International Speech Communication Association
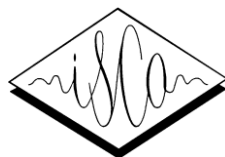
ExLing 2012

Proceedings of 5th Tutorial and Research Workshop on Experimental Linguistics

27-29 August 2012, Athens, Greece

Edited by Antonis Botinis

National and Kapodistrian
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This volume includes the proceedings of ExLing 2012, the 5th Tutorial and Research Workshop on Experimental Linguistics, in Athens, Greece, 27-29 August 2012. The first conference was organised in Athens, in 2006, under the auspices of ISCA and the University of Athens and is regularly repeated thereafter, including the last one in Paris, in 2011.

In accordance with the spirit of this ExLing 2012 conference, we were once again gathered in Athens to continue our discussion on the directions of linguistic research and the use of experimental methodologies in order to gain theoretical and interdisciplinary knowledge. We are happy to see that our initial attempt has gained ground and is becoming an established forum of a new generation of linguists.

As in our previous conferences, our colleagues are coming from a variety of different parts of the world and we wish them a rewarding exchange of scientific achievements and expertise. This is indeed the core of the ExLing events, which promote new ideas and methodologies in an international context.

We would like to thank all participants for their contributions as well as ISCA and the University of Athens. We also thank our colleagues from the International Advisory Committee and our students from the University of Athens for their assistance.

Antonis Botinis

Contents

The role of Discourse in the typology of downsteps: Evidence from Ebira and Ghotuo

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Abstract

Ebira and Ghotuo are three-tone languages of the Benue-Congo language family that have the downstep phenomenon. However, the behaviour of downstep in these languages goes beyond the scope of phonology. This paper reports that there are discourse factors that play significant roles in determining whether there is downstep or not in these languages. The factors include formality of speech, speech rate and certain other sociolinguistic factors. This paper reports with experimental evidence that depending on these factors, speakers of Ghotuo and Ebira, can, and do consciously block the phenomenon. Thus, it is argued that an adequate description of the phenomenon in the languages can only be achieved by relating it to the sociolinguistic factors already mentioned.

Key words: downstep, discourse, speech rate, experimental

Introduction

The downstep phenomenon occurs when the level of realisation of a tone is brought lower than its normal level by an intervening low tone that is no longer visible (Pulleyblank 1986). At the early stages of studies on terraced-level tone systems, the phenomenon was tied to two-tone systems such as Igbo, Tiv, Edo (Bini), Twi (Akan) among others, but later extended to three-tone languages such as Ebira and Ghotuo (Elugbe 1985; Adive 1989).

Characteristics of Downstep

There are, at least, two key characteristics of downstep; one is that the terracing it produces results in tonetic overlap between the contrastive levels in a system (La Velle 1974:170; Clements 1979: 540)

Tadadjeu (1974) also shows quite clearly that though a downstepped high may sound like a Mid, a good way of telling which (!H or M) is by considering the height of the following tone, particularly a following high; if it is Mid, the High would rise without any inhibition whereas if it is a downstepped High, the following High cannot rise above it. Thus, the second major characteristic of downstep is its level-setting ability (Armstrong 1968: 51-52; Clements 1979).

Downstep in Ebira

Ebira contrasts three levels, as seen in *hú* 'to drink,' *hu* 'to uproot,' and *hù* 'to roast in open fire'

Further, the downstep in Ebira affects the M and the H. The downstepping is well pronounced at juncture, especially when a L, originally on the final vowel of a verb gets deleted before a non-low occurring as the initial vowel of a following noun. It can also result in attributive constructions where the deleted L could be after the juncture. In example (2), the pitch of the first syllable of ísórì is lowered from 124.5Hz to 107.4Hz.

(1)   ɔ̀tá àdà → ɔ̀tá!dá "father's friend"
(2)   ô mɛ̀ isɔ́rì → ô !misɔ́rì "he cooked food"
(3)   rí ùrá → rú!rá "eat pork"
(5)   ozí izé → ozíz!é "Ize's child"
(6)   ô sì ɛnyá → ô!sɛnyá   "he found the load"

Downstep in Ghotuo

Ghotuo contrasts three tone levels, as we have in ɔ̀kpà "cock," ɔ̀kpa "one", and ɔkpá "lamp".

The Low and the Mid tones are downstepped in Ghotuo. The tonal behaviour of Ghotuo is complex in the attributive constructions, as well as in other grammatical forms such as sentences. For instance, as shown in the Noun-Demonstrative Associative construction (7), there is a floating high associative marker in the language that contributes highly to the behaviour of its tones, downstep inclusive.

Instrumental evidence shows that in (7) the pitch on ɔ was reduced from 168 Hz to 155 Hz. In (9), the pitch of !sɛ is reduced by 19Hz, while in (10), the tone on !sɛ is reduced by 11Hz from that of ɔ̀sɛ.

(7)   otà ass.H ɔ̀nɔ̀ → otá!nɔ̀   "this tree"
(8)   ɔ dɛ́ ɔ̀mɔká → ɔdɔ́!mɔká "he bought an orange"
(9)   ɔ dɛ́ ɔ̀sɛ na mhɛ̀ → ɔdɔ́!sɛ nàmhɛ̀ "he bought a cricket for me"
(10) ɔ́kpahɛ gbɛ́ ɔ̀sɛ owɛnìn → ɔ́ kpahɛgbɔ́!sɛ owɛnìn "the old man killed a cricket yesterday"

Discussion of the downstep in Ebira and Ghotuo

Downstep in Ebira and Ghotuo is under the active control of the speaker, in which case it can be blocked by the speaker. In most cases, my informants interchanged between the presence and absence of it during data elicitation. Formality of speech is one reason for this. The most literate among my Ebira informants studied my word list before supplying the data. Downstep almost completely disappeared from the data she supplied. Secondly, seeing that the researcher is not Ebira made her automatically want to simplify her speech. In such situations, she restored all the Low tones that were supposed to be lost at junctures. 82-year-old pastor who also supplied data on Ebira had

downstep when chatting with co-speakers of the language, but when speaking to the recorder, he inadvertently restored the supposedly lost Low tones. Ghotuo speakers also block downstep when speaking with non-speakers of their language. Figures (1) and (2) show the same utterance rendered by one of my Ghotuo informants, one having downstep, the other not. Similar reports have been made about some related three-tone systems.
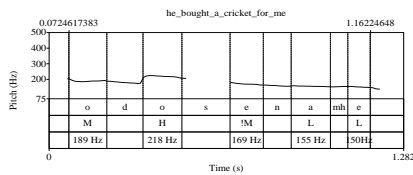
Figure 1. With downstep.   Figure 2. Without downstep.
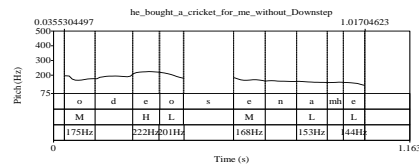
Discourse-related explanation of downstep in Ebira and Ghotuo

Since downstep is speaker-controlled in Ebira and Ghotuo, there is the need to factor-in those discourse factors that determine when it is realised/blocked in order to achieve an adequate description of the phenomenon in the languages, because this is the only way the arbitrariness in its realisation can be captured phonetically. This is because of the possibility that these discourse factors are accommodated within the pitch range, and their effects reflected in the eventual phonetic realisations of tones. In tone languages, the pitch range still gives allowance for "things other than lexical tones" (Xu 2006). "While tones specify the pitch targets…of individual syllables, other aspects of the target approximation process are left unspecified, and hence available for manipulation to encode other communicative functions" (Xu 2006), which is what "the need to be understood by non-native speakers", or the formality of the context explore in these languages to resist the realisation of downstep (Cauldwell 2002).

  I suspect that Ebira and Ghotuo, as well as the other three-tone systems in which downstep is constrained by discourse, are so because they acquired the downstep feature at a later stage than the two tone languages (Clements 1979: 541; Fromkin 1972: 60), and considering that the Proto Niger-Congo language is believed to be a two-tone language (Clements and Rialland, 2008:69), there are grounds that three-tone languages have diverged farther than two tone-languages in respect of tone, and are widening the gap by the development of downstep.

Conclusion

In this paper, I have reported that downstep in Ebira and Ghotuo is under the active control of the speaker. I argued that there are discourse factors that play significant roles in the determination of downstep in these languages,

and that in order to give adequate description of this downstep, one needs to look beyond the scope of phonology and factor-in these discourse factors, such as formality of speech and the sheer desire to obey the cooperative principle. Thus, I have shown that Ebira and Ghotuo are neither typical terraced-level nor typical discrete-level in nature (Connell 2009:239). This paper is, therefore, a contribution to scholarship on the typology of tone systems. However, more works still need to be done on the issues raised and other three-tone languages of the Benue-Congo family need to be studied to see how general this position can be.

Notes
1. Downstep in Yala (Ikom) can be neutralised in emphatic or enthusiastic utterances (Armstrong 1968); "Downstep in Yoruba is constrained in strange ways still largely unclear today" (Elugbe 1995:73).

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Phonological skills in Down Syndrome (DS): Experimental findings from a Greek sample

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Abstract

This paper presents the results of an experiment we carried out in order to investigate phonology in Down Syndrome (DS). Research has shown that during pre-school and school years, children with DS use phonological processes and sound patterns that are similar to those used by typically developing children but at a slower rate. In view of the above and given the paucity of research in the Greek language in children with DS, we conducted an experiment so as to investigate phonological skills in ten children with DS. We examined articulation, phonetic analysis, phonemic completion and phonemic distinction. Our results showed that children with DS present a phonological impairment in the Greek language.

Key words: phonology, Down Syndrome, language impairments, mental retardation

Introduction

Down Syndrome (DS) is caused by triplication of the 21st chromosome and is associated with particular deficits in the phonological field. DS is the leading genetic cause of intellectual disability accounting for 25%-30% of people with mental retardation (Nadel 1999). The degree of intellectual disability varies widely from close to normal intelligence to severe mental retardation, with 80% of individuals showing moderate retardation (Roizen 2002). Despite considerable variability, individuals with DS have been described as having phenotypically distinct behavioral patterns in language and cognition, following a consistent profile in their linguistic development (Chapman et al. 2002). Children with DS often show delay in the onset of babbling (Stoel Gammon 2001) and they produce the first words at a much older age than typically developing children (Bergland et al. 2001). Typically developing children produce their first words in their first year of their life, but children with DS do not produce their first words until much later, even until 3 years of age (Yoder and Warren 2004).

The phonological factors described above, contribute to poor speech intelligibility on the part of DS individuals together with other factors associated with DS, such as apraxia of speech, dysarthria and voice quality. Typically developing children are often fully intelligible at about 48 months of age, while producing intelligible speech is a lifelong challenge for DS individuals, affecting their productive language performance (Martin et al. 2009). Moreover, researches that were conducted with word and non word repetition tasks have proven the existence of phonological impairments. It

has been proven that phonology in children with DS is a linguistic section that is severely affected (Nash and Snowling 2008). This pilot experiment examined the phonological skills of ten children with DS in the Greek language.

Experimental Procedure

We used a standardized test of phonology (Tzouriadou et al. 2008) which examines articulation, phonetic analysis, phonemic completion and phonemic distinction. Articulation was examined in two different ways. In the first task, consisting of 13 items, we asked the children to complete a sentence by showing them a picture, such as /ta malia ehun poles…../ (hair have too many…) and the children had to give the correct answer /trihes/ (hairs). In the second task, consisting of 16 items, we asked them to complete the sentence correctly, for example / I Maria ine gineka. O Θomas ine…./ (Mary is a woman. Tom is a ….) and the children had to give the correct answer /andras / (man).

Phonetic analysis was examined by asking the children to pronounce 29 words letter by letter correctly. Phonemic completion was examined by using a task of 30 words and non words, in which DS children were asked to match the picture with the word spelled phonemically such as /γ/ a/ t/a/ (cat). Phonemic distinction was separated in four different tasks. In the first task we said two words that were heard similarly for example /hortari/ and /moshari/ (grass and veil) and then we said a sentence and we asked the children to choose which word fits the example /fitroni sti γi/ (grows on the ground). This task consisted of 14 items. In the second task we said the first syllable of a word, for example /fi/ and we expected the child to find out which of the following two words started with the syllable /fi/, for example /fili/ or /hili/. The same task was repeated with syllables in the end and in the middle of the word.

Subjects

10 children (6 boys and 4 girls) with DS, mild mental retardation and Greek origin were examined in the four tasks. Their age varied from 4 years to 8 years old and had no other language impairments or health problems that could affect the results of this research.

Results

The data analysis showed that children with DS have serious impairments in the phonological area, where most affected seemed to be the expressive language. In articulation only 33.1 % of the total answers given were correct, in phonetic analysis this percentage was 34.48%, in phonemic completion 35% and only in phonemic distinction this percentage rose to 70.28%.

Discussion

Our findings confirm the deficits in phonology associated with DS, and show that the phonological errors made by these children are combined with difficulties in expressive language. This is proved by the low percentage of correct answers given by children with DS in all phonological tasks with the exception of phonemic distinction which does not involve so much expressive language. It is clear that the relationship between phonology and expressive language is not straightforward but it is important that future research should investigate its nature. If phonological problems constitute the primary deficit, then finding a way to improve them could potentially lead to better expressive language skills on the part of individuals with DS. The findings of this study point towards the notion that phonological development in DS does not end at the same age as in typically developing children but continues to grow making expressive and receptive phonology a fertile area for intervention. However, these results must be treated with caution since it was only a small-scale investigation and children with DS who consisted our sample were not followed longitudinally. Therefore, more longitudinal research studies on DS phonology are needed with large samples which will be followed from childhood right through adolescence and adulthood. Thus, safe results will be reached and perhaps the exact age of "turning off" of the neural mechanisms for phonological development in DS will be found (Abbeduto et al. 2007).

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An experimental investigation of existential sentences and cognitive/semantic categories in Turkish

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Abstract

In this study, we investigated the relationship between two fundamental cognitive/semantic categories, Figure (F) and Ground (G), in Turkish existential sentences. We created a scale in which F-G relations were constructed with sagittal configurations such as 'There is a mouse in front of an elephant.' We asked Turkish native speakers to judge these sentences. Repeated measures ANOVA showed that participants judged the F<G sentences with higher ratings compared to the F>G sentences and they rated the F<G sentences with 'in front of' the highest while the F>G sentences with 'in front of' the lowest. This finding provides evidence for the F-G relations in Turkish existential sentences.

Key words: Existentials, Figure-Ground, Turkish.

Introduction

Existential constructions such as (1) are related to both locatives and possessives. Their underlying structure is presumably related to locatives (Freeze 1992). Previous research has shown that in (1) 'there' is the subject, copula 'be' is the predicate, 'a glass' is the pivot, and 'on the table' is the coda (Barwise and Cooper 1981; Freeze 1992; Keenan 1987; McNally 1992; Milsark 1974; Stowell 1978; for a summary see Francez 2009 and McNally 2011).

(1)   There is [a glass]$_{pivot}$ [on the table]$_{coda}$

According to Zucchi (1995) and Keenan (2003), the pivot, 'a glass' in (1) cannot be marked with 'the' because the pivot should be indefinite in existential sentences. The pivot also introduces a new discourse referent (see Heim 1987; Enc 1991). In the present study, we explore whether the semantic/cognitive relationship between the pivot and the coda make a difference in existential constructions. To our knowledge, this research is the first attempt to investigate this topic utilizing an experimental linguistic methodology.

Talmy (2000) suggested that there are two fundamental cognitive-semantic categories in Conceptual Semantics, Figure (F) and Ground (G), that posit existence Fs are entities that need anchoring whereas G are entities that does the anchoring. Semantic typological studies have shown that there is an asymmetrical relationship between F and G in languages which may also be

reflected in cognition (Levinson 2003). Fs are moving or conceptually movable, more salient and smaller whereas Gs are relatively stable and bigger and can be culturally significant (Svorou 1994; Talmy 1987, 2000). In a series of studies, we are testing these hypotheses in locatives and existentials. Here, we investigated F-G relations and sagittal configurations (front-back) in Turkish existential sentences by employing acceptability judgments.

One expects that existential 'there is a glass on the table' is more acceptable than existential 'there is a table under the glass' because compared to table, glass can be assigned to an F role. The rationale for sagittal configurations comes from the fact that sagittality is one of the fundamental cognitive categories (e.g. Lyons 1977) which is mapped on the body and reflected in spatial relations and temporal relations (Evans 2006; Núñez and Sweetser 2006).

Methodology

Sixty-four native speakers of Turkish participated in this study. We created four scripts: Each script consisted of 24 items/sentences: 8 testing items (2 sets randomly selected from 8 token sets), 8 good fillers, 8 bad fillers. Scripts had a 7-point Likert scale (ratings between 0-6) with a 2x2 within-subjects factorial design (F-Grelation x Sagittal). Below, we give a token set consisted of existential sentences with mouse and elephant for F-G relation and 'in front' and 'behind' for sagittal relations. We hypothesized (2) and (3) would be more acceptable than (4) and (5).

(2)   Filin önünde bir fare var. (F<G; in front)
       'There is a mouse in front of an elephant'

(3)   Filin arkasında bir fare var. (F<G; behind)
       'There is a mouse behind an elephant'

(4)   Farenin önünde bir fil var. (F>G; in front)
       'There is an elephant in front of a mouse'

(5)   Farenin arkasında bir fil var. (F>G; behind)
       'There is an elephant behind a mouse'

Results
Descriptive statistics of the measures are given below.

Table 1. Means and standard deviations of the factors and their levels.

	Mean	SD
F>G, in front of	3.77	1.76
F>G, behind	4.39	1.70
F<G, in front of	4.79	1.44
F<G, behind	4.37	1.63

Repeated measures ANOVA indicated a main effect for the F-G relation, $F(1,63)= 11.27$, $p<. 05$ but not for the Sagittal, $F(1,63)= .50$, $p>. 05$. Yet, there was an interaction, $F(1,63)= 8.01$, $p<. 05$. As we expected, this finding indicated that participants judged the F<G sentences (M=4.58, SD=0.16) with higher ratings compared to the F>G sentences (M=4.08, SD=0.17). As for interaction, they rated the F<G sentences with in front of the highest (M=4.79, SD=0.18) while the F>G sentences with in front of the lowest (M=3.77, SD=0.22).

Conclusion
According to Talmy (2000), Figure and Ground are two fundamental cognitive/semantic categories. From psycholinguistic studies, we have already known that assigning a Figure or Ground role to an entity is very important in the language of spatial expressions (e.g. Levinson 2003), in which constructing lateral and sagittal relations is essential (e.g. Lyons 1977). The present study has explored the relationship between these two categories, Figure and Ground, and sagittality by obtaining acceptability judgments from native Turkish speakers. These findings provided additional evidence for the F-G relations with sagittal configurations from Turkish existential sentences by using experimental linguistic methodology. Future research will investigate this issue in other languages.

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Location, existence, and quantification in Turkish: What do results from a forced choice scale show?

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Abstract

Previous research has shown that Turkish speakers' acceptability judgments differ with respect to the type of quantification of nouns and the introduction of new vs. old information in locatives and existentials. The present study tested these findings by asking participants to make a choice between locatives and existentials in which nouns were quantified. With Cochran Q then McNemar tests, we found that Turkish participants preferred existential sentences over locative sentences due to new vs. old information; number quantification over bare or plural nouns in existential sentences. These findings together provide additional evidence for the distinction between locatives and existentials.

Key words: Locatives, Existentials, Quantification, Turkish.

Introduction

Previous studies showed that locatives ('a book is on the table'), existentials ('there is a book on the table'), and possessives ('I have a book (on the table)') are cognitively and linguistically related to each other (Lyons 1967, Clark 1978, Freeze 1992, Jackendoff 1990, Heine 1997). Yet, they differ from one another in that existential sentences may contain a verb related to locative 'to be' and possessive 'to have,' contain a pivot, and a locative expression, and existential sentences obey definiteness restriction. In this study, by using a forced choice scale, we explored whether locatives and existentials in Turkish can further be distinguished from one another.

As expected, Turkish locatives and existential are related to each other. Locatives consist of NP and NP+locative+(Tense)+Person,number whereas existentials consist of an optional $(NP+locative)_{coda}$ and NP_{pivot} as well as 'var'+(Tense)+Person,number. We give two examples for these constructions below.

(1) $[Kitap]_{theme}$ kutu-nun   iç-in-de-y-di- Ø. (locative)
    Book   box-gen   in-poss-loc-copula-past-3sg
    'The book was in the box'

(2) Kutu-nun iç-in-de]$_{coda}$ kitap]$_{theme-pivot}$ var-(y)dı-Ø. (existential)
    Box- gen in-poss-loc   book   exist-copula-past-3sg
    'There was a book in the box'

We had conducted a series of studies employing experimental linguistic methodologies to explore the relationship between locatives and existentials. By using Likert scales, we asked participants to rate locative and existential sentences in which noun phrases in a theme role, e.g., *kitap* 'book' in (1) and (2), were quantified (bare *kitap* 'book' or number quantified *iki kitap* 'two books' or plural *kitaplar* 'books') (Arik 2011). The results showed that overll, the ratings for the existential sentences were significantly higher than the ratings for the locative sentences. There was no main effect of quantification type. But there was a significant interaction between sentence type and quantification type. One reason for this finding could be because of new vs. old information: Existentials but not locatives introduce new information therefore participants could have rated existentials higher than locatives. To test this hypothesis, we conducted another study (Arik 2012) in which each testing item had two sentences: The first one was either locative or existential while the second one that followed was adjectival to make the theme in the first sentence as new information. For example, 'There is a book on the table. The book is thick'. We obtained similar results: the ratings for the existential sentences were significantly higher than the ratings for the locative sentences. There was no main effect of quantification type meaning that the participants did not rate the sentences differently due to the manipulations at the NP level only. But there was a significant interaction between sentence type and quantification type which suggests that both the manipulations at the NP level and the use of either an existential sentence or a locative sentence led to a change in the ratings.

These findings together indicated that the Turkish speakers' acceptability judgments differ with respect to the structure of NPs and the introduction of new vs. old information in Turkish locatives and existential. In the present study, we further tested our findings by employing another experimental linguistic methodology, forced choice scales.

Methodology

Sixty native speakers of Turkish participated in this study. We used a forced-choice scale with a 2x3 within-subjects design to get acceptability judgments from the participants. The first factor was construction: Locative vs. Existential; the second factor was Quantification of noun in the theme role: Bare vs. Plural vs. Number quantification. There were two scripts with 24 items (12 testing items with 2 sets and 12 fillers). One of the scripts contained items in reverse order of the other script to avoid the order effect. Each item had two columns in which either locative or existential sentence was presented on a single paper.

Participants were asked to pick one item over another, e.g. (3) or (4):

(3)   Kitap masanın üstünde. Kitap kalın. (Locative, Bare noun)
       'A/The book is on the table. The book is thick.'

(4)   Masanın üstünde kitap var. Kitap kalın. (Existential, Bare noun)
       'There is a/the book on the table. The book is thick.'

Results

Descriptive statistics of the measures are given in Table 1. With a Cochran Q's test, we found that there was a significant difference ($\chi2(5)$=94.57, p<.001). A pairwise comparison between these factors with McNemar test showed significant differences between locatives (existential preference, 95.3%) and existentials (existential preference, 73.3%) due to new vs. old information; between bare nouns (existential preference, 80.4%) and number quantified nouns (existential preference, 91.3%); and, between number quantified nouns and plural nouns (existential preference, 81.2%) but no significant difference between bare nouns and plural nouns due to definiteness/specificity effect.

Table 1. Percentages of participants' choices with respect to given testing items.

Testing item on the left column	Locative choice	Existential choice
Locative, Bare noun	8%	91%
Existential, Bare noun	29%	71%
Locative, Number quantified noun	1%	98%
Existential, Number quantified noun	15%	84%
Locative, Plural noun	3%	96%
Existential, Plural noun	34%	65%

Conclusion

Previous research (Arik 2011, 2012) indicated that the Turkish speakers' acceptability judgments differ with respect to the type of quantification in NPs in theme roles and the introduction of new vs. old information in Turkish locatives and existentials. The current study provided additional evidence to support this distinction. This distinction could be because of a DP/NP syntactic distinction, a definiteness/specificity interpretation, new vs. old information (Milsark 1974, Erguvanli-Taylan 1987, Enc 1991, McNally 1992, Kornfilt 1997, Zucchi 2005, Öztürk 2005, Nakipoglu 2009) in

locatives and existentials. Future research will investigate other types of noun modification such as color and quality to further explore this topic.

