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Accentual and Final Lengthening of Dutch Learners of English

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Abstract

In the present study lengthening in L1 Dutch and L2 English was explored. The first purpose was to examine how Dutch speakers of L2 English differing in levels of proficiency produce accentual and final lengthening in English. The second purpose was to investigate whether any influence of L2 English on L1 Dutch was evident in the production of lengthening. The participants were undergraduates at Utrecht University; half of them were majored in English and half of them had a major other than English. The production of accentual and final lengthening in sentence-initial and -final position was investigated, taking into account the syllable structure (CVC or CV) of the target words. Building on previous research, the first hypothesis was that proficient L2 English speakers were more native-like in the production of lengthening in English than those with an intermediate level of proficiency. The results confirmed this hypothesis as in sentence-final position the proficient speakers produced longer durations of both accented and unaccented CVC and CV words compared to the less proficient speakers. The second hypothesis predicted that the proficient group would increase the contrast between English and Dutch, whereas the intermediate group was expected to show convergence of Dutch and English values. The two proficiency groups were found to differ only in the production of the CV syllable structure in sentence-initial position where the less proficient speakers produced a longer duration than the proficient speakers, partially confirming H2. The findings of this study extend our knowledge of bidirectional influence at the suprasegmental level of prosody and provides new insights into lengthening in L2 Dutch and English, especially concerning level of proficiency in L2.

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1. Introduction

Much attention has been given to the influence of speakers' first language (L1) on their second language (L2) in research on second language acquisition (SLA). Pavlenko (2000) described this influence as "L1 transfer" (p. 175). The terms "transfer" and "influence" will be used interchangeably in this study. Studies in bilingualism mainly investigated the influence of early bilinguals' L2 on their L1 but have not focused on late L2 learners (Pavlenko, 2000). Bilingual language acquisition or simultaneous bilingualism refers to acquisition of two languages simultaneously in early infancy (Fromkin, Rodman and Hyams, 2011). The term SLA has been used to indicate the acquisition of a second language after having acquired the first language, and will be adopted in the current study.

For the reason that many people are bilingual or speak more than one language, both L1 influence and, to a lesser extent, L2 influence are becoming an increasingly important area in linguistic research. Since "adults' L1 systems are neither stable nor impermeable" (Pavlenko, 2000, p. 178), exploring bi-directionality is essential in SLA research. Interesting factors to investigate are possible constraints on L2 transfer, such as level of proficiency (i.e. amount of training in L2) and learning context (Pavlenko, 2000). Pavlenko provided evidence for the following language domains in which L2 influence may take place: "phonology, morphosyntax, lexis, semantics, pragmatics, rhetoric, and conceptual representations" (2000, p. 176). L2 influence in this substantial number of language domains cannot be ignored and therefore calls for further investigation. Phonology, which is concerned with both segmental and suprasegmental aspect of the sound system of language, will be the subject of investigation in the present study. This study focuses on the suprasegmental feature length.

Previous studies focused primarily on L2 acquisition of segmental features of speech (at the phoneme level) instead of dealing with suprasegmentals (e.g. intonation and speech rhythm). Suprasegmentals were found to influence learners' L2 (e.g. Li and Post, 2014). As L2 acquisition of prosody was described as "one of the main stumbling blocks for L2 learners" affecting non-proficient as well as advanced learners (Li and Post, 2014, p. 224), this domain in SLA requires more attention.

In a study of the effect of L2 experience (i.e. 3 months, 3 years and 10 years) on the acquisition of intonation and fluency of Korean L2 speakers of English, Trofimovich and Baker

(2006) examined the production of six English declarative sentences by 30 Korean speakers of L2 English and 10 L1 speakers of English (who were all adults). Acoustic measurements and perceptual analysis indicating the degree of foreign accent (on a 9-point scale) were done. The results showed that the more L2 experience the learners had, the better stress timing (i.e., “variation in stress and in degree of vowel reduction from syllable to syllable”) was realised (Trofimovich and Baker, 2006, p. 12). Furthermore, age of arrival in the United States affected other suprasegmentals (pause duration, pause frequency and speech rate). Speakers with a later age of arrival produced a slower speech rate (average number of words spoken per minute), a higher number of pauses (between-word silences longer than 100 ms in sentences) and pauses with a longer duration than speakers with an earlier age of arrival. Peak alignment, i.e., “the location of the highest value of pitch relative to the accented syllable in an intonation phrase” (Trofimovich and Baker, 2006, p. 13) was not influenced by either amount of L2 experience or age of arrival. Moreover, the study revealed similar patterns in segmental and suprasegmental L2 learning.

Mennen (2004) studied bi-directional interference in the realisation of peak alignment of the pre-nuclear rising accent in adult Dutch learners of Greek. She found that age of exposure appeared to be a more important factor in producing native-like accent than amount of experience (Mennen, 2004; Trofimovich and Baker, 2006). Greek and Dutch are similar in having the same “phonological structure in nonfinal or prenuclear rises” (Mennen, 2004, p. 542). However, Dutch and Greek differ in peak timing as Dutch has an earlier peak than Greek. Moreover, Greek has a simpler vowel system compared to Dutch. While in Greek all five vowels have an equal length, Dutch has the distinction between short and long vowels. When the long vowels are accented, peaks are realised earlier in Dutch, which is not the case in Greek. In two production experiments peak alignment was measured for Dutch L2 speakers of Greek (DG) and an L1 Dutch (D) and L1 Greek (G) control group. The DG group (with two male and three female speakers) consisted of proficient speakers of Greek. In each of the other two groups three female and two male participants were included. The Greek materials consisted of 20 declarative sentences. For the Dutch sentences 20 declaratives with a long and 20 with a short vowel in the accented word matching the Greek materials were designed. The test sentences were read twice. The duration of the accented syllables, the rise and the alignment of the low tone (L)

and high tone (H) were measured. Results revealed that only one of the five Dutch L2 speakers of Greek (who had been exposed to Greek at the youngest age compared to the other participants, i.e. at the age of 15 years at the start of exposure) managed to produce native values of peak alignment for Dutch and Greek. This indicates that the other four proficient L2 speakers demonstrated interference or assimilation in intonation as they produced in-between values for peak alignment. Although this study investigated only one suprasegmental feature (peak alignment), the results imply that it is possible for a late bilingual to retain the ability to produce native values of peak alignment in both L1 and L2. Furthermore, a later start of exposure to L2 possibly raises the chance on interference in a first and second language. The in-between values of the speakers with a later start of exposure to L2 Greek might indicate an influence of L1 on L2 and vice versa.

To our best knowledge, no studies have investigated L2 transfer of lengthening to L1 with respect to L1 Dutch and L2 English. One of the few studies focusing on L2 English transfer to L1 Dutch dealt with a segmental feature: stop voice onset time (VOT) of plosives (Flege and Eefting, 1987). This specific study is mentioned here because it distinguished between two levels of proficiency in L2, which was examined in the current study. Flege and Eefting (1987) investigated perception and production of the stops /p,t,k/ by adult Dutch L2 speakers of English. Dutch and English differ in the realisation of voiceless stops. In English the voiceless /p, t, k/ are aspirated in syllable-initial position, whereas these stops are unaspirated in Dutch. Aspirated stops in English cause a longer VOT compared to Dutch where no aspiration occurs (Flege and Eefting, 1987). Forty subjects of the Department of English at Utrecht University participated and ten from a technical college in Delft. Half of them were male and half were female, aged between 20 and 35 years. The students of English had a higher proficiency in English than the other ten students. Five adult native speakers of British English formed the control group. The participants' proficiency was indicated in three ways: first, native speakers judged pronunciations of sentences. Second, a language background questionnaire with self-reported proficiency in L2 English was filled in. Third, the pronunciation of /t/ was taken into account. Flege and Eefting (1987) found that the proficient speakers of L2 English produced a shorter VOT for Dutch /t/ compared to the non-proficient speakers of L2 English. The authors suggested that speakers in the more proficient group “formed a new [phonetic] category for

English /t/” (Flege and Eefting, 1987, p. 185). It seems that the proficient speakers knew how to differentiate between the Dutch unaspirated and English aspirated /t/. The shorter VOT values for Dutch (produced by the proficient speakers) compared to the longer VOT values for Dutch (produced by the less proficient speakers) might have been caused by “polarization” for the proficient group (Flege and Eefting, 1987, p. 198), which a speaker used to distinguish between contrasting phonetic properties (in two languages). To put this result in a broader context, higher proficiency in L2 might lead to L1 attrition, meaning a loss of properties in L1 caused by influence of another language (Pavlenko, 2000). The less proficient speakers, however, might show convergence or assimilation of L1 and L2 with respect to VOT values for Dutch being in between native English and Dutch values (Flege and Eefting, 1987; Pavlenko, 2000).

This study is part of a project dealing with the directional interference from L1 Dutch to L2 English and from L2 English to L1 Dutch at the segmental and suprasegmental levels. Whereas the study by Van Schagen (2015) examined the segmental level with regard to VOT, the current study is concerned with a suprasegmental feature, i.e. lengthening.

