vowel phonemes (Fry et al. 1962; Pisoni 1973), which might imply that listeners are more sensitive to consonantal alternations than to vowel alternations. The claim that vowel perception is continuous was often disputed by later studies, which showed that listeners are sensitive to vowel boundaries (Repp and Crowder 1990; Iverson and Kuhl 2000). Without disputing the categorical nature of vowel perception, several recent studies have provided empirical evidence showing that vowel perception is relatively continuous, in comparison to consonant perception (Kronrod, Coppess and Feldman 2012; Altmann et al. 2014), lending support to Fry et. al (1962) and Pisoni's (1973) early findings. Results from the current study might potentially support the latter claim.

The current study focused on phonetic features of L2 speech. However, sociolinguistic elements such as one's own dialect and familiarity with L2 speech could potentially affect accentedness judgements. As shown in van den Doel (2006), British English speakers and American English speakers do not always agree on which L2 errors are accented. Raters of the current study are from 33 states within the continental United States. Some of them are from regions where the local dialects are quite different from GA (e.g. Texas, Georgia, New York etc.). Native speakers of southern American English or people who are familiar with southern American English might be more tolerant to monophthongizations such as [aɪ] to [a], because such sound change is similar to the phenomenon of off-glide deletion in many varieties of southern American English (Labov, Ash and Boberg 2005). Due to a large presence of Hispanic population in California, Arizona and Texas (Ennis, Ríos-Vargas and Albert 2011), raters from these regions are very likely to have been exposed to Spanish accented English, and thus could be more familiar with Spanish speakers' L2 English speech errors (e.g. s-cluster prothesis). Future research is needed to further investigate how one's familiarity with certain L2 errors affects accentedness perception. Due to the limited access to raters' personal information, the current study cannot warrant a detailed investigation on these extra-linguistic factors. However, since raters of the current study are spread out across the U.S., the current study is likely to have achieved its goal of drawing a general picture of American English speakers' perception of accented speech.

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Appendix

The “stella” passage:

Please call Stella, ask her to bring these things with her from the store: six spoons of fresh snow peas, five thick slabs of blue cheese and maybe a snack for her brother Bob. We also need a small plastic snake and a big toy frog for the kids. She can scoop these things into three red bags, and we will go meet her Wednesday at the train station.

SINGING ACCENT AMERICANISATION IN THE LIGHT OF FREQUENCY EFFECTS: LOT UNROUNDING AND PRICE MONOPHTHONGISATION IN FOCUS

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Abstract
The paper investigates – within the framework of usage-based phonology – the significance of lexical frequency effects in singing accent Americanisation. The accent of Joe Elliott of a British band, Def Leppard is analysed with regard to LOT unrounding and PRICE monophthongisation. Both auditory and acoustic methods are employed; PRAAT is used to provide acoustic verification of the auditory analysis whenever isolated vocal tracks are available. The statistical significance of the obtained results is verified by means of a chi-square test. In both analysed cases the percentage of frequent words undergoing the change is higher compared with infrequent ones and in the case of PRICE monphthongisation the result is statistically significant, which suggests that word frequency may affect singing style variation.

Keywords: frequency effects, LOT unrounding, popular music, PRICE monophthong-gisation, singing accent, usage-based phonology

1. Introduction

The phenomenon of style-shifting involved in pop singing in general and the Americanisation of British singing accent in particular have been investigated from various theoretical perspectives (Trudgill 1983, Simpson 1999, Beal 2009, Gibson and Bell 2012 among others). Depending on the theoretical standpoint, the notions of identity, reference style or default accent have been brought to light and assigned major explanatory power. Trudgill (1983) in his seminal paper on the sociolinguistics of British pop-song pronunciation interprets the emulation of the American accent as a symbolic tribute to the origins of popular music and provides the list of six characteristic features of this stylisation (1), two of which ((1c) and (1d)) are addressed in the present paper.

(1) a. coda-r: ø (Br) → [r] (Am) in non-prevocalic contexts (*girl, far*)
b. the (lack of) BATH-TRAP split: [ɑː] (Br) → [æ] (Am) before some fricative and nasal consonants (a non-systematic process) (*can't, pass*)
c. the LOT vowel unrounding: [ɒ] (Br) → [ɑ] (Am) (*hot*)
d. monophthongisation of the PRICE diphthong: [aɪ] (Br) → [ɑː] (Southern Am) (*my*)
e. flapping: [t] (Br) → [ɾ] (Am) intervocalically before an unstressed vowel (*better*)
f. the STRUT vowel raising: [ʌ] (Br) → [ə] (Am) (*cut, won*)

A number of questions regarding the character of the abovementioned variation, as well as the details of its mechanisms call for further research. One of them concerns the reason why some phonetic features seem to be more prone to Americanisation. Another matter, to some extent connected with the previous one, is distinct behaviour of various words exhibiting the feature at stake within a given phonetic process, the phenomenon that may be considered with the reference to lexical frequency effects.

The dynamics of variation and style shifting acquires a central position in the usage-based paradigm (Bybee 2001), represented as an exemplar model (Johnson 1997, Pierrehumbert 2001). In this model, tokens of linguistic experience are stored together with contextual information, including pragmatic and social or cultural indexation. Thanks to rich lexical representation and automatic associations created and stored in memory, individuals have access not only to the semantic layer, but also to the layer of speakers' identity indices (Foulkes and Docherty 2006). Thus, with regard to the phenomenon of singing accent stylisation, tokens that are indexed as "American" are activated in relevant socio-cultural contexts. Frequency of use also assumes a prominent position in an exemplar theory, in which "a token of linguistic experience that is identical to an existing exemplar is mapped onto that exemplar, strengthening it" (Bybee 2006: 716); hence, the more frequent a given word is, the more it is entrenched in a speaker's lexicon.

The very observation that frequent words behave differently from infrequent ones is not new – their tendency to change faster was already noticed by Schuchardt (1885), with numerous successive studies providing further examples of the phenomenon. Frequent words tend to be processed faster, recognized quicker and articulated more easily (e.g. Bybee 2002, Shockey 2003, Erker and Guy 2012). They are also known to lead in a number sound changes, mainly favouring phonetic reduction, e.g. schwa deletion, as well as final [t] and [d] deletion are more common in highly frequent words (Hooper (Bybee) 1976, Bybee 2000, respectively), the Dublin Vowel Shift first affected frequent words (Hickey 1998), lexical frequency also influenced the rate of [aɪ] monophthongisation in the study on Oprah Winfrey style-shifting (Hay, Jannedy and Mendoza-Denton 1999).

2. The analysis

2.1. Research aims

The aim of this paper is to estimate – within the framework of usage-based phonology, in which sociophonetic variation occupies a central position – the potential significance of lexical frequency effects: to assess whether more frequent words prove to be the carriers of Americanised singing style, still observable in British popular music. In order to do this, the singing accent of Joe Elliott of a British hard-rock band Def Leppard is examined with regard to two processes: LOT unrounding and PRICE monophthongisation. Additionally, a certain problem regarding the status PRICE monophthongisation as such is addressed. As this process may be perceived as Americanisation or just general casual speech reduction, the quantitative comparison of the vocalist's singing vs. speaking styles is conducted to ascertain the nature of the process.

2.2. Def Leppard: general background

Def Leppard is a hard rock British band, whose vocalist, Joe Elliott, was born in Sheffield, Yorkshire, in 1959. The group, active since 1977, is one of the world's best-selling music artists, having achieved outstanding success on the American music market, with their two studio albums (*Pyromania* 1983 and *Hysteria* 1987) selling over ten million copies and thus being awarded *diamond* by the Recording Industry Association of America (RIAA) – an accomplishment celebrated by only six rock bands so far.[1]

Def Leppard's fascination with America can already be noticed on their debut album, *On Through the Night* (1980). In the song entitled simply "Hello America" they fantasize about touring in the US:

> Well I'm takin' me a trip I'm going down to California
> Yeah, I'm gonna try Hollywood and San Pedro Bay
> I'll tell ya what I'm gonna do
> I'm gonna give my love to you
> I'm gonna take you where the lights are bright
> I'm gonna give you my love tonight
>
> Hello America, hello America
> Hello America, hello America
>
> "Hello America" (*On Through the Night* 1980)

[1] https://www.riaa.com/gold-platinum/?tab_active=awards_by_artist&col=diamond_units&ord=desc#search_section [Accessed: 18th February 2018].

The vocalist describes the context in which he wrote the song, juxtaposing gloomy Yorkshire surroundings with the bright visions of America:

> We had never even been to America at that point. I was working in a factory with lots of nuts and bolts and no natural light. But there was a lot of downtime, and I would sit around writing stuff. With this one, I had seen a TV show the night before – *Kojak* or *Starsky & Hutch*, something where they show the tree-lined boulevards of L.A. You see all these palm trees and you go, "Wow, this is a lot sexier than Sheffield!" That's where that lyric came from – "Well I'm takin' me a trip/I'm going down to Californ-i-a." It was, "Get me out of here!".[2]

Thus, it may be unsurprising that Elliott's singing style reflects the abovementioned fascination. Def Leppard's exceptionally heavy Americanisation is even noticed by other singers, e.g. Robert Smith of The Cure:

> I despise Def Leppard and everything they've ever done. I can't believe how popular Def Leppard are. It sickens me to see them all sitting there in Union Jacks and yet [Def Leppard singer, Joe Elliott] adopts that horrible, fake, rock-American accent.[3]

The members of Def Leppard are fully aware of their style-shifting. Def Leppard's guitarist, Phil Collen, comments on their singing style as follows:

> "People always used to ask why we sound like Americans," says Def Leppard guitarist Phil Collen from a shed tour stop along the outskirts of the country's northern border in Walker, Minnesota. "Because that is how we learned to be musicians," he answers. "I wish they all could be California girls," Collen sings through the phone as he polishes off a rendition of a Beach Boys' benchmark. "It is an American accent before you know it. We learned it that way because the stuff happening in England wasn't really homegrown. The pop music was American based blues and R&B. It had a hook to it, it was sexy, and it was the whole Elvis thing".[4]

Some examples of Def Leppard's Americanised singing style with regard to the LOT and PRICE vowels are given below. As it may be noticed, this stylisation goes in line with very straightforward rock message (in Joe Elliott's own words, they do "simplistic, anthemic rock and roll"[5]):

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2 http://www.rollingstone.com/music/lists/def-leppards-joe-elliott-my-life-in-15-songs-20160322/bringin-on-the-heartbreak-1981-20160322 Bienstock, R. Def Leppard's Joe Elliott: My Life in 15 Songs. 22.03.2016 [Accessed: 18th February 2018].

3 Considine, J.D. The concert's the thing you can keep the rest, says the Cure's front man. 24.05.1992. Available from: http://articles.baltimoresun.com/1992-05-24/features/1992145174_1_cure-smith-fans/2 [Accessed: 18th February 2018].

4 http://www.theaquarian.com/2007/08/08/def-leppard-americas-brits/ Halo, M. Interview with Def Leppard: America's Brits. 08.08.2007 [Accessed: 18th February 2018].

5 https://www.youtube.com/watch?v=yaKjEhZ_wyg Metal Hammer Official. Def Leppard Interview – Joe Elliott. 12.01.2012 [Accessed: 18th February 2018].

I **got [**gɑt] **my** [mɑ] whiskey,
I **got [**gɑt] **my** [mɑ] wine
I **got [**gɑt] **my** [mɑ] woman,
and this time the lights are going out
"High 'N' Dry (Saturday Night)" [*High and Dry* 1981]

Rock [rɑk] of ages, rock of ages
Still rollin', **rock**'n'rollin' [rɑk]
We **got [**gɑt] the power, **got [**gɑt] the glory
Just say you need it
and if you need it
Say yeah
"Rock of Ages" [*Pyromania* 1983]

Joe Elliott's speaking style is distinctly different, as it can be observed e.g. in the abovementioned interview.[6] The qualitative and quantitative details regarding the LOT and PRICE vowels are presented in, respectively, sections 3.1 and 3.2, but the overall impression confirms the old split between singing and speaking styles of British vocalists noticed by Trudgill (1983): the variety Elliott adheres to is British (e.g. the rounded [ɒ] in *rock* or *everybody*); his Northern origin can also be noticed, e.g. the lack of the FOOT-STRUT split in some words (*country*, *stuff*). Elliott's pronunciation of the PRICE diphthong is analysed in a quantitative detail in section 3.2, but the general impression is that he uses [aɪ] pronunciation, with no indications of potential monophthongisation to [ɑ:], which confirms Beal's (2004: 125) description of the current status of the diphthong in the North of England: the monophthongisation of [aɪ] to [ɑ:] is characteristic of more traditional dialects, while the majority of PRICE words are nowadays pronounced with a diphthong in this region. This makes PRICE monophthongisation a proper choice for the analysis of singing accent Americanisation.

Taking all the above into consideration, it seems that the case of Def Leppard constitutes an interesting object of study with regard to the main aim of this paper. The band itself is described as "the definitive hard rock band of the '80s"[7] and the vocalist's singing accent may be treated as the representative of heavy Americanisation (observable in British pop singing style since the 1950s), providing ample data for the analysis. Finally, striking contrasts and *conflicting identities* are clearly visible, as his spoken accent is British, with some Northern features.

[6] https://www.youtube.com/watch?v=yaKjEhZ_wyg Metal Hammer Official. Def Leppard Interview – Joe Elliott. 12.01.2012 [Accessed: 18th February 2018].

[7] https://www.allmusic.com/artist/def-leppard-mn0000193320/biography Erlewine, S. T. Artist Biography. [Accessed: 18th February 2018].

2.3. Materials and methodology

The analysis is based on three studio albums by Def Leppard (about 7469 words): *On Through the Night* (1980), *High 'n' Dry* (1981), *Pyromania* (1983) and five isolated vocal tracks: "Rock of Ages", "Photograph", "Foolin'", "Bringin' on the Heartbreak", "Undefeated" (the availability of high-quality isolated vocal tracks, which make acoustic analysis possible, is limited). Spoken accent analysis is based on a high-quality interview: "Def Leppard Interview – Joe Elliott Metal Hammer Official" (2012).[8]

Frequency was measured locally, i.e. the word frequency of the sample itself was used, following the methodology and argumentation given by Hay at al. (1999) and Erker and Guy (2012) regarding "the spirit of usage-based models" (Erker and Guy 2012: 530). All LOT and PRICE items in the corpora were identified as frequent (occurring 5 or more times) or infrequent (occurring fewer than 5 times). All surface word-forms were considered (not lemmas). The following elements were excluded from the analysis: backing vocals or other voices (the interviewer, the audience), spoken fragments in songs, triphthongs, function words in the case of the LOT vowel (except *on*), other LOT words with optional schwa (e.g. *gonna*), unless it was evident a given speaker uses either [ɒ] or [ɑ] (e.g. in *anybody*, *somebody*, *nobody*), as well as parts of the recordings of poor quality. The statistical significance of the obtained results regarding lexical frequency effects was verified by means a of chi-square test with Yates' correction.

A combination of auditory and acoustic methods was used for the analysis of the material. PRAAT was used to provide acoustic verification of the auditory analysis (on the basis of isolated vocal tracks and a selected interview). PRAAT script (pnwe_get_205080.praat script; Pacific Northwest English study (Wassink)) was used for both the LOT and PRICE vowels (the midpoint method and proportional distance method with measurements at 20% and 80% into the vowel, respectively).

Monophthongisation is a continuous feature, but for the sake of frequency count it has to be treated as a binary one. There are various methods of measuring this process. For the gathered data, the adopted approach – based on the methodology by Cramer (2016), with modifications – was as follows. First, the relative change of frequency (in percents) of both formants F1 and F2 (*df1* and *df2*, respectively) was measured: the frequency at 20% was subtracted from the frequency at 80% and the difference was divided by the frequency at 20%.

[8] https://www.youtube.com/watch?v=yaKjEhZ_wyg Metal Hammer Official. Def Leppard Interview – Joe Elliott. 12.01.2012 [Accessed: 18th February 2018].

(2) Measurement of relative change in both formants' frequencies: relative change of frequency (percents): *df1*, *df2*

a. $$df1 = \frac{f1_{80} - f1_{20}}{f1_{20}}$$

b. $$df2 = \frac{f2_{80} - f2_{20}}{f2_{20}}$$

Next, the relative spread (*s*) at 80%, i.e. the sum of percentage changes of both formants' frequencies (in percentage points) was measured.

(3) Relative spread at 80% (percentage points): *s*

$$s = df2 + df1$$

A vowel was considered diphthongal if the relative spread equalled at least 25 percentage points or if at least one change of formant frequency was greater than 10%. A vowel was considered monophthongal otherwise, i.e., if the relative spread was lower than 25 percentage points and both relative changes of formant frequencies equalled 10% or less, as monophthongisation could be achieved by a greater change of one formant or a moderate change of both formants.

PRAAT was used to verify the auditory analysis of the LOT items in isolated vocal tracks. All the elements were identified as "British" or "Americanised". The scatterplots present [ɒ] vs. [ɑ] frequencies of F1 and F2 (Figure 1 and Figure 2, respectively). Though extreme frequency values of [ɒ] and [ɑ] overlap, the scatterplots still enable to distinguish two clusters, forming two distinct vowel groups.

The F1 and F2 mean values, based on the analysis of 91 tokens, are given in Table 1. The acoustic analysis shows that both formants have higher frequencies compared with speaking. Regarding F1, this confirms the results of Gibson's (2010) study, in which it is shown that F1 is significantly higher in singing due to the sonority factor: the general preference for openness in this mode.

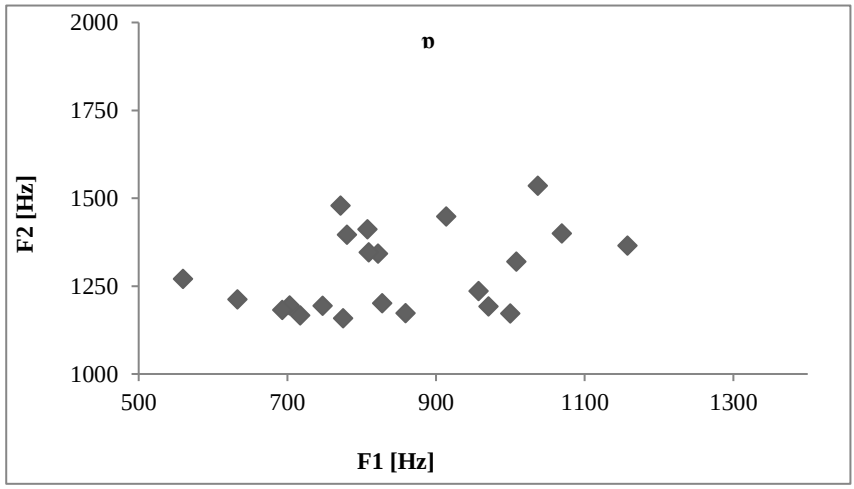

Figure 1. Joe Elliott's singing accent (isolated vocal tracks): the LOT vowel realized as [ɒ]

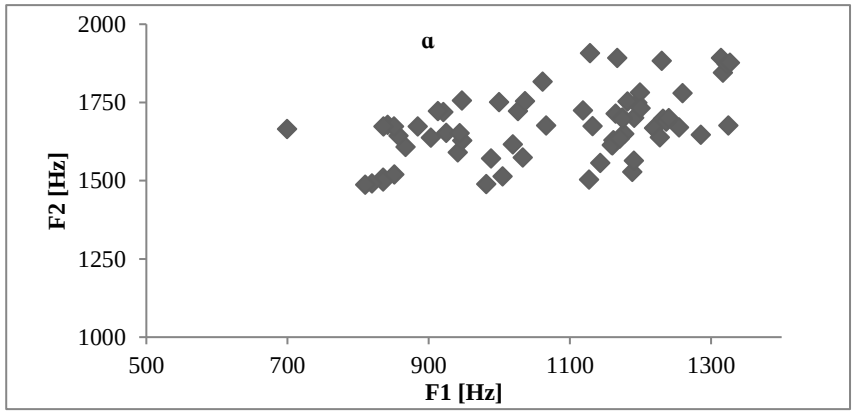

Figure 2. Joe Elliott's singing accent (isolated vocal tracks): the LOT vowel realized as [ɑ]

Table 1. Joe Elliott's singing accent (isolated vocal tracks): the LOT vowel mean F1 and F2 values

the LOT vowel	F1 mean	F2 mean	No. of tokens
ɒ	795	1293	25
ɑ	1078	1674	66

Figure 3 and Figure 4 show the trajectories of the PRICE vowel realized, respectively, as a monophthong (31 analysed tokens) and a diphthong (21 analysed tokens), i.e. the mean values of F1 and F2 measured at 5 time points across the vowel. Figure 5 constitutes a comparison of the average trajectories of [a] and [aɪ].

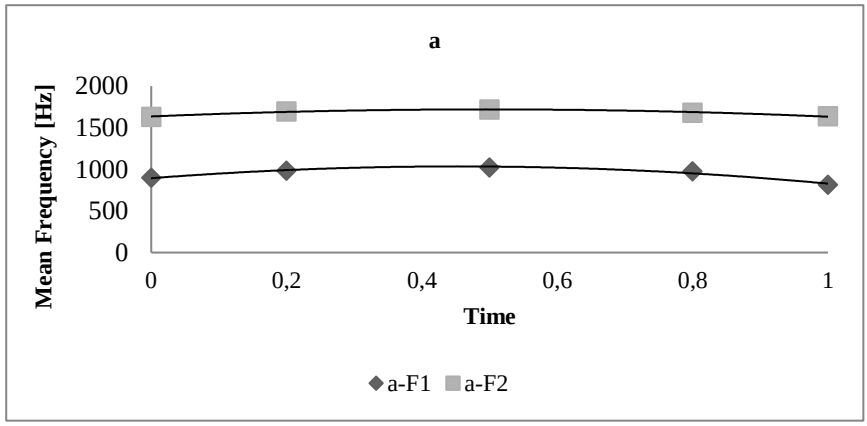

Figure 3. Joe Elliott's singing accent (isolated vocal tracks). The trajectory of the PRICE vowel realized as a monophthong: the mean values of F1 and F2 at 5 time points across the vowel

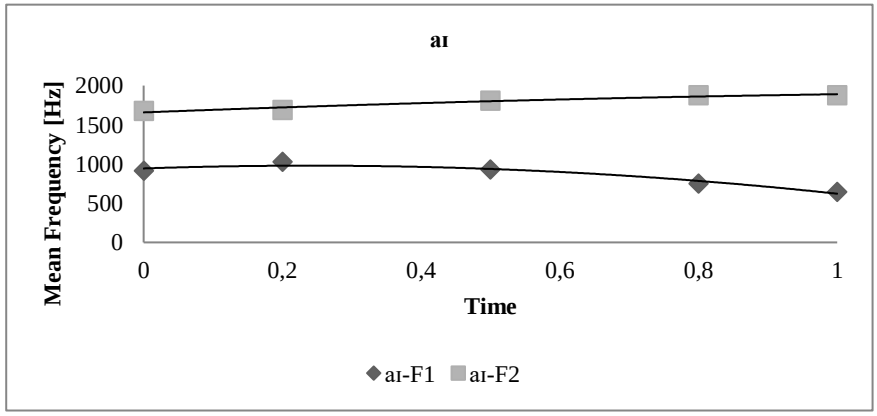

Figure 4. Joe Elliott's singing accent (isolated vocal tracks). The trajectory of the PRICE vowel realized as a diphthong: the mean values of F1 and F2 at 5 time points across the vowel

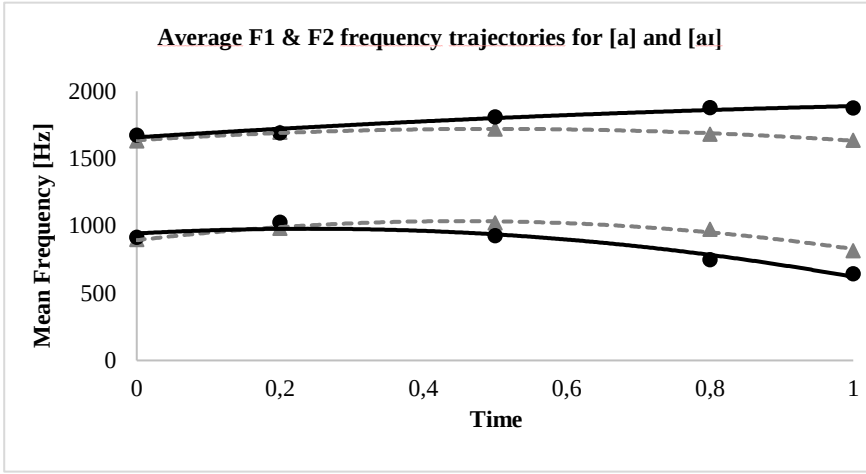

Figure 5. Joe Elliott's singing accent (isolated vocal tracks): average F1 and F2 frequency trajectories of [a] (triangles and dotted lines) and [aɪ] (circles and solid lines)

3. Results

3.1. Spoken accent: the LOT vowel

With regard to the speaking mode, the acoustic analysis confirms auditory impressions – there is no Americanisation in this respect, all analysed tokens are rounded ([ɒ]). The mean F1 and F2 values, based on 26 analysed tokens, are: 569 Hz and 939 Hz, respectively. The values are comparable to the ones given in literature, e.g. Hawkins and Midgley (2005).

3.2. Spoken accent: the PRICE diphthong

The PRICE diphthong was generally pronounced as [aɪ]; it was monophthongised in the speech of the vocalist in only 17% of cases (5 tokens out of 30 analysed acoustically).

3.3. Singing accent: lexical frequency and LOT unrounding

The results of lexical frequency effects analysis given in Table 2 show that frequent words favoured unrounding, though the difference is relatively small (60% vs. 52%), with the overall degree of Americanisation in the corpus reaching 59%.

Table 2. Joe Elliott's singing accent: lexical frequency and LOT unrounding

frequency level	ɑ	ɒ	total
frequent	224 (60%)	152	376
infrequent	32 (52%)	29	61
total	256 (59%)	181	437

In order to check the statistical significance of the obtained results, a chi-square test with Yates' correction was conducted. On the basis of the distribution of all 437 tokens (54 types) in the corpus, as presented in Table 2, it turns out frequent words are not significantly more likely to undergo LOT unrounding (Yates' chi-square=0.822, df=1, p=<0.36).

3.4. Singing accent: lexical frequency and PRICE monophthongisation

With regard to PRICE monophthongisation, the analysis shows that frequent words favoured the process and this difference is greater compared with the previous one (see Table 3). In Elliott's singing style 52% of frequent words and 23% of infrequent ones undergo the process. The overall degree of Americanisation in this respect reaches 43%.