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German *beim*-progressive exists: Evidence from acceptability rating and self-paced reading

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Abstract

This study investigates the behavior of German prepositional progressive with respect to object complementation by running an acceptability rating and self-paced reading task. Previous corpus studies showed that complements are usually incorporated when occurring with the prepositional *am-* or *beim*-progressive. In contrast, this study provides empirical evidence that German natives accept also non-incorporated complements in *beim*-progressive, and even more, there is a tendency towards higher acceptability of *beim*-progressive than the similar, even though more frequent, *am*-progressive.

Key words: progressive, German, complementation, acceptability rating, self-paced reading

Progressive in German

In the non-progressive language German it is possible to express progressive meaning (e.g., Bergmann 2012, Engelberg 2003) via simple present and an optionally temporal adverbial expression. Moreover, there are several lexical expressions also conveying progressive meaning.

Considering previous corpus studies on German progressive based on frequency effects, it is assumed that *beim*-progressives including a complement that is not incorporated tend to be ungrammatical, whereas incorporated complements are grammatical (Krause 2002, Glück 2001). In more detail, both *am-* and *beim*-structures usually do not occur with direct objects as non-incorporated complements (Krause 1997), and further, non-incorporated prepositional phrases as complements are only found rarely in case of *am*-progressives (Krause 2002).

Methodology

In a combined self-paced reading (SPR) and acceptability rating study (n=39, German natives) it was investigated, whether the absence of a structure in a corpus is evidence enough for its non-acceptance. The current experiment implements the SPR-paradigm in combination with the method of acceptability rating by running the LINGER experimental software (Rohde 2003). More precisely, measures were taken for total reading times (RT) for complete sentences, and further, for upcoming acceptability ratings on a 1 (ungrammatical) to 7 (grammatical) scale.

Material

Due to the more investigated *am*-structure, and based on the assumption that the former can replace the latter (Van Pottelberg 2005), *am*- and *beim*-progressives were compared as minimal pairs both including incorporated and non-incorporated constituents. Critical items were composed on the assumption that the non-incorporated object must be realized structurally post-progressive (see Bergmann 2012 for a more detailed explanation). (1) exemplifies an experimental item for *beim*- and *am*-constructions consisting of an incorporated nominal phrase (iNP) (1a), a non-incorporated nominal phrase (nNP) (1b), or a non-incorporated prepositional phrase (nPP) (1c).

(1)   a. Paul ist am/ beim   Zeitunglesen.
          Paul is   AM/ BEIM newspaper-reading
          'Paul is reading the newspaper.'

       b. Paul ist am/ beim   Lesen   der   Zeitung.
          Paul is AM/ BEIM reading the$_{genitive}$ newspaper
          'Paul is reading the newspaper.'

       c. Paul ist heute Abend   am/ beim   Aushelfen   in der Kneipe,
          Paul is today evening AM/ BEIM helping-out in the pub
          'Paul is helping out at the pub this evening.'

Results

The statistical analysis of acceptability ratings as well as reading time measures was performed via linear mixed models (Baayen 2008, Gelman & Hill 2007). The results showed that *beim*-progressive forms are significantly more accepted than *am*-progressives (t= 2.81) across all investigated complement types and irrespective of incorporation. Furthermore, mean rating values for both progressives with nPP (M_{am}= 4.12/ 7; M_{beim}=4.80/ 7) showed a significant higher acceptability for *beim*-progressive (t= 2.11), which is in contrast to former observations (Krause 1997). Whereas mean rating values for iNP show a tendency to be higher for *beim*- than for the respective *am*-structures (M_{am}= 5.12 / 7; M_{beim}= 5.49/ 7), a marginal significant effect (t= 1.78) is revealed for *beim*-progressive including nNP (M_{am}= 4.98/ 7; M_{beim}=5.33/ 7).

   Assuming further that longer RTs indicate greater difficulties in processing (e.g., caused by ungrammatical structures, see Sekerina, Fernández & Clahsen 2008, Just, Carpenter & Woolley 1982), the current data do not verify differences in processing difficulties for both progressive types. In fact, no significant differences in reading times could be found for each complement type (iNP: RT_{am}= 4097ms, RT_{beim}= 4171ms; nNP: RT_{am}=

4353ms, RT_beim= 4543ms; nPP: RT_am= 4976ms, RT_beim= 4196ms). All mean rating values as well as total RTs are shown in table 1. The corresponding plots are depicted in figure 1.
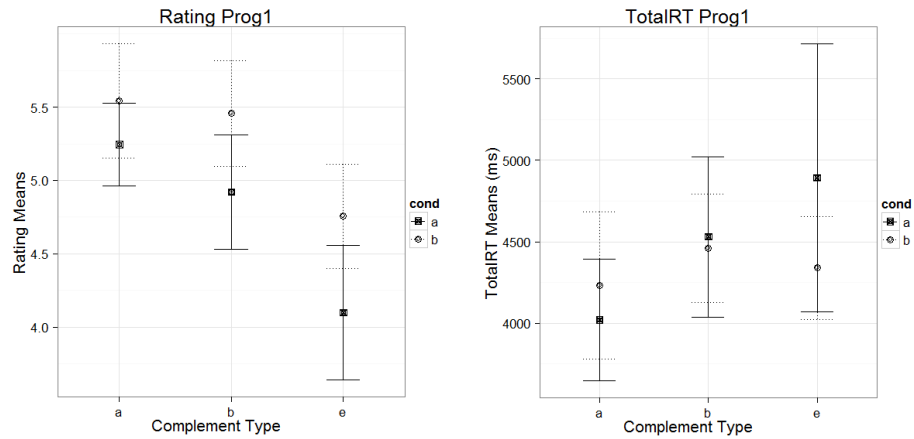
Figure 1. Mean rating measure which showed a statistical significant effect on non-incorporated complementation for nNP and nPP. Line type indicates the progressive types: solid line for *am*-constructions and dashed line for *beim*-constructions. Complement types are defined as follows: incorporated noun (a), non-incorporated noun (b), and non-incorporated prepositional phrase (e). Error bars indicate the 95% confidence intervals. Note: Only the between-subjects variance was removed.

Table 1. Rounded rating means (numerical numbers) as well as totalRT (in ms) for all six conditions, that is, the progressive type of either *am* or *beim* including the respective complement type iNP, nNP or nPP.

Condition	*am* iNP	*beim* iNP	*am* nNP	*beim* nNP	*am* nPP	*beim* nPP
Rating means	5.12	5.49	4.98	5.33	4.12	4.80
Total RT (ms)	4097	4171	4353	4543	4976	4196

Conclusions

The current results suggest that *beim*-progressives are regardless of their complement type in the first place grammatical structures in German, contrary to former results inferred from frequency effects. In particular, the results of the present study raise serious doubts about previous claims such as non-incorporated complements are not possible with German prepositional progressive structures. Thus, acceptability in grammatical terms cannot be predicted sufficiently based on frequency in a corpus.

In sum, research on German progressive structures is still in its infancy, and therefore, further investigation needs to be done to provide a more detailed description, especially with respect to complementation and any restrictions that come with it.

The results of this study indicate a higher acceptability of *beim*-progressive structures in German.

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Incidental vocabulary acquisition during reading by adult native speakers of German

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Abstract

In the present study, we explore the influence of syntactic complexity on incidental vocabulary acquisition. Instead of relying on introspective research methods based on self-evaluation that have been typically used previously (e.g. the Vocabulary Knowledge Scale (Paribakht & Wesche, 1996)), we employ several psycholinguistic paradigms to investigate the acquisition of various lexical aspects of the new words (especially of phonological form and meaning) under two different acquisition conditions: a) directly within the context in which the subject first encounters the new word (self-paced reading) and b) independently from the acquisition context (lexical decision and semantic priming). The results of the present study indicate that the acquisition of new words is more successful in syntactically simple contexts.

Key words: incidental vocabulary acquisition, reading, syntactic complexity

Introduction

Incidental vocabulary acquisition, i.e., "the acquisition of vocabulary as a by-product of another activity" (Laufer, 2001), has gained considerable attention in past decades, especially in the context of second language acquisition. After a period of predominate focus on its quantitative aspects (e.g. how many times a new word must appear so that it is acquired), the attention has turned to the qualitative properties of the context in which the new word appears: „The quality of the context provides an answer to why gains in knowledge of meaning have varied from word to word (Horst et al. 1998; Saragi et al. 1978) and study to study (Horst et al 1998; Rott 1999; Saragi et al. 1978; Waring & Takaki 2003)" (Webb, 2008).

In the present study, we explore the incidental acquisition of German nouns in syntactically complex and simple contexts by adult native speakers.

Experiments

Sixty-eight native speakers of German participated in all experiments. In **Experiment 1**, 17 super-participants (each consisting of four participants that together formed a complete experimental list) read 20 short texts (ca. 93 words), each containing one to-be-learned word (TBLW, repeated three times in the text) that was represented by a pseudo-word taking the place of a real low-frequency word. The texts were constructed such that the meaning of the TBLW could be derived from its context.

Each subject saw half of the texts in a syntactically complex version (long clauses, passive voice, infinitive and participle constructions) and the other half in a syntactically simple version (short main clauses). Each text was followed by 1-3 sentences that were read according to the self-paced reading method (moving window). One of the sentences contained the TBLW, which was combined either with a semantically plausible or implausible adjective, e.g.: kaputte Schocht (broken schocht (i.e. 'rake')) vs. leere Schocht (empty schocht (i.e. 'rake')).

In **Experiment 2**, the same participants performed a lexical decision task, in which the 20 TBLW appeared together with 20 pseudo-words and 20 real words.

In the semantic priming **Experiment 3**, the TBLWs were presented as primes in a semantic condition (the target was a word semantically related to the TBLW) and in a semantic + contextual condition (the target was semantically related and had also appeared three times together with the TBLW in the short texts of Experiment 1). Each related condition also had a respective counterpart with semantically unrelated primes and targets. In addition to the previous two conditions, there was also a control semantic condition with known primes and targets that did not appear in the previous experiments.

Results

The results of **Experiment 1** show that participants read the syntactically complex texts significantly more slowly than the simple ones (29,7s vs. 28,3s). In addition, reading times during the self-paced reading part of the experiment were significantly slower (p<.01) in the implausible than in the plausible condition in the part of the text directly following the TBLW. This suggests that participants successfully derived the meanings of the TBLWs because they had problems to integrate them with the semantically implausible adjectives.

Moreover, a tendency towards an interaction between the factors plausibility and complexity at the position TBLW+1 ($F1(1,15)=6.9$, p<.05; $F2(1,19)=2.2$, p=.15) suggests that subjects were less successful in deriving and/or representing the meaning of the TBLW in syntactically complex texts.

Table 1. Results of Experiment 1; mean RTs in ms in all four conditions; effect of plausibility

| Position | | Plausibility | | |
		plausible	implausible	diff.
TBLW	simple	412,75	416,95	4,20
	complex	418,52	421,49	2,97
TBLW+1	simple	406,04	444,86	38,82
	complex	414,45	427,72	13,27
TBLW+2	simple	396,85	414,36	17,51
	complex	396,50	417,98	21,48

This finding is supported by the results of **Experiment 2**: Participants recognized the phonological form of the TBLWs significantly more often if the TBLW appeared in a syntactically simple context than if it appeared in a complex one. Analyses of RTs further revealed that the yes-responses to the TBLWs were slower than the yes-responses to the real words and even slower than the no-responses to the pseudowords. This indicates that participants successfully stored the phonological form of about 44% of the TBLWs, but access to them was still very demanding.

Table 2. Results of Experiment 2, mean RTs in ms and correct responses ("yes" for TBLWs)

	real words	pseudowords	TBLWs
RT (in ms)	617(99%)	833(86%)	941 (44%)

The results of **Experiment 3** showed significant semantic priming effects in the control semantic condition. Subjects were significantly faster in recognizing familiar words in the semantically related than the semantically unrelated condition. However, no priming effects were observed when TBLWs appeared as primes, neither in the semantic, nor in the semantic + contextual condition. (For each subject only the RTs of the TBLWs that they identified in Experiment 2 as real words were analyzed).

Conclusions

The results of the self-paced reading Experiment 1 show that participants successfully derived the meaning of the TBLWs which appeared three times in short texts. The tendency towards larger and more immediate plausibility effects for TBLWs that appeared in syntactically simple contexts indicates that syntactic complexity interferes with the process of meaning derivation from context and/or with the process of creating the new representation.

Moreover, the absence of the semantic priming effects for TBLWs in Experiment 3 suggests that the integration of the new TBLWs into the semantic network either had not taken place (yet), or that the connections were so weak that no effects could be measured.

The results of Experiment 2 show that participants established a form-based, graphemic representation for at least 44 % of the TBLWs, suggesting that formal aspects were also memorized and retrievable independently from the context of acquisition. However, as indicated by the slow reaction times, access to these newly learned forms was very demanding. The larger number of recognized phonological forms that appeared in syntactically simple contexts indicates that syntactic complexity also had a negative effect on creating the phonological/graphemic representation of the TBLWs.

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Stress and syllable structure durations in Greek

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Abstract

This is an experimental study of segmental durations as a function of lexical stress production and syllable structure in Greek. In accordance with a production experiment, the results indicate that lexical stress production has different effects on different syllable structure constituents. Thus, the vowels are lengthened more than prevocalic consonants whereas stress production has a shortening effect on postvocalic consonants. These results imply that vowels are the main carriers of stress distinctions in Greek with reference to duration correlates of stress production.

Key words: Greek, stress production, syllable structure, segment durations, prosody

Introduction

This is an experimental investigation of segmental durations as a function of lexical stress production and syllable structure in Greek. Lexical stress has a distinctive function in Greek and may be distributed in one of the three last syllables of the word. Syllable structure, on the other hand, has no weight distinction, i.e. light vs. heavy, and no effect on lexical stress application.

Greek has a dominant open syllable structure and intervocalic consonants are thus as a rule syllabified with the vowel on the right unless the consonant phonotactics are violated. The prevocalic consonants are referred to as "onset", the vowels as "nucleus" and the postvocalic consonants as "coda". The syllable is assumed to have a hierarchical structure, according to which the nucleus and coda constitute one syllable element, the "rhyme", which is branching with the onset, i.e. [[O]nset [[R]hyme [C]oda]]. Given that intervocalic consonants quite often violate the onset phonotactics of the syllable on the right, a consonant is consequently syllabified on the left, constituting the coda element of the syllable on the left.

The production of lexical stress is correlated with a variety of acoustic parameters. Among them, syllable lengthening is a constant acoustic correlate across different prosodic contexts and this lengthening is considerably bigger with respect to vowels than consonants (Botinis 1989, Fourakis et al. 1999). However, the duration variability of the coda consonant as a function of lexical stress production has not drawn attention in prosodic research, which is virtually an under-examined area.

In the present investigation, the main question is addressed to the duration correlates of coda consonants as a function of lexical stress production in Greek. Additional questions are addressed to the duration correlates of onset consonants and nucleus vowels and the results of this investigation are compared with results of other investigations.

Experimental methodology

One production experiment was carried out in order to investigate segmental durations in different lexical stress and syllable structure contexts. The speech material consisted of 5 key words in the carrier sentence [ˈipa ___ kaˈla] ("I said ___ good"). All key words had the same CVCCV segmental structure, according to which the two intervocalic consonants have different syllable hosts. 10 female and 10 male speakers with standard Athenian pronunciation and no known speech disorders, at their twenties, produced the speech material 2 times at a normal tempo. The speech material was recorded in Athens University Phonetics Studio and analysed with the Praat sofware program. Segmental duration measurements were taken with standard criteria, in accordance with visual inspection of the soundwave and spectogram. The results were subjected to statistical analysis and processing with the SPSS software program.

Results

The results are reported with respect to the duration of word penultima syllable and its constituents (i.e. onset, nucleus, coda). Since the examined words were consisted of different segments (/ˈvalti ~ ˈmurla ~ ˈpenθi ~ ˈpafsi-nafˈsi/) and because absolute durations may have varied as a factor of speaking rate, syllable and segment "normalized" durations were examined, defined as the ratios of syllable duration over word duration and segment duration over syllable duration, respectively. Table 1 presents the mean duration (in ms) of each segment, syllable and word for each CV structure. The segment/syllable and syllable/word ratios are also presented.

In terms of syllable normalized duration, stressed syllables were significantly longer (0.684) than unstressed ones (0.548) [$t(46)=46.000$, $p<.0001$] (Figure 1). A three-way Anova (gender x stress x position) with segment normalized duration as the dependent variable revealed a main effect of segment position in syllable [$F(2,36)=15.679$, $p< 0.0001$]. Post hoc tests indicated that there was a significant difference between onset and coda as well as nucleus and coda, but not between onset and nucleus position (onset: 0.360, nucleus: 0.346, coda: 0.293). A significant interaction between position and stress [$F(2,36)=25.751$, $p<0.0001$] revealed that although segments at onset and mostly nucleus position were longer in stressed syllables, segments at coda position were longer in non-stressed syllables (Figure 2). Table 2 presents the mean normalized segment duration at onset, nucleus and coda position in stressed and non-stressed syllable condition.

Table 1. Mean duration (in ms) of each segment, syllable and word for each CV structure and the ratios of segment duration over syllable duration and syllable duration over word duration.

CV structure	Segment	Syllable	Word	Segment / Syllable	Syllable / Word
/CVltV/	90	270	400	0.225	0.675
/CVrlV/	82	246	415	0.197	0.592
/CVnθV/	81	243	413	0.195	0.586
/CVfsV/	83	250	409	0.205	0.610

Table 2. Mean normalized segment duration (segment/syllable) at onset, nucleus and coda position in stressed and non-stressed syllable condition.

Syllable position	Male		Female		Mean	
	[+stress]	[-stress]	[+stress]	[-stress]	[+stress]	[-stress]
Onset	0.380	0.359	0.356	0.346	0.368	0.352
Nucleus	0.379	0.318	0.396	0.293	0.387	0.306
Coda	0.242	0.323	0.247	0.361	0.245	0.342
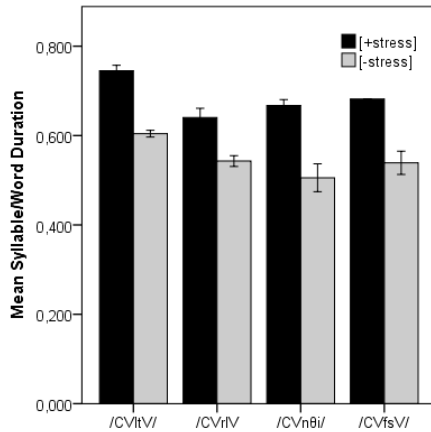
Figure 1. Mean normalized syllable/word durations as a function of stressed [+stress] and non-stressed [-stress] syllable condition.
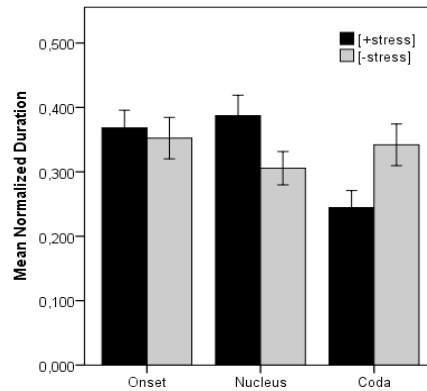
Figure 2. Mean normalized segment/syllable durations at onset, nucleus and coda position as a function of stressed [+stress] and non-stressed [-stress] syllable condition.

Discussion

The results of this investigation indicate that the production of lexical stress has different duration effects on different syllable structure constituents. Thus, the neucleus vowel is lengthened more than the onset consonant, whereas the coda consonants show the oposite effect.

The above results are based on the hypothesis that coda consonants are permitted in the syllable structure of Greek. In accordance with the open syllable structure, which is predominant in Greek, intervocalic cluster consonants must syllabify on the right. However, when the phonotactis of the onset constituent of the syllable on the right are violated, a question is raised as to whether consonants may syllabify on the left.

A related to syllable structure study has provided experimental evidence that syllabification in Greek is mainly accomplished with reference to the non-violation of the phonotactics of the onset constituent of the syllable on the right (Chaida et al. 2012). This evidence is based on tonal structure and the production of voice fundamental frequency (F0), the rise of which is aligned with the beginning of the syllable, be it consonant or vowel. In accordance with the results of the above study (Chaida et al. 2012), the alignment of the F0 rise as a function of second syllable stress production was associated with either the first or second intervocalic consonant. In the former case, the phonotactics of the syllable on the right were not violated whereas, in the latter case, were violated. Hence, the first consonant was syllabified on the left, despite the dominant open syllable structure of Greek.

Assuming that a variety of different consonants may syllabify on the left and constitute thus the coda of the preceding syllable, a major issue is raised with reference to the temporal organization of syllable constituents as a function of lexical stress production. Segmental durations may vary in different prosodic contexts, including lexical stress and syllable structure ones (Botinis et al. 2001). In the present investigation, the shortening of the coda constituent in lexical stress context may be attributed to a complementary shortening in relation to the lengthening of the other onset and nucleus syllable constituents.

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Cultivating reading self-efficacy

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Abstract

This study is a longitudinal investigation, conducted over one academic year, into the role that extensive reading (ER) and reading strategies play in the cultivation of reading self-efficacy in an English as a foreign language (EFL) context. The study also examined how changes in reading self-efficacy relate to changes in reading proficiency. The participants ($N = 322$) were non-English major students at a university in Japan. The data for the study was obtained through a battery of Likert-scale questionnaires and reading comprehension tests. The results revealed that a combination of reading strategy intervention and participation in an extensive reading program would lead to greater gains in reading self-efficacy which was also later shown to translate into gains in reading comprehension.

Key words: self-efficacy, extensive reading, language testing, reading strategies

Review of the literature

Self-belief and its influence on reading development is one dimension of this reading motivation. The role that self-belief plays in English as a foreign language reading motivation has been investigated (e.g., Mori, 2002) and empirical results indicate that there is a strong relationship between reading motivation and reading self-efficacy beliefs. However, research investigating methods by which reading self-efficacy may be cultivated in an EFL context are lacking.

Self-efficacy

In his article entitled "Self-Efficacy: Toward a Unifying Theory of Behavioral Change," Bandura (1977) defined self-efficacy as the strength of expectations individuals maintain about their ability to perform successfully a behavior that will lead to a particular outcome. He further claims that one's level of self-efficacy relates strongly to one's decision to initiate activities that support learning, the level of effort expended on accomplishing those activities, and how perseverant that person can be in the face of adversity.

Reading strategies and extensive reading

As mentioned above, reading self-efficacy plays a significant role in reading motivation, therefore, methods of teaching that might promote self-efficacy in the EFL context were investigated. Reading strategy intervention and extensive reading showed great promise.

Schunk and Rice (1987) found through studies with L1 remedial learners that explicit instruction to students on the use and utility of reading comprehension strategies helped them not only comprehend better, it also

helped to improve their reading self-efficacy. Schunk et al. (1991) also demonstrated that children's sense of efficacy is closely connected to their academic performance, and that instructing students both on how to be more efficacious would lead to learners' engagement in the reading process.

In addition to reading strategies, ER has also shown some positive affective benefits to learners. Nishino (2007) conducted a longitudinal, case study of two teenage EFL learners in Japan in which her data supported the notion that ER fosters a stronger sense of motivation and attitude toward reading in the L2.

Takase (2003) also reported gains in motivation of 219 Japanese EFL high school students related to ER program participation. She found that the motivation of the participants was multifaceted with the strongest element in extensive reading motivation being intrinsic motivation.

In the end, an investigation into the effects that reading strategies and extensive reading have on reading self-efficacy was undertaken with the following research questions:

1. To what degree does the participants' English reading self-efficacy change after participation in one of the three experimental groups or the intensive reading group (control group) over one academic year?
2. Do changes in reading self-efficacy lead to changes in reading comprehension?