2. Previous research on accentual and final lengthening

2.1 Defining terms

In English and Dutch, prosodic features such as pitch and duration indicate the most salient segments of the speech stream and set boundaries (called “*prosodic boundaries*”) for smaller parts of the stream of speech (Cambier-Langeveld, 1999, p.13). Prominence at the word level is defined as (lexical) “stress”, whereas “accent” indicates salience at the phrasal level leading to a pitch accent (Cambier-Langeveld, 1999, p. 13). Stressed syllables in prominent parts of the sentence or phrase can receive a pitch accent, consisting of one or more tones (e.g. H* or H*L). The starred tone is associated with the stressed syllables. A pitch accent typically makes this part of the sentence focal (i.e. being in focus and carrying new information) (Chen, 2009; Sluijter and Van Heuven, 1995).

Accentual lengthening occurs when a word has a pitch accent, increasing the duration of this word in comparison with the same word in an unaccented condition (Cambier-Langeveld, 1999, 2000; Eefting, 1991).

Final lengthening refers to lengthening in a word at an intonational phrase boundary (IP). An IP is the most clearly demarcated prosodic boundary in speech. Final lengthening can manifest as an increase in the duration of the IP-final word, syllable(s) and segments compared to the same word in other positions in the phrase (White, 2002).

2.2 Accentual lengthening

For Dutch, accentual lengthening has been studied by Sluijter and Van Heuven (1995). Both a production and perception experiment were conducted. Only the relevant production experiment is reviewed here. In this study two native speakers of Dutch (who were trained members of the Department of Linguistics/Phonetics at Leiden University) participated. Their task was to produce a pitch accent on stressed and unstressed syllables in question-answer pairs. The target words were in non-sentence-final position. The experiment consisted of four focus conditions. In the non-focus (NF) condition no accent was put on the target word. The broad-focus (BF) condition was designed to accentuate the lexically stressed syllable in the target word. In the stressed-focus (SF) condition only the stressed syllable of the target word was put in focus. The difference between the BF and SF condition was that in the BF condition the complete target word was made focal, while in the SF condition only one syllable was placed in focus. In the unstressed-focus (UF) condition the speaker put accent on the unstressed syllable of the target word. The data were analysed by comparing the duration of the words (and syllables) in the UF condition with words in the BF, NF and SF conditions. The authors found that accented syllables had a longer duration compared to unaccented syllables. In addition, the duration of the whole word increased when it contained an accent. Finally, when a naturally unstressed syllable was put in focus, that syllable was lengthened caused by “a transfer of relative duration from the stressed syllable to the [naturally] unstressed syllable” showing that besides stressed syllables, unstressed syllables were lengthened when put in focus (Sluijter and Van Heuven, 1995, p. 88). A shortcoming is that only two native speakers of Dutch participated, and consequently it is not clear whether the results are generalisable. Furthermore, accentual lengthening was not explored in sentence-final position. Another shortcoming of this study is that only disyllabic words were investigated.

The study by Eefting (1991) explored the duration of monosyllabic and three-syllabic words.

In Eefting's (1991) experiment, a professional speaker of Dutch had to read speech fragments. The author explored the influence of "information value" ("old versus new" information) and "accentuation" (accented versus unaccented condition) on duration of words (Eefting, 1991, p. 412). Word duration of the mono- and three-syllabic target words and the duration of each syllable and segment in the target words were measured. Information value was not found to influence word duration significantly. Accentuation, however, lengthened the target words by 25%. Syllables and segments were both found to influence the duration of accented words, signalling that the word was the domain of accentual lengthening. The conclusions of this study would have been more generalisable if more participants were included.

For English, accentual lengthening has been studied by Turk and Sawusch (1997). The authors investigated the domain of accentual lengthening in two production experiments. In the first experiment the question whether this domain was a linguistic unit (e.g a vowel or rhyme) was answered and the second experiment investigated whether this unit was a syllable, feet or word. In both experiments 20 speakers of American English participated. The male-female ratios in the experiments were 16-4 and 13-7 respectively. In the first experiment seven test consonants were designed and put into two different phrase types (i.e. "bee farm / beef arm") and two accent conditions (accented_unaccented and vice versa) (Turk and Sawusch, 1997, p. 29). The consonants were placed in initial and final position in the syllable, word or foot. Carrier sentences were designed in which the phrases were included. In the second experiment unstressed syllables were put in 11 word sequences placed in initial and final position and in two conditions (accented_unaccented and vice versa). In the first block of the sentences, accent was placed on the first word of the two-word phrases (i.e. "BACON force", "BAKE enforce") and in the second block on the second word (i.e. "bake ENFORCE", "bacon FORCE") (Turk and Sawusch, 1997, p. 34). In the first experiment the consonant, the vowel before this consonant and the total duration of the utterance were measured. In the second experiment the duration of the unstressed syllable and the total utterance duration were measured. Results of the first experiment showed that the domain of accentual lengthening was larger than the nucleus or rhyme of the syllable. The second experiment revealed that only word-final unstressed syllables in disyllabic words were lengthened when accented. The experiments showed that

accentual lengthening occurred within the word as linguistic domain. Furthermore, an unstressed syllable was only lengthened when following an accented syllable in the same word. A critical note with respect to the design of this study is that lengthening of the accented syllables was not examined and accented syllables in both positions were not the same, making it impossible to compare the lengthening effect of words or syllables in different positions (Cambier-Langeveld, 2000). Another limitation of this study is the unequal distribution of male and female participants. The larger number of male speakers made it impossible to generalise the results to female speakers.

Some studies have explored both types of lengthening in English, of which White's (2002) thorough study is an example. White examined among other things (the domain of) accentual and final lengthening. In a production experiment (Experiment 2) six undergraduate and postgraduate students of Edinburgh University (three male and three female) participated. Durations of stressed syllables in monosyllabic and left- and right-headed di- and three-syllabic target words were measured. Left-headed words received stress on the word-initial syllable and right-headed words on the word-final syllable. Sixteen different test syllables were each spoken in three contexts (i.e. in monosyllabic, disyllabic and three-syllabic target words). The target words were put in meaningful carrier sentences. The duration of the onset, nucleus and coda of the lexically stressed syllables was measured. The experiment investigating utterance-final lengthening will first be explained. Mono-, di- and three-syllabic accented and unaccented syllables in utterance-medial and utterance-final position were measured. Final lengthening was found in each of the syllable conditions. Monosyllabic target words were found to undergo the most lengthening in final position. In addition, unstressed syllables after the stressed syllable in left-headed final words were lengthened. The last syllables were lengthened to a higher degree regardless of being stressed or unstressed. Utterance-final stressed syllables and, to a lesser degree, penultimate stressed syllables in an utterance were lengthened compared to those in utterance-medial positions. The domain of final lengthening was found to start from a stressed syllable moving to the right word boundary. Regarding accentual lengthening in English, in Experiment 2 White (2002) investigated "the interaction between lengthening and the number of syllables in the word; and the distribution of lengthening in the stressed syllable and the rest of the accented word." (p. 226). Stressed syllables were found to be longest in accented monosyllabic target words and shortest

in accented three-syllabic target words. Main-stressed syllables received less lengthening when the word contained more syllables. These findings showed that the word is the domain of accentual lengthening in English.

On the basis of the above-reviewed literature, the following concluding remarks on accentual lengthening in both languages can be made. In both Dutch and English, the word was shown to be domain of accentual lengthening (Cambier-Langeveld, 1999, 2000). However, the two languages differed in the direction of lengthening from the stressed syllable within the word. In Dutch, the whole word was lengthened with syllables and segments to the left and the right of the stressed syllable (Turk and Sawusch, 1997; Eefting, 1991). Eefting (1991) reported that Dutch stressed syllables underwent more lengthening compared to unstressed syllables. For English, the lengthening started in the pitch-accented syllable and spread to unstressed syllable on the right within the word (Turk and Sawusch, 1997). Concerning the distribution of lengthening within a word, stressed syllables were lengthened more than unstressed syllables (White, 2002). For English and Dutch, no relative increase in lengthening was found for polysyllabic words compared to monosyllabic words. The reason for this was the attenuation of accentual lengthening of the stressed syllable to an adjoining unstressed syllable (Eefting, 1991; White, 2002).

2.3 Final lengthening

Final lengthening in Dutch was investigated by Cambier-Langeveld, Nespior and Van Heuven (1997). The two production experiments in this study were designed to explore what factors might influence final lengthening. Only the main experiment is mentioned here, as the other experiment was a small pilot study. In this experiment three male and three female participants were included. All speakers were native speakers of Dutch. The experiment consisted of six words each occurring in four sentences similar in length. The six words had different final syllables and stress patterns. The words were placed in each of the following four contexts: before a boundary of a prosodic word (PW), a phonological phrase (PhP), an intonational phrase (IP) and before an utterance (U) boundary. A PhP is also considered as an intermediate phrase, containing a group of PW's (Wightman, Shattuck-Hufnagel, Ostendorf and Price, 1992). The duration of syllables and segments of the target words was measured. Words in the context of both an IP and U boundary were lengthened. The authors found

that final lengthening always occurred in the final syllable. However, when only a schwa was present in the final syllable, the vowel of the pre-final syllable was lengthened in addition. Putting this study in the context of the present study, a drawback was that only penultimate and final syllables of the target words were measured. Since two target words contained three or four syllables, nothing is known about the lengthening of the first (two) syllable(s) in these words.