Table 3. Joe Elliott's singing accent: lexical frequency and PRICE monophthongisation

frequency level	a	aɪ	total
frequent	170 (52%)	158	328
infrequent	31 (23%)	106	137
total	201 (43%)	264	465

In order to check the statistical significance of the obtained results, a chi-square test with Yates' correction was conducted. On the basis of the distribution of all 465 tokens (99 types) in the corpus, as presented in Table 3, it turns out frequent words are significantly more likely to undergo PRICE monophthongisation (Yates' chi-square=32.399, df=1, p < 0.00000001).

4. Discussion and conclusions

The main research aim was to assess the significance and potential explanatory role of lexical frequency effects in singing accent stylisation, namely, to evaluate whether highly frequent words prove to be the best carriers of Americanised singing style. In general, the outcome seems to be promising, as in both analysed processes the percentage of frequent words undergoing the change was higher compared with infrequent ones. The results suggest that word frequency can affect variation, as common words facilitate PRICE monophthongisation – they are

significantly more likely to undergo the process. However, as regards LOT unrounding, in the case of which the difference was not statistically significant, further research is required to establish precisely the potential significance of lexical frequency effects. In particular, including more types of analysed LOT words in a bigger corpus may be revealing.

As regards the additional research question, i.e. the potentially problematic status of PRICE monophtongisation, the analysis shows that the process is encountered in Joe Elliott's speech, yet the percentage is small in comparison with his singing accent (17% and 43%, respectively). Thus, taking into account his general style in both analysed modes and the comparative degree of monophthongisation, one may venture to say that in this case the contrast may indeed indicate Americanisation, rather than casual speech reduction. What may be emphasised, though, is the importance of a quantitative account with regard to the speaking mode to evaluate the overall comparative degree of monophthongisation, as the results may be quite different for other vocalists.

Finally, it seems vital to stress that frequency does not function in isolation. Rather, it is interrelated with other phenomena, which – when combined – could add to the explanatory power of the analysed factor alone. Naturally, frequency and experience are intrinsically connected. Frequency is a reflection and derivative of experience, as Bybee (2006: 711) points out, describing the usage-based perspective: "grammar is the cognitive organization of one's experience with language". Among the totality of one's experiences there are these special inspirations, which prove to be of particular significance in the music world. This is visible at the personal, individual level of various artists, while delving into their biographies, e.g. British musicians as stylistically distant as the glam rock icon David Bowie and Dizzee Rascal, a grime artist, both known for their use of British accent in singing, point to, respectively, Syd Barrett, and UK garage or drum and bass MCs as their inspirations in this respect. [9][10]

[9] "He [Syd Barrett] was the first guy I'd heard to sing pop or rock with a British accent – his impact on my thinking was enormous. [David Bowie]" http://www.nme.com/news/music/pink-floyd-128-1366035
David Bowie pays tribute to Syd Barrett. 11.07.2006. [Accessed: 18th February 2018].

[10] "Drum and bass MCs (…), UK garage MCs (…) influenced me as much as American hip-hop. I already wanted to sound like where I was from."
https://www.youtube.com/watch?v=ARMZBxGKlG4 Vlad TV. Dizzee Rascal: I Believe Ali G Character Was Based Off Tim Westwood. 13.05.2016. [Accessed: 18th February 2018].

Inspiration then seems to be key. However, this phenomenon may also be transferred to a more general level: to the plane of tendencies and fashions in the music industry. It could be compared, to quote Joe Elliott again, to passing the torch[11] in singing – in this case, the *accent* torch. In the usage-based paradigm there is place for such changes, the system is mutable, dynamic, never fixed. Memories may remain or decay and the well-known elements of the system may be reshaped to create novel modes of expression and become acts of identity in new circumstances.

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[11] https://www.youtube.com/watch?v=yaKjEhZ_wyg Metal Hammer Official. Def Leppard Interview – Joe Elliott. 12.01.2012 [Accessed: 18th February 2018].

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PRODUCTION ACCURACY OF L2 VOWELS: PHONOLOGICAL PARSIMONY AND PHONETIC FLEXIBILITY

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Abstract
Ultimate attainment in foreign-language sound learning is addressed via vowel production accuracy in English spoken by advanced Czech EFL learners. English FLEECE–KIT, DRESS–TRAP, and GOOSE–FOOT contrasts are examined in terms of length, height, and backness. Our data show that, while being constrained by phonemic category assimilation (new vowel height distinctions are not created), the learners' interlanguage combines phonological parsimony (reusing L1 length feature to contrast L2 vowels) with phonetic flexibility (within-category shifts reflecting L1–L2 phonetic dissimilarity). Although achieving nativelike phonological competence may not be possible learners who acquire L2 in the prevailingly L1 environment, the Czech learners' implementations of English vowels revealed their ability to adjust for phonetic detail of L2 sounds.

Keywords: English as a foreign language, L2 phonology, ultimate attainment, vowels

1. Introduction

This study examines L2 pronunciation accuracy of advanced learners of English as a foreign language (EFL). While research on ultimate attainment in the domains of L2 phonetics and phonology is often carried out in immersion settings (e.g. the numerous AOL studies by Flege[1]), our goal is to estimate the limits on the final outcome of speech learning when L2 is learned without prolonged interactional input from a native speaker community. Speech sound learning under such input constraints suffers from serious disadvantages because frequent exposure to a variety of speakers from the same dialect would seem necessary for developing sensitivity to acoustic properties of L2 sounds, noticing L2–L1 differences, and

[1] AOL stands for the Age of Learning, i.e. age at the onset of acquisition. The most frequently cited AOL studies include e.g. in Flege, Munro and MacKay (1995), Flege, Yeni-Komshian and Liu (1999), Mackay, I. R., Flege, J. E., & Imai, S. (2006).

refining L2 sound categories. Learning L2 English in one's home country, however, means that EFL learners only very sporadically experience exposure to authentic English used communicatively in a native English-speaking community. The native pronunciation models that such learners encounter interactively (e.g. native English teachers, personal acquaintances) and in media (e.g. via textbook recordings, YouTube, computer games, or TV shows) may be too diverse to allow them to develop stable sound representations close to one specific native English variety. Instead, their representations of L2 sounds are mainly shaped by frequent exposure to foreign-accented exemplars produced by their non-native teachers and peers. In addition, since EFL learning occurs in a pervasive L1 environment, the daily use of the L1 relative to L2 is typically very high. The interconnectedness of the learner's L1 and L2 sound patterns (Flege, Frieda & Nozawa 1997; Guion, Flege & Loftin 2000) results in L2 sound representations being constantly shaped by L1 interference due to the overwhelming prevalence of daily L1 use.

For the purposes of the current study participants were sought from a specific population of particularly successful EFL learners. They are best described as advanced L2 learners or, alternatively, as highly proficient late L1-dominant bilinguals, depending on whether we consider the fact that they actively continue to work on improving their L2 proficiency or the fact that they are linguistically fully competent in two languages (though predominantly using L1 in daily life). At the time of data collection the participants were students of English at an institution of higher education. They were learning English in an academic setting, being trained to become English language professionals, namely translators-interpreters, in a highly selective university programme. Such learners can be expected to have high levels of aptitude as well as to have received a great amount of formal exposure to the L2. At the same time, their language learning experience had been non-immersional, their L2 learning taking place in the L1 environment of their home country. If they experienced any more or less sustained or regular contact with a native speaking community, it was only in postadolescence; hence, they are best described as late bilinguals. By sampling L2 learners from such a population we hope to establish what the upper limits on foreign language sound learning might be, although, admittedly, the very idea of ultimate attainment, in the sense of a final fixed end-state, is an over-simplification and L2 (and possibly also L1) of these learners/bilinguals is likely to continue to change.

1.1. Measuring attainment – the monolingual reference point

A recent paper by Stoehr et al. (2017) highlights the role of language environment in which bilinguals function on a daily basis in shaping their ultimate linguistic competence. Arguing that the task of research into L2 phonology and phonetics is to establish how well "bilinguals have been able to adapt to the phonetic environment in which they actually acquire the L2" (p. 485), Stoehr et al. criticize

using the monolingual native speaker's performance as the reference point against which L2 speech acquisition is measured. In this view, while a comparison against monolingual native speakers may be suitable for learners immersed in L2 environment, it is less appropriate when one is examining speech of foreign language learners who have acquired the L2 in the L1 environment.

Another argument against monolingual linguistic competence as the reference point in evaluating outcomes of L2 learning is based on the findings of psycholinguistic research (Hopp & Schmid 2013, Stoehr et al. 2017). Researchers in bilingualism widely cite Grosjean's paper (1989) articulating the view that the linguistic competence of a bilingual does not comprise two separate language systems. Successful L2 learning eventually produces an individual competent in multiple languages (Cook 1992). In other words, the desired outcome of L2 learning is L2 mastery as well as retention of the previously learned L1 and other languages. However, adding a language to one's linguistic repertoire has consequences for the learner's overall linguistic competence, which manifests itself as inter-lingual interactions on all levels of language representation (e.g. Dussias & Sagarra 2007 for syntax, Meir, Walters & Armon-Lotem 2016 for morphosyntax), including phonological and phonetic representations. Research shows consistent differences between bilinguals and monolinguals both in how they represent speech sounds in their long-term memory (e.g. Barlow 2014, Fabiano-Smith & Barlow 2010 for children) and in how they process language during online production and perception (e.g. see articles in Deuchar 2016). Consequently, Hopp & Schmid (2013) or Stoehr et al. (2017) propose to rely on a bilingual reference point, arguing that since L2 learners' ultimate attainment can never mean full nativelikeness in the sense of achieving monolingual competence, bilinguals' linguistic performance should be compared to that of other bilinguals, e.g. late L2 learners to L1 attriters. Nonetheless, both studies (Hopp & Schmid 2013, Stoehr et al. 2017) include also (near) native monolingual control speakers.

While accepting the reservations about monolingual reference norms, we believe that, depending on the research goals, there may be good reasons to measure late L2 learners' speech against a native speakers' benchmark. Systematic comparisons of bilinguals' L1 and L2 performance in speech perception and production tasks to a monolingual baseline has led to the present-day understanding of bilingual speech sound representations. Thus, it is now well-established that, depending on factors such as age at the onset of acquisition, language proficiency, and language dominance, the L2 sound system shows a stronger or weaker influence of the L1 (among many others Caramazza et al. 1973, Flege 1991), that cross-language influences may be bi-directional with the L2 affecting the L1 (Chang 2012, Flege 1987), that bilinguals can form language-specific sound categories in the L2 which are (acoustically) distinct from corresponding L1 categories (Flege & Eefting 1987, Flege 1991), and that corresponding phonetic categories in a bilingual's L1 and L2 often show convergence but they may also diverge from each other, typically during early L2 learning that started before L1 categories are developed (Flege 2010).

As stated above, the current study aims to explore the limits on L2 speech learning by highly motivated learners in a foreign-language (FL) learning context typified by diminished interactional input. It is not concerned with how closely EFL learners approximate the L2 pronunciation they encounter in their immediate linguistic environment. Instead, it asks to what extent such learners can overcome the limitations set by that environment. This is done by describing the (near)-ultimate outcome of such learning in terms of differences from nativelikeness, i.e. from the native speakers' reference performance.

There are several reasons to expect at least some of our EFL learners to approximate, even if not completely match, nativelike speech. First, reduced interactional input available to these learners is to some extent compensated for by their both intensive (several hours a day at the time of data collection) and extensive (at least 10 years) instruction in English. As a result, the learners have achieved high proficiency in their L2 English, including oral proficiency as tested by CAE/CPE (Verhelst et al. 2009). Overall L2 proficiency has been shown to predict how nativelike L2 speech production is. More proficient L2 learners speak faster and make fewer errors (Kormos & Dénes 2004); they have better speech motor control (Nip & Blumenfeld 2015); they show greater segmental accuracy (Chakraborty, Domsch & Gonzales 2011) and adopt L2 articulatory patterns (e.g., Flege, Schirru & MacKay 2003). In addition, based on our long-term experience with the target learner population, we believe motivation to be an essential factor in compensating for the input handicap. Empirical support for the impact of motivation on pronunciation learning in late L2 learners is found e.g. by Moyer (2004, 2014). Typical learners in our population have no problem constructing an image of their ideal L2 self (Dörnyei 2009) as a fluent speaker with a specific nativelike English accent. Many of them are inclined to consider nativelike pronunciation to be important for their future profession of an English language translator-interpreter and desire to modify their pronunciation towards the chosen model (see Appendix for the learners' responses to three questions on attitudes to pronunciation included in a language experience questionnaire). Such learners are motivated to employ strategies for maximizing their exposure to L2, seeking out native English speakers outside school and exposing themselves to a variety of English-language media.

1.2. Cross-language interference

From the outset, our question about ultimate attainment was not whether there are L2 learner – native speaker differences in phonological competence but what is their nature. Nativelike acquisition of L2 phonology is relatively rare for late L2 learners due to firmly entrenched L1 sound patterns, even when L2s are learned in immersion contexts. Adding the unfavourable input conditions and low L2-to-L1-use ratios of non-immersion foreign language learning should make achieving authentic pronunciation impossible. While accent-rating studies do occasionally

report individual FL learners who sound undistinguishable from monolingual native speakers to native listeners' ears (Birdsong 2007, Bongaerts 1999), most successful FL learners' speech indeed reveals degrees of non-nativeness.

What eventually differentiates among bilinguals with respect to the authenticity of their L2 pronunciation is how developed their L1 phonological representations are at the start of learning L2 (Best & Tyler 2007). A completely developed L1 phonology of a late sequential bilingual has a firmer influence on L2 sound learning than a developing L1 phonology of an early simultaneous bilingual (McCarthy, Evans & Mahon 2013, Flege, Schirru & MacKay 2003). At the same time, early bilinguals' speech production shows bidirectional L1-L2 cross-language effects. For late bilinguals, on the other hand, a unidirectional influence of the L1 on the L2 is found (Baker & Trofimovich 2005), their L1 is more resistant to interference from L2.

The most influential models of L2 sound learning, the Speech Learning Model (e.g. Flege 1995) and the Perceptual Assimilation Model-L2 (Best & Tyler 2007), agree that L1 interference in L2 pronunciation, i.e. learners' inaccurate production of L2 segments, occurs because of inaccurate perception, where learners rely too much on L1 sound categories to process the incoming signal. Insufficient exposure to auditory input in the FL learning context complicates overcoming such L1 entrenchment. Further, central to SLM and consistent with PAM-L2 is the idea that phonetic categories[2] of both L1 and L2 are at the higher level of representation accommodated within a single phonological system. Consequently, a bilingual's/learner's phonology is comprised of both L2 and L1 phonetic categories and thus likely to differ from phonology of a monolingual speaker of either L2 or L1. Flege (1995) proposed that interlingual L1-L2 interactions take place at the subphonemic level of the phonetic categories. He further argued, with corroboration from empirical research, that one's phonetic categories remain flexible past puberty and the ability to form new phonetic categories remains available to adult learners. In Flege's model, the relative success in L2 phonetic learning depends on acoustic closeness of sounds in the L2 input to the existing L1 sounds: new sounds that are phonetically different from their closest L1 equivalents are more likely to be accurately acquired than phonetically similar sounds.

However, a shared phonological space also means that a bilingual's L2 phonology parsimoniously reuses the existing L1 phonemic elements (features, phonemes), i.e. there is also phonological cross-language influence. For example, L1-Czech voicing contrast or place features of obstruents can be transferred into L2-English although their phonetic implementation, e.g. English-specific VOT settings or the apico-alveolar rather than lamino-dental realization of /t, d/, must be newly learned. The early learned phonological structure seems to be quite resistant to change due to additional language learning. Attrition studies typically report phonetic adjustments rather than losses of phonologically relevant L1

[2] PAM-L2 does not use acoustic categories but distal gestures.

distinctions (Mayr, Price & Mennen 2012; Schmid 2011; but cf. de Leeuw, Tusha & Schmid 2017). Studies of L2 speech learning show that learning a new L2 contrast which is not part of L1 phonology may prove impossible. Specific predictions about degrees of difficulty in acquiring contrasting L2 phonemes are made within the PAM-L2 framework.

This model allows for L1-L2 relationships both at the level of gradient phonetic knowledge and at the higher level of phonological representations. According to Best and Tyler (2007), "contrasts at the functional linguistic level of the L1 phonology and their relationship to phonological contrasts of the L2 are as important to perceptual learning as phonetic categories in the two languages" (p. 26). Perceptual assimilation (identification of a perceived L2 sound as an instance of an L1 category) that, at least initially, constrains L2-sound learning, results from the interplay of phonological and phonetic L1-L2 mappings. Different assimilation patterns are possible, of which the most relevant for the current study are (1) Two-Category assimilation (two members of an L2 contrast are assimilated to two different L1 phonemes), (2) One-Category assimilation with a Category-Goodness Difference (two members of an L2 contrast are assimilated to the same L1 phoneme but one is perceived as a less prototypical instance of the L1 phoneme than the other), and (3) One-Category assimilation (two members of an L2 contrast are assimilated to the same L1 phoneme and they are both equally (dis)similar to the L1 phoneme). The difficulty of acquiring the L2 sound contrast is expected to increase from the first to the last pattern. However, two-category assimilation is no guarantee that the phones instantiating the contrasting L2 phonemes will be perceived and implemented phonetically in a nativelike way. Learners' ability to treat them as distinct may rely on their associating the contrast with a non-target-like phonetic cue. For example, Spanish learners of L2 English have been shown to rely on duration in discriminating English /i/-/ɪ/, which native listeners primarily distinguish on the basis of spectral quality (Escudero & Boersma 2004). In the present study, we expect the Czech EFL learners (Czech being a vowel-quantity language) to produce a consistent durational difference but not necessarily a spectral difference between pairs of English vowels. As will be apparent from the contrastive comparison of English and Czech in the next section, this would be the case not because of the universal availability of the durational cue (e.g. Bohn 1995, Cebrian 2006, McAllister, Flege & Piske 2002) but because of the cross-language influence of the phonologically encoded vowel length in the learners' L1 (Ylinen et al. 2010).

When making predictions in the following section, we assume that memory representations of L2 sounds are based on the perception of L2 speech and its vis-a-vis interactions with existing L1 sound representations. We further assume that the same representations underlie L2 sound perception and production. Consequently, production data from an L2 learner are revealing about the learner's phonology and reflect the perceptual abilities that constrain it. The patterns of L1-L2 phonetic and phonological mappings that initially constrain perception of

L2 sounds are likely to change with exposure to L2 input. Analysing speech of advanced FL learners is informative about any enduring effects of the L1 sound system on L2.

1.3. English and Czech vowels: a cross-language comparison

The vowel inventories of the two languages in question differ in the number of phonemic categories and in the phonological features along which vowel phonemes are contrasted. In addition, even equivalent L1~L2 phonemes differ to a greater or lesser extent in how they are phonetically implemented. The following cross-linguistic comparison focuses on monophthongs.

In the participants' L1, Czech, five contrasting vowel qualities specified in terms of height and backness combine with two degrees of length (Skarnitzl, Šturm & Volín 2016). This yields an inventory of ten vowel phonemes /iː, ɪ, ɛː, ɛ, aː, a, oː, o, uː, u/. Notice that, unlike the other long – short pairs, the members of the /iː/-/ɪ/ pair are represented by different IPA symbols. The qualitative differentiation of the long and short high front vowels was first documented in Podlipský, Skarnitzl & Volín (2009), who also noted a decreased /iː/-to-/ɪ/ duration ratio. Interestingly, the back pair of high vowels /uː/-/u/ exhibits a tendency towards a symmetrical change, although the qualitative differentiation of the two vowels is smaller compared to the front vowel pair (Skarnitzl & Volín 2012) and their short-to-long ration is greater, i.e. intermediate between that of /iː/-/ɪ/ and of the other three vowel pairs (Podlipský et al. 2009). In addition, the perception experiment in Podlipský et al. (2009) revealed a regional difference in attending to spectral vs. durational information in categorization of /iː/-/ɪ/. Listeners from Bohemia relied more on spectrum, while speakers from Moravia, the region of origin of our participants, relied more on the durational cue. The Czech EFL learners in this study can thus be expected to transfer the length feature into L2 English and differentiate English vowels as long vs. short.

In the participants' L2, English, pairs of vowels also differ in duration. However, the temporal difference is phonetic rather than phonemic, accompanying a spectral differentiation of the vowels. Consequently, the distinction between vowels such as /iː/ and /ɪ/ or /uː/ and /ʊ/ has been treated as a lax – tense contrast (Giegrich 1992, Ladefoged & Johnson 2014). Perception experiments confirm that native English listeners attend primarily to vowel quality (Hillenbrand, Clark & Houde 2000, Morrison 2008, Kondaurova & Francis 2008) and only rely on duration as a secondary cue. Standard Southern British English (SSBE), the native reference accent used here, has a phonemic inventory of 12 monophthongs (Cruttenden 2014[3]). Six of these vowels are investigated here, namely the two lax – tense high vowel pairs /iː/-/ɪ/ and /uː/-/ʊ/, and the front non-high vowels /ɛ/-/æ/ contrasting in height.

[3] The list of contrasting RP monophthongs in Cruttenden (2014) includes the SQUARE set, which is represented as containing a long monophthong.

The low front /æ/, represented as TRAP in Wells's lexical sets (1982), is exceptional in being phonetically longer than the other English lax vowels, especially before a voiced obstruent (Cruttenden 2014). This may have consequences for Czech learners of English who have been previously shown to perceive and produce the TRAP–DRESS contrast as a long–short distinction (Šimáčková 2003). In terms of quality, the vowel also presents a challenge to a Czech learner. There appear to be two options in how the quality of /æ/ can be treated vis-à-vis the learners' L1. First, since the non-high front region of the Czech vowel space is occupied by a pair of phonemes /ɛ/ and /ɛː/ undifferentiated in quality, a single-category assimilation of L2 /æ/ and /ɛ/ to the spectrally overlapping Czech /ɛ-ɛː/ can be predicted. The spectral overlap was observed in Czech learners' productions of English TRAP and DRESS in Šimáčková (2003). Alternatively, the Czech EFL bilinguals in the present study, who were tested 14 years later, may have picked up on the shift in the SSBE pronunciation of the TRAP vowel towards a lower and more retracted quality (Hawkins & Midgley 2005, Cruttenden 2014, Bjelaković 2017). In such a case, they might either assimilate percepts of TRAP to the Czech /ɛ/ or /ɛː/ but as poor exemplars of those categories, or they may assimilate them to the Czech low, non-back /a/ (or /aː/). The published reference values of F1 and F2 in Table 1 suggest that in terms of height (i.e. F1), the English /æ/ is closer to the Czech /a-aː/, whereas in terms of backness (F2) it is between Czech /ɛ/ and /a/.

Predicting the spectral mappings between the remaining five L2 target vowels and their L1 equivalents is more straightforward. The other member of the /ɛ/-/æ/ contrast, the English DRESS vowel corresponds to the Czech short /ɛ/. Its phonetic implementation is close to the Czech counterpart in height, though it is somewhat more front than the Czech vowel (see Table 1). The English lax–tense contrast between the high front FLEECE and KIT vowels maps on the contrasting long–short /iː/-/ɪ/ in Czech. The acoustic values in Table 1 confirm the phonetic closeness of the corresponding high front vowels, especially for English /i/ and Czech /iː/. English lax /ɪ/ appears somewhat more front compared to the Czech short /ɪ/. English and Czech are less close in the high back vowel pair. First, English /ʊ/ is spectrally more differentiated from its tense counterpart /u/ than the Czech short /u/ is from the long /uː/. Second, although both GOOSE and FOOT match Czech /u/ and /uː/ in vowel height, they are clearly different in terms of backness. It is well documented that the English tense /u/ and to some degree also the lax /ʊ/ have undergone fronting (Hawkins & Midgley 2005, Cruttenden 2014). Consequently, the vowels have become phonetically less similar to the Czech /uː/ and /u/, which are realized as fully back (Skarnitzl and Volín 2012). The cross-linguistic difference in the degree of retraction (represented by F2) is clearly evident in Table 1.

Table 1. Formant reference values for the target English vowels (Bjelaković 2017) and their closest Czech equivalents (Skarnitzl & Volín 2012)

Target English vowel	L1 Czech equivalent	F1 (Hz)		F2 (Hz)	
		RP	CZ	RP	CZ
FLEECE	iː	350	329	2623	2603
KIT	ɪ	457	492	2071	2251
DRESS	ɛ	636	678	1918	1793
TRAP	ɛ, ɛː a, aː	845	678, 710 773, 801	1663	1793, 1904 1503, 1418
GOOSE	uː	347	344	1852	757
FOOT	ʊ	444	415	1491	1004

To sum up, the contrasting English vowels and the inter-lingual assimilation patterns examined in the current study include:

1) FLEECE, KIT: Two-category assimilation (to L1 Czech /iː/, /ɪ/) based on vowel length and quality combines with a phonetic overlap of the corresponding L2-L1 categories.
2) GOOSE, FOOT: Two-category assimilation (to L1 Czech /uː/, /u/) based on length combines with phonetic dissimilarity of the corresponding L2-L1 categories. The phonetic realizations of the corresponding L2-L1 vowels differ spectrally.
3) DRESS, TRAP: (a) Both vowels assimilate to a single L1 phoneme (/ɛ/), although only one (DRESS) is phonetically similar to the Czech category, the TRAP vowel differing in spectrum as well as in duration, or (b) two-category assimilation (to L1 Czech /ɛ/, /ɛː/) based on length combines with phonetic dissimilarity of TRAP from Czech /ɛː/, or (c) two-category assimilation is possible based on quality and length (to /ɛ/, /aː/) or quality only (or to /ɛ/, /a/).

The relative accuracy of the three target contrasts in speech of beginning Czech EFL learners should then pattern in the following way: the FLEECE-KIT pair should be most clearly separated, showing both temporal and spectral differentiation, with FLEECE being realized closer to the L2 target. The GOOSE-FOOT vowels should show differentiation in the temporal dimension. Both vowels are likely to differ from the native English fronted targets. For the TRAP-DRESS contrast, alternative outcomes are possible: The vowels may not be differentiated at all, or they may differ only in duration. Alternatively, they may be clearly differentiated both temporally and spectrally, if TRAP assimilates to the Czech /aː/, or less clearly, if both assimilate to the Czech /ɛ/ and /ɛː/ and TRAP is recognized as a poor phonetic implementation of /ɛː/.

The question we are asking about advanced L2 learners are as follows: Can the phonological and phonetic constrains, defined for the initial state of beginner FL learning, be overcome as a result of prolonged and intensive FL learning experience leading to high L2 proficiency? Do highly proficient EFL learners stop

relying on L1 phonemic categories (such as contrastive length); do they expand the phonemic system (e.g. adding a height distinction) and the repertoire of phonetic categories (e.g. forming fronted [u] and [ʊ])?