Methods
The study was conducted with the cooperation of 322 first- and second-year non-English major university students enrolled in 14 intact English reading classes in Japan. All participants were native Japanese speakers and were divided into four groups: an extensive reading group that only practiced extensive reading, a reading strategies group that was only instructed on the use of reading strategies, a combination of ER/reading strategies group that practiced both methods, and a control group. The control group classes were conducted using intensive reading methods.

Instrumentation
One questionnaire measuring changes in reading self-efficacy and one reading comprehension test were given three times over the academic year.

Results
The data of the questionnaire and the reading comprehension tests were analyzed using MANOVAs and Latent Growth Curve Modeling.

A MANOVA was conducted with the independent variable being the four groups and the dependent variable being the gain scores for reading self-efficacy taken the three times over the course of the study. The participants in the reading strategies and extensive reading/reading strategies groups gained significantly more from time 1 to time 3 in reading self-efficacy than those in the ER and control groups (Figure 1).

Results for Research Question 1
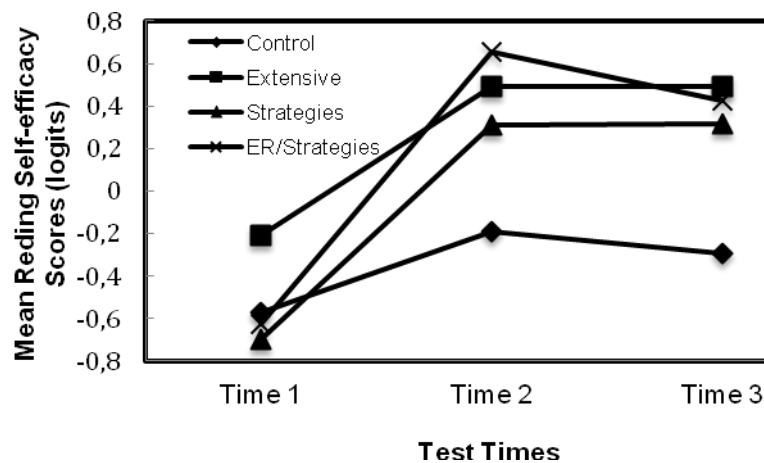
Figure 1. Mean reading self-efficacy scores for all groups.

Results for Research Question 2
A latent growth curve was conducted to determine if changes in reading self-efficacy lead to changes in reading comprehension. The associative model depicted in Figure 2 illustrates the initial changes in reading self-efficacy (InterceptSE) have a minimal and negative effect on changes in reading comprehension (SlopeRC). However, changes in reading self-efficacy (SlopeSE) show a fairly strong effect on change in reading comprehension (SlopeRC).
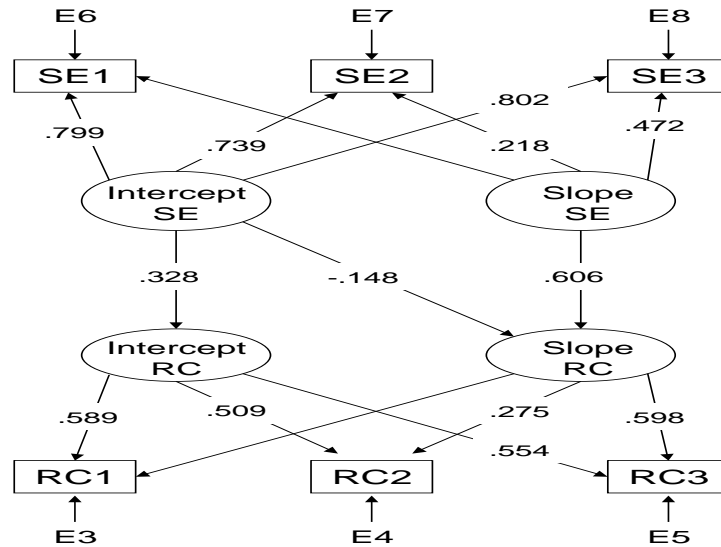
Figure 2. Latent growth curve for changes in reading self-efficacy predicting changes in reading comprehension.

Conclusion

These results underscore the importance of self-efficacy in the learning process and how the cultivation of self-efficacy can lead to the improvement of reading comprehension.

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Prosodic and pragmatic properties of affirmative words in European Portuguese

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Abstract

This paper investigates the correlation between the prosodic behavior and pragmatic functions of affirmative words from a spoken dialogue corpus collected for European Portuguese (EP). The analysis of 460 affirmative answers shows that affirmative words expressing *agreement* occur more often than those interpreted as *auto positive* and *confirm*. Low/falling and high/rising nuclear contours correlate with affirmative words with different pragmatic functions: *agreement* and *confirm* are commonly uttered with (H+)L* L%, whereas *auto positive* is commonly uttered with L*+H / (L+)H* H%. The analysis of acoustic/prosodic cues reveals that the three functions of the affirmative word *sim* 'yes' have significant differences ($p<.001$ and $p<.05$). A pitch concord effect is also found between functions, although expressed in different degrees.

Key words: affirmative words, prosody, pragmatics, dialogues.

Introduction

Previous research has shown that (i) affirmative words are crucial in dialogues but also difficult to identify automatically, since they serve different communicative functions; and that (ii) the prosodic behavior of these structures varies according to their function (*e.g.*, Benus *et al*. 2007; Gravano *et al*. 2007, 2012; Mata & Santos 2011, a. o.). This study is a first attempt to characterize affirmative words in adult-adult interactions in EP. Our main goal is to verify if words such as *sim* 'yes', *okay* or *humhum* (grunts) correlate with different acoustic/prosodic cues depending on their communicative function.

Methodology

This study uses a subset of the CORAL corpus (Viana et al. 1998), comprising 11 dialogues (12 speakers, 5 male and 7 female) in Map-task format. We analyzed 460 affirmative answers, corresponding to several linguistic structures, namely: *sim* 'yes', *okay*, *exacto* 'exact', *exactamente* 'exactly', *certo* 'certainly', *está bem* 'that's right', *está correcto* 'that's correct', *pronto, pois*; grunts (*e.g.*, *humhum*); the frozen form of the verb *ser* 'to be'; and both the repetition of the previous utterance, as well as the repetition of the main or auxiliary verb. These affirmative words occur mainly as isolated utterances (N=320), but also at the beginning (N=91), in the middle (N=18), and at the end of longer utterances (N=31).

Affirmative words were classified as proposed by the *Semantic Annotation Framework – Part 2: Dialogue Acts,* developed by Bunt et al. (2010) according to the rules of the International Organization Standard (ISO). The data was coded with three communicative functions: *agreement* (AG) – the speaker accepts the previous utterance as true; *auto positive* (AuP) – the signal was well interpreted and the listener is still paying attention; and *confirm* (CONF) – answers to yes-no questions and check questions.

The prosodic annotation was done in the ToBI (Tones and Break Indices) system, applying the first proposal *Towards a P_ToBI* (Viana *et al* 2007). For each affirmative word and for their adjacent declarative and interrogative contexts, we extracted the following features: number of syllables, duration (ms), energy mean, pitch maxima, minima and range, as well as f_0 values corresponding to high (H) and low (L) targets within the nuclear pitch accents and final boundary tones. All f_0 values were converted to semitones (ST).

Results

Affirmative words and communicative functions

Results show that affirmative words expressing *agreement* occur more often (52%) than affirmative words interpreted as *auto positive* (28%) and *confirm* (20%). The most common affirmative structures in the corpus are: *sim* 'yes' (42.8%), used across all functions (N=197: AuP=81, AG=78, CONF=38); *okay* (16.3%), mainly classified as *agreement* (N=75: AG=58); and grunts (10.7%), mainly coded as *auto positive* (N=49: AuP=31). Affirmative words such as *exacto* 'exact', *exactamente* 'exactly', and *está bem* 'that's right' (mainly classified as *agreement* or *confirm*) are quite residual in the corpus.

Prosodic properties

Results from a Kruskal-Wallis test show that the three functions of the affirmative word *sim* 'yes', as an isolated utterance, differ significantly in the following properties: duration ($\chi^2(2)=13.093$, $p<.001$), f_0 mean ($\chi^2(2)=6.583$, $p<.05$), maxima ($\chi^2(2)=8.172$, $p<.05$), and minima ($\chi^2(2)=8.243$, $p<.05$). This affirmative word has, therefore, a different prosodic behavior according to its different functions: (i) as *auto positive*, it correlates with higher values of duration, f_0 mean, maxima and minima; (ii) as *confirm*, it presents the lowest values of duration, f_0 mean, maxima, and minima, but the highest energy value; and (iii) as *agreement*, it presents the lowest energy value and, in all the remaining features, it is closer to the *auto positive* function.
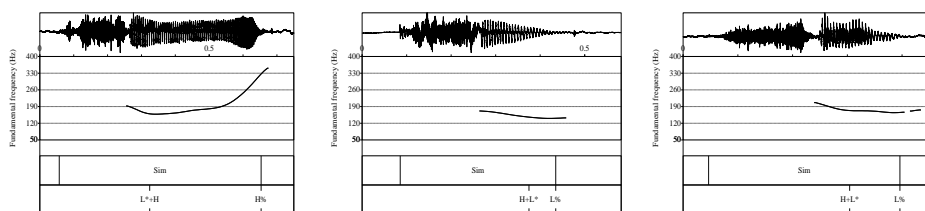
Figure 1. Sim 'yes' coded as *agreement*, as *confirm*, and as *auto positive*.

As for nuclear pitch accents and boundary tones across all functions (Table 1), results point out that low/falling and high/rising nuclear contours correlate with affirmative words with different pragmatic functions. Two distinct trends were found in the data: (i) *agreement* and *confirm* are commonly uttered with low/falling nuclear contours (L* / H+L* L%), indicating completeness; (ii) *auto positive* is mainly uttered with high/rising nuclear contours (H* / L*+H / L+H* H%), suggesting continuation. These results are comparable with what Benus (2007) and Gravano (2012) found for English. Thus, results show that different pragmatic functions are associated with distinct prosodic properties, making, therefore, a distinction between *auto positive*, on one hand, and *agreement* and *confirm*, on the other. See Figure 1.

Table 1. Distribution of nuclear pitch accents and boundary tones.

Functions	Nuclear pitch accent						Boundary tones		
	low/falling		high/rising			N	low	High	N
	L*	H+L*	H*	L*+H	L+H*		L-/L%	H-/H%	
AG	94	64	39	36	6	239	36/117	12/74	239
AuP	26	23	27	49	4	129	5/41	5/78	129
CONF	20	34	18	16	4	92	11/40	9/32	92
N	140	121	84	101	14	460	52/198	26/184	460

Additionally, we made a first analysis of the prosodic adjacent declarative and interrogative contexts of the affirmative words to check for the absence/presence of pitch concord effects. In isolated affirmative words, results suggest the presence of a pitch concord effect between the H targets of the declarative contexts and the H targets of the *agreement* and *auto positive* functions, although manifested in different correlations between nuclear pitch accents and boundary tones. For words classified as *agreement*, with a rising nuclear contour, the correlation is significant: (i) between the H target of the falling nuclear accent of the context and the H target of the accent of the affirmative word ($r_s=.435$, $p<.05$); and (ii) between the H target

of the high boundary tone of the context and the H target of the boundary tone of the affirmative word (r_s=.416, p<.01). For words coded as *auto positive*, with a rising nuclear contour, the correlation is significant between the H targets of the high boundary tone of the context and (i) the H target of the nuclear accent of the affirmative word (r_s=.245, p<.05); and (ii) the H target of the boundary tone of the affirmative word (r_s=.570, p<.01). For the *confirm* function and for interrogative contexts, no correlations were found.

Conclusions

Results show that *agreement* is the most frequent function in the corpus, followed by *auto positive* and *confirm*. Regarding the prosodic properties of the affirmative words, we can make two generalizations: low/falling contours, indicating completeness, mainly occur in affirmative words classified as *agreement* and *confirm*; and high/rising contours, suggesting continuation, are more frequent in words classified as *auto positive*. The prosodic properties point out to the different prosodic behavior of the affirmative word *sim* 'yes' according to its function. There are also evidences of a cross function effect of pitch concord between declarative contexts and affirmative words, although expressed in different degrees.

Acknowledgements

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Discourse prosody and political speech in Greek

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Abstract

This study investigates the prosodic characteristics of discourse, based on the analysis of a TV interview of a Greek politician. Temporal and tonal features were examined. It is shown that breaks and pauses cut up sentences into smaller chunks, which reflect semantic and discourse functions rather than syntactic structures. The politician did not use rising tonal structures at phrase boundaries in most cases, deviating from an average speaker. The issue of how "professional" public speakers differentiate their use of prosodic means by adopting more stereotyped patterns is, thus, raised.

Key words: discourse, prosody, intonation, political speech, Greek.

Introduction

This study focuses on prosodic structure and discourse organisation, reporting on an analysis of spontaneous speech material by a well-known Greek politician, who is considered to be a skilled speaker.

  Prosody conveys various discourse functions, interacting with linguistic factors and is assumed to express "the meaning" of a message (e.g. Wichmann, 2002). It has been suggested that a prosodic grammar interacts with linguistic and rhetorical features, in order to build an argumentative discourse, a "prosodic code" (Braga & Marques, 2004). Prosodic elements are intentionally manipulated in correlation with syntactic, lexical and pragmatic ones. In many languages, including Greek, intonation sets boundaries of speech units and brings forth the material they are aligned with into information units, with phrasing and prominence, according to the speaker's intention for the listener's interpretation (e.g. Botinis, 1995; Martin, 2010). Prosodic parameters, such as intonation, speech rate and intensity, are also essential for characterising a "good speaker" (Strangert & Gustafson, 2008), as well as emotions and expressions (Wichmann, 2002).

  In political speech, the art of persuasion involves a dual transaction: an audience to be persuaded and a persuader with a target-oriented rhetoric (Touati, 1993). It is assumed that persuasive political discourse typifies the speaking style, while "intensifiers" are often used to highlight several elements of the argumentation by tonal and temporal means (Touati, 1993; Strangert, 2005; Martin, 2010).

Methodology

The speech material consists of an interview of a male Greek politician, within a TV news report. The whole interview is 4.36 min long, while the

examined part of the politician's speech is 1.59 min (95.16 sec) long. A part of the interviewer's speech (newscaster) was also analysed (~34.42 sec, control sample). The interview is about the economic policy, focusing on the government's measures on taxing and pension. Both speakers are in their fifties, with standard Athenian pronunciation. The recorded material was written in standard Greek spelling and segmented into perceived phrases.

Acoustic analysis was carried out with Praat and statistical analysis with StatView. Duration measurements were taken for pauses and phrase length (chunks). F0 measurements were taken for pre- and post-break pitch (phrasing), mean F0, and tonal range of the whole of each speech sample.

Results

The main variables measured in the politician's speech sample are presented in Table 1. The pause-to-speech ratio is relatively low (21%), considering that the interview was produced without a prepared manuscript. Pauses (silent intervals) are many, but generally fairly short (mean duration 245 ms, sd=154), contributing to the low pause-to-speech ratio.

Breaks and pauses cut up sentences into smaller chunks, reflecting semantic rather than syntactic structuring. There are many cases where perceived breaks in prosodic phrases do not involve pauses. Longer pauses occur after no syntactic phrase (*no*), i.e. after particles and conjunctions. Pauses occur after sentences (*clause*), subordinate clauses (*secondary clause*), and other syntactic phrases (*phrase*, e.g. prepositional phrase, adjunctive phrase in genitive) - with this order, longest to shortest (Fig. 1). Pause length as a function of syntactic phrases is not significant for any pair (post-hoc test).

Chunks with 2-4 words are the most frequent, but single-word chunks are also noted. Mean phrase length in the politician's speech sample is 1607 ms, and 1162 ms in the interviewer's (Fig. 2), with a significant difference (t(df 82)=3.003, p<0.05).

With regards to intonation and syntactic phrases (Fig. 3), it seems that sentences (*clause*) are more prominently indicated by tonal means, in the politician's sample. However, the interaction of syntactic phrases with pitch is not statistically significant, either in pre-break (F(3,63)=0.86, p=0.46), or in post-break position (F(3,63)=1.42, p=0.26).

Regarding prosodic phrasing, the politician does not use rising tonal boundaries at phrase breaks in most cases. In his sample (Fig. 4), pre-break pitch (mean 173 Hz) is quite lower than post-break (mean 204 Hz), with a significant difference (t(df 66)=-3.98, p<0.05). In contrast, the interviewer's sample shows similar tonal features to usual spontaneous speech phrasing, with rising boundary at phrase breaks: pre-break pitch (mean 161 Hz) is higher than post-break (mean 153 Hz), a not significant difference though (t(df 16)=0.43, p=067). The difference between the two speakers is not

significant for pre-break pitch (t(df 82)=-0.69, p=0.49), but it is highly significant for post-break (t(df 82)=-5.20, p<0.001)(see Fig. 5-6).

Table 1. F0 and duration data for the speech sample by the Greek politician.

Politician's speech			
F0 (Hz)		Duration (sec)	
Mean	208.63	Total speech sample	95.16
Standard deviation	39.68	Total pauses	16.44
Minimum	75.26	Mean pause	0.24
Maximum	317.97	Pause-to-speech ratio	21%
Tonal range	242.71		
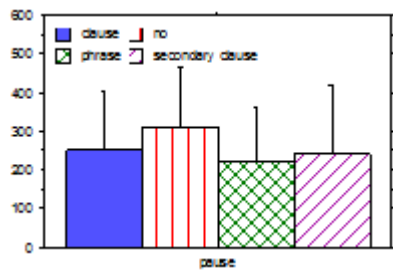
Figure 1: Mean pause duration (ms) of the politician speech, with regards to syntactic phrases.

Figure 2: Mean phrase length (ms) of the politician speech sample in comparison to the interviewer's.
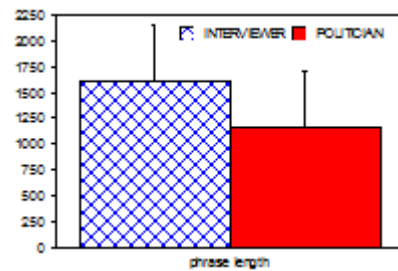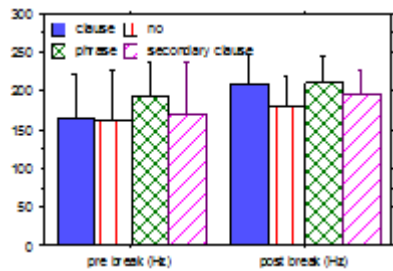

Figure 3: Mean pre- and post-break pitch (Hz) of the politician's sample, with regards to syntactic phrases.
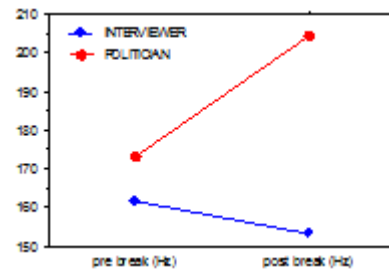

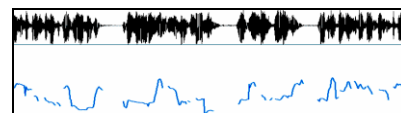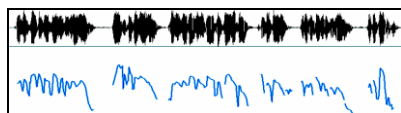Figure 4: Mean pre- and post-break pitch (Hz) of the politician's sample in comparison to the interviewer's.

Figure 5-6: Pitch snapshots by the politician's (left) and the interviewer's (right) speech sample.

Discussion and conclusions

Prosody plays a significant role with respect to discourse functions of political speech. Pauses were short and frequent. Chunks were short, with breaks occurring regardless of syntactic structures, violating continuity. Breaks were used in most cases in non-syntactic positions, demonstrating a sort of "semantic pausing" (Strangert, 2005). In fact, pauses in non-syntactic positions were longer than pauses based on syntactic structures, denoting that they are functional and intentional. Thus, breaks in non-syntactic positions may be considered as means to emphasise parts of speech, within the persuasive purposes of the speaker, although they might also indicate discourse processing by the speaker, since in spontaneous speech there is no time for planning what to say next. Producing breaks in non-expected positions can be seen as an attempt by the speaker to avoid interruptions (Strangert, 2005).

The politician uses a variety of argumentative and expressive acts, as well as strategies exploiting tonal prominence and phrasing (Botinis, 1994, 1995). However, his speech seems to differ from a non-skilled speaker, with respect to prosodic phrasing. He used consistently falling tonal contours, without exploiting "colourful" means for tonal segmentation ("tonal disjunction/conjunction" archetypes in Botinis, 1994). This is an interesting finding, maybe denoting "typification" of political speech (also found in Ségolène Royal's speech data, reported in Martin, 2010). This constant use of falling tonal patterns in discourse phrases does not probably serve well the persuasion purposes of a politician, while it typically puts the audience at a distance.

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Stress, tonal alignment and syllabification in Greek

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Abstract

The present study is an experimental investigation of tonal alignment and syllabification as a function of stress production in Greek. The results of a production experiment show that the onset of the tonal rise alignment of the stressed syllable is within a 0-48 ms region. This tonal alignment is associated with the first intervocalic consonant, unless the phonotactic structure of the syllable on the right is violated. These findings indicate that tonal production structure and tonal alignment are major acoustic correlates of syllabification. On the other hand, the phonotactic structure of the syllable on the right overrides any syllabification on the basis of the open syllable structure, which is predominant in Greek.

Key words: Greek, stress, tonal alignment, syllabification, prosody, intonation

Introduction

This is an experimental study of tonal alignment and syllabification as a function of stress production in Greek. One production experiment was caried out to investigate tonal alignment in lexical stres production context with reference to different combinations of intervocalic cluster consonants.

Lexical stress production in Greek is associated with a variety of acoustic parameters. However, these acoustic parameters do not have constant associations with lexical stress production but are heavily dependent on different prosodic contexts (e.g. Botinis 1989, Fourakis, Botinis, Katsaiti 1999). With reference to neutral focus contexts, the production of lexical stress is associated with a tonal rise, which is aligned with the beginning of the syllable, be that consonant or vowel. Thus, the tonal rise of stress production in neutral focus contexts is presumably an acoustic correlate of syllabification in Greek, as well as in many languages with a similar tonal structure, i.e. a L*H in autosegmental notation (e.g. Gussenhoven 2004).

Greek has a dominant open syllable structure, according to which syllables and thus lexical words end as a rule in a vowel. Except for acronyms and foreign words, the only consonants that may appear at the end of words are the sibilant [s] and, to a much lesser extend, the nasal [n]. However, even words with the nasal [n] ending, most commonly appear with an allomorphic ending with the epenthesis of the vowel [e] (e.g. ['pinun] ~ ['pinune] '(they) drink'). Given the open syllable structure of Greek, one intervocalic consonant is always syllabified on the right (e.g. [ka.li.'me.ra] (good morning). However, when a consonant cluster is in intervocalic position, a question of syllabification is raised, especially whenever the open syllable structure on the left violates the phonotactic syllable structure on the right.

Experimental methodology

One production experiment was carried out in order to investigate segmental durations in different lexical stress and syllable structure contexts. The speech material consists of 23 experimental words in the carrier sentence ['elejes __ ðina'ta] ("You were saying __ loudly"). All experimental words carry lexical stress on the second syllable, and have the same (C)VCCV segmental structure, according to which the two intervocalic consonants have different syllable hosts. Five female and five male speakers, in their twenties, with standard Athenian pronunciation and no known speech disorders, produced the speech material at a normal tempo. The speech material was recorded at the recording studio of the University of Athens Laboratory of Phonetics and analysed with the Praat sofware. Three segmental F0 measurements, as well as segmental duration measurements were taken with standard criteria, in accordance with visual inspection of the soundwave and spectrogram. The results were subjected to statistical analysis with the SPSS software.

Results

The results of this study are presented in the Figures 1-2 and Table 1.In Figure 1, tonal alignment is associated with the first intervocalic consonant, unless the phonotactic structure of the syllable on the right is violated. In Figure 2, percentages of syllable boundaries are illustrated in relation to permitted or non-permitted phonotactic structure of the consonant cluster. The offset of the first intevocalic consonant was set as zero point, and the duration (ms) was measured up to the point were intonation starts rising, either to the righ (positive) or to the left (negative).