Final lengthening for English was explored by Shattuck-Hufnagel and Turk (1998). The authors investigated the domain of phrase-final lengthening in a preliminary study with one participant. Thirteen pairs of utterances were designed with each pair using the same three target names A, B and C forming sentences such as “Please say A and B or C will stay.” (p.1235). In each sentence the target words had the same vowel pattern (full versus reduced vowels) and received stress on the same syllable. Target words differed in number of syllables and stress patterns. The durations of “preboundary vs. non-preboundary syllables and of post-boundary vs. non-postboundary onsets and rhymes” (p. 1236) were measured and compared. Pre-final lengthening occurred mainly in the final syllable of the phrase. Moreover, lengthening moved to the left in the direction of the stressed syllable. The authors noted that these results were preliminary as one speaker participated, consonant clusters were not taken into account and no distinction between lexical stress and accent was made.

Wightman, Shattuck-Hufnagel, Ostendorf and Price (1992) examined segmental lengthening near phrase boundaries for English. The speech corpus by Price, Ostendorf, Shattuck-Hufnagel and Fong (1991) was employed, containing “35 pairs of phonetically similar, but syntactically ambiguous, sentences” (Wightman et al., 1992, p. 1711). Each pair of sentences was read by four professional radio news announcers (one male and three females), who were native speakers of American English. Four preboundary segments in the phrase were measured. First and second, the coda consonant and the vowel nucleus in the final syllable were measured. Third, the segments between the foot-initial vowel and the last vowel before the boundary were measured. Finally, the foot-initial stressed vowel was measured. Duration was calculated using “a normalized duration” measuring “the duration of a segment as the number of standard deviations from the mean duration of the phone contained in the segment” (Wightman et al., 1992, p. 1711). The authors found that preboundary lengthening occurred only in the rhyme of the pre-final syllable. This study investigated lengthening of segments near the

phrase boundary but did not provide information on lengthening of the whole word in final position. Moreover, the amount of lengthening of words in final position relative to the same words in sentence-medial position was not examined. The amount of lengthening in final position could not be compared with, for instance, the duration of words in sentence-medial position.

2.4 Interaction between accentual and final lengthening: Dutch versus English

Cambier-Langeveld (1999, 2000) is the only author who investigated both accentual lengthening and final lengthening for L1 English and L1 Dutch in one study. In the study three male and three female native speakers of Dutch and the same number of male and female native speakers of RP-English participated. Monosyllabic and disyllabic words (i.e. the target names) were each put in three positions (initial, medial and final) in the sentence. An example for Dutch is: “Volgens mij sprak Ko met Jan over Mie.” In this sentence “Ko” is initial, “Jan” is medial and “Mie” is final. The English version was “I think that Joe told John about May.” (2000, p. 106). In each of the three positions, four monosyllabic and four disyllabic names were designed for Dutch and English. The disyllabic target names were extended versions of the monosyllables. The monosyllabic names had a CV(C)-structure and the disyllabic names had a CVcv(c)-structure. The carrier sentence always consisted of either mono- or disyllabic target names preceded by an interrogative sentence designed to elicit focus on one of the names. For each language 24 utterances were designed. Total name duration (in ms) was measured.

The results for Dutch showed that final lengthening occurred as names in phrase-final position were longer than target names in non-final position. Accentual lengthening was found in initial (by 25%) and medial (by 18%) position, but only by 4% in final position where an interaction of Position and Accent was found.

For English, accentual and final lengthening were found in both positions. No interaction of Position and Accent in final position was evident, although less accentual lengthening in final position (where words were only lengthened by 14%) compared to the other two positions (26% in initial position, 22% in medial position) was found. Both English and Dutch seemed to have less accentual lengthening in final position. The languages differed in that for English, the combination of final and

accentual lengthening was additive. For instance, in a sentence like “I think that Joe told John about May”, the lengthening effect of accent on the duration of “May” was comparable in all positions (initial, medial and final) in the sentence. For Dutch, however, no additive effect of accentual and final lengthening in final position was found. By way of illustration, in the sentence “Volgens mij sprak Ko met Jan over Mie” (a translation of the example for English above), a comparable significant lengthening effect of accent was only found when “Mie” was placed in non-final position. In final position, a near absence of accentuation of the target name was found compared to placement in initial and medial positions. The interaction of Position and Accent was only found in mono- and disyllabic words for Dutch, but not for English.

2.5 Lengthening in L2

Little attention has been given to accentual and final lengthening in L2. In a recent study Li and Post (2014) investigated acquisition of L2 English prosody by L1 German and Mandarin learners, taking into account two different proficiency levels in L2 English. Part of the study dealt with rhythm metrics. In the other part two prosodic properties accentual and final lengthening contributing to speech rhythm were examined, which is the focus in this review of Li and Post’s study. The speakers of L1 Mandarin were from the Communication University of China. The advanced L1 German learners of English were students of the University of Cambridge and the intermediate learners attended a grammar school in Germany. The native English control group consisted of five native speakers of general American English from Cambridge in the United Kingdom. One L1 Mandarin group and the German intermediate group of five speakers were control groups for L1 Mandarin and L1 German. All groups consisted of female participants aged between 18 and 25, except for the L1 German speakers in the intermediate group, who were aged 14 or 15 years, and the L1 Mandarin control group with speakers aged 18 years. Twenty English sentences were designed. Four types of syllables were placed in four conditions to examine the effect of syllable structure. Fifteen Mandarin and 20 German sentences were designed to match the English sentences. Each syllable was labelled unaccented_non-final, unaccented_final, accented_non-final or accented_final. Syllable duration was measured.

Results for the L1 were that, as predicted, English had more accentual lengthening in final position compared to German (as no accentual lengthening occurs in Mandarin, this result was only found for German). Furthermore, with respect to final lengthening German and English speakers behaved similarly, and more final lengthening was found for English and German than for Mandarin.

Results for the L2 indicated that at the intermediate level, German and Mandarin speakers produced less accentual and final lengthening and less lengthening in accented final syllables in their L2 compared to L1 English speakers. The results for the three types of lengthening showed that advanced speakers did not differ from native speakers of English. Moreover, the higher the proficiency in L2 English, the more the values of accentual and final lengthening approached native English values. Another finding was that intermediate L1 German speakers of L2 English produced a percentage of final lengthening in L1 German similar to the final lengthening produced in L1 English. Yet, in L2 English shorter values were measured for these German L2 learners of English. However, this effect was not evident when syllable structure was controlled for. The authors suggested that difficult syllable structures might have caused this different behaviour in L2 English (Li and Post, 2014). In connection with this, L2 learners succeeded better in producing lengthening in utterances with CV-type syllables compared to more complex syllable structures.

Based on the above-mentioned results, Li and Post (2014, p. 245) argued that the findings concerning the acquisition of L2 stress and accent mainly supported the “hypothesis of universal developmental paths” stating that, no matter what the typological background of the learners’ L1 is, learners approach progressively to native L2 levels when proficiency in L2 increases. Some evidence supporting the “L1 transfer hypothesis” (Li and Post, 2014, p. 233) was found as some L1 transfer was observed. This transfer was more likely to be found for intermediate L2 learners compared to advanced learners. Although this study did not investigate L2 transfer to L1, it showed that speakers with a higher level of L2 proficiency were able to produce native-like lengthening patterns in their L1.

As far as we know, Mennen (2004) was the only study on bidirectional interference in the intonation of L2 speakers. Although this study was not concerned with lengthening, it is highly relevant to this research topic. As mentioned before, Mennen (2004) studied bi-directional interference in the realisation of peak alignment of the pre-nuclear rise for adult L1 Dutch learners of L2 Greek.

Results revealed that only one of the five Dutch L2 speakers of Greek (who had been exposed to Greek at the youngest age compared to the other participants) managed to produce native values of peak alignment for Dutch and Greek. The results imply that it is possible for a late bilingual to retain the ability to produce native values of peak alignment in both L1 and L2. The other L2 speakers showed interference or assimilation in intonation as they produced in-between values for peak alignment. The in-between values of the speakers with a later start of exposure to L2 Greek might indicate an influence of L1 on L2 and vice versa.

Research questions and hypotheses

The current study focuses on the interference of L2 English in L1 Dutch and L1 Dutch in L2 English as this has not received attention in the literature with regard to lengthening.

The first purpose of this study is to find out how Dutch speakers of English (hereafter L2 English speakers) differing in levels of proficiency produce lengthening in English. The first proficiency group is majored in English and is therefore considered as proficient in English (as training in English was received). Speakers in the second group have a major other than English and are identified as less proficient or intermediate in English.

The second purpose is to investigate whether any influence of L2 on L1 in the production of lengthening is evident and whether proficiency has influence. The following research questions are designed in order to answer the above-mentioned existing gap in the literature:

Research question 1: How do Dutch L2 English speakers differing in levels of proficiency produce lengthening in English?

Research question 2: Is any influence of L2 on L1 in the production of lengthening evident and does proficiency play a role?

Two hypotheses have been put forward in the light of findings from the above-reviewed studies.