2. Methodology

2.1. Reference data

Formant measurements of the Czech EFL bilinguals' target vowels were compared to the data from 7 female speakers of Received Pronunciation published in Bjelaković (2017). Detailed biographical information about the speakers in this corpus of read BBC news is provided in the paper. The speakers are older than the bilinguals in the current study, born between 1955 and 1968 (i.e. 49–62 years old at the time of the data collection.) The paper gives each speaker's mean F1 and F2 values in Hz. Standard British English pronunciation, RP, rather than American pronunciation was chosen as the reference point because of its wide representation in language teaching materials used in the Czech Republic.

The bilinguals' English vowels were further compared to the published formant values for equivalent Czech vowels (Skarnitzl & Volín 2012). These reference data, based on recordings of read texts by 48 female speakers aged 20–30 years, comprise group means of F1 and F2[4]. The duration reference data were group means for six speakers (3 female), from a corpus of Czech Radio news recordings Skarnizl (2012).

2.2. Participants

The 20 Czech-English bilinguals were EFL learners, all young females between 19 and 27 years of age (M = 22). At the time of data collection they were enrolled in the bachelor programme 'English for Interpreters and Translators' at the Palacký University Olomouc. All were L1-dominant though highly proficient in their L2 (C1 or C2 in CEFR).

The stimuli were recorded by 5 native speakers of English: 2 speakers of SSBE (male, 40 and 52 yrs.), 3 speakers of North American English (1 male, 41 yrs; 2 female, 24 and 54 yrs.

2.3. Stimuli and procedure

The targets for analysis were 6 vowels in monosyllabic CVC words controlled for voicing of the post-vocalic consonant. Each high vowel occurred in six words, non-high vowels occurred in four words. The complete set included the KIT vowel

[4] In the paper, the female values are represented only in a figure; the exact numerical values were kindly provided by the authors.

in *big, give, dig, fish, thick, sit*; FLEECE in *cheese, lead, leave, heat, cheat, niece*; GOOSE in *choose, lose, move, goose, shoot, soup*; FOOT in *good, hood, should, book, bush, look*; DRESS in *beg, bed, bet, neck*; TRAP in *bag, badge, back, match*.

Each target was placed in 2 sentences, once occurring sentence-initially (e.g. *Give them the money.*), once sentence-finally (e.g. *What did you give?*). In total there were 64 stimulus sentences and 24 fillers. Participants produced the sentences in a delayed repetition task during which they heard a stimulus sentence followed by a prompt *What should you say?* said by a different person. The participant responded using the quote frame *I should say,* _ and repeating the stimulus, e.g. "I should say, Give them the money." The native speakers who provided the baseline read the stimulus sentences off a computer screen and produced them in the frame *I should say,* _. A subset of each native speaker's sentences was included in the elicitation instrument used with the learners.

2.4. Measurement and analysis

In each elicited vowel token, duration and frequencies of F1 and F2 were measured. The onset and offset of the vowels was determined manually from the waveform with a reference to the vocalic formant structure in the spectrogram. Formants were tracked using the Burg method in Praat (Boersma and Weenink 2017), with the maximum formant value set to 3500 Hz for GOOSE and FOOT, to 3800 Hz for the other vowels and the number of formants set to 3. Subsequently, the mean F1 and F2 in the medial 50% of each vowel were computed in hertz. These acoustic measurements were then used to calculate the mean duration and the mean formant frequencies for each speaker's sentence-initial and sentence-final target vowel.

3. Results

3.1. Temporal differentiation

Figure 1 shows the learners' group mean duration of each vowel. Repeated Measures (RM) ANOVA with duration as the dependent variable and Vowel (FLEECE, KIT, GOOSE, FOOT, DRESS, TRAP) as the within-subject independent variable revealed its significant main effect [$F(5, 95) = 80.21$, $p < .0001$]. According to a post-hoc Tukey test, vowels in each lax-tense pair significantly differed from each other ($p < .001$). Another RM ANOVA performed on long-to-short durational ratios found a significant effect of Vowel pair [$F(2, 38) = 44.33$, $p < .0001$], a post-hoc Tukey test confirming that the i/ɪ ratio to be significantly higher compared to the u/ʊ ratio, which was in turn higher than the æ/ɛ ratio ($p < .01$).

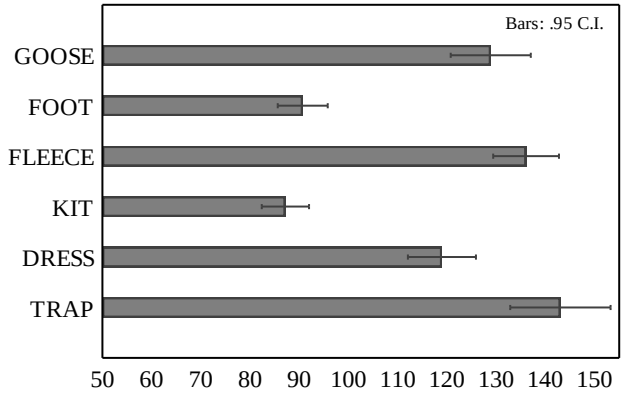

Figure 1. Group mean durations of the Czech EFL bilinguals' target vowels in ms

3.2. Spectral differentiation

In Figures 2 and 3, learners' target vowels are represented in an F1-by-F2 vowel space. For this display, the measurements in Hz were converted into Bark and normalized so that height is represented as the distance of the F1 from F3 and retraction as the distance of F2 from F3. Individual learners' means for the six vowels are displayed in Figure 2, while Figure 3 shows each vowel token measured. For the sake of displaying the full front-back scale, the figures include measurements of an additional, back vowel (/ɔ/ in the word *thought*). A single token for each participant was measured. In Table 2, mean F1 and F2 values in Hz with standard deviations of the bilingual EFL group are juxtaposed to the native RP speaker data from Bjelaković (2017).

Table 2. Group mean F1, F2 values in Hz and standard deviations for 20 Czech EFL bilinguals in the current study and for the 7 RP speakers in Bjelaković 2017

	Czech EFL bilinguals		**RP speakers**		**Czech EFL bilinguals**		**RP speakers**	
	F1		**F1**		**F2**		**F2**	
	Mean	***(SD)***	**Mean**	***(SD)***	**Mean**	***(SD)***	**Mean**	***(SD)***
FLEECE	383.7	*(25.8)*	349.7	*65.7*	2604.8	*123.1*	2623.0	*59.8*
KIT	467.5	*33.8*	457.4	*59.9*	2239.1	*154.4*	2071.1	*100.4*
DRESS	710.1	*75.7*	636.3	*94.2*	2013.0	*110.7*	1918.6	*61.1*
TRAP	743.3	*79.8*	844.9	*111.5*	1972.5	*162.9*	1663.4	*44.1*
GOOSE	405.6	*24.0*	347.0	*51.8*	1561.5	*208.3*	1852.7	*71.2*
FOOT	443.6	*36.5*	444.1	*73.4*	1458.8	*162.2*	1491.7	*97.4*

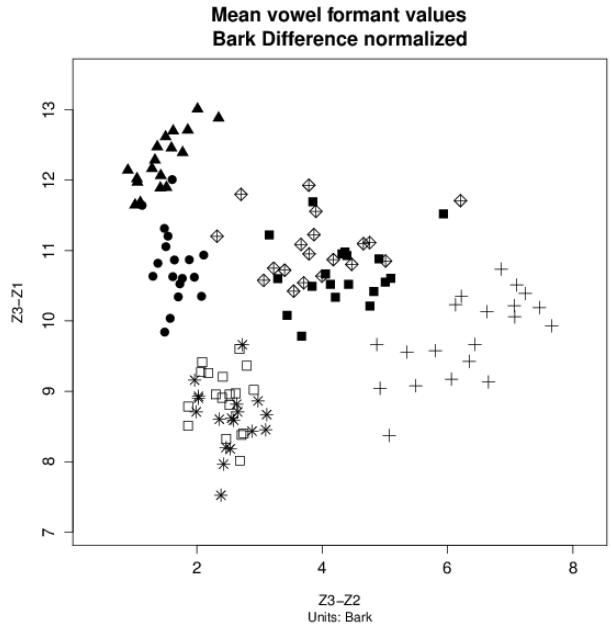

Figure 2. Czech EFL bilinguals' mean vowel formant values (Bark difference normalized). Legend: triangle FLEECE, dot KIT, empty square DRESS, asterisk TRAP, diamond GOOSE, filled square FOOT, plus THOUGHT

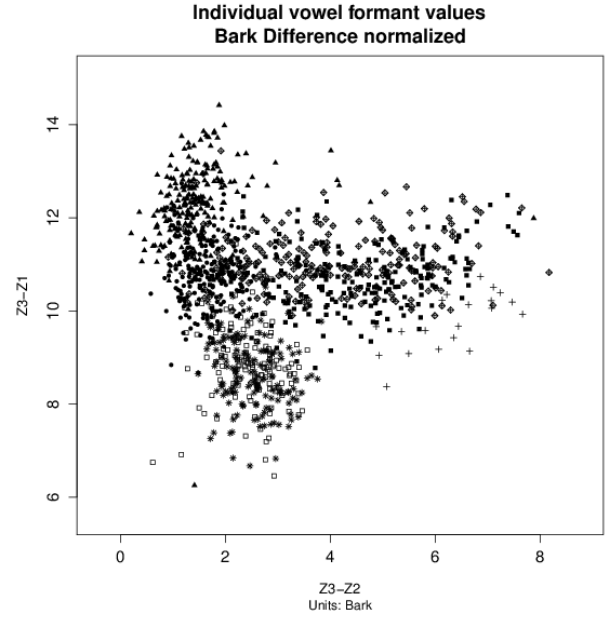

Figure 3. Czech EFL bilinguals' individual formant values (Bark difference normalized). Legend: triangle FLEECE, dot KIT, empty square DRESS, asterisk TRAP, diamond GOOSE, filled square FOOT, plus THOUGHT

In order to evaluate statistically the spectral differentiation of the learners' vowels as well as to compare them to native speakers' vowels, two separate RM ANOVAs were performed on mean F1 and F2 measurements. The within-subject variable Vowel (FLEECE, KIT, GOOSE, FOOT, DRESS, TRAP) and the between-subject variable Speaker Group (Bilinguals, RP Speakers) were included. The results for F1 showed a significant main effect for Vowel [$F(5, 125) = 340.00$, $p < .0001$] but not for Speaker Group. The interaction between the Speaker Group and Vowel as significant [$F(5, 125) = 10.856$, $p < .0001$]. A parallel main effect of Vowel [$F(5, 125) = 293.10$, $p < .0001$] but not Speaker Group, and a significant Vowel – Speaker Group interaction [$F(5, 125) = 19.624$, $p < .0001$) was found for F2. Post-hoc Tukey tests for both F1 and F2 confirmed that native speakers produced significant differences between the vowels in each pair ($p < .01$). For the learners, the post-hoc test results are summarized in Table 3. Their L2 /i/ was clearly constrasted with /ɪ/, having a significantly lower mean F1 and higher mean F2. The other two vowel pairs, /ɛ/-/æ/ and /u/-/ʊ/, did not differ in either dimension within the learners. The bilinguals differed significantly from the RP speakers with respect to two English vowels. They produced TRAP vowel with lower F1 and higher F2 values, i.e. the vowel was higher and more front compared to that of the RP reference data. Second, their L2 /u/ had a significantly lower F2, not showing the same degree of fronting as the native speakers' GOOSE vowel.

Table 3. Pairwise comparisons of mean F1 and F2. Columns 2 & 4 are within-subject comparisons within each vowel pair, Columns 3 & 5 comparisons of Czech EFL bilinguals and RP speakers from Bjelaković 2017

Target vowels	F1 diff. from each other	F1 diff. from RP vowel	F2 diff. from each other	F2 diff. from RP vowel
FLEECE	p < .001	n.s.	p < .001	n.s.
KIT		n.s.		n.s.
DRESS	n.s.	n.s.	n.s.	n.s.
TRAP		p = .01		p < .001
GOOSE	n.s.	n.s.	n.s.	p < .001
FOOT		n.s.		n.s.

3.3. Assessing the degree of nativelikeness of the L2 data

Finally, using the nativelikeness criterion of bilinguals' values falling within 1 standard deviation of the native speakers's mean (e.g. Birdsong 2007), we compared individual mean F1s and F2s to the RP reference data. The number of bilinguals who satisfied this criterion for each vowel is given in Table 4, showing that more bilinguals were accurate in vowel height (F1) than in the front-back dimension (F2). The number of bilinguals who satisfied the criterion for both F1 and F2 was highest for FLEECE and FOOT. For F1, we further counted how many bilinguals satisfied the criterion for both contrasting vowels of each target pair.

Sixteen speakers approximated NS's values for both the FLEECE and KIT vowels, ten for FOOT and GOOSE, and only five for DRESS and TRAP. Two bilinguals produced RP-like F1 values for all 6 vowels.

Table 4. Number of bilinguals whose formant values fall within 1 SD of the native speakers' group mean

	F1	**F2**	**F1&F2**
FLEECE	17	11	10
KIT	18	9	7
DRESS	13	7	5
TRAP	12	1	0
GOOSE	10	2	1
FOOT	18	13	11

3.4. The variability of L2 TRAP and DRESS

In Table 2, the bilinguals' F1 column showed higher standard deviations from the group mean for DRESS and TRAP relative to the other vowels, revealing increased between-speaker variability. Within-speaker variability in F1 across the vowels was assessed by a one-way ANOVA on individuals' SDs for each vowel, which found a significant main effect of Vowel [$F(5, 114) = 10.705$, $p < .001$]. A post-hoc Tukey test confirmed significantly higher SDs for DRESS compared to the remaining four vowels and significantly higher SDs for TRAP compared to three out of the four remaining vowels ($p < .05$), FLEECE being the exception. SDs for DRESS and TRAP did not differ. The variability within and across individual bilinguals in F1 of DRESS and TRAP can be observed in Figure 4, showing each speaker's mean, 1 SD from the mean (box), and 2 SDs from the mean (whiskers). A further perusal of individuals' raw formant (and durational) data reveals that lexical misrepresentation of TRAP and DRESS words is not uncommon for the bilinguals who pronounced some words belonging to the DRESS category with the TRAP vowel and vice versa. Figure 5 displays two scatter plots of F1 values against vowel duration of DRESS and TRAP produced by the speakers KM and KK, whose DRESS had one of the highest and the lowest SDs from the mean F1, respectively. Both figures show clusters of shorter vowels with lower F1 and longer vowels with higher F1, each cluster comprising both DRESS and TRAP words.

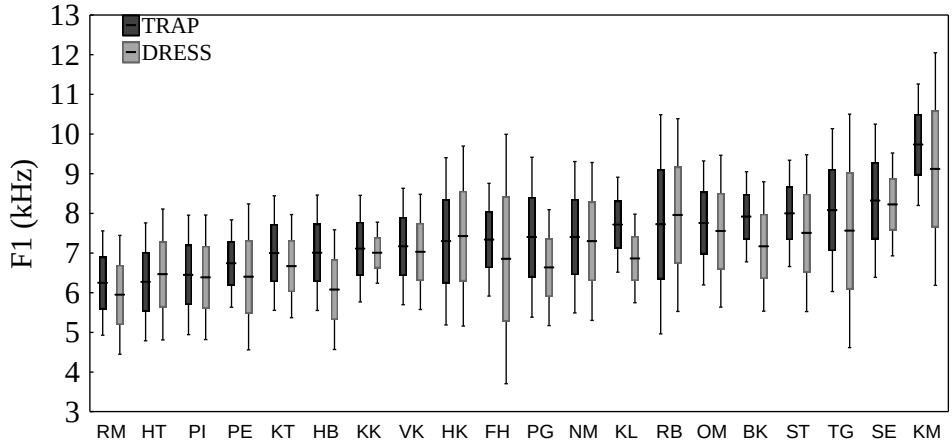

Figure 4. Individual mean F1 values (horizontal line), 1 standard deviation (box) and 2 standard deviations (bar) from the mean. Bilinguals are arranged according to F1 of TRAP from the lowest to the highest value

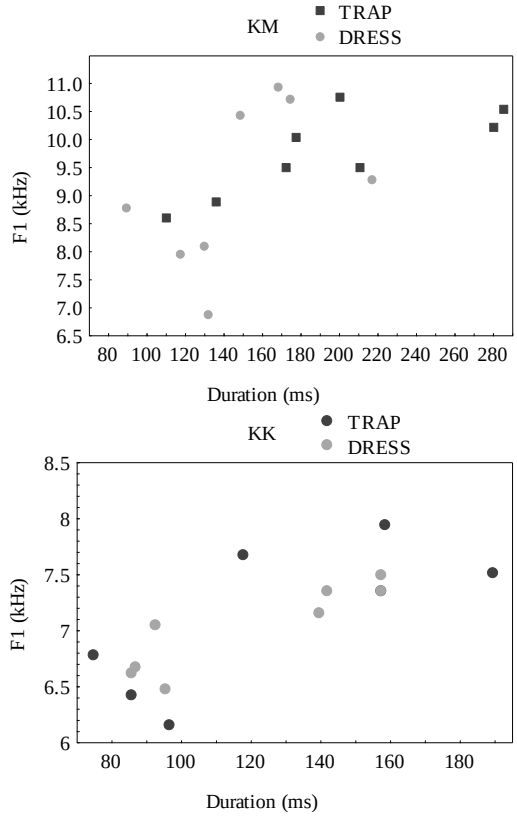

Figure 5. Scatterplots of F1 values against vowel duration for speakers KM and KK

3.4. Fronting of FOOT and GOOSE

The bilingual group's mean F2 of the GOOSE vowel is significantly lower relative to the RP speakers' value (Tables 1, 2) although one speaker's mean F2 of GOOSE (and FOOT) was in fact above 1 SD of the native speakers' value. Matching GOOSE and FOOT to their closest Czech equivalents (data from Skarnitzl & Volín 2012) reveals a difference between L1 and L2 high back vowels along the front-back dimension. A t-test for single means, testing the mean F2 values of the bilinguals' GOOSE vowel against the reference value of 757 Hz (long Czech /uː/) found the bilingual values to be significantly higher (t[19] = 17.27, p < .001). Likewise, a t-test for single means testing F2 values of bilinguals' FOOT vowel against the reference value of 1135 Hz (short Czech /u/) showed that they were significantly higher (t[19] = 8.93, p < .001). In sum, the Czech EFL bilinguals' English /u/ and /ʊ/ were more front (had higher F2) than the Czech native speakers' mean long /uː/ and short /u/ reported in Skarnitzl and Volín (2012).

4. Discussion

This is a study of cross-language L1 interference manifested in L2-vowel production of highly proficient EFL bilinguals. By comparing the acoustic measurements of bilingual vowels to native speaker reference data we address the question of limits on ultimate attainment in L2 sound learning under the input restrictions of the foreign-language settings. Assuming that cross-language interference involves L1-L2 interactions both at the higher-level phonological and lower-level phonetic representations, we selected three English vowel pairs for which we described, based on PAM-L2, differential degrees of L1 interference at the initial stages of L2 learning. We further suggested that phonological and phonetic learning means moving away from these L1 constraints and that speech of advanced bilinguals should evidence such changes.

Three pairs of contrasting English vowels were tested, namely /iː, ɪ/, /uː, ʊ/ and /æ, ɛ/. For each vowel pair we asked if and how clearly the bilinguals distinguished between the contrasting vowels and how closely each of the six bilinguals' vowels approximated production of reference native speakers of RP.

Our measurements showed that in all three pairs, the Czech EFL bilinguals relied on duration to differentiate between vowels. They used length to contrast FLEECE-KIT as much as, or even more than, they used it to contrast GOOSE-FOOT. They did so despite the reduction of the durational /iː/-/ɪ/ differentiation in their L1 related to increased spectral differentiation (Podlipský et al. 2009). The bilinguals also used duration to differentiate the L2 TRAP from DRESS. The smaller long-to-short duration ratio reported in group results cannot be interpreted as a weaker reliance on duration. Instead, individual bilinguals' data suggest that it is due to lexical misrepresentations. As illustrated by Figure 5, some DRESS

words were realized with extended vowel duration (and a relatively high F1) indicating that /æ/ was the target while some TRAP words had a relatively shorter vowel (and low F1) indicative of the /ɛ/ target.

With respect to vowel quality, the bilinguals' performance on FLEECE and KIT can be regarded as a baseline for evaluating the production accuracy of the other two pairs. In both English and Czech the high front vowels are differentiated by spectrum as well as duration. Spectrally, FLEECE overlaps with Czech /iː/ and KIT is very similar to Czech /ɪ/. Unsurprisingly, the bilinguals contrasted the English vowels both in length and quality. Further, for the group, the implementation of either vowel does not differ from the native speakers' implementation either in height or backness. Nonetheless, the bilinguals' production of KIT, which matches closely the Czech reference values of short /ɪ/ and appears somewhat more (though not significantly) front compared to the RP speakers' KIT, evokes Flege's (1995) reasoning about the relative difficulty of acquiring similar sounds completely. Out of the twenty bilinguals, ten produced FLEECE in a nativelike way, seven of which produced also nativelike KIT.

Compared to the FLEECE-KIT baseline, the bilinguals' production accuracy of GOOSE and FOOT is somewhat diminished. The vowels are contrasted by length but not by quality. The tendency towards some spectral differentiation between long and short /uː/-/u/ reported for the bilinguals' L1 Czech, is not observable in their L2 at all. In terms of nativelikeness, the lax /ʊ/ is better implemented than the tense /u/. In fact, with eleven bilinguals having nativelike pronunciation, /ʊ/ is the most accurately produced vowel of the whole set. Both vowels approximate better the native reference values when it comes to height, which is warranted by similarity between English and Czech. With respect to backness, bilinguals' FOOT is close to the RP realization while their GOOSE is different. And yet, a comparison with Czech /uː/ and /u/ shows for both vowels a substantial degree of fronting (in one case even an overshoot of fronting). This is an indication that the bilinguals succeeded in creating new spectral categories for their English high back vowels, distinct from the existing L1 phones. The bilinguals' L2 /u/ and /ʊ/, undifferentiated in height, are fronted together, which is sufficient for the accuracy of FOOT but not of GOOSE, with much more front realizations in modern RP.

Clearly, the bilinguals were least successful in production of DRESS and TRAP. The two vowels were separated in duration, TRAP being the "long" vowel (Šimáčková 2003), but not in vowel height or backness. Unlike in the case of GOOSE and FOOT, this may be a result of lexical misrepresentation rather than of phonological non-differentiation. In terms of vowel height (and duration), the bilinguals do seem to separate two phonetic targets but sometimes use [ɛ] for TRAP words and [æ] for DRESS words. The phonetic differentiation is then lost in individual means calculated across all TRAP and all DRESS tokens. Regarding the accuracy of each vowel, DRESS was closer to the RP reference values along both dimensions, reflecting the phonetic similarity of the English lax /ɛ/ the Czech

short /ɛ/. The bilinguals realized TRAP as a front vowel showing little, or rather, no retraction. Obviously, they did not assimilate the English vowel to the Czech /a-aː/. The results for vowel height discussed above suggest the bilinguals' perception of [æ]-phones as poor exemplars of /ɛ/.

To summarize the discussion, for the EFL bilinguals in this study, cross-language phonological interference deriving from early established phonemic categories continued to influence their vowel production even at the highest levels of proficiency. First, the phonemic vowel length discretely separated the vowels into long and short. Second, the FOOT-GOOSE and DRESS-TRAP contrasts showed that the bilinguals did not succeed in adding new vowel-height distinctions. The height differentiation of FLEECE and KIT can be interpreted as a transfer of L1 phonetic categories. In contrast, the phonetic implementation of the existing categories can shift towards more L2-like targets as evidenced by fronting of the GOOSE and FOOT vowels. The production results for TRAP signal the bilingual's ability to notice phonetic dissimilarity, which in this case led to destabilizing the /ɛ/-category and for individual items to less L2-like production (e.g. when neck is pronounced as [næk]).

5. Conclusion

It is not the case that there is one best outcome of L2 speech learning, nativelike L2 phonology. Depending on the circumstances of L2 learning, there are a number of ultimate attainment outcomes. This study shows that foreign language sound learning is constrained by phonological interference. For the Czech EFL bilinguals, the phonemic structure underlying L1 vocalic inventory defines the boundaries of their L2 system, in the sense that old phonemic categories are reused and new ones are difficult to set up. Such cross-language interference can be understood as parsimony: a bilingual late L2 speaker, who is fluent in both L1 and L2, has arrived at an optimal bilingual sound system in which phonological units such as features are not necessarily multiplied. Those units that have been already established are maximally exploited. However, as shown by our results for the fronting of the L2 high back vowels, even in the circumstances of limited access to interactional native input, these bilinguals show evidence of flexible phonetic learning, achieving an approximation to nativelike values for these vowels.

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Appendix

A language experience questionnaire included three accent-related questions: about bilinguals' self-perceived foreign accentedness (Q1: *In your perception, how much of a foreign accent do you have in English?*), about their desire to improve their accent in English (Q2: *How important it is for you to improve your pronunciation?*) and about the importance of accent-free pronunciation (Q3*: In your opinion, how important is it for an interpreter to speak without a foreign accent?*). The bilinguals responded on a nine-point Likert scale, ranging from one, the least degree, to nine, the highest degree.

Speaker	Q1	Q2	Q3
LK	2	9	7
KH	2	9	6
ES	4	9	6
IP	4	8	7
TK	4	3	7
BH	4	7	7
TS	4	9	8
KK	4	6	6
MR	5	7	5
GT	5	9	6
KB	5	6	7
EP	5	7	4
HF	5	9	9
MK	5	7	6
MO	5	7	6
GP	6	8	4
KV	6	5	5
MN	6	8	7
TH	7	9	3
BR	8	9	8

DEGREE OF GRAMMATICALISATION OF *BEHIND*, *BENEATH*, *BETWEEN* AND *BETWIXT* IN MIDDLE ENGLISH

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Abstract
The present paper traces the history of four selected adverbs with the prefix *be-* in Middle English. Already in Old English *behind*, *beneath*, *between* and *betwixt* are attested to function as both adverbs and prepositions, which demonstrates that the process of grammaticalisation accounting for the development of prepositions from adverbs started before that period. The focus of the study are the diachronic changes of the degree of grammaticalisation of the examined lexemes in the Middle English period as demonstrated by the ratio of their use with a respective function in the most natural context. Hence, specially selected Middle English prose texts are analysed.