In Table 1 mean length (in ms) of syllable rise alignment is presented (measured from the offset of the first consonant up to the point were intonation starts rising), in relation to both consonants' manner of articulation, to syllable boundary alignment (positive, negative zero) and to phonotactic structure (permitted – Y, not permitted – N).

Both Figure 2 and Table 1 show that in most cases, when the consonant cluster does not violate the phonotactic structure of the syllable on the right, the first intervocalic consonant is syllabified on the right (negative or zero), while when the phonotactic structure does not permit the consonant cluster, the first intervocalic consonant is syllabified on the left (positive or zero).

Regarding the case of left syllabification of the first intervocalic consonant (positive), and taking into consideration the manner of articulation of the second consonant, according to the independent samples t-test, there is a significant difference in duration only between fricative (M=37.6, SD=18) and nasal (M=23.7, SD=19) conditions; t(43)=2.041, p < .05 With regards to right syllabification of the first intervocalic consonant (negative), and taking into consideration the manner of articulation of the first consonant, there is a

significant difference in duration only between fricative and stop (Bonferroni post hoc test); F (2, 123) = 8.792, p < .0001 (one-way Anova).
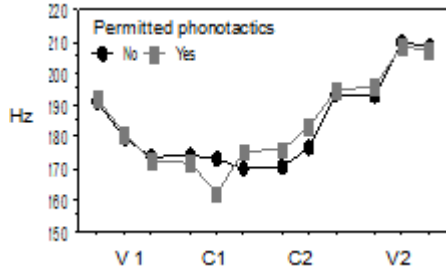
Figure 1. Mean tonal values of three measurements per segment with regards to the speech material consisting of two vowels (V) and two consonants (C).
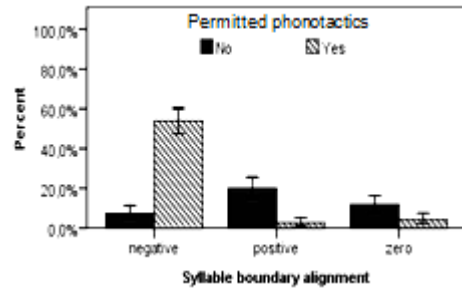
Figure 2. Percentages of syllable boundaries in relation to phonotactic structure (permitted/not permitted): zero = syllabification at the boundary of the 1st consonant, negative = left syllabification, positive = right syllabification.

Table 1. Mean length (in ms) of syllable rise alignment, based on manner of articulation (C1, C2), in relation to syllable boundary alignment (positive, negative, zero) and to phonotactic structure (permitted–Y, not permitted–N).

C1	C2	Positive		Negative		Zero	
		Y	N	Y	N	Y	N
fricative	fricative	45		-38		0	
	lateral			-36			
	nasal	25		-42	-43	0	
	trill			-28		0	
lateral	fricative		48				0
	nasal		25				0
nasal	fricative		27				0
	nasal			-26		0	
stop	lateral			-25			
	trill			-23			
trill	fricative		37				0
	lateral		16		-17		0
	nasal		22		-21		0

Discussion

In the present investigation, evidence has been provided that tonal variation associated with lexical stress production may be a major acoustic correlate of syllabification in Greek. An experimental methodology has been applied in order to enlighten theoretical issues and linguistic structure at syllabic level.

Syllable is the foremost basic linguistic unit in the context of which a very limited number of segmental units, i.e. consonants and vowels, may be combined in different ways. Furthermore, the phonetic rules are usually applied with reference to phonotactics and syllable structure in general in compositional morphology and lexical consituency. Open syllable structure languages are far more common than closed syllable structure languages. However, this typological dichotomy is fairly relative and thus languages rather have tendencies, to a greater or lesser extend, with reference to open or closed syllable structures. On the other hand, even in fairly closed syllable structure languages, such as English or Swedish, the open syllable structure tends to be abandoned in lexical morphology. Thus, the CV structure is the canonical and most frequent syllable structure across different languages.

Syllabification is among the most controversial areas in linguistic analysis based, in the first place, on intuition and the knowledge of language. Traditionally, syllabification is related to three main principles: (1) syllable structure openness, (2) phonotactic structure on the right and (3) phonotactic structure on the left. In accordance with these principles, consonant clusters are syllabified rightwards unless there is a phonotactic constraint. In case of phonotactic constraint on the right, consonants may syllabify on the left if there is no phonotactic constraint. However, the Greek lexicon abandons words, the syllabification of which does not comply with all these principles. In words like ['alsos] ('park') the syllable structure openness is in conflict with the phonotactic structure on the right. On the other hand, the syllabification of the consonant [l] on the left violates the phonotactic structure on the left. In accordance with the results of the present investigation, the phonotactic structure on the right is the predominant principle of syllabification in Greek (i.e. ['al.sos]).

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The influence of animacy on the choice of referring expressions in German

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Abstract

In this article, we present the results of a written sentence completion task in German which investigated the influence of antecedent animacy and position on the choice of referential expression. Such an effect has been shown for English (Fukumura & Gompel 2011). However, in contrast to English where speakers in these contexts generally chose to realize reference via full NPs or personal pronouns, in German speakers may also apply demonstrative pronouns (Ellert & Holler 2011). Thus, the current study asked whether this cross-linguistic difference would also lead to differences in reference realizations.

Key words: anaphora, animacy, sentence completion task, psycholinguistics, cross-linguistic differences

Phenomenon

Referring to a previously mentioned entity in discourse may be realized with different referential forms: lexical NPs, proper names, and pronouns. Languages differ in the means they have at disposal; e.g. whether they make use of pronominal clitics, or whether they overtly or covertly realize pronominal reference. However, it is assumed that the choice of referring expressions is determined by a universal principle: fuller referential forms (such as NPs) refer to less salient entities while less fuller forms (such as pronouns) refer to more salient entities (Ariel 1990; Ariel 2001; Givón 1983; Gundel et al. 1993). A vast body of research has addressed the question what exactly determines the salience level of an antecedent, and has identified several factors, such as e.g. the order of mention of the antecedent candidates (Gernsbacher & Hargreaves 1988; Gernsbacher et al. 1989), their grammatical functions (Crawley et al. 1990; Frederiksen 1981) and their level of animacy (Ellert & Holler 2011). Moreover, it has been shown that different referential forms (such as personal pronouns and demonstrative pronouns) may be influenced to a different degree by these factors (Kaiser & Trueswell 2008). This leads to the question whether this difference may also be observed between languages, even more so when languages differ with regard to the referential means they provide to realize referential relations.

An interesting case is the comparison of usage of demonstrative pronouns in German and English. While demonstrative pronouns are quite frequently used in German to make reference to previously mentioned entites (1) (see corpus study by Ahrenholz 2007), in English they may not be used in the same contexts (2). Thus, it may be asked whether these pronominal

differences between languages may also lead to a different degree of sensitivity towards factors marking salience, such as the animacy level of the antecedents or their position in the sentence.

(1) Die Hooligans haben <u>den Beschluss</u> ziemlich manipuliert.
…Der Beschluss$_{NP}$/Er$_{pers}$/Der$_{dem}$/Dieser$_{dem}$ führte zu einer großen Diskussion.
(2) The hooligans influenced <u>the decision</u> quite clearly.
…The decision$_{NP}$/it$_{pers}$ led to a huge debate.

The current study addressed this issue by replicating an English sentence completion study (Fukumura & Gompel 2011) which asked whether the animacy level of the antecedent (animate, inanimate) had an effect on the choice for a referential form. The English study showed that participants used more pronouns (such as *it*) than full NPs (such as *the decision*) for animate than for inanimate referents. This was found for NP1-reference as well as NP2-reference, however, in the latter case less pronouns were used.

In German, Ellert & Holler (2011) conducted a visual-world eyetracking task and found that personal pronouns were preferentially resolved towards first-mentioned animate antecedents. However, they also tested the resolution of demonstrative pronominal forms and found that they were not affected by the animacy level of the antecedents, showing a robust preference towards NP2. Thus, these results hint at cross-linguistic differences: while it may be quite common for German speakers to refer to NP2 via a demonstrative pronominal form, English speakers may rather use full NPs since demonstrative pronouns are not licensed in these contexts.

Method
The current study addressed these issues by adapting the English sentence completion task by Fukumura and Van Gompel (2011) to German using a within-subject design. Twenty-four experimental items were created which presented a first antecedent sentence in SVO word order either showing two definite animate NPs (AA), two inanimate NPs (II), or two NPs of mixed animacy levels (AI, IA). One of the NPs was underlined as in (1) and participants were asked to fill in a second sentence referring to the underlined NP which in half of the cases appeared as the grammatical subject and in the other half as the object of the sentence. The sentences were never ambiguous in that the underlined entity was a singular NP and the other a plural NP. Thus the factors *syntactic role* (subject, object), *animacy condition* (animate, inanimate) and *competitor animacy* (same, different) gave rise to a 2x2x2 design, resulting in eight conditions for each item. The items were distributed across eight experimental lists following a

latin square design, and forty-eight filler items were added to the lists. Each participant saw each item only once and the order of presentation was randomized for each participant.

Results and discussion

The results[1] showed that participants indeed had a clear preference to use more pronominal forms over all conditions (86%). Personal pronouns were the preferred form in all conditions, but they were less preferred for NP2-reference (68% vs. 87% for NP1-reference). This is comparable to the results of the previous sentence completion study by Fukumura and Van Gompel (2011) in English. However, differentiating between the two types of pronouns used, demonstrative pronouns patterned more like full NPs in that they were used more often when referring to the object antecedent (both around 15%) than to the subject supporting the view that there exists a cross-linguistic difference.
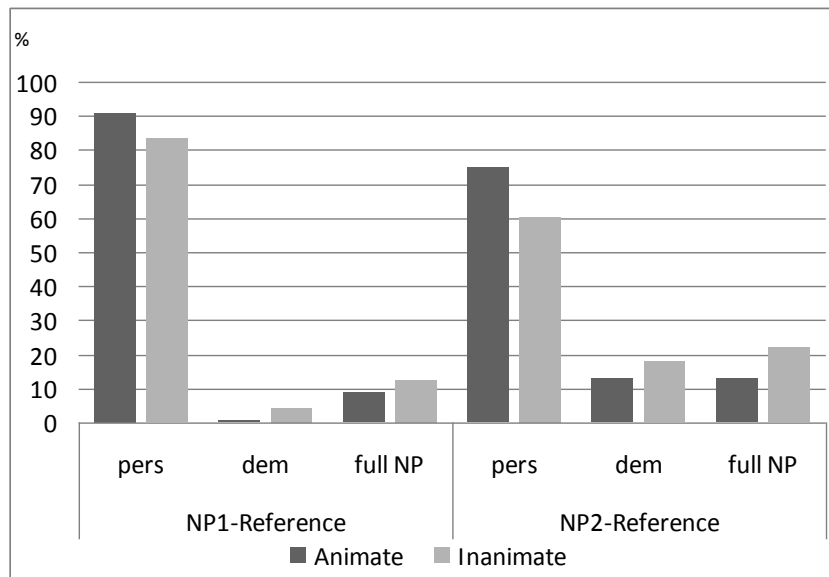
Figure 1. Distribution of the types of referential expressions used as a function of position and animacy of the antecedent

Target animacy affected the results in that personal pronouns were more frequently used with animate antecedents than inanimates, while demonstrative pronouns and NPs were more frequently used to refer to inanimate than animate antecedents. Competitor animacy had no effect. Since the use of demonstrative pronouns was in general quite low compared to personal pronouns, it may be asked whether presenting the materials in

spoken language (as in Ellert & Holler, 2011) would increase their use. Therefore, the experiment is currently replicated in spoken German in order to investigate whether there are any changes in preferences across modalities.

Notes

1. We conducted a loglinear analysis on the data which showed that the three-way interaction *choice x syntactic role x target animacy* and its main effects significantly well predicted the data. To break down the effects separate chi-square tests were conducted. Due to space limitations, we restrain ourselves to report the statistically significant results. The interested reader is very much welcome to contact the corresponding author for the exact values (mellert@uni-goettingen.de).

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Language technology tools and the Phrasal Lexicon

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Abstract

This paper explores the possibility of resorting to language technology to automatically extract lists of phrasal items instead of terms. Such items come in multiple and varied forms and constitute a very large part of what we say and write. Two types of tools, concordancing software (*Lexicon* feature in *Déjà Vu*) and automatic terminology extraction software (*MultiTerm Extract* and *PhraseFinder* from *SDL Trados*, *PlusExtract* from *Wordfast*, *Araya*, *ExtPhr32*), were tested on a purpose-built corpus, and their performance was compared to manually extracting the items. The results of the experiments suggest that many of these tools can yield high recall and that since phrases are highly variable, compared to terms, any software designed for phrases should take such variability into account.

Keywords: language technology, phraseology, automatic extraction, computer-assisted translation (CAT).

Introduction

Since Becker (1975: 62) established that the mental lexicon of English speakers contains more than 25,000 phrases, estimates of the number of items in the phrasal lexicon has increased since then. For example, Glucksberg (2001: 68) proposed a figure of 80,000 items, based on Jackendoff (1995), but this figure may still be under-representative of the vast numbers of phrases in our lexicon, because we constantly coin new phrases to deal with new language needs. Phrases take on special importance because a large proportion of what we say and write is made up of them.

In addition, phrases are extremely diverse; it has been calculated that there are more than 200 terms to describe them, in a bewildering array of terms (van Lancker-Sidtis & Rallon 2004: 211) for somewhat overlapping concepts. Examples of phrasal items range from social formulae (e.g. *Good morning*), collocations (e.g. *striking difference*), idioms (e.g. *hit the hay*), dual phrases (e.g. *facts and figures*), comparisons (e.g. *good as gold*), proverbs (e.g. *birds of a feather flock together*), commonplaces (e.g. *money talks*), complex prepositions (e.g. *in spite of*) and many others.

Therefore, in this paper I explore the possibility of resorting to language technology in order to automatically compile lists of phrases which can then be used, for example, by translators, terminologists and linguists in general to create bilingual vocabulary lists. Such lists can also have multiple uses in computer-assisted translation (CAT).

Overview of the software
Two types of tools were used in the experiments, concordancing software (*Lexicon* feature in *Déjà Vu*) and automatic terminology extraction software (*MultiTerm Extract* and *PhraseFinder* from *SDL Trados*, *PlusExtract* from *Wordfast*, *Araya*, *ExtPhr32*). The novel side of this research consisted of applying such tools to phrasal items, rather than to terminological items. Below is a brief introduction to each tool; for a more detailed overview and workflow of each tool, see Fernández-Parra (2012).

Lexicon in Déjà Vu
Déjà Vu was developed in 1993 by a Spanish telecommunications engineer, Emilio Benito (Nogueira 2004), and is currently provided through his Madrid-based company Atril (*www.atril.com*). It has a unique built-in feature to CAT tools, the Lexicon, which is an index of all words and phrases from a text, to be used alongside terms from a terminological database. Although the Lexicon is not a typical concordance tool, that is the use made of it here.

MultiTerm Extract and PhraseFinder (from SDL Trados)
SDL Trados (*www.translationzone.com/en*) is the result of the merger of two companies, Trados and SDL International in 2005 (DePalma 2005: 4). Its main product, a CAT tool also called SDL Trados, is the current leader in the CAT tools market (e.g. Cocci 2009, García 2005). MultiTerm Extract was inherited from Trados and is a statistics-based extraction tool, whereas PhraseFinder was inherited from Trados and is mainly a linguistics-based extraction tool.

PlusExtract (from Wordfast)
Wordfast (*www.wordfast.com*) was developed by Yves Champollion in 1999 (Wassmer 2008) and it is described as a simpler and free alternative to SDL Trados on the Wordfast web site. PlusExtract is a statistics-based term extraction component in +Tools (or PlusTools), a small but powerful set of tools in Wordfast that can be downloaded for free as a standalone suite.

Araya
Araya is a statistics-based bilingual terminology extraction tool developed by Dr. Klemens Waldhör in 2002 according to its own web site (*www.heartsome.de*). Although Araya only performs bilingual term extraction, in this research only the monolingual part was used, in order to compare its performance to that of the other tools.

ExtPhr32
ExtPhr32 is a freeware program for statistical monolingual term extraction developed by Prof. Tim Craven from the University of Western Ontario, Canada, in the 1990s. It can be downloaded from Prof. Craven's web site, *http://publish.uwo.ca/~craven/freeware.htm*.

Setup of the experiments

The research followed two stages. First, a purpose-built corpus was collected of about 200,000 words and every phrasal item was extracted manually. In total, 1,985 types and 4,183 tokens were found, and these figures were then used as benchmarks for comparison.

In the second stage, the corpus was processed with each of the tools. Because there were several settings and combinations of settings possible in each tool, the corpus was processed 387 times, that is, once with every setting and combination of settings available in each tool.

Evaluation of the results

Because of the variety of settings available in each tool, only the setting to select the maximum number of words per returned string was used when comparing the results obtained (*Max setting* for short), since it is provided by all the tools. For the evaluation of the results, the Max setting is taken into account together with measures of precision, recall and F-measure as described by Manning and Schütze (1999).

The Lexicon (concordance-like method of extraction) achieved full recall with a Max setting of 6, but precision was extremely low (0.3% at best). This means that every target item was retrieved, but the user would have to search through a long list of items in order to find the target ones.

The statistical extraction tools (MultiTerm Extract, PlusExtract, Araya and ExtPhr32) produced varying recall (from 13% to 98%) but they returned the highest precision (16.6% with MultiTerm Extract). This means that almost all the target items can be retrieved, especially with ExtPhr32 and PlusExtract (98% recall each), but post-editing tasks are considerably reduced, since the list of items to search through is shorter.

PhraseFinder (the linguistics-based tool) returned very low recall (9% at best) and low precision (1.8%). This result is hardly surprising if we consider that linguistic methods of extraction have a number of built-in rules to extract terms specifically, which tend to consist of noun phrases, rather than the general phrases I tried to extract with it, many of which consisted of verbal phrases. In order to improve this result, new rules would have to be built into the program specifically designed for every type of grammatical phrase, more specifically verbal and prepositional phrases, which in my corpus amounted to 75% of the total number of phrases.

One problem common to all tools was that of variable phrases such as verbal phrases. For example, the component words of the phrase *break the ice* do not always occur adjacent to one another and *break* may occur in a number of forms, e.g. *broke*, *was breaking*, etc. This means that the Max settings which produced the best results ranged from Max 6 to Max 20, to

allow for varying amounts of intervening material between the component words.

Although the similarities between terms and phrases in general provided a theoretical framework at the start of the research, the results obtained rather highlight the differences between them. There is considerable scope for further research on the full extent of variability in phrases but, in the meantime, I hope to have shown that the combination of language technology and phraseology is a fruitful one.

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Exploring Mediterranean languages learners' motivational profiles

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Abstract

The aim of this study is to report the results of a survey we carried out in order to explore the role of motivation in learning particular Mediterranean languages, namely, Arabic, Hebrew and Turkish in an academic setting. Second language acquisition is contingent on various factors, such as age, gender, personality, learning strategies and motivation. Among these variables, motivation influences significantly the rate and final outcome of learning a second language. In order to describe the motivational profiles of 30 university students learning Arabic, Hebrew and Turkish as foreign languages we conducted a small-scale experiment. Our findings indicate the prevalence of instrumental over integrative motivation.

Key words: SLA, motivation, Mediterranean languages

Introduction

In the field of Second Language Acquisition (SLA), it is undeniable that certain people are more successful language learners than others. Applied linguists have tried to develop a comprehensive typology of individual differences which are deemed to influence SLA (Bialystok and Hakuta 1994). The factors that contribute to individual differences are divided into three main categories, namely, cognitive factors, such as intelligence and aptitude, affective factors, such as motivation and attitude and personality factors, such as extroversion and introversion (Johnson 2001).

Among the above mentioned individual differences motivation has been accepted by both instructors and learners as one of the key factors which exert an influence on the rate and final outcome of learning a second language (Dörnyei 1998). Motivation is a multifaceted phenomenon and generally refers to the attitudes and affective states which influence the degree of effort made by language learners (Ellis 1997).

In the relevant literature, four major types of motivation have been identified, namely, instrumental (language learning for a particular functional reason, such as better professional prospects), integrative (interest in the people and culture expressed by the target language), resultative (motivation seen as a result of learning) and intrinsic motivation (curiosity for second language learning rather than general reasons per se) (Ellis 1985, 1997). These four motivational types should be seen as complementary rather than oppositional (Ellis 1997). Looking closer at this classification, it is clear that more tangible and measurable motivational types are the first

two ones, namely, instrumental and integrative motivation. For this reason, the emphasis of this study was laid on the investigation of these two types.

In light of the above, we conducted a small-scale experiment in order to investigate the motivational profiles of Greek university students learning Arabic, Hebrew and Turkish in a foreign language context.

Method

Participants

Our study consisted of 30 advanced Greek students who learn Arabic, Hebrew and Turkish as foreign languages in the Department of Mediterranean Studies (DMS) at the University of the Aegean (Rhodes campus). They were divided into three groups of 10 students according to the foreign language learnt, each group containing students learning one of the languages mentioned above. Regarding our participants' sex, 9 were males and 21 females. Their mid age was 22.3 years old.

Materials and procedure

The data on motivational profiles were collected through adopting and adapting an existing questionnaire consisting of 8 statements (the questionnaire is available upon request). Out of these 8 statements, items 2, 3, 4 and 6 showed instrumental motivation, whereas the remaining items 1, 5, 7 and 8 showed integrative motivation. The original questionnaire has already been used in similar studies (cf. Gardner 1985). Our participants' task was to indicate on a three-type scale (i.e. 1: disagree, 2: neutral and 3: agree) to what extend they agree or disagree with these 8 statements.

The questionnaire was administered to all students enrolled on advanced Arabic, Hebrew and Turkish classes in April 2012. The researcher, after being introduced by the instructor, explained the goal of the study and provided detailed instructions on how to fill in the above mentioned questionnaire. The whole procedure lasted for approximately 20 minutes. The data were analyzed by means of SPSS for Windows and the statistical criterion x^2 ($p<0.05$) was used to examine the statistical significance of our findings.

Data analysis

Our results indicate the prevalence of instrumental over integrative motivation. This finding is evident across the three languages. In other words the majority of our subjects reported that they have chosen to study Arabic, Hebrew and Turkish in order to improve their career prospects rather than having a better understanding of the people and their culture (Arabic: 7 out of 10, Hebrew: 6 out of 10 and Turkish: 9 out of 10) ($p<0,05$).

Discussion and Conclusions

Our findings (i.e. prevalence of instrumental motivation over integrative one) can be attributed to the context of learning Arabic, Hebrew and Turkish. Learning the target language in an SLA context forces the learner to learn it as well as possible. On the other hand, the objective of learning the target language in a foreign context is a good working knowledge for better professional potentials (Dörnyei 2001).

The three languages in our study are studied in an institutional/academic setting. Hence, there is no real and actual need for communication in the target language outside classroom. Apart from the context, Gardner (2001) mentions two major assumptions within the concept of integrative motivation which provide further justification for our findings. First, the ultimate goal of SLA is near-native competence. Second, the above mentioned educational goal requires identification with the second language community. At this point it should be mentioned that the tendency to approach language learners as potential approximations to native speakers and measure their achievements against those of monolinguals is controversial and a cause of fuzziness for two main reasons. Firstly, it takes for granted that the notion of the native speaker is straightforward and therefore easily defined and secondly that there is an ideal native speaker, which is not the case by no means (for a detailed discussion cf. Andreou and Galantomos 2009). Under this perspective and taking into consideration the nature and the requirements of foreign language teaching in the DMS, it becomes clear why the major driving force behind choosing and studying a foreign language is to gain better career prospects and not to understand the culture of the people who speak the languages in question.

Our findings are in line with those reported in similar surveys, such as Michalakis (2011), Coleman (1996), Dörnyei (1990) and Gardner and Lambert (1972). Moreover, the learning context (foreign vs second) seems to affects learners' choices in relevant aspects, such as the adopted learning strategies when dealing, for example, with unknown vocabulary (preference for formal learning strategies over informal or spontaneous ones) (e.g. Galantomos 2011).