On the basis of Li and Post's (2014) finding that a higher proficiency in L2 English led to the production of native-like English values for the three types of lengthening (accentual, final and accentual lengthening in final position) in contrast with the intermediate proficiency group, hypothesis 1 was formulated:

Hypothesis 1:

L2 English speakers with a higher level of proficiency will be more native-like in the production of lengthening in L2 than L2 English speakers with a lower level of proficiency.

On the basis of Li and Post's (2014) finding that less proficient speakers of L2 English produced a percentage of final lengthening in their L1 similar to the percentage of final lengthening found for L1 speakers of English but failed to produce the same amount of lengthening in L2 English; and based on Mennen's (2004) finding that a proficient L2 speaker managed to retain the ability to produce native values in intonation in both L1 and L2, whereas the other L2 speakers produced in-between values in intonation, hypothesis 2 formulated:

Hypothesis 2:

The intermediate speakers produce more lengthening in final position in Dutch compared to the proficient speakers who are predicted to produce less lengthening in final position. The proficient group will increase the contrast in lengthening between English and Dutch, whereas the intermediate group might show the additive effect of accentual and final lengthening in Dutch in absence of an interaction, due to assimilation or convergence of Dutch and English values.

4. Method

4.1 Participants

Twenty female students studying at Utrecht University participated in the study. They were all native speakers of Dutch and aged between 18 and 24 years. Eleven of the participants were second or third-year students of English. They all received training in pronunciation of British English in their first year. One of these participants turned out to have learned British English in her childhood. The other ten participants were students who had a major other than English. The participants were not reported to have reading and speaking difficulties. The students of English (except for the Dutch-English bilingual speaker) formed the group of L2 English speakers with a high level of proficiency. The students who studied a different subject than English formed the group of L2 English speakers with an intermediate level of proficiency. The data of 5 speakers from each proficiency group were analysed in the present study.

4.2 Tasks

The experimental task was a read-aloud task in which the participants read out isolated words and sentences. In addition, the LexTale test was taken. The sentences produced in the experiment were analysed for the present study, whereas the words were analysed in the study on VOT by Van Schagen (2015). The LexTale test was designed to examine learners' knowledge of English vocabulary (Lemhöfer and Broersma, 2012) and was argued to be a good indicator for general proficiency in English. The results of this test were used to provide evidence for the difference in proficiency between the two groups of L2 English speakers.

4.3 Materials (stimuli)

The stimuli were derived from the stimuli used in Cambier-Langeveld (1999, 2000). Cambier-Langeveld (1999, 2000) used proper names to investigate lengthening, and found no difference between mono- and disyllabic names and between initial and medial position in the amount of lengthening. Moreover, the previously mentioned finding of White (2002) of monosyllabic words undergoing the most lengthening in final position compared to polysyllabic words was the reason why the test utterances for the current study only had monosyllabic names in initial and final position. The stimuli consisted of monosyllabic names occurring in initial-accented (IA), initial-unaccented (IU),

final-accented (FA) and final-unaccented (FU) position (as shown in Appendix G for Dutch and H for English)

As in Cambier-Langeveld's (1999, 2000) studies, question-answer dialogues were used to elicit declarative sentences with target names in different sentence-positions (initial vs. final) and in different accentuation conditions (accented vs. unaccented) in both English and Dutch. The declarative sentences were similar for Dutch and English in terms of containing five monosyllabic words and phonetically similar target names. Two types of questions were used in the question-answer dialogues. The first type of question "Who gave it to Y?" was to be answered with "X gave it to Y", in which the X was an accented name in initial position. The accented name was underlined to make sure the participants accented the name. Y was an unaccented name in final position. The second type of carrier dialogue "Who did X give it to?" was to be answered by "X gave it to Y". In answer to this question X was the unaccented target name in initial position and Y the accented name in final position. For Dutch, the first type of carrier dialogue was "Wie gaf het aan Y?" with the answer "X gaf het aan Y". The second type of carrier dialogue was "Aan wie gaf X het?" with the answer "X gaf het aan Y".

Four target names were included in each language. The names in English (John, Will, Joe, May) were phonetically similar to the names in Dutch (Jan, Wil, Bo, Mie). Two of the names for each language had phonemes in CVC structure and two had a CV structure. The two different structures (the CV structure with a free vowel and the CVC structure with a checked vowel) were chosen to investigate whether any difference might be found in lengthening between the CVC and CV words in Dutch and English. For the CVC target names, sonorants instead of plosives were used as coda consonants. In a review of studies dealing with the linguistic uses of segmental duration in English, Klatt (1976) described with regard to the segmental duration of the consonants that word-final fricative and sonorant consonants have the longest duration in phrase-final position compared to those not occurring in phrase-final position. Plosive coda consonants instead, have less lengthening in a phrase-final word compared to fricatives and sonorants. Further, in English, vowels followed by a voiced coda consonant are lengthened in contrast with Dutch, having devoicing of coda consonants at

the syllable-final position. This difference may interact with how well Dutch speakers of English can produce final lengthening in English in the case of phrase-final CVC words.

Per language, each name appeared three times in each accent condition and each position. This meant the number of test utterances per language was: 4 names x (3 occurrences per accent condition x 2 conditions) + 4 names x (3 occurrences per position x 2 positions) resulting in 48 target names with two target names in each utterance is 24 sentences x 10 participants resulting in 240 utterances.

Per language, 48 filler question-answer pairs that were different from the experimental question-answer pairs in terms of subject, number of syllables and words, word order, use of interrogative pronouns and place of emphasis in the declarative sentences were used. This prevented the participants from paying too much attention to the sentences containing proper names. The complete list of experimental stimuli and fillers can be found in Appendix I.

4.4 Procedure

The experimental session took place in a sound-treated booth in the phonetics lab at the Utrecht Institute of Linguistics. One experimenter instructed the participant and attended the whole session to control the smoothness of the experiments and to answer questions. After the participant was seated behind a portable voice recorder (Zoom Handy Recorder H1), the participant read the general instructions for either testing order A (as shown in Appendix A) or B (as shown in Appendix B). All instructions were given in Dutch to ensure that students who had a major other than English understood the tasks.

The experimental session consisted of 5 parts. The first two parts consisted of pronouncing words and sentences in Dutch. In the third part the participants conducted a short online LexTale test, in which they were asked to indicate whether 60 strings of letters were existing English words. This test was used as a break between the other 4 parts of the experiment and to serve as a switch from the Dutch to the English part. In the fourth and fifth part the participants pronounced words and sentences in English (Appendix E and F). Separate instructions were given for each part (words and sentences for Dutch are included in Appendix C and D; words and sentences for English are included in Appendix E and F). For the read-aloud tasks, testing order A started with words to be pronounced, whereas in testing order B sentences were pronounced first. The two testing orders were included to

minimise the chance of order effects such as fatigue influencing the pronunciation of words and sentences.

In the instructions for the sentences the participants were instructed to read short question-answer dialogues in Dutch or English. The participants were asked to read the dialogues using a medium and constant tempo and to speak loudly and clearly. They were also asked to pause between the dialogues. When the participants were not satisfied with their pronunciation they were allowed to repeat the whole question-answer pair. The participants were asked to turn the page after having read the last dialogue on a page. The participants were requested to read two dialogues out loud for practice and to ensure fluent pronunciation during the experiment.

After the experiment, the participants received a questionnaire (as shown in Appendix I) containing 10 questions based on the questionnaire designed by Flege and Eefting (1987). Questions on the internet were added to this questionnaire as the internet has become an important medium in participants' lives through which they have more exposure to English compared to two decades ago. The questionnaire provided insight into the self-reported proficiency of the participants' English. Moreover, the results provided insight into the students' language background, use of English, their proficiency in English etc.

At the end of the experiment, the participants signed a payment form and were paid for their participation. The experiment lasted about 50 minutes.

5. Analysis and Results

Information from the questionnaire was not included in the analysis as this was beyond the time scope of this thesis and this will be used for further analysis.

5.1 Annotation and Intonational Analysis

The recordings were annotated in Praat. First, the relevant target sentences were separated from the large sound file. Next, the two target names per sentence were separated from the sentences and the duration of these words and segments were measured and calculated.

The duration of the names (target words) in the utterances was measured as follows: initial accented (IA) versus initial unaccented (IU) to measure the amount of accentual lengthening in medial position; final accented (FA) versus final unaccented (FU) to measure the amount of accentual lengthening in final position; IA versus FA to measure how much more lengthening accented target words in final position underwent compared to accented target words in medial position. Syllables were measured instead of segments as all target words had the same CVC or CV structure without plosives in a coda.

5.2 Statistical Analysis and Results

All data analyses were performed using the Linear Mixed model in SPSS version 22 (IBM, 2013). The dependent variable was duration of the target names in milliseconds, which was gradient. The first categorical fixed factor was Position of the target names in the sentence, with initial (1) and final (2) position. The second categorical fixed factor was Accent_condition, with accented (1) and unaccented (2). The categorical fixed factor for the participants was Proficiency, divided into English major or proficient group (g1) and non-English major or intermediate group (g2). For the target words the categorical fixed factor Syllable_structure was included with CVC (1) and CV (2) to find out whether syllable structure caused significant differences in duration. Participant and Name of the target words were included as random effects. First an independent-samples t-test with Proficiency and the score in percentage correct on the LexTale test was conducted on the whole group of participants (N=20) to examine whether this test was a good indicator for Proficiency group. Thereafter, the dataset was split into Language (Dutch and English). A comparison between g1 and g2 was made to investigate the influence of their L2 proficiency on L1 Dutch and vice versa. 2-way, 3-way and 4-way interactions between all the fixed factors were investigated in the analysis.