The analysis shows that while *behind* and *beneath* are still frequently used as adverbs in the whole Middle English period, *between* and *betwixt* are predominantly used as prepositions already in Early Middle English. This clearly demonstrates that the degree of grammaticalisation of the latter two Middle English words was much higher than that of *behind* and *beneath.*

Keywords: adverb, grammaticalisation, Middle English, preposition

1. Introduction

The aim of the present paper is to investigate the history of four selected compound adverbs with the prefix *be-* in Middle English from the perspective of the degree of grammaticalisation. The analysed lexemes share some structural, functional, etymological and semantic characteristics and include *behind*, *beneath*, *between* and *betwixt*, i.e., ME *bihīnde(n)*, *binēthe(n), bitwēne* and *bitwix(en)*. Structurally, these words are composed of the prefix *be-*, ME *bi-/be-* and an adverb or a numeral, and are recorded in the function of both prepositions and adverbs already in Old English. All the examined compound adverbs have emerged in the process of grammaticalisation, specifically reanalysis of the preposition and adverb *bī (big)* 'about', which developed into the prefix *bi-/be-*, and respective adverbs with the originally locative sense. Further, the grammaticalisation continued, which is demonstrated by the rise of grammatical units, i.e., prepositions from lexical ones, i.e., adverbs. As confirmed by the presence of the discussed words functioning as prepositions in Old English, those two stages of grammaticalisation must have occurred before that period. The focus of the study is the Middle English period and the diachronic changes of the degree

of grammaticalisation of ME *bihīnde(n), binēthe(n), bitwēne* and *bitwix(en).* The degree will be tested on the basis of the ratio of their use with a respective function. The decrease in the adverbial use of the lexemes will be a sign of a higher degree of grammaticalisation.

2. Theoretical framework and methodology

The grammaticalisation framework applied in the study relies on the classical definition by Kuryłowicz (1965: 69) stating that "[g]rammaticalization consists in the increase of the range of a morpheme advancing from a lexical to a grammatical or from a less grammatical to a more grammatical status, e.g., from a derivative formant to an inflectional one" as well as on the more recently view of grammaticalisation as "the process whereby lexical items and constructions come in certain linguistic contexts to serve grammatical functions, and, once grammaticalized, continue to develop new grammatical functions" (Hopper and Traugott 2003: xv).

The special context in which the degree of grammaticalisation of *bihīnde(n), binēthe(n), bitwēne* and *bitwix(en)* will be examined is intended to be the most natural, or neutral, i.e., closest to spoken Middle English. Hence, the selection of special prose texts for the analysis will guarantee the exclusion of occurrences which might have been motivated by such poetic devices as rhyme, rhythm or alliteration. As noticed by Markus, "prose, on an average, employed a language less stylised than verse and was, thus, relatively close to the language really used by people." (http://www.uibk.ac.at/anglistik/projects/icamet/) The linguistic material selected for the present investigation relies on the recent achievements of corpus linguistics and specifically on Manfred Markus's (2010) *Innsbruck Corpus of Middle English Prose*[1] (henceforth *Innsbruck Corpus*). This extensive electronic corpus is a collection of complete texts, not of text samples, which ensures the completeness of the analysed data. However, not all the 129 texts amounting to as many as c. 7.8 million words have been employed in the present study. The intention is to analyse the behaviour of *bihīnde(n), binēthe(n), bitwēne* and *bitwix(en)* only in the texts with most reliably identified localisation and dates, the information of which has been derived from *A Linguistic Atlas of Early Middle English* (*LAEME*) and an electronic version of *A Linguistic Atlas of Late Mediaeval English* (*eLALME*) (cf. Esquibel and Wojtyś 2012; Wełna 2013, 2015). Such a procedure will guarantee the highest accurateness and reliability of the obtained results relating to the chronological and dialectal distribution of the examined lexemes. Thus, a total number of 56 Middle English complete prose texts will be subject to further analysis. The Early Middle English material consists of 21 texts (599,583 words) and the Late Middle English one of 35 texts

[1] I hereby gratefully acknowledge the *Innsbruck Corpus of Middle English Prose* (version 2.4) to its compiler, Professor Manfred Markus from the University of Innsbruck.

(1,900,729 words). Altogether, the study is based on about 2.5 million words. Other extensive and acknowledged databases employed for the analysis include the *Oxford English Dictionary online* (henceforth *OED*), the *Middle English Dictionary online* (henceforth *MED*) as well as the *Dictionary of Old English* (A-H online) (henceforth *DOE*) and the *Dictionary of Old English Corpus* (*DOEC*).

3. Previous studies on the grammaticalisation of Medieval English adverbs

Middle English adverbs and their development into prepositions and conjunctions/subordinarors viewed in the grammaticalisation framework have been recently of interest to a few scholars. Molencki, Rissanen and Kahlas-Tarkka, who performed detailed qualitative studies richly illustrated with quotations from various corpora and dictionaries, deserve a special mention here.

Molencki studied the topic most extensively. Molencki (2003, 2005, 2007abc, 2008) offers a detailed analysis of ME *as, after, before, since, because* and their path of development from adverbs to conjunctions. Moreover, he investigates a group of Middle English prepositions and conjunctions borrowed from Romance sources, e.g., *according to*, *during*, *purveyed/provided*, *save*, *except*, *maugre*, *(a)round* and *sans* (Molencki 2011a). Molencki (2011b) discusses the development of the preposition *forward* in Middle English. He bases his studies on the *DOEC*, the *OED* and the *MED*. Moreover, in his extensive book devoted to the rise of Medieval English causal conjunctions in the process of grammaticalisation Molencki (2012) thoroughly discusses the development of *because* from the noun *cause*. The author employs not only the databases mentioned above but also the *Corpus of Middle English Poetry and Prose*, the *Anglo-Norman Dictionary* and the Helsinki corpora.

Rissanen (2000a and 2004) studies the grammaticalisation of *according to* and *beside(s)* respectively, relying mainly on the Medieval English parts of the *Helsinki Corpus* and the *ARCHER Corpus*. Rissanen (2005) investigates the development of the Early English *till* and *until* into conjunctions and Rissanen (2007) discusses the replacement of the Old English preposition and subordinator *oþ* by Old Norse *till*. The latter study relies on Old and Middle English samples from the *Helsinki Corpus* as well as on the *DOEC* and the *Middle English Compendium*.

Kahlas-Tarkka (2010) describes Old and Middle English low frequency temporal expressions consisting of the prepositions *in, at, to* or *till*, the noun *time* and the particle *þe*. Her data are retrieved from the *Helsinki Corpus* and, similarly to Molencki's studies, from the *DOEC* and the *OED*.

Additionally, Iglesias-Rábade (2011) examines twelve Middle English prepositions, i.e. *aboue, after, at, bi, bifore, bihinde, biside, in, on, ouer, þurgh* and *under*. Relying on the occurrences recorded in the Middle English part of the *Helsinki Corpus* he analysed the development of these prepositions from lexical items as well as their semantic erosion. Moreover, he conducts the analysis of the

frequency and dialectal distribution of the prepositions, which, however, due to the size of the corpus may pose the question of the reliability of his results.

ME *bihīnde(n), binēthe(n), bitwēne* and *bitwix(en)* have not been investigated in the grammaticalisation framework so far. Some aspects of those lexemes have been of interest to a couple of scholars, though. Hotta (2014) analyses recorded spelling variants of ME *betwixt* and *between* and the competition between them. Ciszek-Kiliszewska (2014) compares the semantics of ME *twēne* and *bitwēne* and provides the textual distribution of *bitwēne* and *bitwix(en)* in texts employing *twēne.* Moreover, Ciszek-Kiliszewska (2017a) investigates the semantic features as well as the temporal, textual and dialect distribution of ME *bitwix(en).*

Ciszek-Kiliszewska (2017b) thoroughly discusses various aspects of *bihīnde(n), binēthe(n), bitwēne* and *bitwix(en)* as well as *bifōre(n)* and *biyōnd(e)* relating to the use of those lexemes in complete Middle English prose texts. The author devotes a considerable part of her book to the semantic analysis of the analysed words, including the distinction between their prepositional and adverbial uses. Ciszek-Kiliszewska recognises the prototypical locative senses, the temporal and the abstract/metaphoric (neither locative nor temporal) senses. She also provides the textual and dialectal distribution of the analysed words accompanied by their frequencies. In terms of the obtained detailed quantitative results, the study is intended to provide a reliable overview of the use of the examined lexemes in specific periods, dialects and texts as well as a comprehensive database for further studies. Hence, the author does not distinguish between the frequencies of the prepositional and of the adverbial uses of the words in particular texts. Ciszek-Kiliszewska (2017) will serve as a source of some data and a point of reference for the present paper, which delves into the frequencies and the proportions between prepositional and adverbial uses as well as the degree of grammaticalisation of the four ME *bi-* words analysed there.

4. Etymology

The *MED*, the *OED* and the *DOE* point to OE *bi-*, *behindan* (see *DOE behindan)* as the ancestor of ME *bihīnde(n).* Regarding the structure of OE *behindan*, the *OED* recognises the word as composed of the Germanic prefix *be-* and the adverb *hindan* 'from behind, behind', specifying the direction. The adverb goes back to the root *hind-* found in words like *hinder* and *hindmost* and the adverbial suffix *-ana.* The prefix *be-* adds the meaning relating to the location. As mentioned above, the same prefix appears in all the words analysed in the present study.

ME *binēthe(n)* is recognised by the *MED* and the *OED* as going back to OE *bineoþan*, *-niþan* (see *DOE beneoþan)*. *Moreover, the OED*'s *claim that "*[o]riginally an adverb, but already in Old English construed with dative (of reference), as a preposition" may point to the grammaticalisation path. *Be-niðan/neoðan* is *analysed as consisting of the prefix be- and niðan*, *neoðan*

'below, down', originally 'from below,' earlier *neoðane*, *neoðone; cf.* OS *nithana*, OHG *nidana*, MHG *niden(e)* < Gmc *niþar* 'lower, farther down, down' plus the adverbial ending *-ana*.

As claimed by the *MED*, the ME *bitwēne* originates in OE *betwēonum*, *-an* & *bitwīn(um)*. The *OED* provides a similar origin, yet the dictionary distinguishes two related Old English forms, i.e., OE *bi-*, *betwēonum*, etc., which developed into Middle English *bitwenen*, *-twene*, and the exclusively Northern OE *bi-*, *betwēon*, etc., which evolved into ME *bitwēn.* "[A]fter 1400, when final *-e* became mute, and was omitted in writing, or retained only as a sign of a preceding long vowel, both forms necessarily coalesced in *betwene* (= *betwēn*)". Additionally, the *OED* recognises OE *betwēonum* as originating in the Old English construction *bi sǣm twēonum*, lit. 'by seas twain', in which *twēonum* is derived from the original Old English dative plural **twīhnum*, **tweohnum*[2]. Phrases like *frið freondum bi twēon* 'peace friends between' represent the further step towards the merger of the preposition *bi* and *twēonum*/*twēon*. Regarding the early forms of *between*, the *DOE*, which, similarly to the *MED* and the *OED*, identifies the Old English preposition and adverb *betwēonan* as the ancestor of Middle English *bitwēne*, "here are all forms derived from *be* + *tweonum* (*dat.*) with medial *-n-*, and all forms derived from *be* + **twīhn* (*acc.*) with final *-n*, *-nh." (DOE betwēonan)*

ME *bitwix(e)*, the ancestor of Present-Day English *betwixt*, is claimed by the *MED* to be going back to OE *betwix*,*-tweox*, *-twux(t)*, *-tux* (cf. OFris. *twiska*, OS *twisk*). Likewise, according to the *OED*, ME *bitwix* goes back to OE *betweohs*, *-tweox*, *-twux*, *-twyx*, *-tux*, probably shortened from the dative **be-tweoxum*, *-tweox(a)n*, preserved in Middle English as *be-*, *bitwixe(n).* OE **be-tweoxum*, *-tweohsum*, originally OE **bi-twihsum* < **-twicsum*, **-twiscum* is viewed as composed of the prefix *be-* and **twiscum*, (dative plural of **twisc* 'two-fold', adj.) (OS *twisc*, OHG *zuiski*, MHG *zwisc*, *zwisch* < OGerm. *twiskjo-*). **twisc* can be further analysed as a complex form consisting of *twa* 'two' and the suffix *-isc*. The Old English ancestor of ME *bitwix(en)* provided by the *DOE* is the preposition and adverb *betwux.* The Old English forms authorized by the dictionary include "all forms derived from *be* + Gmc. **twisk-* with final *-x*, *-xh*, *-xs*, *-xt*, *-hs*, *-hx*, or an *-(a)n* suffix and medial *-x-*, *-hx-." (DOE betwux)*

5. Grammaticalisation

The test demonstrating the degree of grammaticalisation of the examined Middle English words, *bihīnde(n)*, *binēthe(n)*, *bitwēne* and *bitwix(en)*, conducted in the present study will rely on the proportion of the use of those lexemes with different functions. Specifically, the number of tokens of adverbial uses of respective words will be compared to the number of tokens of prepositional uses attested in the

[2] **twīhnum can be further analysed as twīh* + the collective suffix *-n-* + case inflection (Kitson 1993: 12).

examined specially selected Middle English prose texts. The ratios will be tested separately for Early and Late Middle English texts. This will allow us for the observation of some diachronic tendencies concerning the use of *bihīnde(n)*, *binēthe(n), bitwēne* and *bitwix(en)*. The textual and dialectal distribution of the examined tokens is presented in the hope of providing some insight into the degree of grammaticalisation as perceived from those perspectives.

5.1. Grammaticalisation of *bihīnde(n)*

As evaluated by Ciszek-Kiliszewska (2017: 109), the examined 56 complete Middle English prose texts specially selected from the *Innsbruck Corpus* amounting to c. 2.5 million words contain 239 occurrences of *bihīnde(n).* Table 1 shows the distribution of numbers recorded in Early and Late Middle English prose texts.

Table 1. The tokens of *bihīnde(n)* in Middle English prose

Period	Number of all words	Number of tokens	Relative frequency per 100,000 words
EME	599,583	50	8.34
LME	1,900,729	189	9.94
ME	2,500,312	239	9.56

The relative frequency per 100,000 words shows that despite the uneven number of tokens in the texts representing the two Middle English subperiods, the relative use of *bihīnde(n)* is similar in both Early and Late Middle English.

Regarding the Early Middle English period, the investigation of the texts shows the use of *bihīnde(n)* in only about a half of them. Table 2 (in the Appendix) presents the distribution of the tokens in specific Early Middle English prose texts divided into groups representing particular dialects. Moreover, the instances are divided according to their function, i.e., adverbs and prepositions.

In total, *bihīnde(n)* is recorded 35 times as an adverb and only 15 times as a preposition in the investigated Early Middle English texts. Figure 1 presents the absolute number of tokens of the adverbs and prepositions normalised to a relative frequency per 100,000 words.

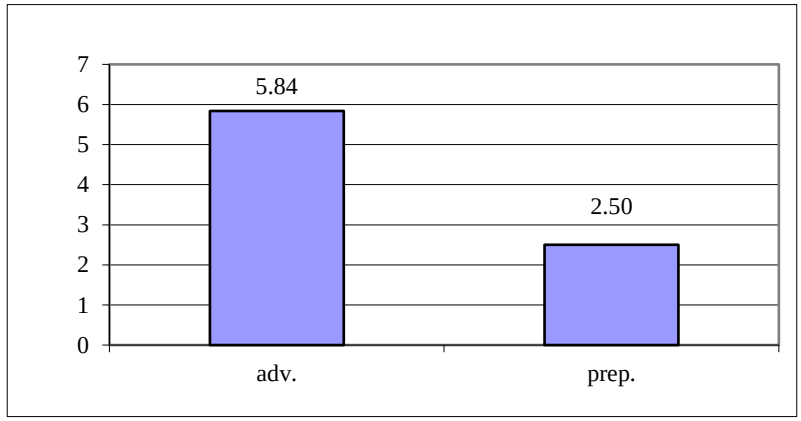

Figure 1. Early Middle English *bihīnde(n)*: relative frequency per 100,000 words

The general dominant function of *bihīnde(n)* as an adverb in the examined linguistic material can be easily seen. Moreover, the same tendency is exhibited in all the dialects and in the analysed prose texts including *bihīnde(n)*. A minor exception is the text of *Ancrene Riwle* (Gon-Ca) in which the use of the adverbial and prepositional tokens is balanced.

The analysis of the Late Middle English prose texts demonstrates a radically different distribution of *bihīnde(n).* Generally, more tokens than in Early Middle English are recorded and almost all Late Middle English texts employ *bihīnde(n)*. Table 3 (in the Appendix) presents the results of the investigation.

The total absolute numbers demonstrate that the function of *bihīnde(n)* notably changes in Late Middle English. The lexeme is attested to function as a preposition more frequently than as an adverb. Figure 2 presents those frequencies as relative per 100,000 words.

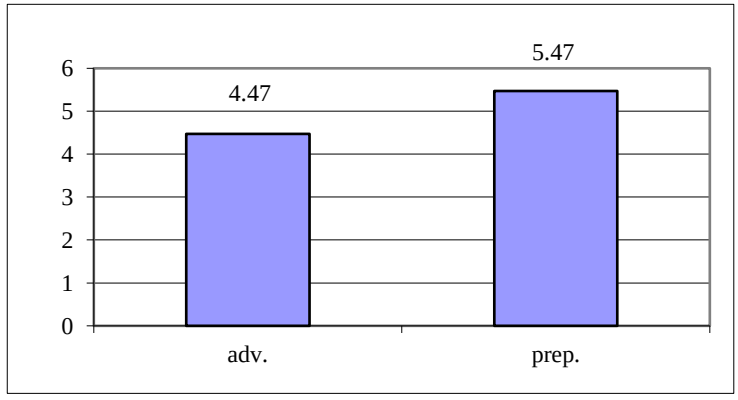

Figure 2. Late Middle English *bihīnde(n)*: relative frequency per 100,000 words

Figure 3 sets the data from Figures 1 and 2 together and demonstrates the changes in the frequencies of adverbs and prepositions between the Early and Late Middle English prose.

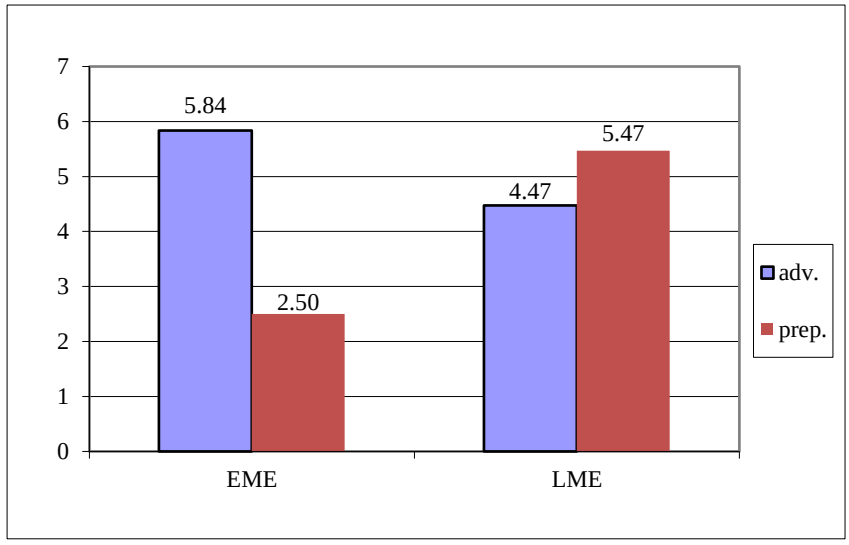

Figure 3. Early and Late Middle English *bihīnde(n)*: relative frequency per 100,000 words

While the frequency of use of *bihīnde(n)* as an adverb shows a tendency towards a decrease in the later period, the prepositional function of *bihīnde(n)* is employed noticeably more frequently in Late than in Early Middle English. The prevailingly adverbial use of *bihīnde(n)* in Early Middle English with time changes into a more balanced use of the word with both functions with a slightly higher frequency of *bihīnde(n)* employed as a preposition in Late Middle English. Thus, it might be assumed that ME *bihīnde(n)* shows an advancing yet still intermediate degree of grammaticalisation. Interestingly, a scrutiny of the dialectal and textual distribution of *bihīnde(n)* in Early and in Late Middle English reveals that while the EM micro-scale use overlaps with the global results obtained for Early Middle English, there are some discrepancies in Late Middle English. Specifically, one out of four West Midland texts, the only Kentish text and 11 out of 16 East Midland texts exhibit proportions of the adverbial and the prepositional use of *bihīnde(n)* different from those observed for the whole LME period. The adverbial use of *bihīnde(n)* in them is either higher or the same as the prepositional one, which exhibits a lower micro-scale degree of grammaticalisation than that estimated for Late Middle English prose.

5.2. Grammaticalisation of *binēthe(n)*

The examined Middle English prose texts of c. 2.5 million words include 75 instances of *binēthe(n)* (Ciszek-Kiliszewska 2017: 130). Table 4 shows the distribution of tokens attested in Early and Late Middle English prose.

Table 4. The tokens of *binēthe(n)* in Middle English prose

Period	Number of all words	Number of tokens	Relative frequency per 100,000 words
EME	599,583	26	4.34
LME	1,900,729	49	2.58
ME	2,500,312	75	3.00

The relative frequency per 100,000 words shows that despite the uneven number of tokens in the texts representing the two Middle English subperiods, the relative use of *binēthe(n)* is similarly low in both Early and Late Middle English.

Binēthe(n) can be found in about a half of the analysed Early Middle English texts. Nevertheless, texts representing all the dialectal areas employ the lexeme. Table 5 (in the Appendix) presents the distribution of tokens according to the syntactic function.

The obtained results show that the adverbial function of binēthe(n) is represented by a higher number of occurrences, i.e., 17 than the prepositional one attested in 9 cases. Figure 4 presents the absolute number of the adverbs and prepositions normalised to a relative frequency per 100,000 words.

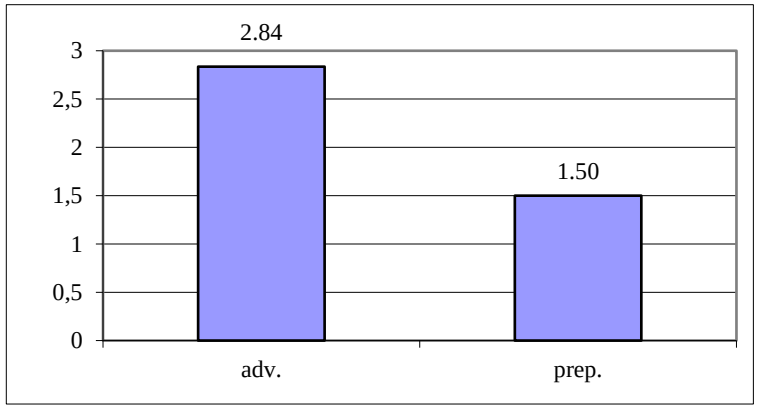

Figure 4. Early Middle English *binēthe(n)*: relative frequency per 100,000 words

Figure 4 clearly demonstrates that the adverbial function of *binēthe(n)* is employed about twice as frequently as the prepositional function in Early Middle English prose. Hence, it can be concluded that the degree of grammaticalisation of *binēthe(n)* in Early Middle English is low. When the same phenomenon is observed from the perspective of specific dialects or single prose texts, generally, a similar conclusion can be drawn. There are, however, some Southern and West Midland texts which exhibit minor deviation from the overall tendency (cf. Table 5).

The investigation of the Late Middle English prose texts demonstrates a higher number of attested tokens of *binēthe(n)* in comparison to the Early Middle English linguistic material. Table 6 (in the Appendix) illustrates the results of the analysis including the textual distribution of the occurrences with a respective function.

The total absolute numbers of *binēthe(n)* divided according to the function of the lexeme show a similar tendency to that exhibited in Early Middle English prose. Specifically, *binēthe(n)* is employed as an adverb about twice as frequently as with the prepositional function. Figure 5 presents the proportion of the relative frequencies normalised to the number of instances per 100,000 words.

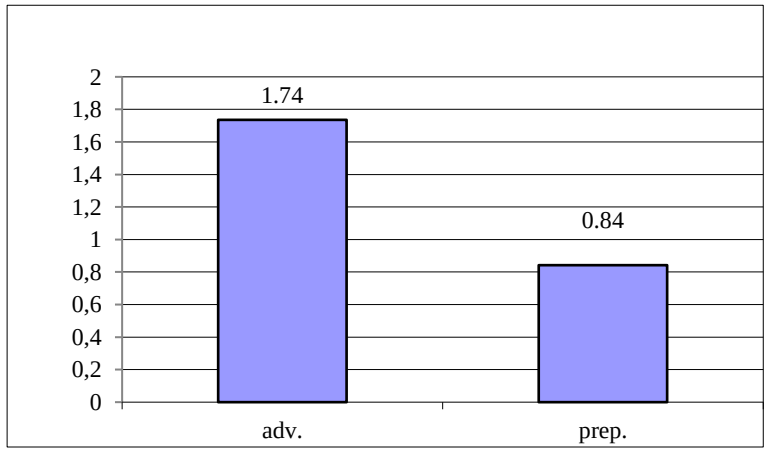

Figure 5. Late Middle English *binēthe(n)*: relative frequency per 100,000 words

Figure 6, combining the data from Figures 4 and 5, illustrates the changes in the frequencies of the adverbial and prepositional functions between Early and Late Middle English prose.

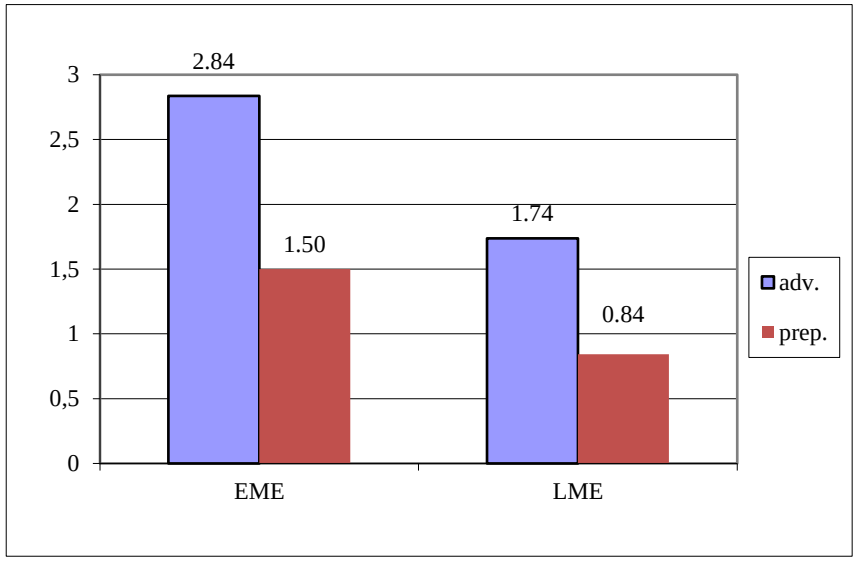

Figure 6. Early and Late Middle English *binēthe(n)*: relative frequency per 100,000 words

The frequency of use of *binēthe(n)* with both functions decreases in Late Middle English. The ratio of the relative frequency reduction is similar in both cases and amounts to about 40% each. Hence, *binēthe(n)* becomes employed less frequently in general and its function stays stable in both Early and Late Middle English. In both examined subperiods *binēthe(n)* functions as an adverb about twice more frequently than as a preposition. Consequently, it may be argued that even though ME *binēthe(n)* is grammaticalised to the extent that it can function not only as an adverb but also as a preposition already in Old English, the degree of its grammaticalisation in Middle English seems low because the lexeme exhibits a tendency towards functioning prevailingly as an adverb both in Early and in Late Middle English. However, a detailed examination of the dialectal and textual distribution of *binēthe(n)* in Early and in Late Middle English reveals that all the EME Southern texts and some West Midland texts employing *binēthe(n)* (see Table 5) as well as some LME West Midland (one out of two), Southern (the only one) and East Midland (four out of 12) texts including *binēthe(n)* (see Table 6) slightly deviated from the general tendency and thus the generally low degree of grammaticalisation. This might be indicative of the dialectal and textual variation with respect to that specific examined lexeme. Moreover, one might speculate that the listed dialects and texts are the leaders initiating and signalling the presupposed change towards a higher degree of grammaticalisation of *binēthe(n)* in Early Modern English.