A number of limitations of the present study are noteworthy. First, the small sample prevents us from reaching safer conclusions. Second, the proportion of our subjects (more females than males) does not enable us to gain more insights regarding the role of gender in certain choices. Third, the focus on advanced learners does not give us the opportunity to explore potential shifts in motivation from level to level. Finally, more data are required from learners who study a language in a second language context so as to make the necessary comparisons and investigate in a more detailed way the role of setting/context in motivation.

To sum up, in this study we investigated the motivational profiles of advanced university students learning Arabic, Hebrew and Turkish in an institutional setting. Our findings are related to the role of the learning setting (foreign vs second) and demonstrate the prevalence of instrumental over integrative motivation.

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On the role of the syllable in tip-of-the-tongue states

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Abstract

The tip-of-the-tongue (TOT) phenomenon is a type of production failure during phonological encoding. A reaction-time experiment was performed to determine whether the right first syllable of the target facilitates TOT resolution and whether another first syllable inhibits TOT resolution. The syllables were presented individually, which means not in another word related to the target in order to avoid interlopers. It seems that the right first syllable facilitates a positive TOT resolution, while a wrong first syllable has an inhibiting effect. These results indicate that the presentation of the right first syllable of the target word strengthens the weakened phonological connections that cause TOTs and facilitates word retrieval.

Key words: speech production, lexical retrieval, word finding failures, phonological cue, first syllable

Theoretical background

The tip-of-the-tongue (TOT) phenomenon refers to the experience when a well-known or familiar word cannot immediately be recalled but "recall is felt to be imminent" (Brown & McNeill 1966: 325). In the absence of actual retrieval, various aspects of the inaccessible target word are still frequently available, such as first phoneme or letter, first syllable and number of syllables. The recovered partial information can consist of competing items that resemble the target word phonologically and/or semantically and could give rise to competition or conflict during attempts to resolve the TOT. These words that often come to mind while experiencing a TOT and can hamper TOT resolution are so-called "interlopers".

Successful lexical retrieval in a TOT state can be imminent (within minutes) or delayed (after some hours or days) and may occur spontaneously (so-called "pop-ups"). TOT resolution may be achieved through external search strategies (such as looking up the word in a dictionary or by asking someone) or through internal strategies (such as searching in the alphabet or generating similar words). Laboratory studies often involve cueing procedures with a cue-target relationship that is not readily obvious, yet efficient to boost activation of the target word and assist TOT resolution.

Experiments by James & Burke (2000) demonstrated that phonologically related cues boost activation of the target word. Abrams and colleagues followed up James & Burke and showed that it is the first syllable of the target (presented in a cue word), which leads to significantly more TOT resolutions, compared to the middle and last syllable (White & Abrams 2002). Abrams et al. (2003, Experiment 2) demonstrated that TOT resolution

requires the entire first syllable and not only the first letter and, furthermore (Experiment 3), that the first syllable (presented in a cue word) significantly improves TOT resolution over the first phoneme – but only when the participants read the cue words silently. Thus, TOT resolution was facilitated by activating the initial syllable via related words sharing that feature.

Aim and scope

In the present study, a reaction-time experiment was performed to determine whether the right first syllable of the target facilitates TOT resolution and whether another first syllable with matched frequency inhibits TOT resolution. The syllables were presented individually, which means not in another word to avoid providing any semantic information of the target and to avoid interlopers. In contrast to the studies of Abrams et al. (2003), the cue did not consist of a related word that shared the same first syllable as the target but only consisted of the first syllable alone.

Experimental Methodology

Participants

The participants in this experiment were ten undergraduates at Heinrich-Heine-University in Dusseldorf who were paid for their services. All students (7 female, 3 male) were native speakers of German and between 22 and 30 years old (mean: 25.5 years).

Stimuli

138 German nouns were presented to induce TOTs. The frequencies of the whole words were taken from DLEX database and the frequencies of the first syllables of these nouns were accessed from the CELEX database (Baayen, Piepenbrock & Rijn 1993).

Procedure

Participants read 138 definition-like questions on a computer screen and pushed a button to indicate "know", "don't know" or, "TOT", respectively. When in a TOT state, a written cue was presented. This was either the right first syllable, a wrong syllable with the same CV structure and matched frequency as the fitting syllable, or a neutral baseline condition XXX.

Results

Of the 138 stimuli, 14 stimuli did not induce TOTs at all. These 14 words were middle- or high-frequent and 50% had a CVC syllable structure, 42.9% a CV structure and 7.1% a VC structure. Of the 124 stimuli that induced TOTs, the most frequent syllable structure was CV (58.1%), then CVC (16.9%), VC (15.3%), CCV (7.3%) and CCVC (2.4%). Furthermore, 58.9% of these were middle-frequent, 33.8% high-frequent, 6.5% low-frequent, and 0.8% without indication from the database.

The TOT rate was 20.6% (=284 TOTs, at average 28 TOTs per person). After the cue was presented, 15.5% of the TOTs could be resolved in the given time of 10 seconds. Of the resolved TOTs, 68.2% were positive TOTs (answer was consistent with target) and 31.8% were negative TOTs (answer differed from target).

With the right first syllable, TOTs were positively resolved more often (19.8%) in comparison to the control condition (7.5%). With a wrong first syllable, TOTs were positively resolved less (4.3%) in comparison to the control condition (7.5%).

Discussion and conclusion

Tip-of-the-tongue states are an important source of information concerning the nature of the processes and architecture of the speech production system. TOTs are a unique type of production failure, a breakdown during phonological encoding (cf. Levelt 1989).

TOTs occur about once a week in everyday life and on between 10-20% of lab stimuli (cf. Brown 2012: 195). In the present study, the TOT rate was 20.6%. With the right first syllable, TOTs were positively resolved more often in comparison to the control condition. With a wrong first syllable, TOTs were positively resolved less in comparison to the control condition. It seems that the right first syllable facilitates a positive TOT resolution, while a wrong first syllable has an inhibiting effect. These results indicate that the presentation of the right first syllable of the target word – presented individually and not in a cue word – strengthens the weakened phonological connections that cause TOTs and facilitates word retrieval.

Only 15.5% of the TOTs could be resolved in the given time of 10 seconds while the remaining 84.5% TOTs stayed unresolved. It needs to be discussed if the time span should be longer in order to get more resolved TOTs but then it would be unclear if the participants used other search strategies (such as the semantic one via associations and co-hyponyms) and the syllable cue was not used.

Another reaction-time experiment is currently being run in order to investigate further how the first syllables of the targets, syllable frequencies, and number of cohort words with the same first syllable influence TOT incidence and TOT resolution.

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Efficacy of L2 on L3 segment perception: a case study on native Arabic speakers' discriminability of Korean vowels

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Abstract

The study aims to investigate cross-linguistic influence in speech perception by tracing the source of L3 vowel perception. Two groups of native Egyptian Arabic speakers, monolinguals and late-bilinguals of English, were examined for their ability to discriminate Korean vowels. It was assumed that the discriminability depends on the factors such as *L2 experience*, *phonological constraint of L1*, *type of memory*, and *phonetic contrasts*. The result suggests that L2 experience could enhance sensitivity to certain L3 vowel contrasts. However, L2 experience does not do much to overcome an L1 phonological constraint. Also, it was found that even in the phonemic process, listeners may rely on auditory memory for discriminating the novel speech sounds.

Key words: Korean, Arabic, Vowel, perception, L3

Introduction

It has been well-acknowledged that listeners' L1 phonology greatly affects the acquisition of L2 phonology. In terms of the L2 segment perception, listeners perceive L2 segments based on the reflection of L1 phoneme inventory. That is, if a phonological contrast which is not available in L1 exists in L2, listeners have difficulty in perceiving it (i.e., Perception of /r/ vs. /l/ by Japanese speakers). However, even if a contrast is available in the listeners' L1 phonology, which can also trigger phonemic distinction in L2, listeners may face the difficulty in perceiving it due to a phonological constraint in their L1 (i.e., perception of word-final English stops by German speakers). Analogous to these, dialectal variation within a language shall be noticed as individual languages since it can also lead the perceptual differences in perceiving L2 speech sounds (see Escudero & Williams 2012). Likewise, in many ways, L1 shows very robust effects to L2 speech perception. However, when it comes to an additional language (L3), that a listener has a prior experience in L2, it becomes more complicated since the speech perception of the latter may be involved not only with listeners' L1, but L2 phonology (See Williams & Hammarberg 1998). There is still a question of what is the source for L3 speech perception.

To answer this question, current study investigated listeners' discrimination ability of novel speech sounds (L3: Korean vowel) based on their L2 experience (L1: Egyptian Arabic, L2: English). Since Arabic vowel

inventory is far smaller than English and Korean[1], it was hypothesized that Arabic speakers with English learning experience (GB) would grasp the phonetic contrasts in Korean vowels better than the monolinguals (GM) so the discriminability of GB would be higher than GM. Also, Arabic phonology allows CV as its standard syllable unit while English accepts the V as a basic syllable unit; it was assumed that GM would perform better when the vowels were delivered in CV than in V while it would not matter for GB listeners.

Methodology

The participants were 11 Cairene EA speakers (Mean age of 35). Since the phonology of colloquial Arabic differs between each dialect, the native Arabic speakers in this study were restricted to Egyptian Arabic speakers born and raised in Cairo. They were divided into two groups (GM and GB) based on their learning experiences of English (L2): monolinguals (6 in GM) vs. late-bilingual of English (5 in GB). The English proficiency of GB listeners may differ from each other, but all were at the level that they could communicate with native English speakers while the participants in GM could not understand ever a simple word in English.

Seven Korean vowels (/a/,/i/,/u/,/e/,/o/,/ɡ/,and /ɨ/), in two different syllable contexts (V and *h*V) were used as stimuli. Each vowel was paired up based on the proximity in the vowel space, thus eight sets of contrasts /a-ɡ/,/a-e/,/i-e/,/i-ɨ/,/u-o/,/u-ɨ/,/o-ɡ/ and /ɨ-ɡ/ were made. The pairs of vowels consist of stimuli in ABX discrimination task with 1500ms-ISI. Participants were guided to choose one odd stimulus out of three. The test trials were composed of 8 contrasts, 2 syllable contexts, 4 set types (AAB, ABB, BAA, BBA), 3 times of iteration, and control trials (AAA, BBB) were also added in order to see the reliability of the experiment. In total, there were 234 trials.

Results

Logit-loglinear analysis was employed to analyze the result since the nature of the data is frequency data, and it was required to see how each factor (L2 experience: L, syllable context: S, type of memory: M, and phonetic contrast: P) attributes to the result. Therefore, the null hypothesis is that all variables interact together as an effect of vowel distinction, and this can be represented as the model as {LSMP}. If there can be an another model which consists of fewer variables but still fits the saturated model, the variable that is missed in the model is a non-factor and can be neglected. The goal of this analysis is to find the simplest model that does not reject the null hypothesis.

As a result, {LP}{SP}{T} was selected as the best model (See Table1)[2]. That is, all four variables were factors that decide the discriminative capacity

of Korean vowels. However, not all of them attribute independently to the result, and they rather associate with each other in a way that: L2 experiences improve only the discriminability of certain phonetic contrasts {LP}, however it was unrelated to the disciminability under different syllable contexts or the target stimulus position. Similarly, the vowels delivered in *h*V were more beneficial to listeners than in V for discrimination in general, but not in all cases {SP}. Although the experiment was set that the listeners go through the phonemic process, the performance of both GM and GB showed the recency effect under any type of syllable contexts and contrasts, and this means that the listeners relied on auditory sensitivity for judgment regardless of the condition (see Best et al. 2001).

Table 1. Result of hierarchical models by logit-loglinear analysis.

Model	df	L2	P
{LSM},{LSP},{LMP},{SMP}	11.688	7	0.111
{LP},{SP},{M}	35.450	39	0.633
{SP},{TC}	42.415	40	0.367
{SP},{L},{M}	47.140	46	0.426
{SP},{M}	50.011	47	0.355

Discussion
The findings posits that the source of L3 speech sounds can be flexible in between listeners' L1 or L2 since it shows that the L2 experience not only helps to improve the sensitivity towards L3 segments, but it could also possibly deteriorate the sensitivity or to have no affect at all. This may be related to the robustness of established L2 category. As in Flege's SLM (e.g., Flege et al. 1997), if an L2 category is established successfully due to the absence of such phonetic category in listeners' L1, the established L2 category could be later used as the source for relevant L3 speech sounds. Also, it is presumed that L1 phonological constraints are stronger than L2 rules; although segmental properties of novel speech sounds were acquired, they could be still governed by the rules in L1.

Notes
1. Modern Standard Arabic is known as that it has three vowels, both long and short vowels of /a/, /i/, and /u/ (Al-Ani 1970). Here, /e:/, /o:/ were added up for Cairene Egyptian Arabic (Becker 2010). Although colloquial Arabic shows more of allophonic variation in of vowels, its vowel inventory is still smaller than English since English is known as 11 vowels, /i/,/I/,/E/,/Θ/,/A/,/□/,/o/,/Y/,/u/,and / ℘/.
2. The models in Table 2 are all satisfied as the saturated model {LSMP}. Then, the model such as {SP}{M} could be the best one among them. However, when the residual cells were reviewed, the other models include some cases which are not

explainable. The model {LP}{SP}{M} was the only one without any unexplainable case, and therefore, it was selected as the best model.

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Acquired pragmatic disorders of right hemisphere damaged patients

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Abstract

In neuropragmatics attempts have been made to investigate how the brain/mind uses language both in healthy and neurologically impaired individuals (Paradis, 2009). This field, combining the approaches of linguistics and neurology, focuses on the communicative use of language, its neurological/neural basis and representation in the brain, mental strategies, communicative difficulties, intentional communication, inference from discourse and the role of context (contextual clues) in comprehension. Studies often deal with "pragmatic competence" (Perkins, 2010). By means of experimental pragmatics, our current research focuses on pragmatic competence and its vital component, the theory of mind (Baron-Cohen, 1985, 1995, 2000; Frith, 2007).

Key words: theory of mind, right hemisphere damage, pragmatic competence, intentionality, inference

Hypotheses, materials and procedure

It is assumed that the intentional use of language is affected by right hemisphere damage (RHD), and it is also proposed that there is dissociation between patients' pragmatic competence and linguistic performance (Chomsky, 1968; Paradis, 2009). This study supposes that there would not be noticeable differences in the performance of RHD patients and the members of the control group concerning their understanding of natural causality. The participants of the experiment were patients treated at the Department of Neurology and Neurosurgery at the University of Szeged. Experiments were conducted with 15 right frontal hemisphere damaged patients and 15 controls. The latter group consisted of healthy persons, whose sex, age and qualifications were the same as those of the test group. Firstly, we used the Hungarian version of the Western Aphasia Battery in order to assess the linguistic functions of the patients. Their abilities to understand intentionality were examined by means of a series of tasks compiled by us, a special picture test focusing on patients' ability to recognize and assume intentional connections between the pictures/sequences. First-order representational abilities, being able to describe what is happening in reality around us, are not enough to interpret certain implicatures or irony; in these cases one needs to rely on his second-order metarepresentational abilities to understand and consider the mental

states of others (Happé, 2003). These pictures show stories including connections based on natural intentionality and others show human behaviour/ intentions. These pictures can be divided into four categories based on their content: representing natural causality, firs-order intentionality, irony. Each subtask included four pictures as elements of a story which the participants were asked to put into the correct order, and then they had to answer two testing questions. By means of these questions, it was possible to find out whether participants interpreted the stories properly, and on the other hand, it was vital to examine how the patients in the experiment attributed intentions to others. Sequencing and their answers to the questions (showing intention attribution) were scored separately within each task item. Data were analysed by means of SPSS software. Then a two-sample t-test was used to compare the differences in the performance of the two samples in the experiment. Furthermore, to be able to study the performance profile of the groups separately, we applied a paired t-test. Finally, we calculated percentages in those subtasks where the differences in the maximum scores did not enable us to carry out t-tests.

Results and conclusion

Comparing the performance of the two groups, it is obvious that the control group performed better in each task. Moreover, the members of the control group did not only do better, but their results are rather more homogeneous than those of the test group.
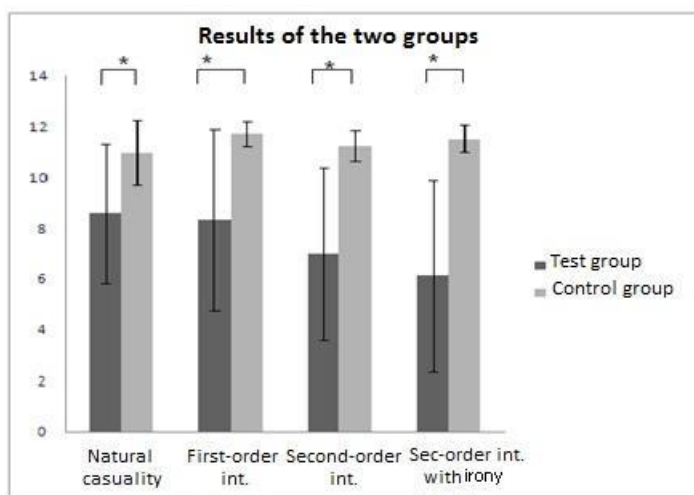

Figure 1: Total results of the two groups.

The present experiment demonstrates that the executive functions are located in the frontal lobe (Frith, 2007). Considering the approach of Perkins (2010), these results also demonstrate the importance of further research in a wider context, as it seems that during communication, the abilities of understanding natural causality and the intentions of others complement one another, thus contributing to successful interpretation. Therefore, the main goal of the current experiment was to explore the relationship between inferential processes underlying the interpretation of natural causality and the so-called pragmatic inferential processes underlying the interpretation of intentional sequences. Analysing the scores of the intention attribution-tasks, there were significant differences between the points of RHD participants and the members of the control group. These findings confirm the emergentist approach to pragmatics, which defines pragmatic competence as dynamic relationship of several interconnected abilities and capacities (Perkins, 2010).

Subtasks focusing on the analysis of non-literal language included pictorial stories with irony and pictorial stories with idioms. While RHD participants had difficulties in understanding the idiomatic expressions embedded into the test, we could see the most significant differences when considering their comprehension of irony. To put it briefly, the test group achieved the lowest results in these tasks. These findings also demonstrate the fact that our ability to interpret irony appropriately greatly relies on our second-order metarepresentational abilities (Happé, 2003), which proves to be damaged in patients with brain lesions. We should draw attention to the fact that the performance of the participants in the test group did not decrease in parallel with the increasingly demanding nature of the tasks. In that case, the last task should have been the most difficult for the participants. Finally, the analysis of non-literal language indicates similar results concerning the interpretation of irony and idioms. The test group scored 51.08% and 56% in these tasks, while the control group scored 96.08% and 100%. These percentages demonstrate the considerable differences between the performance of the two groups taking part in the experiment.

The current research also focuses on the question of localization. According to Frith─Wolpert (2003), injuries in the temporo-parietal and frontal cortex affect pragmatic performance and competence. Our research confirms the assumptions that several typical deficiencies are caused by right hemisphere damage, for example, discourse organization deficits, problems of cohesion, deriving the main point of a story, logical coherence, troubles with considering contextual clues. Individuals with RHD can make conscious logical deductions but cannot make implicit pragmatic inferences. They are unable to understand the so-called figurative meanings relying on others' cognitive competences, not just on the appropriate linguistic choices

(Paradis, 2009). Our findings demonstrate that patients suffering from subcortical impairment do worse in these tasks than patients with cortical impairment. Although there is a need for a large-scale research to study this matter in detail, based on our results, we claim that white matter impairment, the damage of transmission pathways, can be seen as another cause of deficiencies in performance, such as the damage of neurons in the case of cortical impairment leading to functional disorder.

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Sonority and shape

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Abstract

The current study investigates whether sonority scale can linearly predict the "roundness" of a phoneme in the visual attribute. The results revealed that for vowels, it is the "roundness" feature not the sonority that predicts "roundness". But for consonants, the rank generally follows the sonority scale, except that the voiceless fricatives ranked relatively higher than voiced fricatives and voiced stops.

Key words: sonority scale, sound symbolism, kiki-bouba effect

Introduction

Sound symbolism holds that there are naturally biased mappings between phonological properties of labels and perceptual properties of their referents. A famous example is the "kiki-bouba" study by Ramachandran and Hubbard (2001). They showed that both English and Tamil speakers selected the curvy shape as "bouba" and the jagged shape as "kiki" for over 95% of the times (see Figure 1). The "kiki-bouba" effect has stimulated a growing interest in sound symbolism, and various studies have demonstrated that systematic mappings exist not only between sound and shape or size (Spair, 1929), but also between sound and colour (Wrembel & Rataj, 2008), sound and taste (Simner et al, 2010; Spence, 2012), sound and smell (Auvray & Spence, 2008), sound and spatial position (Loomis et al, 1998), etc.

 Figure 1. The visual stimuli used by Ramachandran and Hubbard.

But what exactly phonological features lead to the sound symbolic effects? It has generally been reported in the literature that vowels "o" and "u" and consonants "m", "b", "l" and "n" are associated round/big/heavy objects; vowels "e", "i" and consonants "t", "k" are associated with angular/small/light objects. But the previous classifications of the two groups of phonemes are largely inconsistent. Table 1 sampled some of the classification criteria used in previous studies.

   The current study aims to provide a better classification of the "round" and "angular" phonemes in terms of their phonological features. Our hypothesis is that sonority scale linearly predicts sound symbolism. According to Parker (2002), the sonority scale in English is "Glides> Liquids> Nasals> Voiced Fricatives> Voiced Stops>Voiceless Fricatives> Voiceless Stops". Thus we predict that more sonorous sounds are perceived as more rounded in the visual attribute.

Table 1. "Round" and "Angular" sounds in previous studies

Study	"Round" sound	"Angular" sound
Klink, 2000	back vowels voiced consonants	front vowels voiceless consonants
Yorkston & Menon, 2004	low back vowels	high front vowels
Westbury, 2005	continuants	stop consonants
Abel & Glinert, 2008	voiced consonants	voiceless consonants
Peiffer-Smadja, 2010	rounded back vowels voiced continuant consonants	unrounded front vowels voiceless stop consonants
Nielsen & Rendall, 2011	sonorant consonants	strident consonants
Sweeney et al., 2012	rounded sounds	unrounded sounds

Methods

Participants: 30 Oxford University students (9 male, 21 female, mean age=21.4 years) participated in the study. The whole experiment lasts for about 20 minutes, and was approved by the Oxford University ethics review.

Stimuli: The visual stimuli included 25 different 5-point shape scales (see Figure 2). The shapes were generated by an online pattern generator (http://www.subblue.com/projects), and were all 4cm x 4cm in size, black and white in colour.
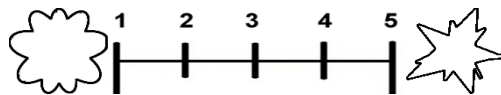
 Figure 2. The visual stimuli.

The auditory stimuli consisted of 100 non-words of CV string (20 consonants x 5 vowels). The 20 consonants included glides ("w, y"), liquids ("l, r"), nasals ("m, n"), voiced fricativse ("z, f, ð, ʒ"), voiced stops ("b, d, ɡ"), voiceless fricatives ("s, f, θ, ʃ") and voiceless stops ("p, t, k"); the 5 vowels were "a, o, u, i, e". The sounds were recorded in a sound proof booth by a female phonologist, who was also a native English speaker. The duration of each sound was adjusted to 1 second, and the average intensity of all the sounds was scaled to 70 decibel by Praat.

Procedure: The participants heard a CV sound and saw a scale on the screen. They then had to indicate, by pressing "1, 2, 3, 4, 5" on the keyboard, how much they thought that the sound resembled the two shapes. Each sound was repeated 3 times, giving rise to 300 trials in total. The presentation of the stimuli was randomized, as was the orientation of the scales. The participants were debriefed after the experiment and were also asked whether they had previous knowledge of sound symbolism, and

whether they found some of the non-words resembled real words and hence responded according to the semantics of the words.