5.2.1 Independent-samples t-test

An independent-samples t-test with the LexTale score as the dependent variable and Proficiency as the independent variable has shown that the LexTale score differed significantly between the two proficiency groups ($t = 31.979$; $df = 958$; $p < 0.001$). That is, the Lextale score was significantly higher for the English majors, indicating a significant difference in proficiency between g1 and g2.

5.2.2 Results Dutch

We found 2 significant main effects and 4 significant interactions (Position x Accent_condition, Proficiency x Position, Syllable_structure x Position, and Proficiency x Syllable_structure x Position). As main effects and lower-order interaction effects are not meaningful in the presence of higher-order interactions, only the 2-way interaction Position x Accent_condition and the 3-way interaction Proficiency x Syllable_structure x Position will be discussed.

5.2.2.1 Dutch: Position x Accent_condition

A significant interaction-effect of Position x Accent_condition was found ($F(1, 454) = 7.032$; $p = 0.008$), as shown in Appendix J. Breaking down this interaction by Position, a paired-samples t-test was conducted to investigate whether accented (1) and unaccented (2) words differed in duration (in ms) in each position.

Regarding Position = 1 (as shown in Figure 1), a significant difference between Accent_condition = 1 ($M=241$, $SD=42$) and Accent_condition = 2 ($M=208$, $SD=40$); $t(238) = 6.383$, $p < 0.001$) was found, showing in initial position accented words were lengthened compared to unaccented words, indicating that accentual lengthening (by 15%) occurred in sentence-initial position.

For Position = 2 (as shown in Figure 1), a significant difference between Accent_condition = 1 ($M=309$, $SD=43$) and Accent_condition = 2 ($M=294$, $SD=42$); $t(238) = 2.748$, $p < 0.001$) was found, showing than in final position accentual lengthening (by 5%) occurred.

These results show that the speakers produced accentual lengthening for Dutch in both positions, but less accentual lengthening occurred in final position.

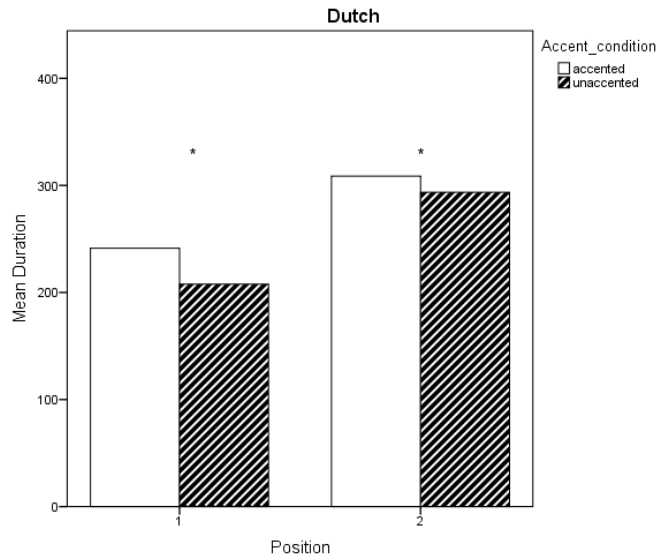


Figure 1. Mean duration in milliseconds of accented and unaccented items in initial (1) and final (2) position for Dutch. N = 480 (120 accented and 120 unaccented items per position).

5.2.2.2 Dutch: Proficiency x Syllable_structure x Position

A significant 3-way interaction effect between Proficiency x Syllable_structure x Position ($F(1, 454) = 7.316$; $p < 0.007$) was found (Appendix J). After this interaction was broken down by Syllable_structure and Position, the duration (in ms) of g1 and g2 was compared per position.

For Syllable_structure = 1 and Position = 1 (Figure 2), an independent-samples t-test was conducted to compare the duration in Proficiency = g1 with Proficiency = g2. There was no significant difference in the duration of Proficiency = g1 ($M=225$, $SD=42$) and Proficiency = g2 ($M=118$, $SD=40$); $t(118) = -0.459$, $p = 0.647$, showing that both groups did not differ in the production of CVC words in initial position.

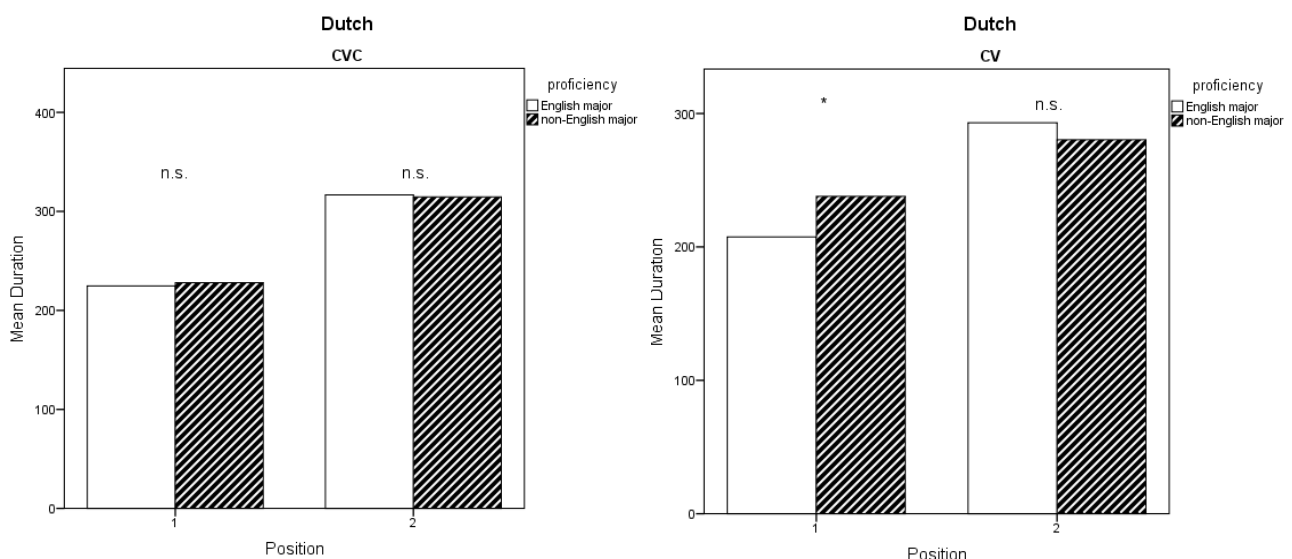
For Syllable_structure = 1 and Position = 2 (Figure 2), an independent-samples t-test was conducted to compare the duration in Proficiency = g1 with Proficiency = g2. There was no significant difference in the duration of Proficiency = g1 ($M=317$, $SD=50$) and Proficiency = g2 ($M=315$, $SD=28$); $t(118) = 0.279$, $p = 0.780$, showing that both groups did not differ in the production of CVC words in final position.

For Syllable_structure = 2 and Position = 1 (Figure 3), an independent-samples t-test was conducted to compare the duration in Proficiency = g1 with Proficiency = g2. There was a significant difference in the duration of Proficiency = g1 ($M=207$, $SD=40$) and Proficiency = g2 ($M=238$,

SD=49); $t(118) = -3.717$, $p < 0.001$, showing that CV words in initial position were produced with a shorter duration by g1 compared to g2.

For Syllable_structure = 2 and Position = 2 (Figure 3), an independent-samples t-test was conducted to compare the duration in Proficiency = g1 with Proficiency = g2. There was no significant difference in the duration of Proficiency = g1 ($M=293$, $SD=49$) and Proficiency = g2 ($M=280$, $SD=30$); $t(118) = 1.715$, $p = 0.089$, showing that both groups did not differ in the production of CV words in final position.

The results show that g1 and g2 differ only in the production of the CV syllable structure in initial position where g1 produced a shorter duration than g2.



Figures 2 (left) and 3 (right). Mean duration in milliseconds of items with a CVC and CV structure in initial and final position (initial and final) of g1 (i.e. the proficient group) and g2 (i.e. the intermediate group) for Dutch. $N = 240$ (60 CVC and 60 CV items per position) per group.

5.2.3 Results English

Two significant main effects and 5 significant interactions (Proficiency x Position, Proficiency x Accent_condition, and Proficiency x Syllable_structure, Syllable_structure x Position and Proficiency x Syllable_structure x Position x Accent_condition) were found. As main effects and lower-order interaction effects are not meaningful in the presence of higher-order interactions, only the 4-way interaction Proficiency x Syllable_structure x Position x Accent_condition will be discussed.

English: Proficiency x Syllable_structure x Position x Accent_condition

A significant 4-way interaction between Proficiency x Syllable_structure x Position x Accent_condition was found ($F(1,452.003) = 4.866$; $p = 0.028$), included in Appendix J. The interaction was broken down by Syllable_structure, then Position, then by Accent_condition and independent-sample t-tests were conducted to compare the duration in ms of Proficiency = g1 with Proficiency = g2.