5.3. Grammaticalisation of *bitwēne*

There are 829 instances of *bitwēne* in the investigated Middle English prose texts (Ciszek-Kiliszewska 2017: 150). Table 7 presents their distribution in Early and Late Middle English prose.

Table 7. The tokens of *bitwēne* in Middle English prose

Period	Number of all words	Number of tokens	Relative frequency per 100,000 words
EME	599,583	181	30.19
LME	1,900,729	648	34.09
ME	2,500,312	829	33.15

The relative frequency per 100,000 words shows that despite the uneven number of tokens in the texts representing the two Middle English subperiods, the relative use of *bitwēne* is similar in both Early and Late Middle English.

Regarding the analysed Early Middle English prose texts, *bitwēne* can be found in all the dialectal areas but not in all texts representing them. Table 8 (in the Appendix) shows the textual and dialectal distribution of tokens according to their syntactic function.

Table 8 shows that there are only seven instances of the adverbial use of *bitwēne* in the examined complete prose texts of c. 600,000 words. Figure 7 normalises the obtained results to a relative frequency per 100,000 words. In that context, the adverbial function of *bitwēne* proves to be only slightly more frequent than one token per 100,000 words. The prepositional function of *bitwēne* is employed c. 25 times more frequently.

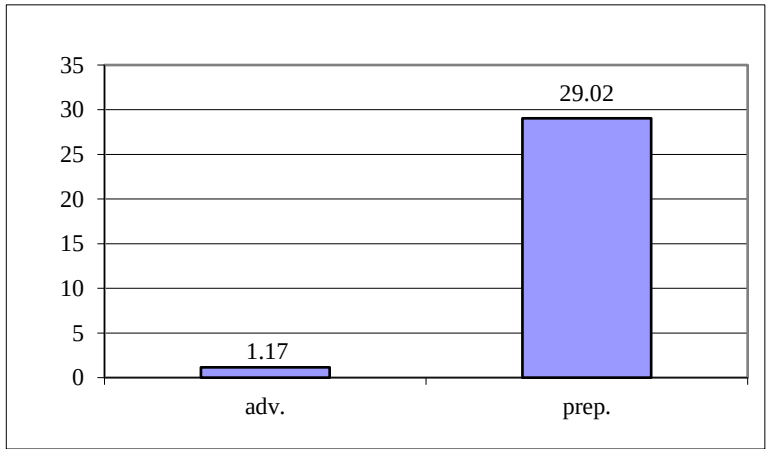

Figure 7. Early Middle English *bitwēne*: relative frequency per 100,000 words

Regarding the Late Middle English prose, there are generally more recorded cases of *bitwēne*. Table 9 (in the Appendix) introduces their distribution and functions before the data normalisation.

The table demonstrates that the use of *bitwēne* with the adverbial function in the Late Middle English prose is only sporadic. The dominating function of ME *bitwēne* is that of a preposition. Figure 8 presents the Late Middle English data normalised to the relative frequencies per 100,000 words. As can be seen *bitwēne* functioning as an adverb is attested less frequently than once per 100,000 words.

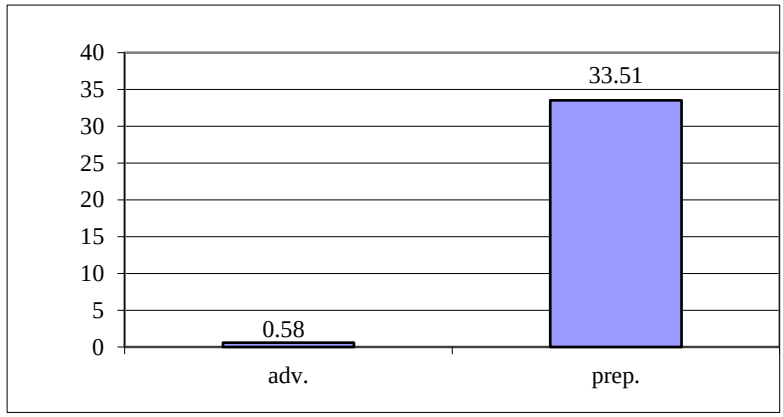

Figure 8. Late Middle English *bitwēne*: relative frequency per 100,000 words

Figure 9 shows the combination the Early and Late Middle English normalised data relating to *bitwēne.*

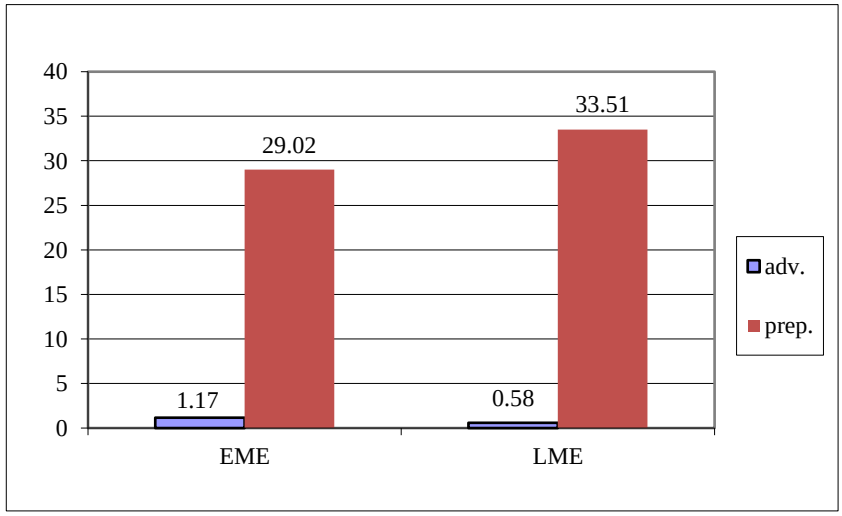

Figure 9. Early and Late Middle English *bitwēne*: relative frequency per 100,000 words

As demonstrated in Figure 9, *bitwēne* functions almost exclusively as a preposition in both Early and Late Middle English prose. Its adverbial function is even about twice less frequent in the latter period. Moreover, the relative frequency of the use of *bitwēne* as a preposition steadily grows between Early and Late Middle English. On the basis of those observations of the behaviour of *bitwēne* in the analysed Middle English prose, it can be claimed that *bitwēne* is highly grammaticalised in prose representing both examined periods. Those global results are also validated by the distribution of the tokens of *bitwēne* functioning as a preposition or as an adverb in every dialect and in every particular text employing *bitwēne.*

5.4. Grammaticalisation of *bitwix(en)*

The analysed Middle English prose texts employ 390 occurrences of *bitwix(en)* (Ciszek-Kiliszewska 2017: 176). Their distribution in Early and Late Middle English prose is presented in Table 10.

Table 10. The tokens of *bitwix(en)* in Middle English prose

Period	Number of all words	Number of tokens	Relative frequency per 100,000 words
EME	599,583	50	8.34
LME	1,900,729	340	17.89
ME	2,500,312	390	15.60

The normalised frequency per 100,000 words shows that the relative use of *bitwix(en)* grows considerably between the two analysed subperiods. In Late Middle English it is about twice higher than in Early Middle English.

Interestingly, *bitwix(en)* appears in only two out of the 21 analysed Early Middle English texts (cf. *bitwēne* above). *Twelfth-Cent. Homilies* in MS Vespasian representing the Kentish dialect include as many as 46 instances of *bitwix(e)* while *Twelfth-Cent. Homilies* preserved in MS Bodley 343 representing the Southern dialect contain four cases of *bitwix(e)*. All the recorded tokens of Early Middle English *bitwix(en)* function as prepositions. Thus, the relative frequency of the preposition *bitwix(en)* equals the general relative frequency of *bitwix(en)* in the subperiod, i.e., 8.34 per 100,000 words (see Table 10 above).

The Late Middle English prose texts exhibit by and large a higher number of recorded tokens of *bitwix(en)* in comparison to the Early Middle English texts. Table 11 (in the Appendix) shows their textual distribution of the occurrences according to the syntactic function.

The table shows that the adverbial use of *bitwix(en)* in the Late Middle English prose is only marginal. Figure 10 highlights the LME data normalised to the relative frequencies per 100,000 words.

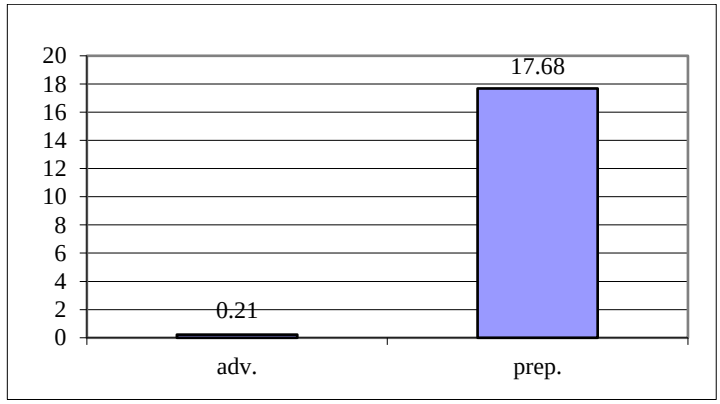

Figure 10. Late Middle English *bitwix(en)*: relative frequency per 100,000 words

Figure 11 combines the Early and Late Middle English data concerning *bitwix(en).*

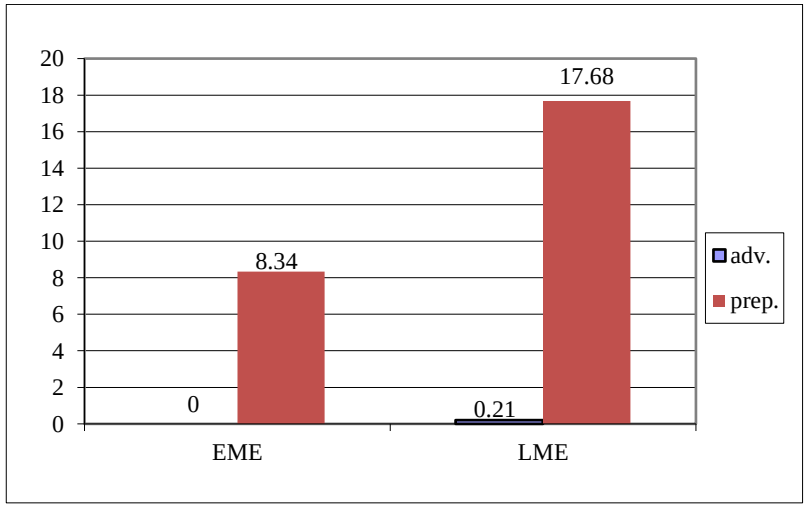

Figure 11. Early and Late Middle English *bitwix(en):* relative frequency per 100,000 words

As can be seen, the word functions exclusively as a preposition in Early Middle English prose and almost exclusively so in Late Middle English prose. Moreover, the relative frequency of use of the preposition *bitwix(en)* increases about twice in the latter subperiod of Middle English. Hence, it can be claimed that *bitwix(en)* is highly grammaticalised not only in Late but already in Early Middle English prose. Those observations are also confirmed by the distribution of the

occurrences of *bitwix(en)* functioning as a preposition or as an adverb in every dialect and in every specific text including *bitwix(en).*

6. Conclusions

The aim of the present study was to investigate the degree of grammaticalisation of four selected complex adverbs with the prefix *be-*, ME *bi-/be-*, in the Middle English period. The examined words shared some structural, functional, etymological and semantic characteristics and included *behind*, *beneath*, *between* and *betwixt*, i.e., ME *bihīnde(n), binēthe(n), bitwēne* and *bitwix(en)*. Moreover, all analysed complex adverbs originally emerged in the process of grammaticalisation from the preposition and adverb *bī (big)* 'about' developing into the prefix *bi-/be-* and respective adverbs with the originally locative sense. The analysis was conducted on the basis of Middle English prose texts, which are unbiased by some poetic devices and thus closer to the spoken natural language. For that purpose 56 specially selected texts (c. 2.5 million words) from the *Innsbruck Corpus of Middle English Prose* (Markus 2010) were examined. The degree of grammaticalisation was tested on the basis of the proportion between their use with the adverbial and with the prepositional function.

The grammaticalisation of the four examined words, i.e., *bihīnde(n), binēthe(n), bitwēne* and *bitwix(en)* exhibits three different degrees. *Bitwēne* and *bitwix(en)* are similarly highly grammaticalised in both Early and Late Middle English prose. It is manifested by either no cases or only a marginal frequency of their use with the adverbial function in both examined subperiods. *Bihīnde(n)* is less grammaticalised showing the dominating adverbial use in Early Middle English prose, which, however, changes to the prepositional function being employed more frequently than the adverbial one in the Late Middle English prose. ME *binēthe(n)* is the least grammaticalised. It is used as an adverb relatively about twice more frequently than as a preposition in prose representing both Middle English subperiods. Additionally, the scrutiny of every individual text and dialect and the behaviour of the analysed four lexemes there provided insight into some interesting peculiarities concerning the degree of grammaticalisation as viewed from those perspectives. While the degrees of grammaticalisation estimated for *bitwēne* and *bitwix(en)* in Early and Late Middle English are also valid for every dialect and every single analysed text, *bihīnde(n)* and *binēthe(n)* display a somewhat smaller textual and dialectal compliance.

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Appendix

Table 2. *Bihīnde(n)* in Early Middle English prose

Text	Number of all words	Number of *bihīnde(n)*	ADV	PREP
West Midland				
Wohunge of Ure Lauerd	4,090	-	-	-
Seinte Marherete (MS Royal)	8,818	-	-	-
St. Julian (MS Bodley)	7,576	3	2	1
St. Julian (MS Royal)	7,002	1	1	-
Hali Meidenhad (Bodley)	9,193	-	-	-
Hali Meidenhad (MS Titus)	9,238	-	-	-
Hali Meidhad (crit)	9,200	-	-	-
Sawles Warde	4,937	1	1	-
Ancrene Riwle (MS Titus)	62,713	6	5	1
Ancrene Wisse (MS Corp-C)	75,185	9	7	2
St. Katherine (MS Royal)	11,804	-	-	-
Ancrene Riwle (Gon-Ca)	30,591	4	2	2
Seinte Marherete (MS Bodley)	8,877	-	-	-
Southern				
Twelfth-Cent. Homilies (MS Bodley 343)	27,517	-	-	-
History of the Holy Rood-tree	7,456	-	-	-
Ancrene Riwle (MS Nero)	75,407	7	5	2
Old English Homilies of the 12th century (Trinity Coll. Cbr. MS. B. 14.52)	42,304	1	1	-
Kentish				
Twelfth-Cent. Homilies (MS Vespasian)	60,982	-	-	-
Kentish Sermons	3,996	-	-	-
Dan Michel, *Ayenbite of Inwyt, or Remorse of Conscience*	104,128	18	11	7
East Midland				
Vices and Virtues	28,569	-	-	-

Total	599,583	50	35	15

Table 3. *Bihīnde(n)* in Late Middle English prose

Text	Number of all words	Number of *bihīnde(n)*	ADV	PREP
West Midland				
Brut, or *The Chronicles of England*	105,947	2	-	2
	116,492	20	3	17
Three Middle English Sermons (MS Wor F. 10; 2nd and 3rd sermon)	24,408	2	1	1
De Imitatione Christi	49,382	3	1	2
Speculum Sacerdotale	110,513	7	3	4
Southern				
The Book of the Knight of La Tour-Landry	80,078	3	-	3
Two Fifteenth-Century Cookery Books (MS Harley 279)	25,809	5	1	4
Kentish				
Merlin	22,0635	43	26	17
East Midland				
Ancrene Riwle (MS Pepys)	77,272	4	3	1
The Gospel of Nicodemus	13,836	-	-	-
Pepysian Gospel Harmony	40,333	6	3	3
John Metham: *Christmas Day* [1]	592	-	-	-
John Metham: *Christmas Day* [2]	353	-	-	-
Paston Letters	277,954	20	15	5
Fistula in ano	40,066	3	-	3
Adam and Eve	9,058	1	1	-
Richard Misyn: *The Mending of Life*	12,668	-	-	-
Richard Misyn: *The Fire of Love*	51,169	6	6	-

Secreta Secretorum (MS Royal 18.A.7)	16,441	1	1	-
Julian of Norwich: *Revelations of Divine Love* (Shorter Version)	15,151	-	-	-
John Trevisa: *Methodius, The Bygynnyng of the World*	3,674	-	-	-
John Mandeville: *Mandeville's Travels* (MS. Bodl. e Mus. 116)	25,393	2	1	1
Speculum Christiani	31,427	2	1	1
Richard Lavynham: *A Litil Tretys*	12,119	-	-	-
Pater Noster of Richard Ermyte	28,855	-	-	-
John Metham: *Days of the Moon*	2,981	-	-	-
John Metham: *Palmistry*	5,633	2	-	2
	5,374	-	-	-
John Metham: *Physiognomy*	9,144	2	-	2
John Capgrave's *Lives of St. Augustine*	58,585	6	3	3
John Capgrave's *Chronicles, Abbreviation* of	87,590	6	2	4
Cely Letters	90,411	13	3	10
Spheres and Planets, in *The Book of Quintessence*	320	-	-	-
Book of Quintessence	9,830	1	1	-
Secreta Secretorum (MS Lambeth 501)	32,911	5	4	1
Agnus Castus. A Middle English Herbal	27,412	-	-	-
Northern				
Alphabet of Tales	90,250	13	4	9
	90,663	11	2	9
Total	1,900,729	189	85	104

Table 5. *Binēthe(n)* in Early Middle English prose

Text	Number of all words	Number of *binēthe(n)*	ADV	PREP
West Midland				
Wohunge of Ure Lauerd	4,090	-	-	-
Seinte Marherete (MS Royal)	8,818	1	1	-
St. Julian (MS Bodley)	7,576	1	1	-
St. Julian (MS Royal)	7,002	1	1	-
Hali Meidenhad (Bodley)	9,193	-	-	-
Hali Meidenhad (MS Titus)	9,238	-	-	-
Hali Meidhad (crit)	9,200	-	-	-
Sawles Warde	4,937	-	-	-
Ancrene Riwle (MS Titus)	62,713	2	1	1
Ancrene Wisse (MS Corp-C)	75,185	2	1	1
St. Katherine (MS Royal)	11,804	-	-	-
Ancrene Riwle (Gon-Ca)	30,591	1	-	1
Seinte Marherete (MS Bodley)	8,877	1	1	-
Southern				
Twelfth-Cent. Homilies (MS Bodley 343)	27,517	1	-	1
History of the Holy Rood-tree	7,456	-	-	-
Ancrene Riwle (MS Nero)	75,407	2	1	1
Old English Homilies of the 12th century (Trinity Coll. Cbr. MS. B. 14.52)	42,304	2	-	2
Kentish				
Twelfth-Cent. Homilies (MS Vespasian)	60,982	-	-	-
Kentish Sermons	3,996	-	-	-
Dan Michel, *Ayenbite of Inwyt, or Remorse of Conscience*	104,128	10	8	2
East Midland				

Vices and Virtues	28,569	2	2	-
Total	599,583	26	17	9

Table 6. *Binēthe(n)* in Late Middle English prose

Text	**Number of all words**	**Number of *binēthe(n)***	**ADV**	**PREP**
West Midland				
Brut, or *The Chronicles of England*	105,947	-	-	-
	116,492	3	1	2
Three Middle English Sermons (MS Wor F. 10; 2nd and 3rd sermon)	24,408	-	-	-
De Imitatione Christi	49,382	5	4	1
Speculum Sacerdotale	110,513	-	-	-
Southern				
The Book of the Knight of La Tour-Landry	80,078	-	-	-
Two Fifteenth-Century Cookery Books (MS Harley 279)	25,809	4	2	2
Kentish				
Merlin	22,0635	10	6	4
East Midland				
Ancrene Riwle (MS Pepys)	77,272	2	1	1
The Gospel of Nicodemus	13,836	-	-	-
Pepysian Gospel Harmony	40,333	-	-	-
John Metham: *Christmas Day* [1]	592	-	-	-
John Metham: *Christmas Day* [2]	353	-	-	-
Paston Letters	277,954	1	-	1
Fistula in ano	40,066	3	3	-
Adam and Eve	9,058	-	-	-

Richard Misyn: *The Mending of Life*	12,668	-	-	-
Richard Misyn: *The Fire of Love*	51,169	1	1	-
Secreta Secretorum (MS Royal 18.A.7)	16,441	-	-	-
Julian of Norwich: *Revelations of Divine Love* (Shorter Version)	15,151	3	-	3
John Trevisa: *Methodius, The Bygynnyng of the World*	3,674	-	-	-
John Mandeville: *Mandeville's Travels* (MS. Bodl. e Mus. 116)	25,393	-	-	-
Speculum Christiani	31,427	-	-	-
Richard Lavynham: *A Litil Tretys*	12,119	-	-	-
Pater Noster of Richard Ermyte	28,855	-	-	-
John Metham: *Days of the Moon*	2,981	-	-	-
John Metham: *Palmistry*	5,633	-	-	-
	5,374	-	-	-
John Metham: *Physiognomy*	9,144	3	3	-
John Capgrave's *Lives of St. Augustine*	58,585	4	3	1
John Capgrave's *Chronicles, Abbreviation* of	87,590	1	1	-
Cely Letters	90,411	1	-	1
Spheres and Planets, in *The Book of Quintessence*	320	-	-	-
Book of Quintessence	9,830	3	3	-
Secreta Secretorum (MS Lambeth 501)	32,911	2	2	-
Agnus Castus. A Middle English Herbal	27,412	2	2	-
Northern				
Alphabet of Tales	90,250	-	-	-
	90,663	1	1	-
Total	1,900,729	49	33	16

Table 8. *Bitwēne* in Early Middle English prose

Text	Number of all words	Number of *bitwēne*	ADV	PREP
West Midland				
Wohunge of Ure Lauerd	4,090	-	-	-
Seinte Marherete (MS Royal)	8,818	-	-	-
St. Julian (MS Bodley)	7,576	1	-	1
St. Julian (MS Royal)	7,002	-	-	-
Hali Meidenhad (Bodley)	9,193	1	-	1
Hali Meidenhad (MS Titus)	9,238	1	-	1
Hali Meidhad (crit)	9,200	1	-	1
Sawles Warde	4,937	-	-	-
Ancrene Riwle (MS Titus)	62,713	28	1	27
Ancrene Wisse (MS Corp-C)	75,185	31	3	28
St. Katherine (MS Royal)	11,804	1	-	1
Ancrene Riwle (Gon-Ca)	30,591	21	1	20
Seinte Marherete (MS Bodley)	8,877	-	-	-
Southern				
Twelfth-Cent. Homilies (MS Bodley 343)	27,517	3	-	3
History of the Holy Rood-tree	7,456	6	-	6
Ancrene Riwle (MS Nero)	75,407	30	2	28
Old English Homilies of the 12th century (Trinity Coll. Cbr. MS. B. 14.52)	42,304	7	-	7
Kentish				
Twelfth-Cent. Homilies (MS Vespasian)	60,982	7	-	7
Kentish Sermons	3,996	1	-	1
Dan Michel, *Ayenbite of Inwyt, or Remorse of Conscience*	104,128	37	-	37
East Midland				

Vices and Virtues	28,569	5	-	5
Total	599,583	181	7	174

Table 9. *Bitwēne* in Late Middle English prose

Text	**Number of all words**	**Number of *bitwēne***	**ADV**	**PREP**
West Midland				
Brut, or *The Chronicles of England*	105,947	115	-	115
	116,492	126	2	124
Three Middle English Sermons (MS Wor F. 10; 2nd and 3rd sermon)	24,408	-	-	-
De Imitatione Christi	49,382	7	1	6
Speculum Sacerdotale	110,513	24	-	24
Southern				
The Book of the Knight of La Tour-Landry	80,078	32	2	30
Two Fifteenth-Century Cookery Books (MS Harley 279)	25,809	5	-	5
Kentish				
Merlin	22,0635	135	1	134
East Midland				
Ancrene Riwle (MS Pepys)	77,272	26	1	25
The Gospel of Nicodemus	13,836	5	-	5
Pepysian Gospel Harmony	40,333	2	-	2
John Metham: *Christmas Day* [1]	592	-	-	-
John Metham: *Christmas Day* [2]	353	-	-	-
Paston Letters	277,954	91	2	89
Fistula in ano	40,066	1	-	1
Adam and Eve	9,058	2	-	2
Richard Misyn: *The Mending of Life*	12,668	-	-	-

Richard Misyn: *The Fire of Love*	51,169	-	-	-
Secreta Secretorum (MS Royal 18.A.7)	16,441	-	-	-
Julian of Norwich: *Revelations of Divine Love* (Shorter Version)	15,151	-	-	-
John Trevisa: *Methodius, The Bygynnyng of the World*	3,674	-	-	-
John Mandeville: *Mandeville's Travels* (MS. Bodl. e Mus. 116)	25,393	8	-	8
Speculum Christiani	31,427	5	-	5
Richard Lavynham: *A Litil Tretys*	12,119	3	-	3
Pater Noster of Richard Ermyte	28,855	4	-	4
John Metham: *Days of the Moon*	2,981	1	-	1
John Metham: *Palmistry*	5,633	13	-	13
	5,374	13	-	13
John Metham: *Physiognomy*	9,144	6	-	6
John Capgrave's *Lives of St. Augustine*	58,585	-	-	-
John Capgrave's *Chronicles, Abbreviation* of	87,590	-	-	-
Cely Letters	90,411	13	2	11
Spheres and Planets, in *The Book of Quintessence*	320	-	-	-
Book of Quintessence	9,830	1	-	1
Secreta Secretorum (MS Lambeth 501)	32,911	10	-	10
Agnus Castus. A Middle English Herbal	27,412	-	-	-
Northern				
Alphabet of Tales	90,250	-	-	-
	90,663	-	-	-
Total	1,900,729	648	11	637

Table 11. *Bitwix(en)* in Late Middle English prose

Text	Number of all words	Number of *bitwix(en)*	ADV	PREP
West Midland				
Brut, or *The Chronicles of England*	105,947	1	-	1
	116,492	2	-	2
Three Middle English Sermons (MS Wor F. 10; 2nd and 3rd sermon)	24,408	8	-	8
De Imitatione Christi	49,382	-	-	-
Speculum Sacerdotale	110,513	8	-	8
Southern				
The Book of the Knight of La Tour-Landry	80,078	1	-	1
Two Fifteenth-Century Cookery Books (MS Harley 279)	25,809	-	-	-
Kentish				
Merlin	22,0635	-	-	-
East Midland				
Ancrene Riwle (MS Pepys)	77,272	6	-	6
The Gospel of Nicodemus	13,836	3	-	3
Pepysian Gospel Harmony	40,333	3	-	3
John Metham: *Christmas Day* [1]	592	-	-	-
John Metham: *Christmas Day* [2]	353	-	-	-
Paston Letters	277,954	104	1	103
Fistula in ano	40,066	-	-	-
Adam and Eve	9,058	-	-	-
Richard Misyn: *The Mending of Life*	12,668	2	-	2
Richard Misyn: *The Fire of Love*	51,169	14	1	13
Secreta Secretorum (MS Royal 18.A.7)	16,441	1	-	1
Julian of Norwich: *Revelations of Divine Love* (Shorter Version)	15,151	4	-	4

John Trevisa: *Methodius, The Bygynnyng of the World*	3,674	3	1	2
John Mandeville: *Mandeville's Travels* (MS. Bodl. e Mus. 116)	25,393	-	-	-
Speculum Christiani	31,427	-	-	-
Richard Lavynham: *A Litil Tretys*	12,119	2	-	2
Pater Noster of Richard Ermyte	28,855	-	-	-
John Metham: *Days of the Moon*	2,981	-	-	-
John Metham: *Palmistry*	5,633	-	-	-
	5,374	-	-	-
John Metham: *Physiognomy*	9,144	-	-	-
John Capgrave's *Lives of St. Augustine*	58,585	25	1	24
John Capgrave's *Chronicles, Abbreviation* of	87,590	85	-	85
Cely Letters	90,411	25	-	25
Spheres and Planets, in *The Book of Quintessence*	320	-	-	-
Book of Quintessence	9,830	1	-	1
Secreta Secretorum (MS Lambeth 501)	32,911	1	-	1
Agnus Castus. A Middle English Herbal	27,412	-	-	-
Northern				
Alphabet of Tales	90,250	26	-	26
	90,663	15	-	15
Total	1,900,729	340	4	336

THE SEMANTICS OF THE SPANISH ADJECTIVE POSITIONS: A MATTER OF FOCUS

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Abstract
This paper presents a hypothesis about Spanish adjective position that accounts for different occurrences in language use. The hypothesis is based on the idea that the modifier position itself is a meaningful sign and that the meaning of the modifier position is related to focus: the postnominal modifier creates focus, whereas the prenominal modifier does not create focus. Drawing on the analysis of examples from a text corpus, the paper suggests that the proposed meaning of the two positions offers an account of various empirical phenomena. For example, it can explain why some adjectives are normally placed in one of the positions and why some adjectives change meaning according to their position.