Results

The average score for each sound is calculated for each participant, with larger values indicating more rounded shapes. Figure 3 shows the average roundness scores for each vowel following the sonority scale. It can be seen that there is a general decline of the scores along the sonority scale, although the scores from voiced fricatives to voiceless fricatives increased—this pattern was observed for all 5 vowels. All the relationships were confirmed via a repeated measures ANOVA and post-hoc pairwise comparisons (p < .001). The post-hoc comparison also revealed the 5 vowels to be significantly different from each other (p<.001, SD=0.31) except for "e" and "i" (p=.23, SD=0.31). Since the ranking of the 5 vowels is "o > u > a > e > i", it can be concluded that the "roundness" feature of the vowels, not the sonority, that correlates with sound symbolism. For consonants, the ranking is highly correlated with the sonority scale, but further examinations are needed to explain why voiceless fricatives ranked than voiced fricatives and voiced stops.
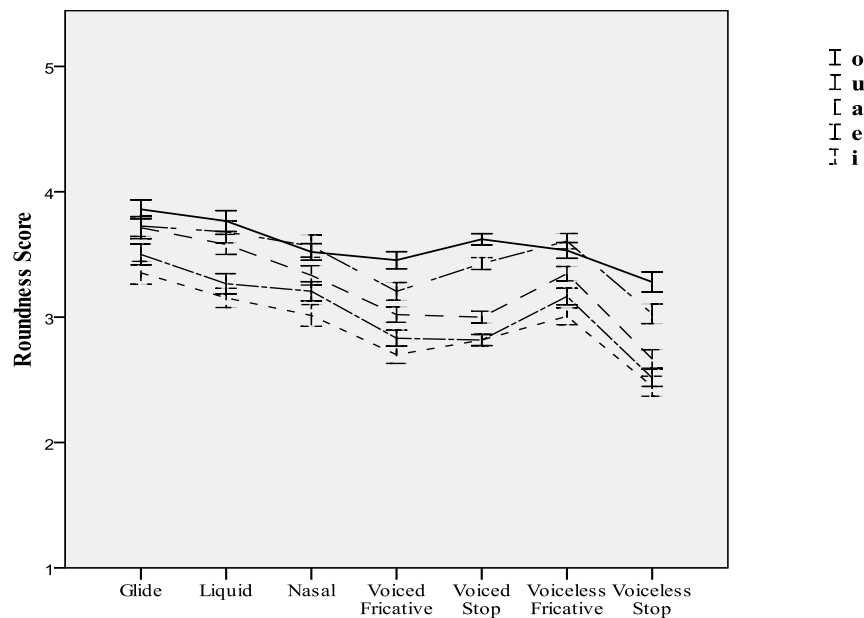

Figure 3.The average roundness score of the sounds.

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Neural correlates of language aptitude during a lexical semantic categorization task

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Abstract

In an fMRI experiment language aptitude, a specific talent for learning languages measurable by tests, has been used as an independent variable and brain activity elicited by a semantic categorization task has been measured. Significant differences in brain functionality have been observed between groups in two comparisons.

Key words: neurolinguistics, language aptitude, semantic categorization

Introduction

Language aptitude, a specific talent for learning languages, is considered to be one of the most robust predictors of language learning success (Dörnyei & Skehan, 2003; Ellis, 2008; Sawyer & Ranta, 2001). Four sub-components of language aptitude are traditionally distinguished: rote learning memory, phonemic coding ability, inductive language learning ability and grammatical sensitivity (cf. Carroll, 1981; Dörnyei & Skehan, 2003; Ellis, 2008). Most aptitude tests underscore the multi-componential nature of language aptitude, e.g. the Llama Language Aptitude Test (LLAMA) (Meara, 2005) consists of four sub-tests: (1) a vocabulary learning task, (2) a test of phonetic memory, (3) a test of sound-symbol correspondence and (4) a test of grammatical inferencing. Despite the recent technological advances in the domain of neurolinguistics, it is still largely unknown how success in foreign language learning, as measured by such tests, can be accounted for in terms of its neural correlates and how the fact that some people are faster and better language learners than others can be associated with the brain functionality on language tasks. The aim of this research was thus to establish the neural correlates of language aptitude during a lexical semantic categorization task (SCT).

Experimental procedures

Participants

24 right-handed healthy Dutch-French bilinguals (11 female, mean age 20.54; SD 1.96) took part in the study. The research protocol was approved by the ethical commission of the University Hospital of Jette.

Design

Language aptitude test and semantic categorization task

The LLAMA test (Meara, 2005) was administered on a Personal Computer to each participant individually and they received written instructions in Dutch prior to each part. Target items in the SCT consisted of 156 stimuli: 39 Dutch and 39 French animals, and 39 Dutch and 39 French non-animals. The items were matched for frequency, number of syllables, length, lexical neighbours and interlingual homographs and homophones. The stimulus duration of 2200 ms. was fixed for all participants. The task's trials were synchronized with the scanning trials and participants' reaction times and accuracy levels were measured.

Data analysis and image acquisition

Language aptitude test

Scores for each part of the LLAMA test range between 0 and 100. A Principal Components Analysis with VARIMAX rotation of these scores was conducted in order to reveal the factors underlying the larger construct of aptitude. Three tests (vocabulary learning, sound recognition and sound – symbol correspondence) loaded highest on Component 1 ($\lambda = .852$, $\lambda = .656$, and $\lambda = .712$). Grammatical inferencing loaded on a separate component. Due to the nature of the tasks, the two factors were interpreted as 'language aptitude on word level' (Component 1) and 'language aptitude on sentence level' (grammatical inferencing). Subsequently, based on their scores a distinction was made between above and below average performers on each factor.

Image acquisition and processing

The images were acquired with a 3 Tesla Philips Achiva with an 8 channel head SENSE coil. Activations were detected by means of BOLD sensitive T2* weighted fMRI and a T1 weighted anatomical scan was used to project the fMRI images. Repetition time was 3000 ms and the echo-time was 35 ms. 22 slices with a thickness of 4 mm were obtained over 130 dynamic scans. The anatomical scan consisted of 100 slices with a thickness of 2 mm and was used to co-register the functional scans. The acquired data were subsequently analyzed with SPM5 software (The Wellcome Institute of Neurology, London, UK). Functional images were spatially realigned, co-registered with the anatomical data, spatially normalized to standard stereotactic MNI space, and smoothed with an isotropic 8-mm full-width at half-maximum Gaussian kernel.

Results

Imaging Data
Although no significant differences in either of the performed group statistics were found for the behavioural data, significant differences between the groups in brain activations during the task were found. Whereas the group with below average language aptitude on word level displayed more brain activity during the task, the reverse could be observed for the effect of language aptitude on sentence level.

The difference in brain activations between the groups were found in a two sample analysis. The participants with below average language aptitude on word level displayed more brain activity during the task. The activated regions included the left Thalamus ($p = 0.003$, uncorrected) and right Insula (BA 13) ($p = 0.015$, uncorrected).

A difference in activations was found only when the activations of the below average 'sentence level' language aptitude performers were subtracted from the above average 'sentence level' language aptitude performers. The analysis reported increased activations in the right Middle Temporal Gyrus (BA 39) ($p = 0.005$, uncorrected), right Posterior Cingulate (BA 31) ($p = 0.000$, uncorrected) and left Superior Frontal Gyrus (BA 9) ($p = 0.041$, uncorrected).

Discussion

Using an SCT and an event-related fMRI, effort was made to unveil functional brain differences typical for high and average performers on two factors of a language aptitude test involved in language switching. There were significant differences in brain functionality when two independent comparisons of the acquired data were conducted. The left thalamus activated in the case of the below average performers on the 'word level' language aptitude component has been previously tied to grammatical (Wartenburger et al., 2003) and morphosyntactic (Fabbro et al., 1997) processing of the second and less-exposed language; the insular cortex has been established to support lexical-semantic processes (Friederici et al., 2003). In the current study these regions were related to language switching by bilinguals with less skill on the lexical component of language aptitude, suggesting that these regions can be tied to language aptitude related neuroanatomical differences. The regions activated in the case of the above average 'sentence level' language aptitude group were previously identified to be involved in semantic memory processing (middle temporal gyrus) (Onitsuka et al., 2004), recall of previously memorized words from temporal cues (posterior cingulate) (Fujii et al., 2002) and to working memory (Du Boisgueheneuc et al., 2006). The exact relationship between these regions

and high level of analytical skills remains a question to be answered in future research specifically investigating syntactic processing.

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The perception of *gonna* and *gotta* – a study of emancipation in progress

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Abstract

In this paper, I report on an experiment to examine the perceptual differences between full and contracted semi-modals in English, i.e. the distinction of *going to* vs *gonna* and (HAVE) *got to* vs *gotta*. It is a listen-and-repeat experiment and is informed by the findings of a corpus study of the use of these forms in American English (AmE). It thus aims to integrate the social/variational and the cognitive sides of the phenomenon.

Key words: word perception, language change, modality, English

Introduction

The contraction of the English semi-modals BE *going to* and HAVE *got to* to *gonna* and *gotta* is well known (Pullum 1997, Krug 2000). The hypothesis here is that this contraction is in the process of change from phonological to lexical variation, that is, the contracted forms are developing from pronunciation variants to independent items. This process, which I have called 'emancipation', has been shown in usage through corpus studies of American English (Lorenz forthc.).

The study presented here aims to test this on perception by applying some of the factors shown to have an effect on usage to a listen-and-repeat experiment. The experiment elucidates what conditions lead listeners to recognize a contraction (or not), and to what extent they accept *gonna* and *gotta* as words in their own right.

Experiment design

Participants listened to recorded sentences containing one of four possible realizations of going to/gonna, or one of four realizations of (HAVE) got to/gotta. The variants included can be represented as:

　　"going to" – "goinde" – "gonna" – "ena"
　　"'ve got to" – "got to" – "'ve gotta" – "gotta"

On these target forms, three test conditions were stipulated based on corpus results, and contrasted with a null condition:

-**Subject**: In corpus studies, 1st person singular favors phonetic reduction of *going to/gonna*; 3rd person singular favors HAVE *got to*.

　(1) After dinner, <u>I'm going to/gonna</u> play backgammon with the camel.
　(2) <u>Our African giraffe (has) got to/gotta</u> see a dentist.

- **Type of modality**: In corpus studies, 'deontic' favors going to; 'epistemic' favors (HAVE) got to/gotta over HAVE to.

   (3) Listen, you're going to/gonna leave that giraffe alone now.

   (4) Surely, they ('ve) got to/gotta have elephant food at the pet shop.

- **Speech rate**: In corpus studies, high speech rate promotes reduction. The sentence speech rate was enhanced from 5-6 syllables/second to 7-8 syll/s; at the target form, the tempo was increased by 40%.

- **The null condition** is neutral with respect to all of these.

   (5) So now I ('ve) got to/gotta run over there to pick up the crocodile.

   (6) The penguins are going to/gonna form a Blues quartet.

Participants were asked to repeat these sentences clearly and literally (i.e. the "words" they heard). Thus, their output reveals whether the form was perceived as an instance of going to or gonna, or of got to or gotta, and the resulting preference patterns show the conditions' effects on the perception of the input forms.

The input sets were designed so that a participant would encounter each variant in a given condition four times (but not every condition was present in every set). About half of the input sentences did not contain a target form. The stimuli were played in random order.

The fifty-nine participants are native speakers of North American English (mostly Canadians). Their age and sex are taken into account.

Results

The data for each input variant were statistically assessed using mixed-effects regression models (Baayen 2008, Bates 2005). The individual participant, the order of the stimuli, and the specific input sentence are controlled for by random factors.

Results for *going to/gonna*

Overall, gonna was the preferred output variant (which corresponds to its preference in usage). Even the full input "going to" was returned as *gonna* at 48% ("goinde": 59%, "gonna": 74%, "ena": 75%).

A general effect was found for the participant's age: younger subjects responded with gonna more often, irrespective of the input form (though statistical significance varies, see Fig.1).

Fig.2 presents the output patterns for the two conditions that favor phonetic reduction in speech. Increased speech rate has an effect only on input "goinde", prompting its perception as *gonna* (p=.001). By contrast, a first person singular subject leads to the interpretation of "gonna" and "ena" as *going to* (as compared to the null condition, p=.012 and p=.061). Deontic modality showed no significant effects.
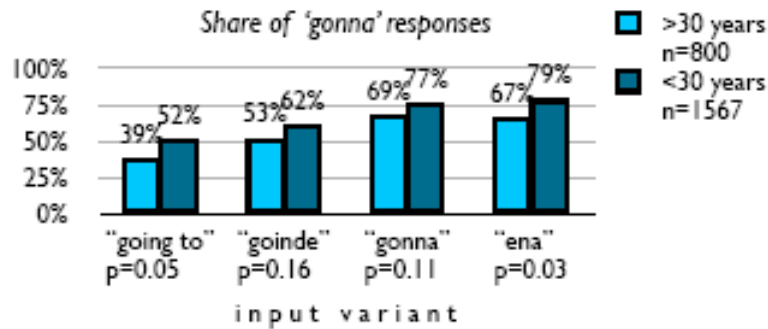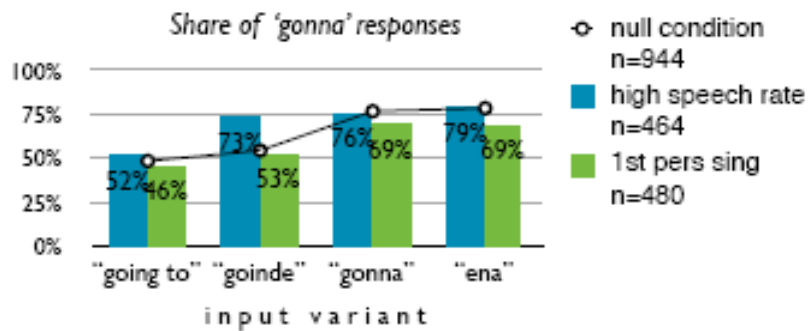
Figure 1: Share of gonna responses by age.

Figure 2: gonna-responses in speech rate and subject conditions.

Results for *got to/gotta*

I will focus here on the distinction between got to and gotta, disregarding auxiliary HAVE.

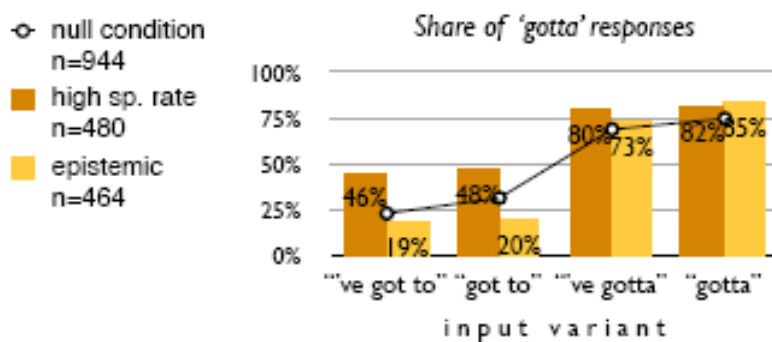

Figure 3: gotta-responses in speech rate and modality conditions.

A clear effect is found for increased speech rate, favoring perception as gotta of all input variants (p=.011 overall). Epistemic modality shows significant effects for inputs without HAVE (p=.037 and p=.069), which are repeated more accurately than in the null condition. (It also elicits more accuracy with respect to auxiliary HAVE.) Third person singular subjects, age and sex have no relevant effects.

Discussion

The results show that, by and large, language users recognize the contractions and distinguish them from the respective full forms.

The age trend for *gonna* but not *gotta* confirms a corpus finding that *gonna* is on the rise while *got to/gotta* are losing ground to HAVE to in AmE. Also, corpus data show that gotta is more dependent on speech rate than *gonna* in speech. This finding extends to perception, showing that *gotta* is more phonetically conditioned (i.e. less emancipated) than gonna.

Epistemic *got to/gotta* was repeated more accurately, and in this use the competing HAVE *to* is not the dominant variant, suggesting a less constrained variation and a possible semantic niche for gotta in epistemic modality.

The factors favoring reduction in speech show a striking difference in perception: Listeners infer reduction, even falsely, from rapid speech ("goinde" as *gonna*, "got to" as *gotta*), but reconstruct the full form from a reduced high-frequency collocation ("I'mna" as going to). It seems that in frequent contexts, reduction is expected and hence (hyper-)corrected, while listeners take at face value what they (mis-)hear in rapid speech.

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Intonational differences between speech tasks in school context

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Abstract

This paper investigates intonational differences between speech tasks from a corpus of spontaneous and prepared non-scripted speech collected in Portuguese high schools, in the last year of compulsory education. It offers evidence that speakers' choice of intonation contours varies depending on the degree of planning and specificity of scholarly oral presentations: non-falling contours are overall less common in spontaneous presentations than in prepared ones; there is a more balanced distribution of the main nuclear contours in prepared speech. Additionally, the speaker's status, age and gender are also a source of the observed variation.

Key words: intonational variation, oral presentations, adolescents.

Introduction

It is widely recognized that intonational variation is a fundamental resource to differentiate types of speech (varying along the spontaneous-read *continuum*) and plays a major role in speaker adaptation to different speech situations (Blaauw 1995; Mata 1999; Hirschberg 2000, a.o.).

This paper analyzes a subset of spontaneous and prepared presentations from a corpus of European Portuguese (EP) spoken by adolescents in school context, focusing on intonation contours in phrase-final position. It investigates to what extent student's contour types are affected by (i) the specific nature of the situation and (ii) inter-individual differences.

Data and methods

The study uses a subset of the CPE-FACES corpus (Mata 1999), collected in Portuguese high schools, in the last year of compulsory education. This corpus consists of spontaneous and prepared non-scripted speech from 25 students (14-15 years old) and 2 teachers. The prepared non-scripted speech corresponds to oral presentations about a book the students have read, according to specific programmatic guidelines, whereas in the spontaneous ones they were unexpectedly asked to speak about a pleasant personal experience. Student presentations vary from about 1 minute to 25 minutes. CPE-FACES also includes the oral presentations made by the high school teachers – which vary from about 2 minutes to 50 minutes.

The subset analyzed comprises 5 spontaneous presentations and 5 prepared presentations, from 4 students (2 boys and 2 girls) and their female teacher. The first 60 seconds of each presentation were analyzed (mean number of intonational phrases, words and stressed syllables per utterance in

spontaneous presentations: 3.2, 10.2, and 6.4, respectively; mean number of intonational phrases, words and stressed syllables per utterance in prepared presentations: 3.6, 13, and 7.6, respectively); a total of 496 intonational phrases (not included in interrogative utterances) were extracted and stylized representations (in ST) were defined for nuclear contours – according to the form, alignment and proportion of pitch movements in phrase-final position. Additionally, a prosodic annotation was done in the ToBI (Tones and Break Indices) system, according to the first proposal *Towards a P_ToBI* (Viana *et al* 2007).

Results

Results show that, contrary to what would be expected based on previous studies, non-falling contours are overall less common in spontaneous speech than in prepared speech (Fisher Exact Test, p=.002) - spontaneous speech: 63% falling / 37% non-falling; prepared speech: 49% falling / 51% non-falling. In general, there is a more balanced distribution of the main contours used in prepared speech.
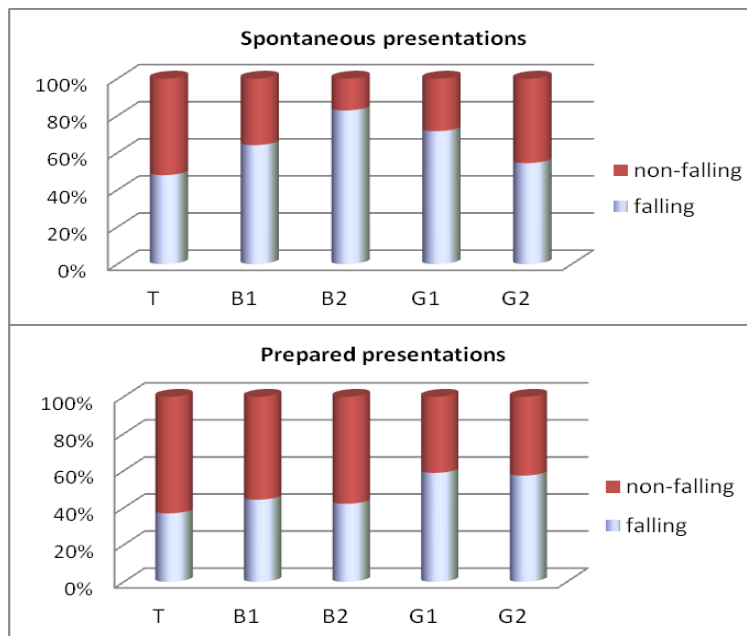

Figure 1. Percentage of falling / non-falling contours per speech task and speaker. T stands for teacher; B for boy and G for girl.

As Figure 1 shows, falling contours - e.g., H+L*/L*/H*(+L) L% - are the most frequent nuclear contours in the spontaneous presentations of students, independently of gender (girls: 72%, 55%; boys: 64%, 83%); in general, the relative frequency of non-falling contours - e.g., (L+)H*/L*(+H) H%/!H%; H+L* LH% - increases in the prepared presentations of students (girls: 41%, 43%; boys: 56%, 58%), and this is more evident for boys (Fisher Exact Test, *p*=.038). It is worth noting that the increase of non-falling patterns is not related to the inclusion in the dataset examined of the question-answer period that followed the oral presentations.

Comparing students vs. teacher, the teacher differs from all students (Fisher Exact Test, *p*=.006) by using more rising than falling contours in the spontaneous presentation (52% and 36%, respectively); there is a more regular distribution of the main subtypes of nuclear contours in the prepared situation, even more regular than the one observed for students (rising: 44%; falling: 30%; and falling-rising contours, with only 4% in her spontaneous presentation, increase: 24%). Figure not shown.

H+L* L%   H*+L L%

L+H* H%   L*+H H%
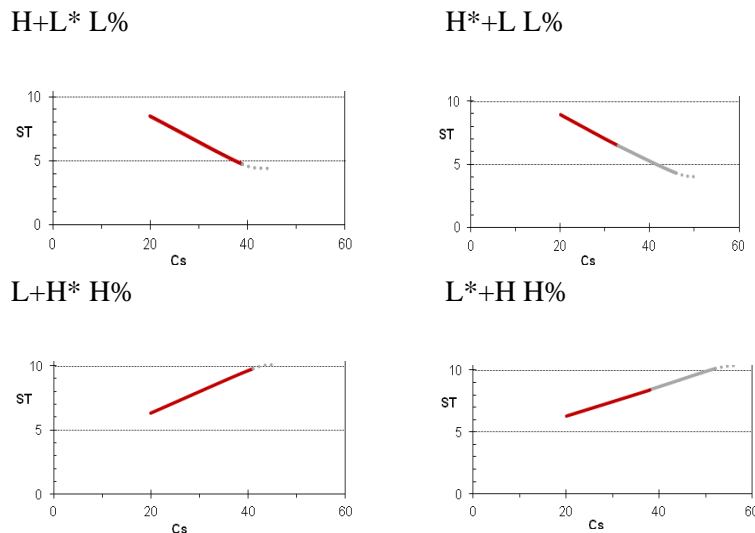
Figure 2. Schematic F0 contours based on mean values for all speakers. (Lines ▬ indicate the stressed syllable; lines ▬ indicate the post-stressed syllable.)

Although the repertoire of intonation patterns most commonly used by each student varies, the data shows that (i) H+L* L% (common in EP) and L+H* H% (virtually absent from lab speech in EP, see Viana *et al* 2007), realized respectively as a fall / rise mainly within the accented syllable (see figure 2), are the most frequent falling / rising nuclear contours in both situations – which may be regarded as an expected result, since that EP is a

language known to extremely reduce and frequently delete unstressed vowels, particularly in post-stressed and final position; and that (ii), in the prepared situation, L+H* and H+L* are used in a similar manner by boys, unlike girls, who use H+L* more often, as they do in the spontaneous situation. The data also shows that (ii) falling / rising nuclear contours that involve the phonetic realization or insertion of a reduced vowel in post-stressed position (and thus were tagged as H*+L L% and L*+H H%, see figure 2) are mainly used by students, most often in the spontaneous presentations. Their frequency can be interpreted as an age group mark; their decrease in the prepared presentations of students as an adaptation effect to the specific school task.