For Syllable_structure = 1, Position = 1 and Accent_condition = 1 (Figure 5), no significant difference in the duration of Proficiency = g1 ($M=305$, $SD=57$) and Proficiency = g2 ($M=301$, $SD=50$); $t(58) = 0.260$, $p = 0.796$ was found, showing that in initial position for CVC words g1 and g2 did not differ in the production of accented words.

For Syllable_structure = 1, Position = 1 and Accent_condition = 2 (Figure 5), no significant difference in the duration of Proficiency = g1 ($M=262$, $SD=71$) and Proficiency = g2 ($M=301$, $SD=54$); $t(58) = -2.403$, $p = 0.019$ was found, showing that in initial position for CVC words g1 produced shorter durations of unaccented words.

For Syllable_structure = 1, Position = 2 and Accent_condition = 1 (Figure 6), no significant difference in the duration of Proficiency = g1 ($M=368$, $SD=46$) and Proficiency = g2 ($M=337$, $SD=31$); $t(58) = 3.070$, $p = 0.003$ was found, showing that in final position for CVC words g1 produced a longer duration of accented words compared to g2.

For Syllable_structure = 1, Position = 2 and Accent_condition = 2 (Figure 6), a significant difference in the duration of Proficiency = g1 ($M=339$, $SD=47$) and Proficiency = g2 ($M=314$, $SD=30$); $t(58) = 2.468$, $p = 0.017$ was found, showing that in final position for CVC words g1 produced a longer duration of unaccented words compared to g2.

For Syllable_structure = 2, Position = 1 and Accent_condition = 1 (Figure 7), no significant difference in the duration of Proficiency = g1 (M=280, SD=45) and Proficiency = g2 (M=291, SD=31); $t(57) = -1.077$, $p = 0.286$ was found, showing that in initial position for CV words both groups did not differ in the duration of accented words.

For Syllable_structure = 2, Position = 1 and Accent_condition = 2 (Figure 7), no significant difference in the duration of Proficiency = g1 (M=272, SD=59) and Proficiency = g2 (M=280, SD=44); $t(57) = -0.561$, $p = 0.577$ was found, showing that in initial position for CV words both groups did not differ in the duration of unaccented words.

For Syllable_structure = 2, Position = 2 and Accent_condition = 1 (Figure 8), a significant difference in the duration of Proficiency = g1 (M=413, SD=63) and Proficiency = g2 (M=332, SD=31); $t(58) = 6.342$, $p < 0.001$ was found, indicating that in initial position for CV words g1 produced a longer duration of accented words compared to g2.

For Syllable_structure = 2, Position = 2 and Accent_condition = 2 (Figure 8), a significant difference in the duration of Proficiency = g1 (M=362, SD=66) and Proficiency = g2 (M=315, SD=34); $t(58) = 3.468$, $p = 0.001$ was found, indicating that in final position for CV words g1 produced a longer duration of accented words compared to g2.

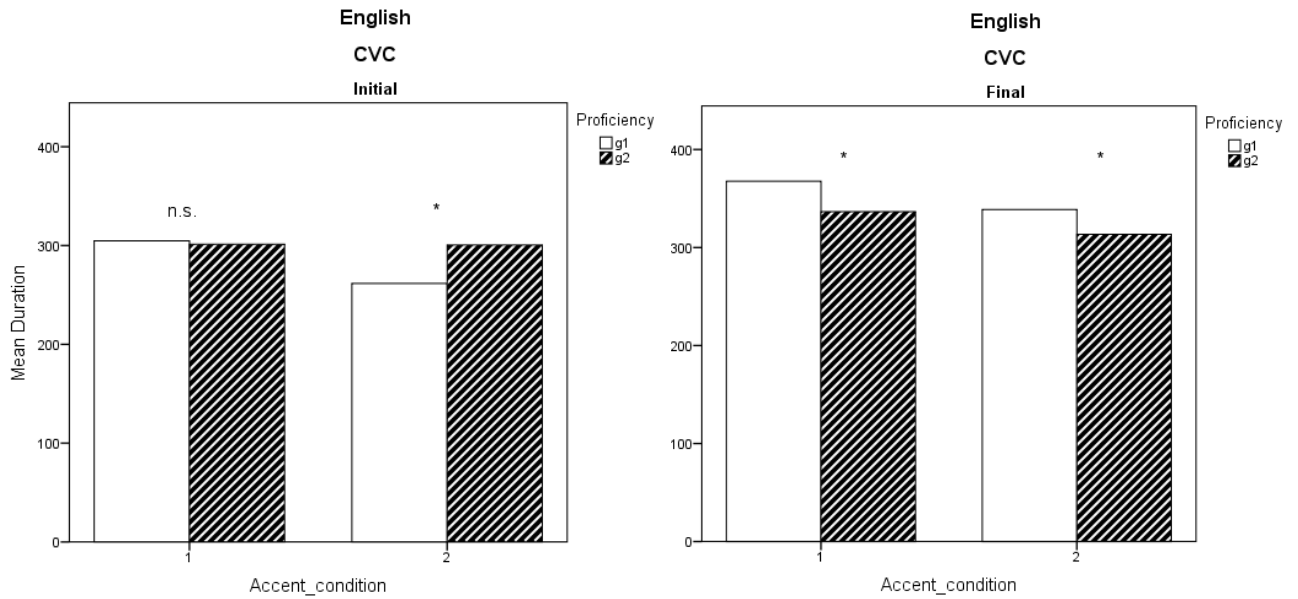


Figure 4 (left) and 5 (right). Mean duration in milliseconds for CVC in initial position (N = 120 (30 items per accent condition with accented (1) and unaccented (2) per group)) and final position (N = 120 (30 items per accent condition per group)) for English majors (g1) and non-English majors (g2).

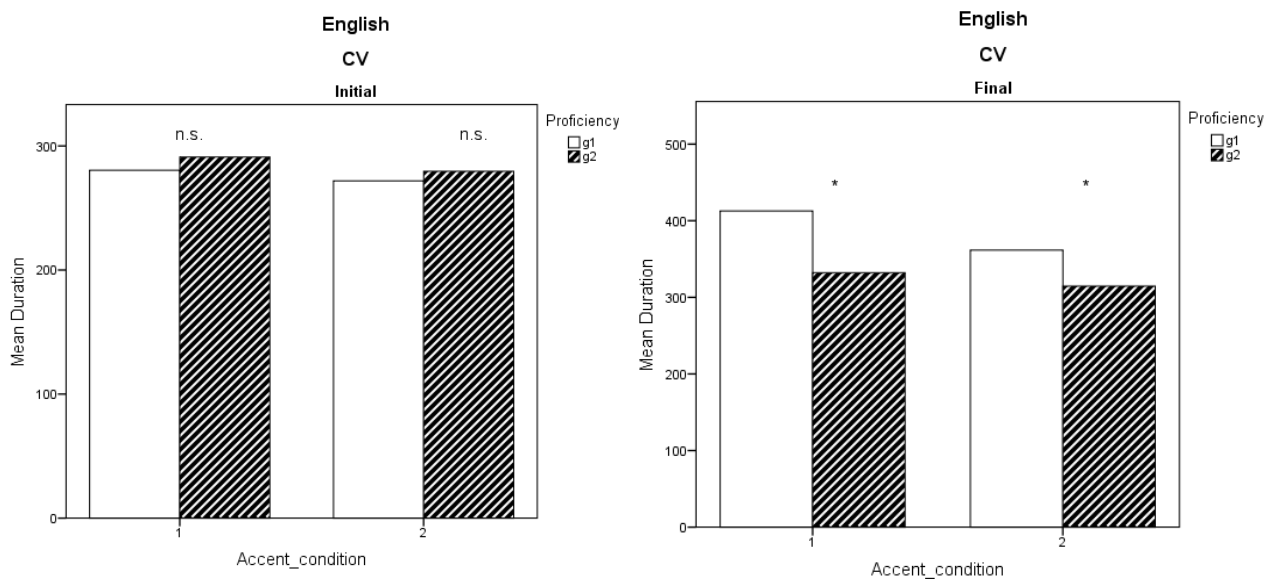


Figure 6 (left) and 7 (right). Mean duration in milliseconds for CV in initial position (N = 120 (30 items per accent condition with accented (1) and unaccented (2) per group)) and final position (N = 120 (30 items per accent condition per group)) for English majors (g1) and non-English majors (g2).

6. Discussion and conclusion

6.1 Discussion

6.1.1.1 Results LexTale

The t-test with LexTale score and Proficiency shows that Lextale score was a good indicator for inclusion of participants in each proficiency group according to the participants' major.

6.1.1.2 General results - Dutch

The results for Dutch showed that the speakers produced accentual lengthening for Dutch in both positions, but less accentual lengthening occurred in final position. This indicates that both proficient and intermediate L2 English speakers produced typical pattern of lengthening in Dutch without influence of English on Dutch in either group. This finding is in accordance with the findings of Cambier-Langeveld (1999, 2000) that more accentual lengthening occurred in initial position. With regard to syllable structure and position, g1 and g2 were found to differ only in the production of the CV syllable structure in sentence-initial position where g1 produced a shorter duration than g2. The proficient speakers seemed to increase the contrast between lengthening and the absence of lengthening in sentence-initial position only for CV words.