Keywords: cognitive linguistics, focus, instructional semantics, Spanish adjective position

1. Introduction

It is a well-known fact that like other Romance languages, the attributive adjective in Spanish may appear after the noun (NA: noches calurosas, 'hot nights') or before the noun (AN: calurosas noches, 'hot nights'), and that post-position is the most common. Many scholars have already addressed this subject and offered useful insights. However, there is no clear consensus on the exact meaning of the two positions themselves, and not everyone ascribes meanings as such to the positions. Based on earlier insights, the aim of this paper is to advocate for a univocal meaning of the two adjective positions that can serve as a starting point for comprehending the use of adjective position in authentic language.[1] The overall hypothesis is that the postnominal modifier position creates focus, whereas the prenominal modifier position does not create focus. The suggested meanings of the two positions predict various empirical phenomena, such as the fact that some adjective types "prefer" one position to the other or that some adjectives acquire a different meaning according to their position. The paper exemplifies the hypothesis through analyses of examples derived from a text corpus.[2]

[1] *Authentic language* refers to written or spoken language used in real situations, in contast to data gained through introspection.

[2] Unless stated otherwise, all examples are taken from CORPES, a database of the Real Academia Española, the official institution responsible for regulating the Spanish language. CORPES is a corpus of contemporary Spanish (2001-2012).

The study is situated within instructional semantics. In this framework, meaning is conceived of as a mental representation that emerges when a linguistic input instructs the addressee to initiate an interpretive process. The two possible positions of the adjective in Spanish are seen as giving different instructions about focus.

2. Instructional semantics

Instructional semantics is based on a cognitive view in which meaning is constructed by individual interlocutors in an interpretive process. This cognitive view is inspired by well-known theories in the field of cognitive linguistics such as Fauconnier (1994), Johnson-Laird (1983), and Langacker (1987, 1991, and 2000). In an instructional semantics terminology, meaning is a mental representation initiated by instructions from language to an addressee. It follows that instructions constitute part of the meaning of linguistic items. The result of the interpretation is the establishment of meaning as output. The term *meaning* thus applies to different levels: it refers both to the semantics of linguistic items as input (the *instructions*) and to the result of the interpretive process as output. In this view, linguistic items are seen as contributing to the interpretive process in different ways depending on whether they are functional or lexical. Whereas lexical items offer instructions for the establishment of a mental representation of the concept that they themselves denote, functional items provide instructions for the interpretation of something distinct from themselves, typically lexemes. An important characteristic of a functional item is that it is univocal: it has one coded meaning (see Thrane 1997 and Thrane 1999). This does not mean, however, that its input cannot lead to different types of output. Linguistic input (the instructions) is combined with information from co-text and context to create meaning, and different final meanings can arise.

In accordance with the framework of instructional semantics, the position of the attributive adjective has a functional instructive meaning by virtue of its syntactic function as a modifier. The modifier provides instructions for the word that fills in the function, in many cases an adjective. This instruction is related to the notion of focus.

3. Other accounts of Spanish adjective position

At a more general level, the paper builds on insights provided by classical linguists such as Bello ([1847] 1988: 179), Ramsey ([1894] 1956: 665), and Salvá ([1931] 1988: 326). With small variations in the wording, they were agreed that an adjective placed before the noun is explicative: it presents a property that is inherent in the meaning of the noun itself. On the other hand, an adjective placed after the noun is specifying: it restricts a property that is not inherent and therefore

has to be specified. This distinction was later applied by Alarcos Llorach (1994: 82). Nevertheless, it is the work carried out by Klein-Andreu (1983), Delbecque (1990), Fant (1990), Matte Bon (1995), and Nølke (1999) that lead more directly to the ideas presented in this paper.[3] According to Klein-Andreu (1983: 150), the postnominal adjective signals contrast, whereas the prenominal adjective signals noncontrast. In the same vein, Fant (1990: 34) suggests that the postnominal adjective means 'look for a significant difference', whereas the prenominal adjective means 'Do not look for any significant difference'. Delbecque's study (1990) deals with both Spanish and French adjective position. She suggests that the variation NA and AN is a matter of focus adjustment and proposes a global analysis in terms of the figure/ground alignment. Similarly, in dealing with the position of the attributive adjective in French, Nølke (1999) suggests that *focus* is the most important factor in the choice of position. Matte Bon (1995: 185) suggests that the postnominal adjective composes new information about the noun, and that this leads to a larger accentuation of the adjective in this position, whereas the prenominal adjective is not new information.

Klein-Andreu (1983: 144) points out that many traditional treatments describe Spanish adjective placement as dependent on the adjective itself. This is also seen in later studies. In their chapter on adjective position, Butt and Benjamin (1988) build upon the basic rule that restrictive adjectives follow the noun, whereas non-restrictive adjectives may precede or follow the noun (1988: 62). RAE (2009: Section 13.13 and 13.14) and Demonte (1999) provide very detailed expositions with a large number of relevant details about different adjective types and their position. In the present paper, it is suggested that the proper meanings of the two positions can explain these details. The paper starts from the idea of Bouchard (1998: 140) that it is not enough to establish a correlation between adjective types and their syntactic distribution (in French); a theory should provide some indication about the reason of the correlation between them. This will be explained in Section 6.

4. Focus

The topic of focus has been approached by researchers working in various linguistic paradigms, from functionalism (see, for example, Halliday 1967; Lambrecht 1994; Dik 1997; Givón 2001) to the government and binding framework (see, for example, Kiss 1998 and Drubig 2003). Also, as pointed out by Erteschik-Shir (2007: 27), focus has been defined in many ways and from several perspectives; semantic, phonological, syntactic, and pragmatic.[4] Important

[3] For a state of the art description, see for example Almela Pérez (2000: 294-295), and Whitley (2002: 231-236), although these are not completely new.

[4] Erteschik-Shir (2007: 27-42) offers a survey of important contributions to focus from the several perspectives. See also Dufter and Jacob (2009b: 3-5).

contributions to the field of focus in Romance language and/or specifically in Spanish are for example Dufter and Jacob (2009a), Dufter and Jacob (2009b), Leonetti and Escandell-Vidal (2009), Leonetti and Escandell-Vidal (2010), Manuel Leonetti (2011) and Ortega-Santos (2016).[5] Ortega-Santos (2016: 1) argues that it is important to study focalization processes because (among other things) "it [the study of focalization] provides a unique perspective on the grammar and (a) the interaction of its various components (e.g., syntax, semantics and phonology), (b) its relation to linguistic (and non-linguistic) context, ..". Despite differences in the theoretical approach, the overall way of conceiving of the notion of *focus* in different approaches is similar. Focus involves highlighting, calling attention to, text elements. The notion falls within the area of information structure and has often been opposed to *topic*. In this sense, topic is related to given (presupposed) information in a sentence, whereas focus is related to new information about the topic. Therefore, focus answers relevant wh-questions (see, for example, Beaudrie 2005). As pointed out by Gundel (1999: 296), however, newness in relation to the topic is not the only reason for calling attention to a constituent. Another reason for calling attention to a constituent could be the intention to contrast it with something else. This has led to two distinct notions of focus in the literature, by Gundel (1999: 295-296) referred to as *semantic focus* and *contrastive focus*. Other terms used are *information gap* and *contrast gap* (Dik 1997: 331), *presentational focus* and *contrastive focus* (Drubig 2003: 2), and *information focus* and *identificational focus* (Kiss 1998: 245). The two interpretations of focus are not exactly the same for all scholars, but they are similar. In this paper, the terminology of Kiss (1998) will be used. According to Kiss (1998: 245),

> An identificational focus represents a subset of the set of contextually or situationally given elements for which the predicate phrase can potentially hold; it is identified as the exhaustive subset of this set for which the predicate phrase actually holds

whereas

> If a sentence part conveys new, nonpresupposed information marked by one or more pitch accents— without expressing exhaustive identification performed on a set of contextually or situationally given entities, it is not an identificational focus but a mere information focus (Kiss (1998: 246)

Sentences (1) and (2) illustrate information focus and identificational focus respectively:

(1) (¿Qué vas a comprar?) Voy a comprar unos pantalones.
'(What are you going to buy?) I'm going to buy a pair of trousers.'

[5] Dufter and Jacob (2009b) e.g. provide a survey of early observations about focus in Romance language studies and of early theories about information structure.

(2) No voy a comprar el jersey, solo los pantalones.
'I'm not going to buy the sweater, only the trousers.'

In (1), the noun phrase *unos pantalones* ('a pair of trousers') is introduced as a new constituent in the sentence that answers the wh-question about the topic. The constituent is not identified as an exhaustive subset of contextually or situationally given elements for which the predicate phrase can potentially hold. In (2), on the other hand, the constituent *los pantalones* ('the trousers') is identified as the exhaustive subset of the set of contextually or situationally given elements for which the predicate phrase can potentially hold. In this case, *el jersey* ('the sweater') and *los pantalones* ('the trousers') constitute the contextually given elements. The adverb *solo* ('only') brings out the noun phrase *los pantalones* as a constituent chosen among, in this case, two possible constituents in a buying situation. In this example, *solo* is a *focalizer*. The set consists of other possible elements from a paradigm to which the constituent belongs. In (2), the focalized constituent *los pantalones* is taken from a set consisting of members (the sweater and the trousers) of the paradigm CLOTHES CONSIDERED TO BUY. Whereas informational focus obviously cannot be on the topic in a sentence, identificational focus can. This has also been put forward in Nølke (2006: 72). It is due to the fact that the speaker may have other reasons for calling attention to a constituent than newness, such as contrasting (topic) elements in a sentence.

Kiss (1998), Drubig (2003), and Beaudrie (2005) suggest that identificational focus in different languages is subject to parametric variation: it allows a contrastive reading or an exhaustive reading. Focus is [+ contrastive] if a set consisting of a limited group of elements is known to the participants in the discourse (see example 2 and 3). In this case, the identification of a subset of the given set also identifies the contrasting complementary subset (Kiss 1998: 267). The focus is [+ exhaustive] (see example 4) if the set of entities is open. In this case, the identification of the subset does not result in the delineation of a complementary subset with clearly identifiable elements (Kiss 1998: 268). The following examples with the adverb *solamente* as a focalizer are inspired by Kiss (1998: 268):

(3) (Me han dicho que has invitado a Juan y María.) – No, solamente he invitado a Juan.
'(I have been told that you have invited Juan and María.) – No, I have only invited Juan'.
(4) (Me han dicho que has invitado a mucha gente.) – No, solamente he invitado a Juan.
'(I have been told that you have invited a lot of people.) – No, I have only invited Juan.'

In (3), the focalized element *Juan* is taken from a set consisting of specific members (two individuals called Juan and María), whereas in (4) the set does not consist of clearly identifiable elements, but is an open set of members. Blok and Eberle (1999) suggest the term *alternative* for elements that are left behind; in (3) the alternative is the person called María, and in (4) it is other people. The

examples illustrate that the same sentence can give rise to different interpretations of alternatives according to the co-text/context.

Identificational focus can be created on the basis of lexical or functional elements. This gives rise to the terms *lexical focalizers* and *functional focalizers*. In (2) − (4), the adverbs *solo* and *solamente* are lexical focalizers. Examples of functional focalizers in Spanish are cleft sentences and explicit pronoun subjects (Spanish belongs to the pro-drop languages. This means that a sentence normally does not need an explicit subject, since the verbal morpheme marks the subject; *implicit subject*).[6] Above, the notion of focus has been related to the sentential level. However, according to Nølke (2006: 76-77), there can also be a focus within a NP, i.e. at a lower level than that of the sentence. Nølke uses the terms *major focus* and *minor focus*, respectively. This idea will be elaborated in the next section.

(Identificational) focus is a widespread category in Spanish that is coded in various lexical and functional linguistic items. As maintained in this paper, focus is also related to adjective position in Spanish. It is suggested that the post-position of a modifier in Spanish is an example of a functional focalizing construction.

5. Focus in the 'adjective-noun' and 'noun-adjective' patterns

The various focalizers share a more abstract instructional meaning as they all instruct the addressee to establish a mental model in which something is highlighted. In addition to the more abstract instructional meaning, each focalizer has its own specific instructional meaning. With regard to Spanish adjective position, this additional meaning is related to the modifier function. It is the contention of this paper that an explanation of the two possible positions of the attributive adjective must be sought in the meaning of the modifier function itself, whether the function is provided by an adjective or by some other linguistic expression. Other types of linguistic material than adjectives can be used as modifiers, such as participles, prepositional phrases, and relative clauses. In addition to its functional meaning as a modifier, the attributive adjective has a descriptive meaning due to its status as a lexical word class. Different types of material provide different semantic nuances, but the functional meaning of the modifier is constant. This meaning is an instruction to an addressee to modify the part of a noun phrase that is within its scope with the meaning of the modifier. However, since the modifier function in Spanish takes two different positions, there must be an additional meaning. It is this meaning that can be found in the notion of focus. So, the post-position instructs the addressee to focus the adjective. The pre-position, on the other hand, instructs the addressee not to focus the

[6] For more details and examples of focus constructions in Spanish, see Leonetti and Escandell-Vidal (2009; 2010), Leonetti (2011) and Ortega-Santos (2016). Ortega-Santos (2016: 17-81) provides the state of the art in research on focalization processes in Spanish.

adjective. The suggested idea that the meanings of the two positions are always the same, clashes with a point made by Delbecque (1990: 369 − 370):

> the postponed adjective enters figure-status, which it shares with the noun it modifies; moreover, it stands out as *focus*. This last characteristic is not present when NA ordering is prototypical, since in the latter case the adjective occupies its natural position, and is, therefore, not likely to receive the focus of attention.

Post-position occurs most frequently and it is the unmarked form (RAE 2009: 990) in spite of the fact that this position is the one endowed with a specific meaning. In other words, it can be argued that this is a case where focus is related to an unmarked form. This could be explained by the fact that the attributive adjective is a modifier. The basic function of a modifier is to provide more information about an entity.[7] The suggested instructional meanings ascribed to the two positions enter as an underlying explanation of the examples in this paper in interplay with co- and context in each concrete example.

In the examples of focus provided in Section 4, the focused constituents are constructed by NPs, whereas the focused constituents in relation to adjective position are constructed by modifiers. In other words, the focalized constituent is a subconstituent in a NP and therefore has a different status in the whole sentence than a NP. As pointed out in Section 4, Nølke (2006: 76 − 77) distinguishes between major and minor focus. He suggests that NPs constitute scopes of minor focus. This means that in addition to the major focus in a whole sentence, there can be a minor focus within a NP. This is illustrated in (5) − (6).

(5) La puerta del patio se abre y aparece [una mujer con un VESTIDO [BLANCO$_{FOC}$]] $_{FOCINF}$. NA[8,9]
'The door into the yard opens and a woman in a white dress appears.'

(6) Aunque el alimento elegido puede variar mucho de mujer a mujer, la mayoría prefiere [los ALIMENTOS [DULCES]$_{FOC}$ antes que los [salados]$_{FOC}$]$_{FOCINF}$. NA
'Although the chosen food can vary a lot from one woman to another, the majority prefers sweet food to salty food.'

According to Nølke (1999: 109; 2006: 77), postnominal adjectives in French are focalized alone or together with the noun. In (5) − (6) the adjectives are focalized alone AND together with the noun and other elements. There is information focus within the whole sentence, and the postnominal adjectives have minor focus

[7] Leonetti and Escandell-Vidal (2009; 2010) and Leonetti (2011) relate fronting of constituents with focus. Nevertheless, they do not treat the position of modifiers/adjectives, but full NPs. Therefore, I will not compare their claims with mine.

[8] The abbreviations 'NA' and 'AN' are used at the end of each example to indicate the internal order between the noun and the adjective in the specific examples.

[9] The analyzed noun phrases are in small caps.

within the NP's.[10] This is due to its function as a modifier.[11] In (5), the focus on *blanco* ('white') is information focus, i.e. the same as the full NP. The full NP as a whole is new to the addressee, but, in addition, inside the NP the adjective has a specifying function as a modifier that only concerns the noun and makes it more possible to identity the dress. It is more precise to say 'white dress' than only 'dress'. In Section 4, it was indicated that only identificational focus represents a subset of contextually or situationally given elements. This is not the case within the NP *vestido blanco* ('white dress') as the dress is not highlighted between other dresses or clothes. However, I will argue that because of the paradigmatic and specifying nature of modifiers, also when the adjective forms part of an information focus, other alternatives are present, just in a more indirect way. If it is specified that a dress is white, this is because it could have had another color as well. In other words, 'white' is chosen from the paradigm COLORS.

In (6) the whole phrase *los alimentos dulces antes que los salados* ('sweet food to salty food') has information focus, but in addition, *los alimentos dulces* ('sweet food') is contrasted to *los salados* ('salty food'), that is identificational focus [+ contrastive]. From the illustrations *[DULCES]*$_{FOC}$ and *[SALADOS]*$_{FOC}$ it seems that focus only extends to the adjectives, which is not the case, as it is the entities denoted by the full nouns which are identified as subsets of a set consisting of the two members, which are now known to the participants in the discourse, and contrasted to each other. However, the focus stems from the instruction from the position of the adjectives, which is illustrated in this way.[12] What happens is that identificational focus always extends over the full NP. As Kiss (1998: 248) points out, identificational focus can never be a subconstituent. In (6), the entity *food* is the same in the contrasted elements, and the meaning of the adjective is what constructs the subset. According to Nølke (2006: 65), focus is the result of an interpretation that takes place in the moment of utterance. In (6), other inputs for the interpretation than the one of focus are the verb *preferir* ('to prefer') and the presence of *antes que los salados* ('to salty food'). The inputs together lead to the result of the interpretation (the output), which is identificational focus with [+ contrastive]. In (7), the same interpretation as in (6) is possible.

(7) María Sofía se puso el VESTIDO ROSA. NA
'María Sofía put on the pink dress.'

This interpretation is activated if a set of various dresses are present in the domain of discourse, and the pink one is chosen among this set. However, it is also possible that the set in the domain of discourse consists of different types of

[10] "Sweet food" and "salty food" have not been mentioned in the previous text and is therefore new to the addressee.

[11] As the topic of this paper is the position of the adjective, I will not address other possible focus constituents in the sentences.

[12] In the second element, the noun is not expressed in the Spanish example, but it is semantically implied.

clothing, such as the pink dress and a green skirt. In this case, the interpretation would be that the pink dressed was chosen rather than the green skirt. In this case, the full NPs construct the subset because the types of entities are different. Consequently, the result of the interpretation of the same sentence can be different in different contexts, as in (7). According to the hypothesis put forward, the input from the postnominal adjective is an instruction to the addressee to modify the noun and focalize the lexical meaning of the adjective. This input, which is always the same, interacts with other input in the sentence in question. In the interpretation of (7), the co-text does not suffice. In this case, it is necessary to know the context to achieve the final meaning; that is whether the alternatives are other dresses or other clothing.

According to Nølke (1999: 109; 2006: 77), prenominal adjectives in French are either not focalized (8) or are focalized together with the noun (9). This idea is illustrated in the following Spanish examples:

(8) Este LARGO AMOR con Willie ha sido un regalo en los años maduros de mi existencia. AN
'This long-lasting love with Willie has been a gift in the mature years of my life.'

(9) Bueno, la verdad es que me siento un poco cansada esta noche, Richard. Ha sido [un LARGO DÍA]$_{FOC}$ y tengo mucho en qué pensar. AN
'The thing is that I feel rather tired tonight, Richard. It has been a long day and I have had a lot to think about.'

In (8), the NP is not focalized. The instruction not to focus it means that there is no minor focus within the NP. The long-lasting love is already known to the participants and it is the topic of the sentence. In (9), the prenominal adjective is not focalized by its position either, but it forms part of the focalized NP (information focus) as a subconstituent. In both (5) and (9), the full NP is focalized, but whereas in (5), the adjective is focalized with the aim of specifying, i.e. providing additional information about the referent of the NP to make it easier to identify it, in (9) a reason for not focalizing the adjective could be because the property is expected.

The prenominal position is an obvious choice when the adjective denotes a property that is already known to the addressee, because, in many cases, there is no need to highlight the property. In (10) the adjective *blanca* describes an inherent property as is forms part of the intension of the lexeme NIEVE and is therefore already known to the addressee.

(10) Pero alrededor solo veían la BLANCA NIEVE. AN
'But all they could see around them was the white snow.

blanca ('white') forms part of information focus together with the noun, but the instruction not to focus it means that there is no minor focus within the NP. Nevertheless, the inherent property for some reason is extracted from the noun. This gives as output a static description evoking a snow-covered landscape.

Adjectives in postnominal position that describes an inherent property do, however, occur:

(11) Abrió la puerta de la cocina y salió al patio casi ciega por la NIEVE BLANCA. NA
'She opened the door to the kitchen and went into the yard almost blinded by the white snow.
(12) La reina contempló el contraste de LA SANGRE ROJA sobre LA NIEVE BLANCA y suspiró.[13] NA, NA
'The queen contemplated the contrast presented by the red blood on the white snow and sighed.'

In (11) depicts a change of state in the subject because of the whiteness of the snow. This causal relation established by means of the preposition *por* ('by') would still hold without the adjective, as the property of whites of snow is already known. Adding and focusing *blanca* ('white') creates a contrast between the outside luminosity and the relative darkness inside the house. In (12), the reason for focusing the adjectives is to create contrastive focus on the NPs: the white snow is contrasted to the red blood ([+ contrastive]).

Sometimes the output resulting from the instruction from the prenominal positioning is the interpretation of a common feature of a whole group:

(13) Quizá por ello, y por las LARGAS DISCUSIONES que mantuvimos en esa época, Uriarte me ha ya pedido que escriba esta recensión. AN
(14) 'Perhaps because of that and because of the long discussions that we had at the time, Uriarte has asked me to write this review.'

The prenominal position of *largas* prevents the possible interpretation of a subset consisting of long discussions contrasted to another one consisting of short discussion (identificational [+ contrastive] focus). This interpretation would be possible if the adjective was focused. Thereby the addressee is indirectly told that the individuals' discussions were generally long. However, the adjective can also be found in postnominal position without major difference (15):

(15) Quizá por ello, y por las DISCUSIONES LARGAS que mantuvimos en esa época, Uriarte me ha ya pedido que escriba esta recensión. NA
'Perhaps because of that and because of the long discussions that we had at the time, Uriarte has asked me to write this review.'

(15) is a constructed example to illustrate that there is not always a major difference between pre-and postnominal position. In (15), contrast to specific short discussions is not created either. Instead, what the postnominal adjective does is to highlight the property of length, only indirectly opposing it to shortness.

[13] This example stems from a Spanish translation of Snow White and the Seven Dwarfs.

6. The relation between adjective position and adjective type

The innate semantics of some adjectives affects its suitability for prenominal or postnominal position. For example, some adjectives are always (or almost always) in postnominal position, whereas others are common in both positions. The focus hypothesis will also provide the basis for an explanation of the group of adjectives that normally change meaning according to their position.