Conclusion

Although based on a limited amount of data, the results reported in this paper indicate that the distribution of intonation patterns is affected by the degree of planning and specificity of the speech task. The increased regularity in the distribution of final falling /non-falling contours in typical school presentations and the intonational variation between prepared and spontaneous presentations may be interpreted as indicators of how students adapt to the speaking styles required in school context. The observed variation in final contour choices between teacher and students, and between boys and girls, also offers evidence to support the role of the speaker's status, age and gender in the selection of the intonation patterns available in the language.

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Asymmetric effects of speaking rate on voice-onset time: The case of Russian

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Abstract

Cumulative cross-linguistic studies have revealed asymmetries regarding the effects of speaking rate on voice-onset time of stop consonants. This paper reports the effects of speaking rate on VOT of lenis and fortis stops in Russian, an area of enquiry that has not been reported in previous literature. The overall results of the acoustic study indicated that lenis stops (pre-voiced VOT category) were greatly affected by changes in speaking rate, whereas fortis stops (short-lag VOT category) were only minimally affected. These results were consistent with those found for various other languages. The results also indicated that VOT distribution of Russian lenis and fortis categories only slightly overlap, even under the changes in speaking rate.

Key words: phonetics, phonology, speaking rate, voice-onset time, Russian

Introduction

This paper reports on the effects of speaking rate on voice-onset time in Russian.

   Voice-onset time (henceforth, VOT) refers to a time difference between the release of oral closure and the onset of the vocal fold vibration. The phonological contrast of voicing in stop consonants is typically associated with VOT in many languages (e.g., Lisker and Abramson 1964). Since the value of VOT is defined by two independent temporal events, one question is how VOT is affected by the changes in global temporal properties, i.e. speaking rate. A considerable number of studies have addressed this question in languages such as English, French, Thai, and Spanish (e.g., Miller et al. 1986; Kessinger and Blumstein 1997; Magloire and Green 1999), and have found that speaking rate modifies VOTs in an asymmetric way: pre-voiced and long-lag (aspirating) VOT categories significantly change as a function of speaking rate, whereas the short-lag category remains roughly stable.

   This paper presents the results for Russian, a language that has a two-way laryngeal contrast, typically realized as a pre-voiced vs. short-lag VOT (Ringen and Kulikov to appear). Following Ringen and Kulikov (to appear), this paper uses the term *lenis* and *fortis* for the pre-voiced and the short-lag category.

Methods

Seven native speakers of Russian participated in a production study (four females and three males, mean age: 27.9). All of the speakers were born and raised around Orenburg city in the Russian Federation. Bilabial (/p/, /b/), dental (/t/, /d/), and velar (/k/, /g/) unpalatalized stops were examined. The vowels following the critical stops were /a/, /o/, or /u/. Nine minimal or near-minimal pairs of monosyllabic real words with 18 fillers were presented to the speakers in a pseudo-random order. For our purpose of manipulating speaking rate, the speakers were asked to produce the target items in three conditions. In the first condition, the items were presented in isolation. In the second, they were embedded in a career sentence such as 'Skazhi, pozhalujsta, _____ jesshe raz. (Please say _____ once again.)'. Finally, the item was presented again in the same career sentence, but the speakers were instructed to produce it quicker than the previous one.

The second and third conditions are defined as 'Slow' and 'Fast', respectively, and the words produced in these conditions were acoustically analysed by using the Praat speech analysis software (Boersma and Weenink 2010). In addition to VOT, word duration was measured as an index of speaking rate. Six tokens (2.4%) were excluded due to the release burst and/or the word boundary not being clear. As a result, the remaining 246 tokens were submitted for further analyses.

Results

Firstly, paired t-tests confirmed that, for each speaker, word duration in the *Slow* condition was significantly longer than that in the *Fast* condition ($p <$ 0.05, or better), indicating that the rate manipulation proved successful.

Focusing on our primary question regarding the rate effects, as a first approximation, the overall distribution of VOT are illustrated in Figure 1. As seen in Figure 1, lenis and fortis stops were typically realized as pre-voiced and short-lag VOTs, respectively, replicating Ringen and Kulikov (to appear). Figure 1 also shows that there was little overlap between the two categories.

Next, in order to examine the effects of speaking rate, 2 × 3 (Rate Condition × Place of Articulation) repeated-measure ANOVAs were conducted on VOTs for lenis and fortis stops separately. ANOVA was applied first for the overall tokens, and then for part of the tokens, where the vowel following the critical stop was controlled. Here, the results for the latter case are reported. The mean values and standard deviations are summarized in table 1.
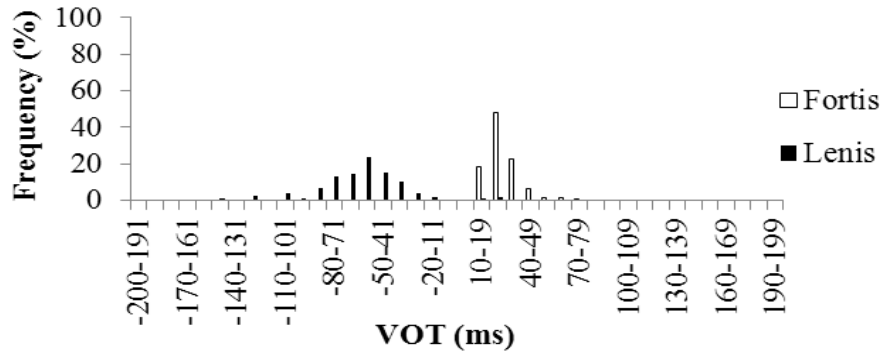
Figure 1. The overall VOT distribution of lenis and fortis stops. (10-ms bin).

Table 1. Mean VOT values where the following vowel was fixed as /o/. Standard deviations are indicated in parenthesis.

	Lenis stops				Fortis stops		
	Slow	Fast	Diff.		Slow	Fast	Diff.
Bilabial	-90 (23)	-63 (15)	27		17 (8)	12 (4)	5
Dental	-87 (35)	-63 (19)	24		12 (5)	13 (6)	-1
Velar	-69 (22)	-54 (15)	15		30 (9)	22 (8)	8

   The results showed that, for lenis stops, a significant main effect of Rate Condition was found ($F(1,5) = 9.319$, $p < 0.05$), but neither significant main effect of Place of Articulation ($F(2,10) = 1.638$, $p = 0.243$), nor interaction ($F(2,10) = 0.880$, $p = 0.445$) was observed. For fortis stops, the main effect of Rate was marginal ($F(1,5) = 5.770$, $p = 0.061$). There was a significant main effect of Place ($F(2,10) = 17.456$, $p < 0.01$), with velar being longer than dental ($p < 0.01$). No significant interaction was found ($F(2,10) = 2.064$, $p = 0.178$).
   Finally, a linear function relating VOT to word duration was estimated. Taking potential speaker-specific differences into account (See Theodore et al. 2009), a hierarchical linear modelling (HLM) analysis was applied for lenis and fortis stops separately. In each model, VOT values were nested within the seven speakers. The HLM analysis obtained a mean slope of -0.14 ms for lenis stops and 0.09 ms for fortis stops. Both slopes were significantly greater than zero ($t_{lenis}(6) = -2.998$, $p < 0.05$; $t_{fortis}(6) = 5.029$, $p < 0.01$).
   To summarize, the results of ANOVA and HLM analyses showed that both lenis and fortis stops were more or less affected by changes in speaking rate. However, fortis stops showed little change across speaking rate, suggesting that speaking rate has asymmetric effects on VOT.

Discussion and conclusion

This study examined the effects of speaking rate on VOT in the Russian language. The results indicated asymmetric effects of speaking rate, that is, fortis (short-lag) stops were less affected by changes in speaking rate. The results are consistent with those reported for various other languages. The results also showed that under the changes in speaking rate, there was little overlap between lenis and fortis distributions along the VOT continuum.

It is interesting to note that the correlation between distributional overlap of VOT and perceptual shift as a function of speaking rate has been suggested for English, which has a considerable overlap in VOT distribution (Miller et al. 1986). On the other hand, in languages with little overlap such as Russian, the effects of speaking rate on the perception of voicing have not been investigated. Future studies could investigate the perception of voicing under changes of speaking rate in languages with little overlap, which may play a role in forming a typology of the correlation between production and perception as a function of speaking rate.

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Analysis of disfluencies in a corpus of university lectures

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Abstract

This paper analyzes the prosodic properties of disfluencies and of their contexts in a corpus of university lectures. Results show that there is a general tendency to repair fluency by means of prosodic contrast marking strategies (pitch and energy increase), regardless of the specific disfluency type, but still there are degrees in the contrast made by certain types. As for tempo patterns, the region to repair is longer than the repair itself, and there is a strong trend manifested in lengthy silences between those regions. However, the monitoring of the lengthiness effect varies considerable amongst speakers and disfluency types.

Key words: Prosody, (dis)fluency, contrast, and university lectures.

Introduction

When targeting the prosodic analysis of the different regions of a disfluent sequence, one must be aware of two main strategies accounted for in the literature (Levelt & Cutler 1983): (i) a contrastive strategy between the *reparandum* (or region to repair) and the repair of fluency, manifested by pitch and energy increases at the onset of the repair; and (ii) a parallel prosodic strategy between the same areas, meaning, the repair mimicking the tonal patterns of the *reparandum*. Although Levelt & Cutler (1983) pointed out, in a map-task corpus, that contrastive marking strategies are associated with error correction categories (mostly substitutions) and parallelism with appropriateness categories (*e.g.*, repetitions and insertions), there is no one-to-one mapping between the strategy used when monitoring speech and the distinct disfluent category or even, in a larger scale, between the strategy and the domain itself (Savova 2003; Cole *et al.* 2005; *inter alia*).

In this paper we analyze the mapping between the disfluency and the fluency repair in order to verify (i) if there are contrast *vs.* parallelism strategies; (ii) which prosodic parameters configure these strategies; and (iii) if a variation of prosodic strategies may be related to proficiency degrees in the university lecture domain.

Data and methods

This study uses a subset of the Lectra corpus (Trancoso *et al.* 2008), with a total of 16 hours, 7 speakers, 110427 words, and 3.46% of disfluencies. Disfluencies were annotated accordingly to Shriberg (1994) and Eklund

(2004). As Table 1 shows, filled pauses and complex sequences are the most frequent types, followed by repetitions; the selection of the disfluency types is speaker dependent (*e.g.*, filled pauses are the most frequent type for S5 and S7, and repetitions are quite frequent for S4 and S6).

Table 1. Distribution of disfluencies per speaker. "S" stands for speaker.

Type	S1	S2	S3	S4	S5	S6	S7	Total
Complex	115	100	116	124	124	247	227	1053
Deletions	13	20	66	74	6	91	35	305
Filled pauses	92	52	45	66	379	163	342	1139
Fragments	13	42	35	21	11	59	33	214
Prolongations	35	0	0	0	46	32	22	135
Repetitions	45	56	59	108	58	205	84	615
Substitutions	29	43	60	45	33	98	34	342
Total	342	313	381	438	657	895	777	3803

   Features were calculated for the disfluent sequence itself and also for the two contiguous words, before and after the disfluent sequence. The following set of features was used for each word in those regions: f_0 and energy raw and normalized mean, median, maxima, minima, and standard deviation, as well as part-of-speech tags, number of phones, and durations. Energy and f_0 slopes were calculated based on linear regression. Pitch and energy were extracted using the *Snack Sound Toolkit* (http://www.speech.kth.se/snack/). Durations of phones, words, and interword-pauses were extracted from the recognizer output.

Prosodic analysis
Our analysis shows that pitch and energy increase from the disfluency region ("disf" or *reparandum*) to the repair of fluency ("disf+1"). Results from a Kruskall-Wallis test show significant differences (*p-value* < 0.001) in "disf-1", "disf" and "disf+1", concerning pitch ($X^2(12)=53.82$; $X^2(12)=161.54$ and $X^2(12)=34.62$; respectively) and energy slopes ($X^2(12)=56.57$; $X^2(12)=78.09$ and $X^2(12)=152.47$; respectively) within a word as well as in the differences of pitch and energy amongst those regions (pitch and energy difference between "disf-1" and "disf" $X^2(12)=139.32$ and $X^2(12)=92.61$; between "disf" and "disf+1" $X^2(12)=378.34$ and $X^2(12)=104.95$; respectively). Thus, pitch and energy slopes are significantly different within the words immediately before and after the disfluency (but not before and after that). Pitch and energy increase from the disfluency to the repair, independently of the disfluency type and stand for the majority of our speakers. There are,

however, degrees in the resets of the next unit (the highest pitch and energy resets occur after a filled pause and a repetition, respectively).

Results show that the prosodic contrast strategy (pitch and energy increase) does not apply exclusively to error correction categories (substitutions, deletions, fragments and complex sequences). Substitutions, *e.g.*, show similar significant pitch/energy increase differences on the onset of the repair, or even on the slope within the repair. Thus, results do not support the use of a contrast strategy exclusively on the error corrections, as described in Levelt & Cutler (1983). There is a more general tendency towards a contrast marking strategy, regardless of the specific disfluency type.

As for tempo analysis, the averages of the different regions are represented in Figure 1. The disfluency is the longest event, the silent pause between the disfluency and the following word is longer in average than the previous one, and the "disf+1" word is the shortest.
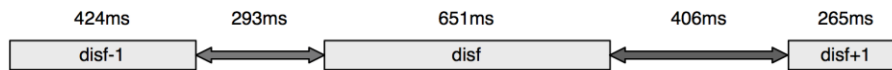

Figure 1. Durations of all the events.

Contrarily to the previous prosodic parameters, tempo patterns exhibit significant differences (*p-value* < 0.001) per speaker and disfluency type in the units "disf-1"; "silent pause before", "disf", "silent pause after", and "dif+1" ($X^2(6)=336.34$; $X^2(6)=128.16$; $X^2(6)=178.82$; $X^2(6)=401.10$; $X^2(6)=250.21$; $X^2(12)=377.93$; $X^2(12)=534.72$; $X^2(12)=1485.84$; $X^2(12)=176.86$; $X^2(12)=449.0$; respectively). For instance, when uttering a filled pause, the previous silent pause is longer (486ms) than the one after (269ms). The articulation and speech rate as well as the phonation ratio (Cucchiarini *et al.* 2002) per speaker are quite distinct as well (ranging from 12.8 to 20.3; 12.5 to 16.7; and 69.3 to 89.3 respectively).

There are degrees in mastering all the features described. Thus, the acoustic correlates of the most proficient speaker (S6) are expressed by means of: (i) the highest energy slope within the repair; (ii) a considerable pitch increase also in the repair; and (iii) the highest articulation and speech rates - correlates which are frequently associated in fluent sequences with higher level strategies of language use. Note that the combination of all those strategies is not found in the production of the remaining speakers.

Conclusions

Three main conclusions arise from the data. Firstly, different regions of a disfluent sequence are uttered with distinct prosodic properties and speakers contrast those areas with the minimum context possible. Secondly, there are different contrastive degrees in using the prosodic parameters (filled pauses

are the most distinct type in what regards pitch increase and durational aspects, and repetitions in what concerns energy rising patterns). Finally, when repairing fluency, speakers overall produce both pitch and energy increases, but they monitor tempo aspects in an idiosyncratic way.

Our results, supported on a considerable amount of data, point out to domain specificities. The systematic way in which the prosodic properties are used to repair fluency points out to higher level strategies of language use. Our work, thus, contributes to a definition of fluency markers which incorporates surgical and contrastive strategies in the production of the so called disfluencies and of fluency repairs. Future work will tackle comparable studies for other domains, and also for other languages in the classroom domain.

Acknowledgements

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PENTATrainer2: A hypothesis-driven prosody modeling tool

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Abstract

Prosody is an essential aspect of speech, as it carries both lexical and non-lexical information. A conventional approach to studying speech prosody is to collect and analyze F_0 data based on certain hypotheses and then develop a theory based on the observation, which constitutes the final conclusion of the study. This process is however far from complete, as the developed theory has not been actually tested for its ability to predict actual acoustic data. This paper presents PENTATrainer2, a prosody modeling tool based on the parallel encoding and target approximation (PENTA) framework. PENTATrainer2 can facilitate prosody studies in testing hypotheses and theories using an automatic analysis-by-synthesis and stochastic learning algorithm. Users can flexibly design the annotation scheme based on their own hypotheses and then find out whether the hypothesized categories can lead to accurate synthetic F_0 contours. PENTATrainer2 consists of three main components: multi-layer annotation, target approximation and stochastic optimization. First, acoustic data are annotated in parallel layers, each of which corresponds to a functional category that may affect F_0 contours. These layers are then compiled into unique functional combinations. The combinations represent underlying invariant representations of communicative functions and their interaction with each other. Target approximation parameters of each combination are then learned through analysis-by-synthesis and stochastic optimization. Pilot tests of PENTATrainer2 conducted on Thai, Mandarin and English demonstrate not only high accuracy of the synthesized F_0 contours but also distinctive contrasts in the distribution of pitch target parameters. This indicates the effectiveness of PENTATrainer2 in modeling speech prosody.

Keywords: prosody modeling, analysis-by-synthesis, parallel encoding, target approximation, stochastic optimization.

Introduction

Speech prosody conveys multiple levels of information simultaneously, in terms of both linguistic contrasts such as tone, focus and modality, and paralinguistic variations related to emotion, mood and attitude. Usually, the method of studying prosody is to try to link such information to changes in surface acoustics by means of statistical analysis. A conclusion drawn from the results was then used to formulate a theory about prosody. This process is however far from complete, as the developed theory has not been actually tested for its ability to predict actual acoustic data. This is a crucial step as it makes the formulated theory testable. A major reason for the general absence of this step is the lack of quantitative tools that allow speech scientists to

incorporate their empirical findings into quantitative modeling. The present paper reports the development of PENTATrainer2 as one of such tools, which can automatically learn parameters of user-defined prosodic categories and synthesize F_0 contours according to the learned parameters.

PENTATrainer2

Modeling Method

The general scheme of PENTAtrainer2 is based on the notion that speech prosody conveys information about multiple communicative functions in parallel (Xu, 2005). This notion is implemented in PENTAtrainer2 in its annotation scheme. Figure 1 shows an example of parallel annotation scheme of three communicative functions of English intonation, including Stress, Focus, and Modality. Each function was annotated independently as a parallel layer. Boundaries on each layer were marked according to the time span of that function.
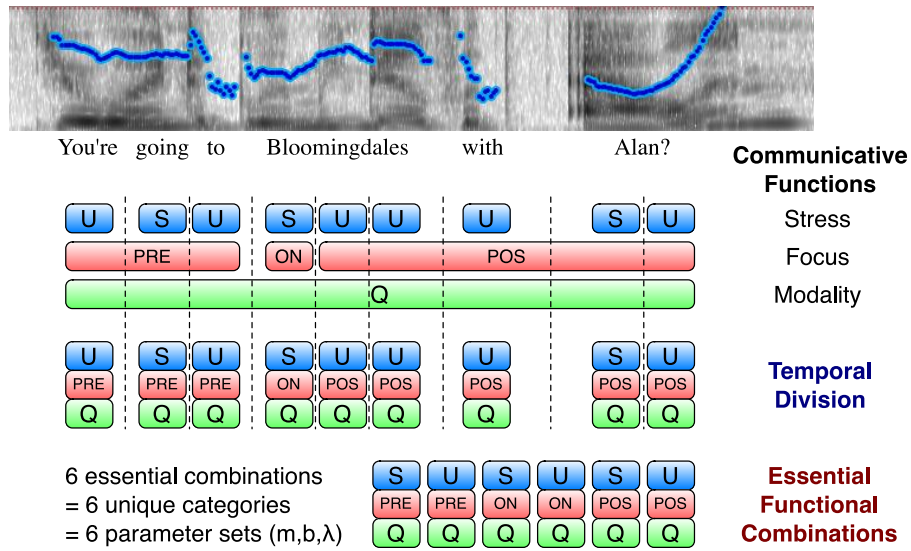
Figure 1. An example of conversion process from parallel annotations to essential functional combinations.

These parallel layers of communicative functions can also be considered as a sequence of functional combination categories. By projecting the boundaries from the layer with the smallest temporal unit (i.e. largest number of intervals) to other layers, we can obtain a sequence of functional combinations associating with each interval. Summarizing the unique

combinations of all utterances in the corpus together results in a set of functional combinations that essentially describe the prosody of that corpus.

Each interval, which is temporally divided from the functional combinations, corresponds to an F_0 movement that approaches one pitch target. This movement is quantitatively implemented in the quantitative Target Approximation (qTA) model (Prom-on et al., 2009). Figure 2 illustrates an example of F_0 movements and their corresponding pitch targets in the qTA model. In qTA, F_0 asymptotically approaches consecutive pitch targets and its dynamic states are transferred from one target approximation interval to the next at the boundary. This transfer of dynamic states, which include F_0 level, velocity, and acceleration, allows the process to carryover the momentum of the previous syllable, thus resulting in the observed carryover coarticulation. F_0 movement thus contains two components: forced response and transient response. Forced response is a pitch target, which is the goal driving the target approximation process, while transient response is the F_0 transition from the initial F_0 dynamic state to the pitch target.
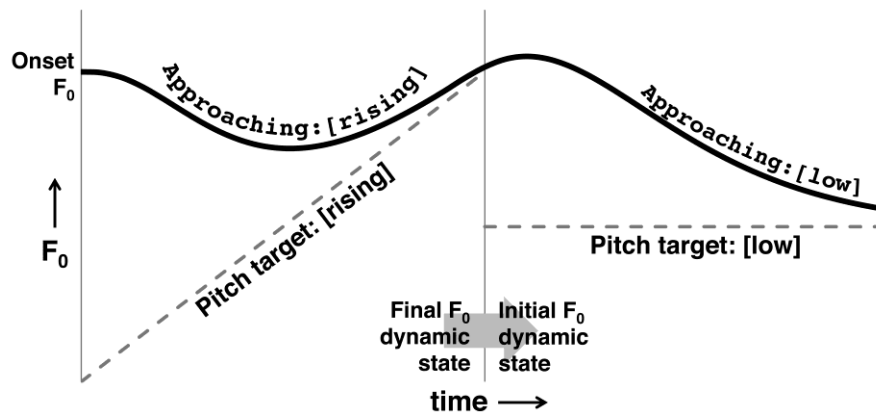

Figure 2. Illustration of the target approximation process (Xu and Wang, 2001; Prom-on et al., 2009).

In qTA, there are three model parameters controlling the F_0 movement of each interval, including target slope (m), target height (b), and strength of target approximation (λ). m and b specify the form of the pitch target and λ indicates how rapidly a pitch target is approached.

After the functional combinations were determined, their parameters were estimated using the analysis-by-synthesis strategy and the simulated annealing algorithm (Kirkpatrick et al., 1983). Parameters of essential combinations were randomly initialized. They were then randomly modified and tested to determine whether to accept or reject the proposed modification depending on the annealing temperature of the algorithm. The temperature is

initially set to a high value and then gradually reduced as the procedure is repeated. This allows the solution to converge to the global optimum over the iterations. Since the final optimized parameters may differ slightly, the learning process should be repeated a number of times to obtain more stable solution. The median of the parameters were then calculated across repetitions for each functional category of each speaker.