6.1.1.3 General results - English

The proficient group produced shorter durations of unaccented CVC words in initial position compared to the less proficient group. This difference was not found for unaccented words with a CV syllable structure. The English majors seemed to increase the contrast between accented and unaccented CVC words only in sentence-initial position. A possible explanation is that the English majors are aware of the English rule that vowels before a voiced coda consonant are lengthened. The coda-related lengthening may have been enhanced in the accented condition, compared to that in the unaccented position. This difference appeared to be realised more successfully in sentence-initial position, suggesting an effect of final lengthening.

Another finding was that in sentence-final position the proficient speakers produced longer durations of both accented and unaccented CVC and CV words compared to the less proficient speakers. This result indicates that the proficient speakers (in contrast with the less proficient speakers) seemed to know that more (final) lengthening occurs in English, and that syllable structure

caused differences in duration. This result might be explained by the finding of Cambier-Langeveld (1999, 2000) that for English the additive effect of accent on duration in final position was produced for English. Furthermore, this might indicate that the non-English majors had not yet acquired the native English lengthening values as they produced less lengthening in final position compared to the proficient speakers, confirming Li and Post's (2014) finding that intermediate L2 speakers showed less (accentual) lengthening than proficient L2 speakers.

6.1.2 L1 influence on L2

The finding for English that in sentence-final position the proficient speakers produced longer durations of both accented and unaccented CVC and CV words compared to the less proficient speakers indicates that the proficient speakers seemed to know that more (final) lengthening occurs in L2 English compared to the less proficient speakers. This finding is in accordance with Li and Post's (2014) findings that intermediate-level L2 learners were not able to produce as much (accentual) lengthening in English as native speakers, supporting Li and Post's (2014) "L1 transfer hypothesis" particularly for the intermediate group, showing L1 influence on L2 for the less proficient speakers.

6.1.3 L2 influence on L1

Concerning syllable structure and position in Dutch, g1 and g2 were found to differ only in the production of the CV syllable structure in sentence-initial position, where g2 produced a longer duration than g1. The proficient speakers seemed to increase the contrast between final lengthening and the absence of lengthening in sentence-initial position only for CV words. This might indicate influence of L2 on L1 for the non-English majors as they seemed to transfer the longer duration of target words in sentence-final position in English to Dutch. This finding is not in accordance with Li and Post's (2014) finding that less proficient L2 speakers produced CVC words with a longer duration compared to proficient L2 speakers because words with a CVC syllable structure were suggested to be more difficult to pronounce for less proficient L2 learners. In contrast, the present finding was that CV words in initial position were pronounced with a longer duration by less proficient L2 speakers.

6.2 Conclusion

Returning to the research question at the beginning of this study, namely: “How do Dutch L2 English speakers differing in levels of proficiency produce lengthening in English?” it is now possible to state that the proficient group produced shorter durations of unaccented CVC words in initial position compared to the less proficient group, which was not found for unaccented words with a CV syllable structure. Furthermore, in sentence-final position the proficient speakers produced longer durations of both accented and unaccented CVC and CV words compared to the less proficient speakers. This might indicate that the non-English majors had not yet acquired the native English lengthening values confirming Li and Post’s (2014) findings that intermediate L2 speakers showed less (accentual) lengthening than proficient L2 speakers, showing L1 influence on L2 for the less proficient speakers (confirming H1).

In answer to research question 2: “Is any influence of L2 on L1 in the production of lengthening evident and does proficiency play a role?”, the results for Dutch showed that the speakers produced accentual lengthening for Dutch in both positions, but less accentual lengthening occurred in final position, indicating that both groups knew how to produce lengthening in Dutch without showing L2 influence on L1 (failing to confirm hypothesis 2). The two proficiency groups were found to differ only in the production of the CV syllable structure in sentence-initial position where g2 produced a longer duration than g1. This is partly in accordance with the hypothesis that intermediate L2 speakers produce more lengthening in final position in Dutch compared to the proficient L2 speakers. The less proficient speakers might show this influence of English only for CV words in sentence-initial position instead of in sentence-final position. This might indicate influence of L2 on L1 for the non-English majors as they seemed to transfer the longer duration in sentence-final position in English to Dutch, partly confirming H2.

This is the first study to investigate bidirectional influence in L2 English and Dutch concerning the accentual and final lengthening combined. The outcome of this research extends our knowledge of bidirectional influence at the suprasegmental level of prosody (investigated by Mennen, 2004 and Pavlenko, 2002). The current study provides new insight into lengthening in L2 Dutch and English, especially concerning level of proficiency in L2. Overall, the English majors produced native-

like English and Dutch values, implying that training in L2 causes a higher proficiency in L2 and speakers are less likely to be perceived by L1 English speakers as having a foreign accent. Li and Post's (2014) "hypothesis of universal developmental paths" mentioned before is confirmed as the current study has shown that learners approach progressively to native L2 levels when proficiency in L2 increases. Especially for the intermediate group convergence between native Dutch and English lengthening values occurred (as described by Pavlenko, 2000). An explanation could be that the less proficient L2 learners were unable to produce native-like Dutch and English values.

6.3 Limitations and future research

The results may only be generalised to female students as no male students participated in the participants the experiment. A study by Rao (2010) on final lengthening and pause duration in L1 Spanish found that female speakers produced a longer mean word duration, stressed syllable and final syllable duration compared to male speakers in a reading experiment. The author suggested that male speakers have a faster speaking rate than female speakers in non-spontaneous speech, which was also proposed in a study by Fitzsimons, Sheahan and Staunton (2001) on speech rate and pitch in L1 Irish English. As the above-mentioned findings only deal with L1 speech, further research should be undertaken to investigate the role of gender in L2 lengthening.

In Cambier-Langeveld's (1999, 2000) study native speakers of English participated, while L2 English speakers were included in the current study. Further research might be undertaken with native English speakers to compare lengthening behaviour with L2 English speakers.

As in the current study only the whole word was measured, future investigation might be concerned with the examination of the duration of segments such as the vowel in target words to find out what segments are lengthened in L2, for instance concerning the CVC and CV syllable structures.

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8. Appendices

Appendix A: Instructions Group A

Instructies – Groep A

Dit experiment bestaat uit vijf delen:

- Lees een aantal woorden in het Nederlands.
- Lees een aantal zinnen in het Nederlands.
- Een korte online-test waarin gevraagd wordt of een aantal woorden die je ziet bestaande woorden zijn in het Engels of niet. Dit deel dient ook als een korte pauze en er mag wat gedronken worden.
- Lees een aantal woorden in het Engels.
- Lees een aantal zinnen in het Engels.

Je krijgt specifieke instructies voor elk deel van het experiment.

Na het experiment word gevraagd of je een vragenlijst wil invullen van 11 vragen over je taalachtergrond.

De sessie duurt ongeveer 45 minuten.

Hartelijk bedankt voor je deelname aan het experiment.

Appendix B: Instructions Group B

Instructies – Groep B

Dit experiment bestaat uit vijf delen:

- Lees een aantal zinnen in het Nederlands.
- Lees een aantal woorden in het Nederlands.
- Een korte online-test waarin gevraagd wordt of een aantal woorden die je ziet bestaande woorden zijn in het Engels of niet. Dit deel dient ook als een korte pauze en er mag wat gedronken worden.
- Lees een aantal zinnen in het Engels.
- Lees een aantal woorden in het Engels.

Je krijgt specifieke instructies voor elk deel van het experiment.

Na het experiment word gevraagd of je een vragenlijst wil invullen van 11 vragen over je taalachtergrond.

De sessie duurt ongeveer 45 minuten.

Hartelijk bedankt voor je deelname aan het experiment.

Appendix C: Instructions Dutch Words

Lees WOORDEN voor in het Nederlands

In dit deel van het experiment, ga je een aantal Nederlandse woorden voorlezen. Lees op een rustig tempo; probeer alle woorden in het zelfde tempo uit te spreken. Spreek duidelijk en helder in de microfoon.

Als je niet tevreden bent over de uitspraak van een woord, mag je het hele woord met het lidwoord (als er een lidwoord gedrukt staat) opnieuw uitspreken.

Sommige woorden zijn bestaande woorden en sommige zijn niet-bestaande woorden. Voor alle woorden is het lidwoord “de” gebruikt in deze leeslijst. Soms klopt dit bij het zelfstandig naamwoord en soms niet, dat maakt niet uit. Je hoeft hier niet op te letten. De klemtoon ligt altijd op het tweede woord (het zelfstandig naamwoord). Probeer geen pauze te maken tussen het lidwoord en het zelfstandig naamwoord in.

We vragen je of je niet tijdens de uitspraak van het laatste woord op een pagina de pagina om te slaan, maar dit te doen nadat je het woord hebt gelezen.

Je begint eerst met vier oefenwoorden:

- Kachel
- Haardvuur
- De Kachel
- De Haardvuur

Appendix D: Instructions Dutch Sentences

Lees ZINNEN voor in het Nederlands

In dit deel van het experiment, ga je een aantal korte vraag-antwoord dialogen voorlezen in het Nederlands. Lees op een rustig tempo; probeer alle zinnen in het zelfde tempo uit te spreken. Spreek duidelijk en helder in de microfoon.