6.1. Specific adjectives and general adjectives

A common distinction is often made between relational adjectives, such as *industrial* ('industrial') and *cubano* ('Cuban'), and qualitative adjectives, such as *grande* ('big') and *redondo* ('round') (see, for example, Demonte 1999: 137 − 139 and RAE 2009: 914), but depending on the topic, other distinctions are also relevant. It is the contention of this paper that the distinctive feature, that is relevant to adjective position and focus is specificity. This idea is inspired by Nølke (1999). Adjectives contain minimal semantic features called sems, which are more or less specific. Depending on the sems, adjectives can be classified as *specific adjectives* or *general adjectives*, but they can also contain both types of sems. Specific adjectives have a precise meaning, independent of the nouns that they modify, whereas the meaning of general adjectives is less precise and depends on the meaning of the nouns that they modify. This distinction is more or less equivalent to the distinction between *categorematic* and *syncategorematic adjectives* (see, for example, Delbecque, 1990), and the distinction between *intersective adjectives* and *non-intersectives adjectives* (see, for example, Demonte 1999: 144, and RAE 2009: 925). Relational adjectives are specific as they denote a specific class to which a noun belongs. Examples are *nuclear* ('nuclear'), *agrícola* ('agricultural'), *irlandés* ('Irish') and *musulmán* ('Muslim'). Among the qualitative adjectives are both specific adjectives, such as *triangular* ('triangular') and *amarillo* ('yellow') and general adjectives, such as *bueno* ('good') and *grande* ('big'). The focus hypothesis predicts the following:

- Adjectives with very specific sems tend to be found in postnominal position because their meaning makes them adequate for specifying or classifying an entity. They have a strong distinctive force.
- In prenominal position, adjectives with specific sems lose the sems, have their sems weakened, or lose their distinctive force.
- Adjectives with few specific sems or none often occur in prenominal position.
- Adjectives with general sems gain specific sems or gain distinctive force in postnominal position.

6.1.1. Specific adjectives

The normal position of relational adjectives is the postnominal one as in (16) − (19).

(16) Además estalló la CRISIS ECONÓMICA. NA
'Moreover, the economic crisis started.'

(17) Aparte de la facilidad para llegar nos ha interesado su SITUACIÓN GEOGRÁFICA. NA
'Apart from the access, we are interested in its geographical location.'

(18) ¿Cree que es elegante la MUJER ESPAÑOLA? 'Do you think that Spanish women are elegant?' NA

(19) Nos asesoran en la PRODUCCIÓN INDUSTRIAL. NA
'They advise us with regard to industrial production.'

In spite of their specific sems, adjectives that denote geography (20) and religion (21) sometimes do occur in prenominal position:

(20) ... aunque también esperaba conseguir el carné de manera fácil y, de paso, evitar a mi regreso EL MUY ESPAÑOL TRANCE DE ESTUDIAR COMO UN OPOSITOR, SUSPENDER COMO UN RETRASADO Y PAGAR COMO UN MILLONARIO... AN – AN
'Although I also hoped to get my driver's license in an easy way and at the same time avoid reverting to the very Spanish trait of studying like a maniac, failing like a retarded person, and paying like a millionaire.'

(21) Y algunos años después su CATÓLICA ESPOSA lo sorprende fumando a escondidas en su casa de Ayamonte.[14] AN
'And a few years later his Catholic wife surprises him smoking secretly in their house in Ayamonte.'

In (20) and (21), the adjectives lose pure relational meaning and gain some qualitative meaning. As Delbecque (1990: 378) points out, "when a normally postponed adjective appears in prenominal position, it takes on the AN ordering"; it is […] interpreted as though it were an adjective of another class. Demonte (1999: 151) and RAE (2009: 988) refer to this phenomenon as *recategorization*. In (20), the presence of the adverb of degree *muy* implies a variation between "more or less" which is not compatible with a meaning of pure relation (as in for example *un pasaporte español,* 'a Spanish passport'). What is meant here is that studying like a maniac etc. is very common behavior in Spain. Likewise, in (21), the meaning of religious affiliation is strongly reduced; instead, the adjective involves connotations of properties related to Catholicism: more specifically, it involves austerity, which makes it worse that the individual in question is discovered smoking. Examples like these have a subjective tone and often, as pointed out by RAE (2009: 988), an ironic ring. It is, however, also possible to

[14] This example was found in the predecessor of Corpus del Español del Siglo XXI (CORPES), CREA. Corpus de referencia del español actual.

establish a qualitative meaning with a postponed adjective; the difference is that if the adjective is preponed, it happens for sure.

6.1.2. General adjectives

The behavior of general adjectives is not precisely opposite to the way in which specific adjectives behave. General adjectives commonly occur in both positions. The most common general adjectives are *bueno*, *malo*, *grande* and *pequeño*, which are all qualitative. Just as some specific adjectives can lose a specific feature when they are placed out of focus, general adjectives can gain a specific feature when they are placed in focus position. This is partly in agreement with Demonte (1999: 198), who suggests that a group of Spanish adjectives uses the two positions to distinguish an intersective meaning from a non-intersective meaning. [15] Demonte (1999: 199) illustrates her point with the following examples:

(22) Gran jefe – Jefe grande AN, NA
'Great boss' – 'big/large boss'
(23) Buen amigo – Amigo bueno AN, NA
'Good friend' – 'Good friend'

In (22), the meaning of *grande* in prenominal position depends on the noun and is "big" in the sense of "great", i.e. the person is great as a boss. By way of contrast, *grande* in the postnominal position does not depend on the noun so specifically, but on the general class to which the boss belongs, that is a big/large person. In the same vein, in (23), *bueno* in prenominal position means "good as a friend", whereas in postnominal position *bueno* means "a good person". It is, however, important to mention that these are default meanings. The following authentic examples with co-text illustrate the meanings described by Demonte.

(24) Todo a la salud de tu padre, que es un GRAN JEFE. AN
'All the best to your father's health; he is a great boss.'
(25) El Ministro no es un cualquiera, es un jefe, un JEFE GRANDE del Partido, y él vino a hablarnos, a nosotros, pobres campesinos. NA
'The Minister is not just anyone; he is the big boss from the Party, and he came to talk to us, to us, the poor farmers.'
(26) Qué simpatico que era Herrera. Y un BUEN AMIGO, además. AN
'Herrera was so sweet. And a good friend too.'
(27) Mi abuela también decía: "un AMIGO BUENO y fuerte, llega más allá de la muerte". NA
'My grandmother used to say: a good and strong friend outlives death.'

[15] Among her examples are *verdadero*, *bueno*, *grande*, *nuevo*, *pobre*, *viejo*, *raro* y *real*. In this paper, however, a distinction is made within this group between general adjectives whose more precise meaning depends on a noun, and adjectives whose meaning is more or less fixed by their position. The adjectives in this group are *cierto*, *nuevo*, *viejo*, *antiguo* and *pobre*. This group is discussed in the next section.

The different interpretations can be explained on the basis of the focus hypothesis: when the adjective is in postnominal position and thereby in focus position, it gains a specific sem and enhances a more precise meaning which is not dependent on the specific meaning of the noun. By way of contrast, the prenominal adjective does not have this sem and acquires its more precise meaning from the noun in question. Examples (28) to (31) illustrate the same phenomenon:

(28) Trae en la mano derecha una MALETA PEQUEÑA. NA
'He has a small suitcase in his right hand'.
(29) La chica entró en una HABITACIÓN GRANDE. NA
'The girl entered a big room.'
(30) ... me comentaba el sábado un empresario de origen paquistaní pero pasaporte británico que tiene un PEQUEÑO NEGOCIO y se gana bien la vida. AN
'Last Saturday, a Pakistani businessman with a British Passport told me that he has a small business and that he earns well.'
(31) Su obra obtuvo una GRAN RESONANCIA en los años setenta. AN
'His work attained great resonance in the 1970s.'

The meaning of the postnominal *pequeño* and *grande* is specific as they refer to physical magnitude (the meaning is concrete), whereas the prenominal adjectives do not have these specific features; instead, they have a metaphorical meaning defined by the noun. These meanings may not exclusively stem from position, as they are obviously also in agreement with the nouns. The corpus also contains examples of a general adjective with a more concrete and specific meaning in prenominal position (32 – 33), just as there are examples of general adjectives with a metaphorical meaning in postnominal position (34 − 35):

(32) El padre de Bradman se ganaba la vida como carpintero en un PEQUEÑO PUEBLO de Nueva Gales del Sur, a unos cien kilómetros de Sydney. AN
'Bradman's father earned his living as a carpenter in a small village in New South Wales, about a 100 km from Sidney.'
(33) El joven que nos acompañaba nos abrió camino hasta una GRAN HABITACIÓN llena de mesas en deorden. AN
'The young man who accompanied us showed us into a big room full of tables which had been left pell-mell.'
(34) Ob viamente es difícil predecir cuándo un PROBLEMA PEQUEÑO es señal de algo grande. NA
'It is obviously difficult to tell when a small problem is a sign of something bigger.'
(35) Y es que Pipe para esa época era un HOMBRE GRANDE dentro del mundo del narcotráfico. NA
'And this is because Pipe was a big man in the world of drug smuggling at the time.'

In (32) and (33), *pequeño* and *grande* can only be understood in a concrete, specific way due to the co-text. In (32), the noun *pueblo* can only be small in a concrete way. In isolation, *gran habitación* (33) could be understood as an *impressive room*, but here the rest of the noun phrase rules out this understanding. The reason for placing the adjective in prenominal position in (32) is probably not to emphasize the property of being small: it is an inherent or at least expected

property of a village to be small. In (33), one possible explanation is similar: it is expected that a room can be big. Another possibility is that the speaker does not want to emphasize the magnitude, as there is another property that he or she wishes to emphasize - in this case, that the room was untidy. In (34), *pequeño* is not interpreted as 'little' in a physical way because of the noun *problema*. In this example, no specific sem is gained; instead the focus position is used to create a contrast between *pequeño* and *grande* later in the sentence. In (35), *grande* is understood metaphorically. In this example, the speaker wishes to emphasize Pipe's importance. The various examples show that the final meaning is a result of the interplay between the instructions implied by the positions and the cotext and context, for example, the meaning of the adjective and noun. This illustrates a crucial point put forward by Klein-Andreu (1983: passim): different meanings of the adjectives are just different interpretations of a single meaning in different contextual conditions.

6.2. Adjectives with two meanings

Spanish grammars normally describe a special group of adjectives whose meanings are said to change according to their position before or after a noun. The adjectives listed are not exactly the same in every grammar book, but the following are often mentioned: *nuevo* (in postnominal position: 'brand-new', in prenominal position: "recently-arrived"), *antiguo* (in postnominal position: 'old/antique/ancient', in prenominal position: "former/previous"), *distinto* (in postnominal position: 'different', in prenominal position: "several/another"), *cierto* (in postnominal position: 'certain; sure/true', in prenominal position: "particular; certain/one"), *puro* (in postnominal position: 'clean', in prenominal position: "sheer") and *pobre* (in postnominal position: 'poor; not rich', in prenominal position: "poor; miserable"). According to Nølke (1999: 155 − 156), this phenomenon in French can also be explained in terms of the relation between focus and sems. In postnominal position, these adjectives "keep" their specific sems, whereas they lose them in prenominal position:[16]

(36) Montando una CASA NUEVA estaba resultando una tarea más absorbente de lo que había calculado. NA
'Building a new house turned out to be a much more demanding job that anticipated.

(37) El NUEVO ALUMNO parecía, efectivamente, un par de años mayor que el resto de los muchachos. AN
'As a matter of fact, the new student looked a couple of years older than the rest of the kids.

(38) Estábamos en otro planeta. Un UNIVERSO DISTINTO nos acogía. NA
'We were in another planet. A different universe welcomed us.'

[16] The use of the phrasing 'to keep sems' is based on the fact that post-position, as earlier stated, is the unmarked position.

(39) En los DISTINTOS GRUPOS DE DISCUSIÓN, los padres participantes aparecieron muy sensibles al problema del consumo juvenil de drogas. AN
'In the different discussion groups, the parents who participated were very sensitive with respect to the problem of the consumption of drugs among youngster.'[17]

The postnominal *nuevo*, for example, has a classifying value in (36) which is opposed to the meaning of "old", whereas the prenominal *nuevo* has a temporal value in (37) and is thus in opposition to "earlier". It is only in (36) that *nuevo* classifies the noun as such, i.e. ascribes a proper quality to it. Another example is *distinto* in postnominal position, which means that something has other properties than something else (38). This is a classifying meaning, whereas its meaning in prenominal position is 'another' (39), that is, a type of temporal value. Another example is *pobre*. Nølke (1999: 156) suggests a semantic analysis of the French equivalent *pauvre*. According to this analysis, it is possible that *pauvre* contains a general sem that indicates a situation of absence and another more specific sem that indicates that the object of absence is material. This is the key to the meaning of *pauvre/pobre* in prenominal position: the adjective loses the specific sem and contains only the general sem of absence. The meaning of *pobre* in prenominal position can be derived from this: *un pobre hombre* ('a poor man') is a man who is without something (friends, love, health, work etc.). This meaning can be considered as an affective meaning.

(40) Aumentará la deuda de los PAÍSES POBRES. NA
'The debt in poor countries will increase.'
(41) El POBRE HOMBRE dice que ha sido visitado por una santa. AN
'The poor man says that a saint has been to see him.'

Nuevo and *antiguo* can be explained in the same way: they may contain a more general sem of novelty and a more specific sem that indicates date. The adjectives in this group lose their qualitative meaning in prenominal position. However, in line with the idea put forward by Klein-Andreu (1983: passim), that the different meanings of these adjectives are just different interpretations, the two different meanings of these adjectives are not fixed lexical a priori meanings, but interpretations of a single meaning in different contextual conditions. In the words of Klein-Andreu (1983: 167), "Yet, here again, it is simply not true that *antiguo* means 'former' in pronominal position, and 'old' in postnominal postion". It is more that the meanings of the two positions favor a certain meaning. In (42), for example, the meaning of the postnominal *nuevo* is the temporal meaning, that is, the meaning normally associated with the prenominal position:

[17] It is worth mentioning that it is more frequent to find the plural form of distinto in prenominal position because of its meaning.

(42) Miré por primera vez la casa con su farmacia antigua en los bajos y sí, ese lugar de color avellana era el HOGAR NUEVO. NA
'I saw, for the first time, the house with the old pharmacy in the ground floor, and, yes, this hazel-colored place was the new home.'

The speaker in this example uses the focus position with another aim - to highlight that the home is in fact his or her home now. Again, the different examples illustrate that the final meaning results from the interplay between the instructions derived from the position, on the one hand, and, on the other, the co-text and context.

7. Concluding remarks

The analysis of the examples presented in this paper supports the idea of a univocal meaning of the two adjective positions. It also supports the idea that the meaning of the positions can be explained with appeal to focus. There is a basic principle in linguistics: before suggesting new meanings or functions, one should look for what already exists. If a meaning or function already exists in a language or across languages, it is very possible that it plays a role in other linguistic elements. Focus is a category that can be identified in various linguistic words and constructions in Spanish. It is coded, not only lexically, but also structurally. The analysis of different examples has illustrated that this notion (+/- focus) functions as a univocal meaning of the two adjective positions that is able to explain various empirical phenomena in language use, such as the tendency of specific adjective types to appear in one or the other of the two possible positions.

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THE CHALLENGE OF TERMINOGRAPHIC GAPS IN TRANSLATION: A TEXT-BASED APPROACH PUT TO PRACTICE

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Abstract
The issue of terminographic gaps in specialized discourses has always concerned the researchers and readers alike. However, due to the interlingual nature of such a technical issue, the need for interdisciplinary collaboration between translation and terminography seems to be in prospect. For such a reciprocation scheme to come into practical effect, the present study has aimed to conduct a translational-terminographic concerto by putting a specialized English text to the test of Persian translation. This has been done to answer the question if a translator is required to provide for any terminological gap once all attempts at finding the corresponding terminological items have failed. In this pursuit, certain workable criteria for terminographic proposition via translation have been discussed. As such, the practical phase of this study concerns itself with addressing the issue of Persian terminological gaps in a language-related metadiscoursal field and consequently detecting the problem zones of non-equivalence in a specialised text carefully selected for translation. Ultimately, a list of Persian terminological items constructed on the basis of the proposed translational-cum-terminographical scheme is compiled to address the identified terminological gaps in the target metadiscourse under study.

Keywords: Specialized discourse, technical term, terminological gap, terminography, translation

1. Introduction

Special discourses are perceived to cross-lingually suffer from the problem of a lack of one-to-one correspondence with regard to their specialized terminology. This problem turns to be more acute in scientific discourses where a higher load of technical items makes cross-discoursal communication considerably more

demanding. Such a dearth in terminological equivalence has led to a belief in the non-universality of technical language, what is rephrased by Montgomery (2010: 303) to be a condition where 'there is no one-to-one correspondence among different tongues when they express scientific information'. The field of Persian scientific discourses is no exception in this regard, that's why an exclusive emphasis has more frequently been laid on the necessity of doing terminographic work by both official and unofficial bodies. Ironically enough, such a persistent emphasis exclusively concerns the field of language-related scientific discourses and the need for giving more specialized dimensions to the terminological work in this area. In what follows, yet, we first go through a brief review of the dominant trend of scientific attitudes towards terminographic work in the field of science-related Persian discourses.

2. Scientific 'word-selection': a persian outlook

As a matter of research findings, the field of Persian scientific terminology reflects a critical need for cross-lingual terminographic work. Therefore, efforts have been put by individual scholars and official institutions in trying to make up for such terminological demands. Sadeghi (1991) appears to recognize that the efforts made by the official word formation assemblies such as Farhangestaan [Iran's official language institution][1] and the unofficial organizations and groups as well as specialists in various scientific fields have all prompted the Persian language to assume the responsibility of 'facing the modern civilization, sciences, and technology' (p. 12). The name of Farhangestan being identified with word-selection endeavour [apart from the fact that the proper terminology to be used here is term-selection rather than word-selection that is the translation of vaaj-e gozini in Persian], efforts are also being made to announce and highlight the identity-changing of such an 'endeavour' into becoming a science, after two decades of trial and error. In this regard, mention is also made of aiming to make the Persian language the language of science by resorting to out-sourcing as a suitable strategy to seek the cooperation of scientific and academic bodies in accomplishing the goal of 'word-selection' (Haddad-e Adel 2008).

In the same pursuit and from a more practical standpoint, reference can also be made to a technological attitude displayed towards the work of 'word-selection' as such and viewing the scientific discourses as the industrial sites of 'massive' word production (Mansuri, 2003). It is in the same pursuit, too, that Kaafi (1995), in a study that aims to provide a systematized set of rules for Persian word-selection, tries to draw scientific principles of lexical formation and selection out of studying a selection of 'words' proposed by the scientists of both past and present eras. Besides, seeing the work of word-selection as a knot-loosening or

[1] Farhangestan: Cultural Institution of Persian Language and Literature's Council of Lexical Selection / Academy of Persian Language and Literature (APLL)

problem-solving action and viewing 'rationalization' as the cornerstone based on which the problem can be solved, Nematzadeh (2000) provides a typology of 'rationals' for the job of word-selection. The individual *vs* collective dichotomy is the primary classification she provides based on whether the job of 'word-selection' is done individually or collectively.

The traces of lexical selection in Persian can still further be sought among other scholars from other dialects of Iranian origin as well as other Persian-speaking nations outside Iran. Though the number of such studies is few, a case in point can be the short descriptive account provided by Yamin (2004) which simply points to and typifies the still sporadic and inharmonious attempts at 'word-selection' desultorily carried out here and there in Afghanistan. It is due to this state of desultoriness that Yamin calls for the necessity of establishing an official body to undertake and systematize the 'word-selection' work; thus settling such existing discordancy through the cooperation provided by Iran's Farhangestan of Persian Language and Literature.

The critical attitudes to addressing the so-called issue of 'word-selection' in Persian, typically referred to above, are remarkable in their own right. However, such concerted efforts have been carried out only through the magnifying glass of linguists, Persian literature academicians, and lexicographers. Ironically enough, what are lacking in this field are the translationally-offered contributions and the alternative perspective the translation and the current generation of educated translation practitioners can bring to this field, both in theory and practice. What's more, such a lacking in Persian terminographic work seems to notably exist in such specific language-related discourses as the field of 'lexical databases'. That's why in the practical phase of this study the terminological gaps of a metadiscoursal text related to lexical databases has been brought under investigation through translation; what is to be tackled with more elaborately by adopting a text-based translational approach.

3. Research questions

Viewing the issue of Persian terminological proposition as a compelling need, this study has addressed the vital necessity for adopting a translational approach towards the issue of terminographical work. As such, the present article in its theoretical phase has planned to investigate the frequently-ignored topic of the reciprocity of translational and terminographical work in the field of Persian discourses. In order for the theoretical assumptions of this study to gain more of an interdisciplinary momentum, an initial discussion on certain pertinent conceptions from both fields of translation and terminography is initiated. To further such a theoretical position towards assuming a practical dimension, an experiential scheme has been planned on the basis of a case study involving the translation of a carefully-selected piece of discourse originally written in English. It should be pinpointed that the choice of the meta-discursive text under study for

translation into Persian has been carried out based on the judgmental attitudes of certain Persian subject-field experts. Apart from the theoretical concerns, there is also a two-fold reason why a meta-text has been selected for translation here. Firstly, in trying to identify and in favour of verifying the inherent terminological needs of a metadiscoursal text of the type: This will have practical bearings with regard to what criteria are needed for terminographic proposition by a translator. Secondly, in attempting to draw on the rich relevant terminological content such a metatext will appear to hold within itself with regard to the its related terminological field: This will attest the hypothesis of the practicality of adopting a text-based translational approach to terminographic proposition.

As such, and within a practical sphere, taking into consideration the case of interlingual terminographic proposition, the main concern of this study is not what the consulted terminographic sources provide in terms of equivalent-finding for discoursal translation, but what they practically do NOT. In theoretical terms, therefore, the main question the present paper tries to answer will be: Is there any need for a translator to provide for the TL terminological gaps during the translation of a specialized text? The answer to this question is provided during and after the completion of the translation work. Accordingly, if the answer to this first question is positive, a related question will be to what part-of-the-speech category/categories the probable terminological gaps belong. In addition, a further theoretical bone of contention will concern the question of what pertinent translational-cum-terminological criteria or requirements will matter most with regard to promoting the terminographical work for the technical discourse(s). Ultimately, the major goal the presnt study is going to accomplish in its last practical phase is to provide for the terminological gaps detected via translating the carefully-selected piece of metatext. On that account, the ultimate list of the proposed Persian terminology is planned to be proposed to fill the existing terminological gaps that are left un-identified and un-treated in the related metadicourse under study. As such, it must be said that any attempt at trying to resolve the above-cited hypothetical questions will seek to confirm the assumption that the more specialized a text, the bigger the challenge it will constitute in terms of providing for the terminological shortfalls in the target discourse.

4. Procedure

After selecting the metatext to be worked on through experts' judgment, the overall number of lexical items existing in the text was determined. To be able to calculate and compare the related lexicological and terminological frequency scores, the number of terminological items existing in the text under study have also been quantified by three experts. The quantification of the terminological items was carried out on the basis of the technical definition of term/terminology provided by Cabré (1999). The process of quantifying the terminological gaps was conducted through putting the text under study to the test of translation. During

the translation process, the terminographic consultations were sought in a range of primary and secondary sources. The consulted sources have included the most pertinent bilingual dictionaries as well as the subject-field experts. The consultation process as such has placed any of such sources at the prime position of a reference point in the process of ad-hoc construction of the terminological 'comparables', to underline Ricoeur's (2006) translational formula of 'constructing comparable'. It was only after the completion of the translational process that the terminological gaps existing in the metadiscourse under study were identified. However, having not arrived at any working equivalent for the terminological gaps detected, the study entered into its next-to-last practical stage, that is the proposition of the target terminology on the basis of a translationally-supported terminographically-oriented approach to be discussed later in this article. As the last procedural step, the terminographic items constructed and proposed for the lacking terminology were put together to make out a glossary of proposed items to be communicated to the pertinent bodies. This ultimate stage will accredit the last stage in Cabré's ad-hoc search process referred to later in the *section 6* of this article.

As such the implemented procedure has turned to bring together major related formula from translation, i.e. Ricoeur's 'constructing comparables', and termniography, i.e. Cabré's 'ad-hoc search process', while having an eye to certain issues contributing to the construction of corresponding terminology, i.e. morphological correspondence and technical suggestivity, to be explained further in this article.

4.1. Procedural justifications

Meta-discourse: A Translational Medium

From the translational-cum-terminographical standpoint foregrounded in this study, the construction of the corresponding terminographic items for the target discourse will follow the translation of a specialized text or piece of discourse. As such, the translation of the source text is the key to the existence of certain terminographic gaps in the target discourse. Consequently, the text to be translated is the very site wherein the terminological gaps in need of terminological innovation are identified and verified in the receptor discourse. Thus, for a practical give-and-take to be ensured between the translation and terminography, the mediatory role of the source text to be translated should be taken into account.

Seeking recourse to the text/discourse as the subdomain of the context, assertion should be made that the translator in carrying out his/her translational role does not move from the word to the sentence, to the text, but conversely: absorbing the wider dimensions of the spirit of a discourse type, the translator descends from the whole text down to the sentence towards the word (see Ricoeur 2006: 27). In this manner, the selected source text appears to avail the practicing

translator with the contextualized concepts for which the target terminological items are to be provided. As such, the translation-oriented lexicological/terminological innovations can be viewed as examples of 'neosemantic forms', to use Augustyn's (2013) terminology, that are guided by and introduced in context. Therefore, viewed from a semantico-syntactic point of view, the idea of translational-cum-terminographic work can as well bear special relevance to Augustyn's emphasis on context-prone terminography.

Moreover, from a terminological point of view, what rises to give a fresh momentum to the translational prominence of 'text' as such is the emphatic terminographic salience given to 'terms' as 'discourse units' by Cabré (2010). Wherever there is a dearth of discourse on a subject area, she maintains, then the *translated text(s)* can be used as *terminological source(s)*. Such a reciprocal relationship between translation and terminography with the centrality of a text as an interactive medium can be outlined as follows:

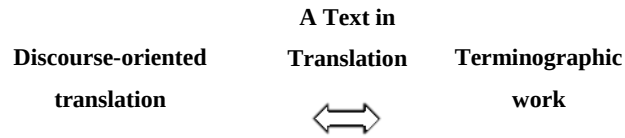


Figure 1. The reciprocal relationship between discourse-oriented translation and terminographic work.

It was on this ground, therefore, that a metadiscoursal text, that is Fellbaum's (1998) basic paper on the key aspects of WordNet lexical database(s) - itself selected through experts' judgment - was put to the test of translation. Thus, the technical text at hand which counted to 4869 words was hypothesized to pose certain equivalence problems in translation due to its containing of a heavy load of technical content, i.e. specialized terminology; hence providing the translation-based indication as to where the terminological innovations need to be made.