Als je niet tevreden bent over de uitspraak van een zin, mag je de hele zin opnieuw uitspreken.

We vragen je of je niet tijdens de uitspraak van de laatste dialoog de pagina om te slaan maar dit te doen nadat je die dialoog hebt gelezen.

Je begint eerst met twee oefen dialogen:

Dialoog 1

- (a) Wie gaf het aan Tim?
- (b) Riek gaf het aan Tim.

Dialoog 2

- (a) Aan wie gaf Miek het?
- (b) Miek gaf het aan Hans.

Appendix E: Instructions English Words

Lees WOORDEN voor in het Engels

In dit deel van het experiment, ga je een aantal Engelse woorden voorlezen. Lees op een rustig tempo; probeer alle woorden in het zelfde tempo uit te spreken. Spreek duidelijk en helder in de microfoon.

Als je niet tevreden bent over de uitspraak van een woord, mag je het hele woord met het lidwoord (als er een lidwoord gedrukt staat) opnieuw uitspreken.

Sommige woorden zijn bestaande woorden en sommige zijn niet-bestaande woorden. Voor alle woorden is het lidwoord “the” gebruikt in deze leeslijst. De klemtoon ligt altijd op het tweede woord (het zelfstandig naamwoord). Probeer geen pauze te maken tussen het lidwoord en het zelfstandig naamwoord in.

We vragen je of je niet tijdens de uitspraak van het laatste woord op een pagina de pagina om te slaan, maar dit te doen nadat je het woord hebt gelezen.

Je begint eerst met vier oefenwoorden:

- Face
- Lighter
- The Face
- The Lighter

Appendix F: Instructions English Sentences

Lees ZINNEN voor in het Engels

In dit deel van het experiment, ga je een aantal korte vraag-antwoord dialogen voorlezen in het Engels. Lees op een rustig tempo; probeer alle zinnen in het zelfde tempo uit te spreken. Spreek duidelijk en helder in de microfoon.

Als je niet tevreden bent over de uitspraak van een zin, mag je de hele zin opnieuw uitspreken.

We vragen je of je niet tijdens de uitspraak van de laatste dialoog de pagina om te slaan maar dit te doen nadat je die dialoog hebt gelezen.

Je begint eerst met twee oefen dialogen:

Dialoog 1

- a. Who gave it to Tim?
- b. Roy gave it to Tim.

Dialoog 2

- a. Whom did Mary give it to?
- b. Mary gave it to Pete.

Appendix G: Dutch Stimuli

Dutch	Question	Answer
		<u>Initial Accented</u> – Final Unaccented
1	Wie gaf het aan Bo?	<u>Jan</u> gaf het aan Bo.
2	Wie gaf het aan Kai?	<u>Jan</u> gaf het aan Kai.
3	Wie gaf het aan Wil?	<u>Jan</u> gaf het aan Wil.
4	Wie gaf het aan Jan?	<u>Bo</u> gaf het aan Jan.
5	Wie gaf het aan Kai?	<u>Bo</u> gaf het aan Kai.
6	Wie gaf het aan Wil?	<u>Bo</u> gaf het aan Wil.
7	Wie gaf het aan Jan?	<u>Kai</u> gaf het aan Jan.
8	Wie gaf het aan Bo?	<u>Kai</u> gaf het aan Bo.
9	Wie gaf het aan Wil?	<u>Kai</u> gaf het aan Wil.
10	Wie gaf het aan Jan?	<u>Wil</u> gaf het aan Jan.
11	Wie gaf het aan Bo?	<u>Wil</u> gaf het aan Bo.
12	Wie gaf het aan Kai?	<u>Wil</u> gaf het aan Kai.
		Initial Unaccented – <u>Final Accented</u>
13	Aan wie gaf Jan het?	Jan gaf het aan <u>Bo</u> .
14	Aan wie gaf Jan het?	Jan gaf het aan <u>Kai</u> .
15	Aan wie gaf Jan het?	Jan gaf het aan <u>Wil</u> .
16	Aan wie gaf Bo het?	Bo gaf het aan <u>Jan</u> .
17	Aan wie gaf Bo het?	Bo gaf het aan <u>Kai</u> .
18	Aan wie gaf Bo het?	Bo gaf het aan <u>Wil</u> .
19	Aan wie gaf Kai het?	Kai gaf het aan <u>Jan</u> .
20	Aan wie gaf Kai het?	Kai gaf het aan <u>Bo</u> .
21	Aan wie gaf Kai het?	Kai gaf het aan <u>Wil</u> .
22	Aan wie gaf Wil het?	Wil gaf het aan <u>Kai</u> .
23	Aan wie gaf Wil het?	Wil gaf het aan <u>Jan</u> .
24	Aan wie gaf Wil het?	Wil gaf het aan <u>Bo</u> .

Appendix H: English Stimuli

English	Question	Answer
		<u>Initial Accented</u> – Final Unaccented
1	Who gave it to Joe?	<u>John</u> gave it to Joe.
2	Who gave it to May?	<u>John</u> gave it to May.
3	Who gave it to Will?	<u>John</u> gave it to Will.
4	Who gave it to John?	<u>Joe</u> gave it to John.
5	Who gave it to May?	<u>Joe</u> gave it to May.
6	Who gave it to Will?	<u>Joe</u> gave it to Will.
7	Who gave it to John?	<u>May</u> gave it to John.
8	Who gave it to Joe?	<u>May</u> gave it to Joe.
9	Who gave it to Will?	<u>May</u> gave it to Will.
10	Who gave it to Joe?	<u>Will</u> gave it to Joe.
11	Who gave it to May?	<u>Will</u> gave it to May.
12	Who gave it to John?	<u>Will</u> gave it to John.
		Initial Unaccented – <u>Final Accented</u>
13	Whom did John give it to?	John gave it to <u>Joe</u> .
14	Whom did John give it to?	John gave it to <u>May</u> .
15	Whom did John give it to?	John gave it to <u>Will</u> .
16	Whom did Joe give it to?	Joe gave it to <u>John</u> .
17	Whom did Joe give it to?	Joe gave it to <u>May</u> .
18	Whom did Joe give it to?	Joe gave it to <u>Will</u> .
19	Whom did May give it to?	May gave it to <u>John</u> .
20	Whom did May give it to?	May gave it to <u>Joe</u> .
21	Whom did May give it to?	May gave it to <u>Will</u> .
22	Whom did Will give it to?	Will gave it to <u>John</u> .
23	Whom did Will give it to?	Will gave it to <u>Joe</u> .
24	Whom did Will give it to?	Will gave it to <u>May</u> .

9. Hoeveel uur schat je dat je per week besteedt aan het luisteren naar
Engelse muziek: ()
10. Hoeveel uur schat je dat je Engels spreekt per week: ()
11. Heeft iemand je ooit aangezien voor een moedertaalspreker van het
Engels?
Ja () / Nee ()

Appendix J: Statistical Results Dutch and English (LMM)

Type III Tests of Fixed Effects^a

Language	Source	Numerator df	Denominator df	F	Sig.
Dutch	Intercept	1	7,549	3361,540	,000
	proficiency	1	8,000	,312	,592
	syll_struc	1	2,000	12,178	,073
	Position	1	454	485,516	,000
	Acc_condition	1	454	49,045	,000
	proficiency * syll_struc	1	454	1,381	,241
	proficiency * Position	1	454	12,227	,001
	proficiency *	1	454	,073	,787
	Acc_condition	1	454	,749	,387
	syll_struc * Position	1	454	13,166	,000
	syll_struc *	1	454	,749	,387
	Acc_condition	1	454	7,032	,008
	Position * Acc_condition	1	454	7,032	,008
	proficiency * syll_struc *	1	454	7,316	,007
	Position	1	454	2,686	,102
	proficiency * syll_struc *	1	454	2,686	,102
	Acc_condition	1	454	,846	,358
proficiency * Position *	1	454	,846	,358	
Acc_condition	1	454	1,939	,164	
syll_struc * Position *	1	454	1,939	,164	
Acc_condition	1	454	,847	,358	
proficiency * syll_struc *	1	454	,847	,358	
Position * Acc_condition	1	454	,847	,358	
English	Intercept	1	3,921	1142,511	,000
	proficiency	1	7,990	2,089	,186
	syll_struc	1	2,005	,021	,897
	Position	1	452,021	214,538	,000
	Acc_condition	1	452,003	30,570	,000
	proficiency * syll_struc	1	452,021	6,859	,009
	proficiency * Position	1	452,021	51,515	,000
	proficiency *	1	452,003	5,662	,018
	Acc_condition	1	452,003	5,662	,018
	syll_struc * Position	1	452,021	10,921	,001
			1	452,021	10,921

syll_struc *				
Acc_condition	1	452,003	,042	,838
Position * Acc_condition	1	452,003	2,895	,090
proficiency * syll_struc *				
Position	1	452,021	2,751	,098
proficiency * syll_struc *				
Acc_condition	1	452,003	,282	,596
proficiency * Position *				
Acc_condition	1	452,003	,000	,995
syll_struc * Position *				
Acc_condition	1	452,003	1,486	,224
proficiency * syll_struc *				
Position * Acc_condition	1	452,003	4,866	,028

a. Dependent Variable: Duration.