4.2. Text as supplier of terminological gaps

Referring to 'term' as a designatory lexical item, Cabré (1999: 35) describes a *term* as a unit with 'a set of systematic linguistic characteristics' which is used in a special domain, as compared with a *word* which has the same linguistic characteristics except that it refers to an element in reality. In this regard, it can be concluded that a 'term' is a lexical item which is used in a specialized discourse just to give a designation/name to a phenomenon or a special category in a special subfield. In terms of the word-term dichotomy referred to above and in reference to Cabré's (1999) schematic mapping wherein a language is shown to embody the

narrower domains of specialized languages, the coverage domain of a specialized discourse can be illustrated more vividly. It must be said that each text as a subset of a specialized discourse domain shares features with other texts, while differing with them in certain other features. Obviously, terminological contents are themselves the points which constitute a portion of such shared and differing features. This idea has been illustrated more clearly in Figure 2, what illustrates the coverage-domain of a specialized discourse, itself entailing the sub-domains of certain intersecting related texts.

In translation of a specialized text, it is possible that any attempt at providing the corresponding target item(s) for certain terminological item(s) − via consulting the related specialized sources − may fail. Consequently, such presumed terminological gaps are those that are to be filled by the translator by resorting to a translationally-supported terminography-oriented approach. To illustrate the coverage domain of a specialized discourse domain and its related texts as well as the probable terminological gaps, this study proposes the Figure 2, below.

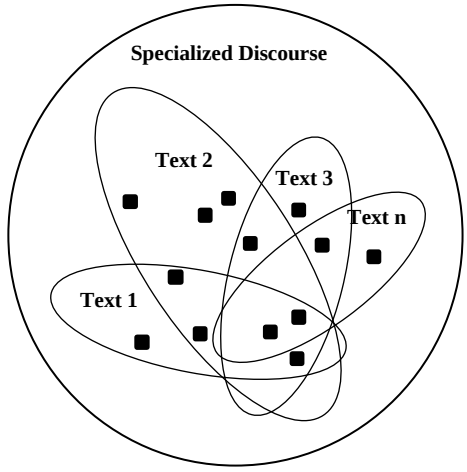


Figure 2. Coverage domain of a Specialized discourse domain and the related texts with terminological gaps

In a broader sense, if it can be pre-assumed that there may probably exist some terminological gaps in a specialized discourse domain, it can be concluded that certain number of such slots will expose themselves in the translation of a related text − illustrated by black squares in Figure 2. Therefore, it is to be said that any translated text is one text among the many in a specialized discourse domain which might probably make its own contribution to its related discursive domain.

5. Dealing with terminographic gaps

5.1. Ad-hoc construction via ad-hoc search

In trying to address the translational challenge of terminological gaps, the translational trial to be conducted not only is a means to investigate the predicted results for the present study, but also is to offer practical bearings for certain translational and terminographical theories. Remarkable among such benefiting viewpoints, one can first and foremost point to the ideal position taken by Ricoeur who voices fervent hope in favor of the fact that it is upon the translation and the translator to provide for the *comparable equivalence*. Cherishing a long tradition of pro-equivalence endeavour, Ricoeur (2006: 18, 22) shows a promising avenue in prospect where he maintains that although the destiny of translation appears to be 'inscribed in the long litany of 'despite everything'', the 'equivalence' is still to be sought for. Further in his discussion on translation, Ricoeur (2006) proposes the theme of *constructing the comparables* as a formula to be applied to the translation of a text or a piece of discourse in an attempt to solve 'the mystery of equivalence by constructing it'. Straightforwardly showing such a prospective path, he thus rephrases his constructive notion as 'the production of equivalence through translation' (p. 35). Looking at the findings of this study in the mirror of Ricoeur's prospective conception, it can be asserted that the problem of terminographical gaps in specialized translation far from being an insurmountable obstacle can usher the theoreticians and practitioners alike into believing in the necessity of terminographic work in the process of translation where the need arises.

From a terminographic point of view, however, the need for carrying out such a compensatory term-providing plan, as previously stated, is justified by Cabré's introduction of the strategic notion of *ad-hoc search*. The situation in which an *ad-hoc search* is required to be done is identified by Cabré (1999: 152) as follows:

> By ad-hoc search, as opposed to systematic search, we mean work on an isolated term or a limited set of terms in a single special subject. This approach to work is usually the result of a query that a user addresses to a terminological service. (p. 152)

It is in dealing with the same self-explanatory, yet practically undervalued, relevance [and viewing *terminology* as a more specialized sub-area of lexical designation] that Cabré (2010) stipulates that terminology is considered as a problem-solving tool in the hand of a user, here a translator. In Cabré's view, also, documents in translation can be viewed as sources from which terms are extracted, wherever no original texts on a special subject exists in the target language. This confirms the procedural scheme proposed by the present study based on which the translated text is viewed as the specialized site wherein the terminological gaps in the target discourse are located.

As a final point of procedural justification, it can further be pinpointed that the tangible theoretical link which tends to collect the two disciplines is provided by those scholars who emphasize the necessity for the co-operation between the translators and lexicographers/terminographers as well as the prospective go-togetherness of the findings of translation and lexicography/terminography as two distinct, yet related, disciplines. The confirmatory ground for such a pragmatic compromise to occur is to be sought in the assertions made by such scholars as Hartmann (2007) who view the bilingual lexicography as a concerted effort made as the result of the close collaboration between acts of translating and dictionary-making. In this view, Hartman sees bilingual dictionaries as 'a repository of the collective equations established by generations of 'translating lexicographers'' (2007: 18). In the same vein, mention can be made of the emphasis placed by Burkhanov (1998) on the recurring notion of 'translation equivalent', a key notion which appears to fairly straddle with both the translational and lexicographic/terminographic ends. In this regard, the notion of 'translation equivalent' appears to denote 'a category of primary importance for both translation theory and translation lexicography [as well as *translation terminography* as this study aims to investigate]' (p. 249). For that reason and by implication, viewing the issue of Persian *terminological proposition* as such, this article has been an attempt to bring closer the prospective notions of constructing comparables and ad-hoc terminolographic work in the light of viewing the translation and terminography as two reciprocal endeavours.

5.2. Providing for terminographic gaps

In trying to deal with the challenge of Persian terminographic gaps and providing for the target terminology, the procedural formula to adopt has been Cabré's (1999) proposed *ad-hoc search* plan. According to Cabré's formula, in case where the problem of non-existence of some term or confusion resulting from equivalence disparity occurs, the translator should follow the procedural method below:

- analyze the case
- consult the material
- consult subject experts, if necessary
- make a proposal
- provide a provisional response
- communicate the proposal to the pertinent bodies. (1999: 157)

Accordingly, in the last practical phase of the present study and in trying to provide the terminographic proposals for the translated text at hand, the above procedure has been followed. Below, we go through the details of applying the translationally-sustained terminographically-oriented process to the case at hand, that is the technical metatext on the key aspects of WordNet lexical database(s). In this stage, this study aims to identify and verify the existence of terminological

equivalence gaps between English, the ST language, and Persian, the TT language. Needless to say, the detected terminological gaps are suggestive of the existence of the same terminological gaps in the Persian metadiscourse of lexical database(s) that need to be made up for in the final stage of terminographic construction.

6. The case study

Metadiscourse on lexical databases

Parting away from the theoretical issues, we now look into the explicit details of terminological gaps in the metadiscourse of Persian lexical database(s). As discussed above, a metadiscoursal text, i.e. Fellbaum's (1998) basic paper on the key aspects of WordNet lexical database(s), was selected for translation in the first practical stage of this study. Practically, the aim of detecting the terminological gaps in the metadicourse of Persian lexical databases was realized through translating the selected text. In so doing, as a procedural prelude, the technical definition of term/terminology provided by Cabré (1999) was firstly used to differentiate term(s), i.e. technical items(s), from general word(s) existing in the text. The concepts of 'word' and 'term' are technically differentiated and defined by Cabré (1999):

> A word is a unit described by a set of systematic linguistic characteristics and has the property of referring to an element in reality. A term is a unit with similar linguistic characteristics used in a special domain. From this standpoint, a word of a special subject field would be a term (p. 35).

On this account, it was through adopting a translational approach towards the metatext under study and consequently consulting the equivalent-providing sources mentioned above that the terminological gaps in the metadiscourse under study were detected, their category identified, and their quantity determined. The sources consulted were Dictionary of Linguistics and Related Sciences (1992), Descriptive Dictionary of Semantics (2006), and the subject-field expert(s). It was hypothesized that the results of this stage would provide the necessary materials for carrying out the subsequent phase of constructing the comparable terminography. This is the core of the practical phase of the present study, yet the next section will bring together and explain some related issues in 'terminographic construction' and highlight certain criteria of relevance in this regard.

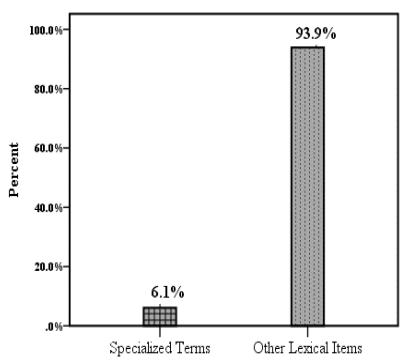
Following the procedural requirement as explained above, the overall terminology existing in the metadiscourse under study were recognized and quantified on the basis of experts' judgement, three experts, while taking into account Cabré's provided definition. The average list of terminological enumeration mounted to 297 items. In the final rendition, the results of ad-hoc

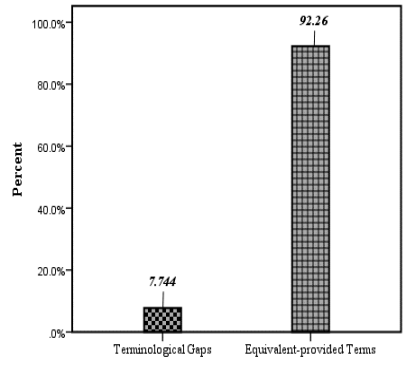
search for the terminology lacking in the consulted sources mounted to 23 items out of the total 297 terms in the text under translation. The twenty-three detected items were considered as points of terminographical gaps (Table 1).

Table 1. Total counts for word, term, and terminological gaps

ITEM	Total Count
Words	4859
Terms	297
Terminological Gaps	23

In what follows, the graphic description of the results of the translational approach to terminographic proposition for the discourse of Persian lexical database(s) is provided. It is to be restated that in the process of translationally-sustained terminographic work, certain terms applied in the opted-for text are considered as the *source terms*, while the equivalents proposed based on them are to be known as *target terms*. Accepting that the terms are but specialized lexical items, the overall percentage values based on the frequency facts determined for the specialized *vs* unspecialized lexical items, as provided in Table 1, are shown in the Graph 1. It must be said that the specialized or terminological items counting to 297 in number are themselves a portion of the total count of the lexical items in the text. As shown in percentage terms, specialized terms make up a reasonable percentage of 6.1 % within the overall percentage of lexical items included in the text under translation. However, it is in Graph 2, that the percentage of source terminology that are in want of corresponding TL terms are provided, what is mounting to 23 items in table 1.

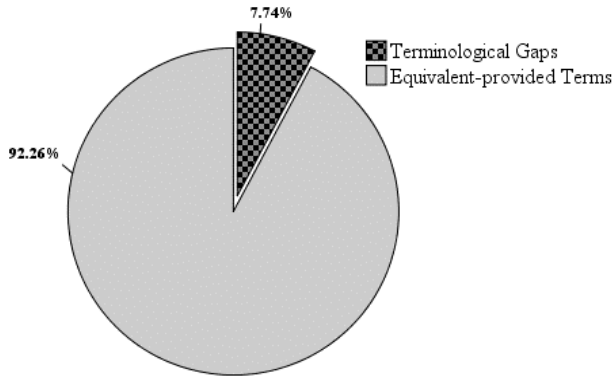




Graph 1 (Left). Overall percentage of terminological items within other lexical items
Graph 2 (Right). Overall percentage of terminological gaps vs terminological non-gaps

The percentage value for the terminological gaps, as it can be seen, is 7.744. It is to be mentioned that the terminology in need of terminographic proposition, or in translational sense the terminological gaps, form a portion of the overall

specialized items included in the source text. A more vivid picture of the overall percentage of terminographic gaps detected is displayed in the Graph 3 – the slice cut out – where the remaining section of the pie-chart graph covers the terminological items for which corresponding TL terms have been provided in the related sources.



Graph 3. Overall percentage of terminological gaps within other lexical items (Pie-chart graph)

In this regard, mention can be made of the terminological gaps for such items as *synset*/*synonym set*, *concordance*, *superordinate*, *tagging*, *meronymy*, *troponymy*, *manner-of relation*, *barbell model*, *lexical entailment*, *middle alternation* … . What these graphs logically imply is that in translating a specialized text, after every attempt at equivalent-finding, in and through the related specialized sources, has failed, such target terminological gaps are to be provided for. Practically, such a lacking state is to be compensated for via a translational scheme in which the work terminographic innovation is a locus of attention.

6.1. Terminographic proposition: equivalence issues

'Morphological correspondence'

The issue of equivalence has proved to be a knotty matter which has afflicted the debates on translation for so long. The extent of such controversy over lexical equivalence is so wide that Hermans, as referred to by Schäffner (2004:1255), appears to foreground the issue of *in-equivalence* or 'difference' over *equivalence* in translational ventures. In translational terms, a *text-wise* attitude towards terminographical provision adopted in this study can particularly be seen in terms of the formal correspondence vs textual equivalence dichotomy proposed by Catford. According to Catford (1965: 27), the *formal-correspondence* conception of equivalence refers to 'any TL category (unit, class, structure, element of

structure, etc.) which can be said to occupy, as nearly as possible, the "same" place in the "economy" of the TL as the given SL category occupies in the SL'. This differs from the *textual-equivalence* conception which concerns any portion of TL text as the equivalent of a given portion of SL text. Based on the latter view, the equivalence perceived as such involves the relations which exist between specific ST-TT pairs with an eye to Saussure's *parole*, and not with languages compared and described as systems (Hatim and Munday 2004). However, the present approach, while giving the primacy to text as the semantic field wherein terms as discursive items appear, does not part from − and in fact foregrounds − the idea of formal correspondence from a morphological perspective. Regarding the fact that what we see as terms, and not words, in scientific discourse shows relatively less semantic variability across the different texts within a specialized field, this very idea of morphological correspondence finds a more justificatory ground. Viewed as such, the notion of terminological proposition based on morphological correspondence can be seen as a practical compromise to achieve fair consistency between the source term and target term to be proposed on the one hand, and the target term proposed as a common technical element to be applied by various target texts within a specialized discursive field on the other.

'Technical suggestivity'

In terminographical terms, this idea of formal consistency appears to be in essential accord with Cabré's (1999: 194) special emphasis on the discursive necessity for 'communication without ambiguity', a condition which requires of 'each designation to correspond to a single concept', while requiring of each concept to be designated only by 'a single term'. Placing stress on the semantic practicality of utilizing target morphological components similar to those used in the morphological make-up of the source-text items, it can be stated that each 'single term' in this sense can be seen as a 'telling' textual component worked in the grand structure of its related scientific discourse. This is to be followed by the notion of *technical suggestivity* in this study which places a due demand on any proposed target term to retain a proportionate technical sense for its associated discourse. It is nearly within the same perspective that Mehrpooya and Nowroozzadeh (2013: 406), looking at technical metaphors as the 'windows worked in the grand scientific edifice' of specialized discourse, remind us of the economic proposition such discursive components can provide the users with, what is sometimes expressible by perhaps paragraph-long chains of words. This also tallies with Johnson's (1992) concern over not to propose those terms from which the 'technical details' have been pushed away; what might lead to a 'mannered' use of jargon items that are mimetically utilized without being truly understood by their end-users.

Seen this way, the notions of 'morphological correpondence' and 'technical suggestivity' have been placed at the core of terminographic proposition in the sense discussed here in this study. Thus, it can be seen that a special emphasis

falls upon the necessity of selecting as closest meaning-bearing morphological components as possible. Being placed in the structure of a proposed term, the relavant corresponding morpheme(s) might give the related end-users a subtle hint of what the proposed technical term, in its total morphological make-up, is to be suggestive of. As such, a morphological congruity with the structural make-up of any source item and its technical bearing(s) should be retained and wrought out within the target terminographic item as well; while taking into consideration the morphological possibilities of the target language.

Parting away from discussing the basic notions of morphological correspondence and technical suggestivity, both associated with the work of terminographic proposition, we now go through the list of the Persian terminology proposed for the metadiscourse of lexical databases.

6.2. Target terminology constructed

Ultimate list to be proposed

In fine, by virtue of adopting a translational approach towards a carefully-selected text, i.e. Fellbaum's paper on WordNet discourse, and drawing on the existing terminographic gaps in the translated text as well as the related Persian metadiscourse, a sample list of Persian terminographical proposals in the form of a *glossary* was proposed. Triggered by the direct relevance of the idea of *constructing comparables* proposed by Ricoeur (2006), it is further to be noted that in such proposing the target terminology, the above-discussed criteria, i.e. 'morphological correspondence' and 'technical suggestivity', have been applied in go-togetherness with Cabré's formula of ad-hoc search. As a last step, the ultimate list of the proposed Persian terminology to fill the detected terminological gaps related to the metadiscourse of Persian lexical database(s) is included here (In the table, 'G' stands for *gloss;* the morphemic-glosses translinearly correspond with the morphological order of proposed Persian terms):

Table 2. List of proposed terminology

Terminology: Nouns		**Terminology: Nominal Phrases**			
Source term & page no. in text	**Target term proposed**	**Source term & page no. in text**	**Target perm proposed**	**Source term & page no. in text**	**Target term Proposed**
1. Synset (p. 210)	معنارشت/ هم-رشت G: set-meaning / set-syn	**1. Synonym set** (p. 210)	رشته‌ی هم‌معنایی G: synonymy of-set رشته‌وند معنایی G: hood-meaning bond-set	**11. Middle alternation** (p. 215)	واگزینی میانجی/هم-واگزینی میانجی G: middle of-alternation/ middle of-alternation-co
2. Hyponym(s) (p. 210)	فرونام/زیرواژه G: name-below/ word-under	**2. IS-A relation** (p. 210)	پیوند هست-یک G: a-is of-relation	**12. Hierar-chical structure** (p. 215)	ساختار پایگانی G: hood-hierarchy of-structure

Terminology: Nouns		Terminology: Nominal Phrases			
Source term & page no. in text	**Target term proposed**	**Source term & page no. in text**	**Target perm proposed**	**Source term & page no. in text**	**Target term Proposed**
3. Hyponymy (p. 210)	فرو-نامی/زیرواژگی G: hood-name-blow/ hood-word-under	**3. Part-whole relation** (p. 210)	پیوند خرد-کلان G: whole-part of-relation	**13. Semantic concordance** (p. 217)	هم‌وندگی چمینه/ هم‌تارگی چمینه/ هم‌تارِگی معنایی G: related-sense of-hood-string-con/ hood-sense of-hood-cord-co/ hood-meaning of-hood-cord-co
4. Super-ordinate (p. 210)	ابرزده/ اَبَرپایه G: ordinate-super / rank-super	**4. Super-ordinate relationship** (p. 210)	پیوند ابرزدگی/ پیوند اَبَرپایگی G: hood-ordinate-super of-relation / hood-rank-super of-relation		
5. Merony-my (p. 210)	پاره‌نامی/بخش-واژگی G: hood-name-piece/ hood-word-part	**5. Direct antonymy** (p. 212)	پادنامی سربه-سر/ پادواژگی سربه‌سر G: end-to-end hood-name-anti/ end-to-end hood-word-anti		
6. Collocate* (*The term *collocate* is the basis for proposing the term *collocation* (p. 210)	همآیه G: comer-co (collocation: هم‌آیگی)	**6. Manner-of relation** (p. 213)	پیوند تایی-از/ پیوند رویی-از G: of-a-fold of-relation/ of-a-manner of-relation		
7. Ambiguity (pp. 211-12)	چندرانگی/دورانگی G: hood-drawing-several / hood-drawing-bi	**7. Barbell model** (p. 212-13)	مدل گوی‌اگوی G: ball-to-ball of-model* (*Persian barbells have two balls at each end)		
8. Troponymy (p. 213)	تا-نامی/تاواژگی G: hood-name-fold/ hood-word-fold	**8. Lexical entailment** (p. 214)	دربرگیرشِ واژگانی/ بَرگیرشِ واژگانی G: lexical of-involvement-in/ lexical of-involvement		
9. Polysemy (p. 214)	چندچَمِگی* G: hood-sense-several (*chæm[~sēma]: sense)	**9. Backward presupposition** (p. 214)	پیش‌انگارشِ پس‌رو G: backward of-supposition-pre		
10. Poly-sem(s) (p. 214)	چندچَمه G: sense-several	**10. Unilateral relation** (p. 214)	پیوند تک-سویه/پیوند یک-سویه G: directional-single of-relation/ directional-one of-relation		

Total: 23

[Note: Persian terminology are proposed by A. Mehrpooya]

6.3. Implications and findings

A practically significant finding of the present research relates to the need for assuming a terminographic side to technical translation where the ideal of providing the corresponding target item for the source item is in prospect. This

point is attested by the results obtained from the initial practical stage of this study; that is the results related to the existence of a considerable number of terminolographical gaps/slots in the consulted sources and consequently the target metadiscourse under study. As a logical consequence, where the existence of certain terminographic gaps is detected and verified in the target specialized discourse, terminographic proposition seems to be an essential phase in the process of translating the specialized text or piece of discourse. Therefore, though at a micro-level of discourse, the results of the present research appear to view as vital the necessity for recognizing a terminographic side to translation. This in itself can be regarded to be one of the major practical implications the present research might turn to carry for the pertinent bodies.

What can be mentioned as a further finding of the present study is the fact that it is solely the terminographical gaps in the noun or nominal category which is observed to be of high frequency in translating the opted-for text. The high frequency of nominal terminographical gaps attests to the designatory nature of such terminological entities. In other words, this finding is suggestive of the terminological primacy of nominal form over other forms in such inequivalence prone discourses. This duly points to the fact that among the terminological units used in special fields, 'those of nominal category with referential and denominative value are the prototypical terms' (Cabré, 2010: 358). This might also be confirmed by the emphasis laid by Cabré (1999) on 'the priority of the concept over the designation' in the field of terminology as compared to lexicology where the reverse is the case. In this regard, Cabré asserts:

> The aim of terminographers is to assign names to concepts; i.e. they move from the concept to the term (an onomasiological process). By contrast, lexicographers start with the word − the dictionary entry − and characterize it functionally and semantically; i.e., they move from the word to the concept, precisely in the opposite direction (a semasiological process). (1999: 7-8)

Furthermore, suffice to say that the resulting list of the terminological items proposed and the details related to each item are planned to be submitted to Farhangestan/Cultural Institution of Persian Language and Literature's Council of Lexical Selection and other related unofficial institutes. This way, it can be said that such a translational-cum-terminographic approach in its ultimate phase will endeavor to issue a call for more collaboration to be fostered between subject-field institutional bodies and translating researchers.

6.5. Limitations

Though the emphasis given in this study is on the necessity of resorting to terminographic work in the process of technical translation, one major limitation imposed on this study is that not every translator, due to the restricting constraints of the work environment or needed aptitude, has enough time and capacity to give to terminographic work as such. Moreover, the final terminographical items proposed might be suggestive of a certain degree of subjectivity being contained in their construction, what might diminish their acceptability in the eyes of the end-users as such. In addition, the terminographic proposals probably might bear and breed a sense of unfamiliarity in the target end-users. Consequently, the translationally-sustained terminographic work may face some limitation in terms of whether the items proposed might gain the common currency within the target discourse and among the ultimate discourse-users. This fact in itself will make communicative demands on the specialized discourse community using the ultimate terminographic items, at least in the initial phases of their proposition. Furthermore, this state of probable unwelcomeness might discourage a translator of specialized discourse from turning to adopt such a strategic approach in making up for the terminographic gaps, and might make him/her turn to using less initiative alternatives such as terminological borrowing, paraphrasing, etc.

7. Conclusion

An alternative perspective to address the challenge of probable terminographic gaps which might exist within any specialized discourse can be offered by adopting a translational approach. Putting it another way, translating a text can provide the authorities with a practically authentic path as to how and where to detect the probable terminological gaps in the target specialized discourse. To investigate this claim, the present study tried to conduct an experiment in which the goal of discourse-oriented terminographic work is carried out via English-Persian translation. The justification behind this practical venture brings into horizon a course of action which fosters a more cooperative initiative between translation and terminography as two distinct yet interrelated disciplines. This frame of reference in itself will pave the ground for a posture of reciprocity to take shape between the two disciplines as regards the discoursal field of Persian lexical database(s). Therefore, it must be said that the locus of attention in this study is to develop a more workable solution for filling the translationally-detected terminographic gaps. The credence for such a strategic solution, in theoretical terms, lies in going beyond a mere cross-lexical approach towards adopting a cross-textual method that is augmented by a discourse-oriented outlook in translation. The ultimate output of applying such a reciprocation method will be, and in this particular case has been, an ultimate list of terminographical proposals for the special subfield under translation. This is to keep up with the final goal

expressed in Ricoeur's (2006: 37) statement that: 'In the end [,] the construction of the comparable expresses itself in the construction of a glossary.' Therefore, the end-result of applying such an ad-hoc method for construction of translation equivalents will be the proposition of certain terminological items in the related subfield, however small in scale it turns to be. With regard to the resulting list of terminographic gaps in the case under study, what appears to be notable is the high frequency of *noun* or *nominal form* over other lexical forms. This point in itself appears to give credence to Cabré's (2010) statement regarding the prototypicality of terms of nominal category with regard to the referential value. For such a practical outcome to find solid grounds in translational and linguistic studies, the equivalence issues of *morphological correspondence* and *technical suggestivity* were underlined, each of which are to be met as best as possible in proposing any terminological item, while taking into account the lexico-semantic potentials of the target language. In turn, the overall results of the approach adopted in the present study might hold practical bearings and confirmatory implications for the prospective affiliation of the two theoretical notions of 'constructing comparables' (Ricoeur, 2006) and 'ad-hoc searches' (Cabré, 1999), proposed in translation and terminography respectively. This way the ad-hoc construction of terminological comparables is seen as a probable subsequent stage to the translation process in trying to provide for the un-provided target terminology. Prospectively, though the performance of such a role in the present study has been examined at micro-discourse level, the significance of its effect can be hypothesized to acquire wider dimensions for such prospective macro-scale projects as specialized dictionary compilations and other related material development plans.

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