Software

PENTATrainer2 contains three computational tools. Figure 3 shows the workflow of PENTATrainer2. First, users need to manually define the annotation scheme using the Annotation tool. Next, parameters are automatically optimized using the Learning tool. Users can then use the Synthesis tool to synthesize F_0 contours based on the optimized parameters and compare them to the original contours.
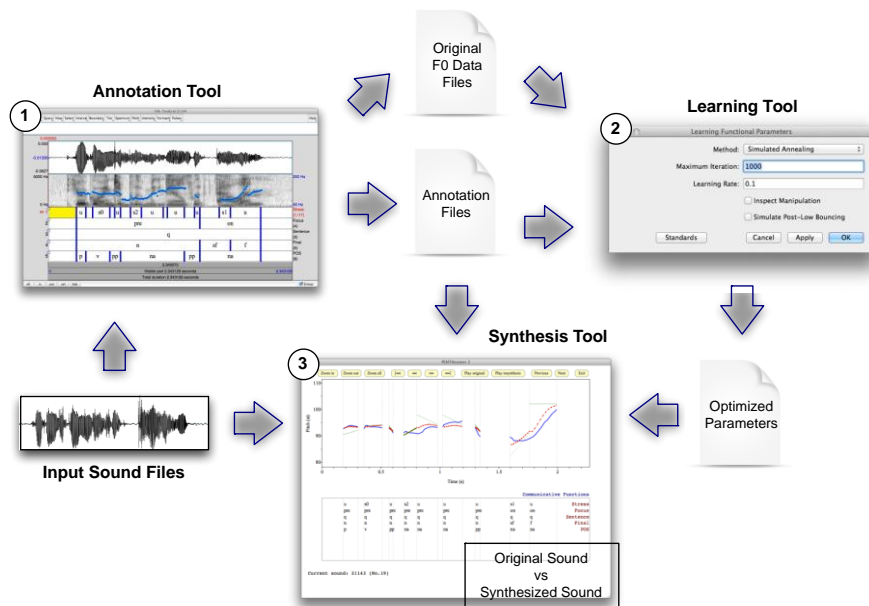
Figure 3. PENTATrainer2's workflow for prosody modeling

Pilot Tests

Corpora

We conducted pilot tests of PENTATrainer2 on Thai, Mandarin and English corpora. Table 1 shows the detail of the corpora. For full details of each corpus, please refer to prior publications (Thai: Prom-on and Xu, 2012; Mandarin: Prom-on et al., 2011; English: Liu and Xu, 2007). Each corpus was annotated separately according to the prosodic factors of that study.

Parameters were estimated according to the method described in Section 2.1. Root-mean-square error (RMSE) and Pearson's correlation coefficient were used to measure the synthesis accuracy between the synthesized and original F_0 contours.

Table 1. Corpus descriptions

Corpora	Number of Utterances (Subjects)	Factors
Thai	2500 (3 males, 2 females)	Tone, Vowel Length
Mandarin	1280 (4 males, 4 females)	Tone, Focus, Modality
English	960 (2 males, 3 females)	Stress, Focus, Modality

Results

Figure 4 shows examples of synthesized F_0 contours of all three languages as compared to the original F_0 contours. As can be seen, the F_0 contours synthesized with learned categorical pitch targets are very close to the original ones. Table 2 shows the overall synthesis accuracies of all three corpora. These accuracies are better than when parameters were estimated locally (Prom-on et al., 2009, 2011). High correlations and relatively low RMSEs can be seen across languages. Such high synthesis accuracies provide support for the user-defined hypothesized functional categories. These results also indicate the effectiveness and the generalizability of PENTATrainer2 to different languages.

Table 2. Means and standard errors of RMSE and correlation of each corpus. Parameters were learned according to the factors shown in Table 1.

Corpora	Number of Parameters	RMSE (semitone)	Correlation
Thai	10/subject	0.78 ± 0.05	0.889 ± 0.012
Mandarin	28/subject	2.16 ± 0.22	0.903 ± 0.008
English	26/subject	2.07 ± 0.23	0.836 ± 0.019

After obtaining the parameters that yield the best synthesis accuracy, the next step in a general modeling study is to analyze the distribution of estimated parameters to determine whether there is any difference between categories. This can lead to a better understanding of the underlying representations of that prosodic phenomenon. To demonstrate this, we show here the parameter distributions of Thai tones and their related statistical analyses.
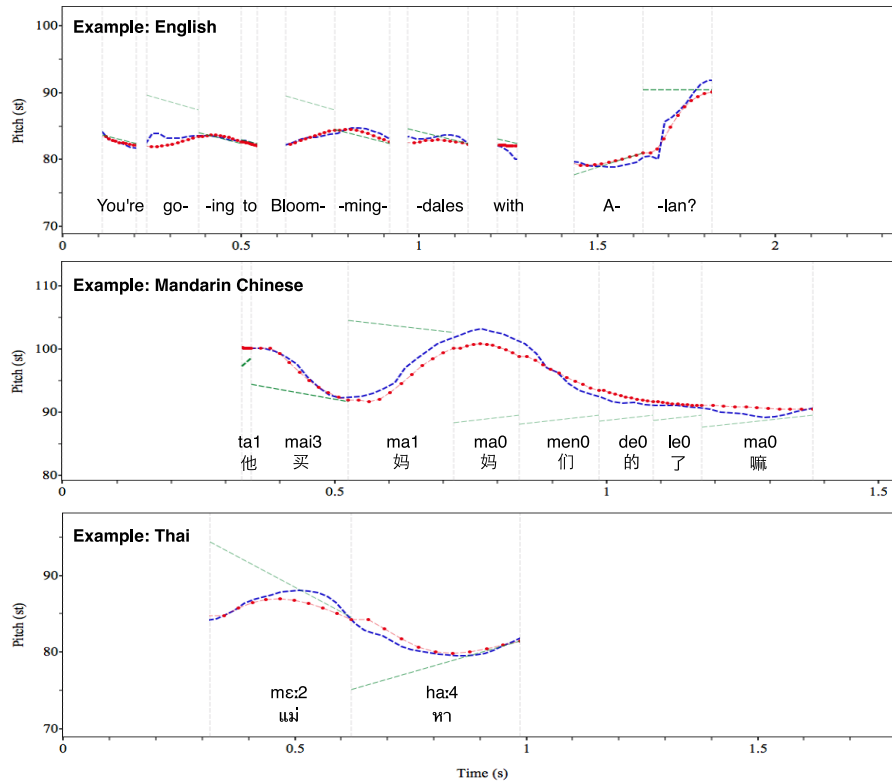
Figure 4. Examples of synthesized (red dotted line) compared to the original (blue dashed line) F_0 contours. The short dashed green lines represent the learned categorical pitch targets with which the synthetic F_0 contours were generated.

Thai has five lexical tones, including Mid (M), Low (L), Falling (F), High (H) and Rising (R), and two lexical vowel lengths, short and long. Previous acoustic analysis has shown highly variable F_0 contours of these tones in connected speech depending on both contexts and other lexical factors such as vowel length. In particular, there are both carryover and anticipatory effects in contextual tonal variations (Gandour *et al.*, 1992; Potisuk *et al.*, 1997). There are also interactions between tone and vowel length (Gandour, 1977), with the shorter duration associated with higher F_0 value. But it is unknown whether these variations reflect changes in the underlying tonal representation. In this study, we explored these issues by making use of PENTATrainer2's ability to learn underlying representations. Tone and vowel length were labeled without contextual information before the training process. Figure 5 shows the distributions of pitch target parameters learned using PENTATrainer2. Repeated measures ANOVAs showed that the

parameters were significantly different depending on the tonal categories (m: $F(4,49) = 56.81$, $p < 0.001$; b: $F(4,49) = 71.07$, $p < 0.001$; λ: $F(4,49) = 9.23$, $p < 0.001$). This indicates that the variability within tone groups is significantly less than that between groups. This also indicates that despite the variability in surface acoustics, learned underlying tonal representations are consistent and can accurately simulate F_0 contours that varied depending on the tonal contexts.

Comparing between different vowel lengths, target slope and strength were not significantly different, but target height of M tone was higher in short vowels than in long vowels ($F(1,49) = 5.37$, $p = 0.026$). This difference might suggest that M has two tonal targets so as to enhance the vowel length contrast similar to what is found in Finnish (Vainio *et al.*, 2010). However, we cannot reach a clear conclusion on this because the difference in the learned target height could also be due to other factors. For example, it is possible that the height difference is because M has a weak strength, just like the Mandarin neutral tone (Chen and Xu, 2006). But the estimation of such weak strength requires the presence of consecutive M tones (Prom-on et al., 2012), which is lacking in the current corpus. This issue therefore has to be resolved by future studies.
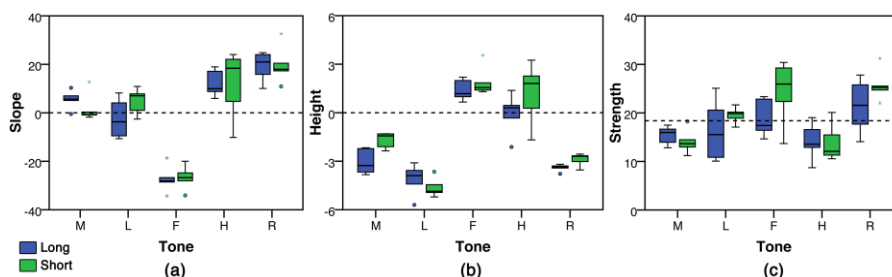

Figure 5. Parameter distributions of Thai tones (Prom-on and Xu, 2012).

Conclusion

This paper presents PENTATrainer2 and its workflow for prosody modeling. PENTATrainer2 can learn underlying representations of communicative functions in the form of pitch target parameters, and use them to accurately synthesize F_0 contours. Users can flexibly design hypothesized functional categories and test whether they lead to an improvement in synthesis accuracy. This allows speech scientists to objectively and quantitatively investigate speech prosody based on communicative functions. The pilot test results have provided initial indication that PENTATrainer2 works effectively across languages. Both high synthesis quality and its ability to estimate underlying representations indicate the effectiveness of PENTATrainer2 in prosody modeling. The integration of the analysis-by-

synthesis approach and the stochastic optimization also allows users to explore theoretical issues such as underlying representations of tonal and intonational units.

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One face, two facets: the Modern Greek complex prepositions *brosta se* and *brosta apo*

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Abstract

Languages differ substantially in the spatial concepts they choose to encode (Talmy 2000, Levinson 2003). This pilot study explores concepts related to the transversal (FRONT/BACK) axis in Modern Greek. As opposed to languages such as English (*in front of*) or German (*vor*), Greek allows two grammaticalized options for the localization of an entity in the front half-axis: the complex prepositions *brosta se* and *brosta apo*. Contrary to recent semantic analyses of Greek prepositions (Bortone 2010), our findings show that these options are not semantically equivalent. More specifically, our production data indicates that, within the complex preposition, the morphemes *se* and *apo* may mark distinct viewpoints on the same front subspace, a view that has been previously argued based on corpus data (Skopeteas 1999).

Key words: spatial cognition, spatial prepositions, front half- axis, Modern Greek.

Introduction

Crosslinguistic research on the semantics of spatial expressions has shown that the diversity found in the languages of the world depends on biological, typological and cultural factors (Talmy 2000, Levinson 2003).

FRONT, in particular, relates to the human physiology and to forward motion – it is relevant to the concept of direction and to the line of sight. Languages vary in the way they structure FRONT: a *figure* entity may be located in the FRONT subspace of a *ground* entity[1], either in an ego-facing way involving reflection (i.e. the strategy followed by English speakers) or in an ego-aligned way involving translation[2] (i.e. the strategy followed by speakers of Hausa; Hill 1982). In the facing strategy the *figure* is between the speaker and the *ground*; in the aligned strategy, the *figure* is the furthest away from the speaker.

Furthermore, localizing an entity in the front axis of another entity can vary regarding the viewpoint: speaker-anchored or *ground*-related. We talk about deictic localization, when the zero point of the coordinate axes – the so-called origo – is anchored on the speaker; if the *ground* figures as origo, we talk about intrinsic localization (Levelt 1996). In languages such as German, which only offer one grammaticalized option for FRONT (i.e. the spatial preposition *vor*), there are situations, in which deictic and intrinsic perspectives concur, resulting in ambiguity (Grabowski, 1994).

Modern Greek is interesting in its use of two options for the localization of an entity in the FRONT axis: the complex prepositions *brosta se* and *brosta apo*. Some scholars regard these as equivalent (*free variation*; Bortone

2010), while others, based on corpora data, argue that these are different perspectives on the same subspace (Skopeteas 1999). Our empirical approach looks at usage and thus aims to fill the gap by providing actual production data.

Method

The present pilot study explores how Modern Greek speakers structure the front half-axis. The production experiment was carried out with 19 adult native speakers of Modern Greek (10 females, 9 males) using black and white photographs of playmobil figures and furniture, as well as other toys (vehicles, animals and houses). Photographs always included two objects and or figures/animals, one of which was marked by a red dot. Subjects were instructed to locate the entity with the red dot in relation to the second entity on the photo. The stimuli included 42 critical items and 30 fillers. Fillers comprised of spatial relations other than FRONT.

Subjects saw stimuli on a computer screen for two seconds; subsequently the screen turned blank (white) and they had six seconds to respond. The experiment was quasi self-paced, as subjects had to then press <ENTER> to continue with the next stimulus.

Results and Discussion

Our empirical data indicates that within the complex preposition, the morphemes *se* and *apo* may mark distinct viewpoints on the same FRONT subspace. Overall, the study shows that *brosta apo* vs. *brosta se* are not semantically equivalent, *brosta apo* being the preferred option for the localization in the front half-axis (2/3 of all data vs. 1/3 *brosta se*). In cases of alignment between *figure* and *ground*, *brosta apo* usage rose to 90%. Moreover, there seem to be more constraints on *brosta se*: usage of brosta se was most frequent in spatial arrays where *figure* and *ground* were facing each other, for example, a chair facing the front side of a closet (55%) or arrays in which the *figure* had no inherent intrinsic orientation, such as a ball in front of a car (45%).

The production data suggests that Greek speakers may follow an alignment strategy; future studies will test this hypothesis and check for any language-specific effects (Levinson 2003).

Our study also questioned whether the distance between *figure* and *ground* plays a role for the selection of *brosta se* vs. *brosta apo*. As results on this issue were not clear, more research is required.

A significant gender factor was found in the usage of *brosta se* (72% male vs. 28% female). Our data suggests that this may be due to differences in scene conceptualization. Subsequent research will, therefore, look into these

grammatical categories and how they relate to speakers' perspective choice – holistic, external vs. specific, internal.

Overall, our findings indicate that the spatial concepts encoded by *brosta apo* vs. *brosta se* in Modern Greek may be more complex than is suggested by the existing literature on frames of reference (Levelt 1996; Levinson 1996). More research is being conducted to unravel the actual concepts behind these morphological categories.
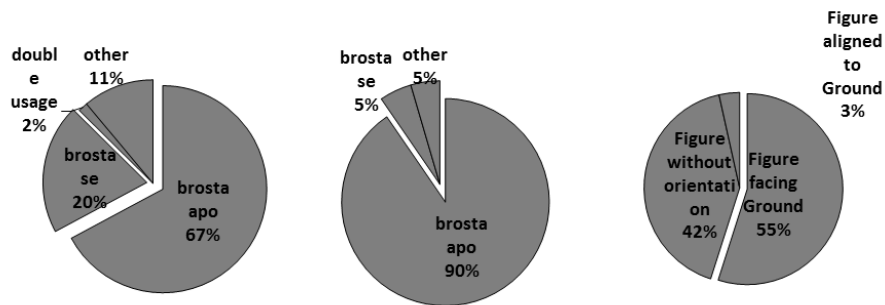

Figure 1. Frequency distribution of the complex prepositions *brosta se* and *brosta apo*. The first column shows the distribution overall. As shown in the second column, *brosta apo* is by far the preferred option when the *figure* is aligned to the *ground*. Finally, the third column shows that *brosta se* usage primarily occurred in constellations in which the *figure* had either no inherent orientation, or was facing the *ground*.

Notes
1. The terms *figure* and *ground* are used here after Talmy (1983; 2000) and refer to the two participants of the prototypical spatial relation: the object to be located (*figure*) and the object which serves as a reference for the location (*ground*). Other terms used in the literature are *theme* versus *relatum* (Becker/Carroll 1997) and *trajector* versus *landmark* (Langacker 1990).
2. In cases of reflection (engl. *in front of*; ger. *vor*), the FRONT/BACK axis is mirrored, so that *front* is toward the speaker, and *back* is furthest away from the speaker, while *right/left* remain unchanged. In cases of translation (as in Hausa), *back* is towards the speaker, *front* is furthest away from the speaker.

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Language dominance in bilingual first language acquisition compared to L2 learners

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Abstract

This fMRI study aims to compare simultaneous- and sequential Dutch-French bilinguals with respect to their dominant language. Although simultaneous bilinguals have acquired two languages from birth, it is assumed that one of both is more dominant. Three language tasks (a verbal fluency task, a grammatical judgement task and a semantic categorization task) are utilized to indicate the differences between both groups, as well as within each group (i.e. Dutch versus French). Significant differences in favor of the dominant language hypothesis were found for Dutch versus French in simultaneous bilinguals for GJT-Dutch (p = 0.042), SCT-accuracy (p = 0.012) and reaction times (p = 0.004).

Key words : neurolinguistics, bilingualism, bilingual first language acuquisition (BFLA), language dominance

Introduction

The most common conception of a bilingual is a person "who knows two languages fluently" (Romaine, 1995:22). The obvious distinction between a simultaneous and a sequential bilingual then, would be that the first acquired two first languages at the same time (Romaine, 1995; also De Houwer, 1990; 2009). Whereas the latter acquired first one mother tongue and later one or more other languages. Still, several types and subdivisions of bilinguals have been described by numerous authors (Romaine, 1995 for an overview). The difference however is not that clear-cut.

Simultaneous bilinguals are considered to have two mother tongues, learned simultaneously and early in life (Genesee & Nicoladis, 2006), before the age of three (McLaughlin, 1984)). Or, more strictly, from birth (e.g. Bloch *et al.,* 2008; De Houwer, 1990; 2009; Duñabeitia *et al.,* 2010). Notwithstanding, it is expected that simultaneous bilinguals can express themselves (slightly) better and more easily in one of both languages. Put differently, one of them is always more dominant than the other one (see Duñabeita *et al.,* 2010). Also, it is expected that the sequential bilinguals score better on tests in their L1 (e.g. Costa & Santesteban, 2004; Liu *et al.,* 2009). Contrasting results were found by Hernandez (2009). The early Spanish-English bilinguals in his study were less proficient in their L1 than in their L2.

Method

Subjects

The participants are students between eighteen and twenty-five years old, right-handed and have normal to corrected vision. 28 subjects (15 simultaneous and 13 sequential) were selected on the basis of a questionnaire.

Procedure

Three language tests were used in both groups, in- as well as outside an MRI- scanner : a *semantic categorization task*, a *verbal fluency task* and a *grammatical judgment test*. Subjects lie in the scanner during the SCT. Instructions for the SCT were given in English. The instructions for the VFT and the GJT were pre-recorded and switched between French and Dutch. The sequence of the tasks was counterbalanced.

Semantic categorization task or SCT

The SCT consists of three distinct variables : *animal/non-animal*. *Dutch/French* and *switch/non-switch*. Subjects are given two controllers, one in each hand. 156 trials are projected on a screen. The order of the stimuli is randomized per participant *(category [animal/non-animal] x language [Dutch or French] x [switch or non-switch]).* The stimulus duration of 2200ms is fixed for all participants.

Verbal fluency task

The verbal fluency task examines the participants ability to name as many words beginning with the letter *x* in one minute. Subjects were asked to repeat this task three times, with three various letters (i.e. L, M, T) and in three diverse language-conditions (i.e. only Dutch, only French, switching between Dutch and French). The order of the letters as well as the language-conditions changed per subject.

Grammatical judgment task

The third part of Paradis' bilingual aphasia test from 1987, as adapted by Coppens was used. In both languages eight sentences, some correct and some incorrect, are read out loud (pre-recorded) to the subject. After every sentence the bilingual has got eight seconds to decide whether the sentence is correct or not (i.e. judgement). And, to correct the mistake in the sentence (i.e. correction). Both the subject's judgement as well as it's correction can be *right*, *wrong* or *none*.

Data processing

The behavioral data of the VFT, the GTJ and the SCT (reaction times and accuracy) were analyzed in SPSS. One sample, independent samples and paired samples t-test were computed for significance. The Levene's test was conducted to search for equality of variances. Finally, the Pearson

correlation was conducted. The fMRI-results of the SCT (activations) were processed in Matlab-SPM. For the fMRI-data there are four missing values, bringing the total of subjects to 12 per group.

Results

Simultaneous bilinguals with Dutch as L1 score better in Dutch as well as in French as compared to the sequential bilinguals. For VFT-Dutch and GJT-Dutch results do not show significant differences (t(24)=1.37, p = 0.183; t(24)=0.49, p = 0.632). For French the results are highly significant (t(24)=5.07, p = 0.000 for VFT and t(24)=4.97, p = 0.000 for GJT). Simultaneous bilinguals score better on VFT-switching (mean = 9.54 (SD = 2.82) *versus* mean = 7.77 (SD=1.79)). The difference is not significant (t(24)=1.91, p = 0.068). Simultaneous learners also score better for SCT reaction times in Dutch (mean = 718.71 (SD = 94.24 *versus* 754.14 (SD = 179.14)), reaction times in French (mean = 794.90 (SD = 90.48) *versus* 953.34 (SD = 170.70)) and on accuracy in French (mean = 89.74 (SD = 5.86) *versus* 71.47 (SD = 6.21)). The differences in reaction times (t(20)=-2.64, p = 0.016) and accuracy (t(20)=7.04, p = 0.000) for French are significant. Sequential bilinguals score higher on accuracy (mean = 97.22 (SD = 1.43) *versus* 96.03 (SD = 2.86)) in Dutch. The difference, however, is not significant (t(20)=-1.20, p = 0.251).

Within the simultaneous group results for GJT (mean = 11.00 (SD = 1.35) *versus* 9.00 (SD = 2.97)), VFT (mean = 12.23 (SD = 3.442) *versus* 10.31 (SD = 2.53)), SCT-accuracy (mean = 96.03 (SD = 2.86) *versus* 89.73 (SD = 5.86)) and reaction times (mean = 718.71 (SD = 94.24) *versus* (794.90 (SD = 90.48)) are higher for Dutch than French. Significant results were found for GJT (t(12)=2.28, p = 0.042), reaction times (t(9)=-3.89, p = 0.004) and accuracy (t(9)=3.16, p = 0.012). Sequential bilinguals score better in Dutch than French for GJT (mean = 10.61 (SD = 2.51) *versus* 3.62 (SD = 2.53)), VFT (mean = 10.54 (SD = 2.847) *versus* 5.54 (SD = 2.259)), SCT-accuracy (mean = 97.22 (SD = 1.43) *versus* 71.47 (SD = 6.21)) and reaction times (mean = 754.14 (SD = 179.14) *versus* 953.34 (SD = 170.70)). All results are significant (t(12)=8.26, p = 0.000, t(12)=7.07, p = 0.000, t(11)=14.51, p = 0.000 and t(11)=-11.70, p = 0.000).

Discussion and conclusion

Simultaneous bilinguals score better than sequentials in Dutch and French (GJT, VFT, SCT). Better results for French were expected, since their proficiency-level is higher. Results for Dutch are remarkable since their exposure to both languages was half as much compared to exposure in the sequential group. Results of the sequential speakers for Dutch *versus* French show a significant advantage in favor of the group's L1. This confirms the

hypothesis that sequential bilinguals score better in their mother tongue. Within the simultaneous group a significant difference for the GJT is observed in favor of Dutch versus French. These results may confirm the existence of a dominant language in simultaneous bilinguals. The VFT-Dutch scores lay slightly higher than the results for French, but not significantly. A tendency versus Dutch as the more dominant language is observed nevertheless. For the SCT, the reaction times and accuracy scores are significantly better in Dutch than in French. The better scores for Dutch imply the existence of a dominant language in simultaneous bilinguals.

In conclusion, simultaneous bilinguals have one language which is more dominant than the other one. However, this is only true for language reception tasks. Despite exposure differences, simultaneous bilinguals score as well on their L1 as L2 learners, while they perform significantly better on their second language compared to sequential bilinguals.

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A neural basis for the effect of bilingual language control on cognitive control

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Abstract

It has been observed that bilinguals have an advantage on tests of cognitive control, such as the Simon task (Bialystok et al. 2004). This advantage has been attributed to the bilingual's need to constantly manage two competing languages. However, the neural correlates of this effect have not been fully understood. Although many of the networks in the brain used for cognitive control are also used for language control, it has been argued (Frühholz et al. 2010) that different types of conflicts rely on distinct neural mechanisms of conflict processing. The present study sought to explore potential overlaps in the brain circuits involved in cognitive language and control in order to provide a tentative basis for the bilingual cognitive advantage.

Key words: neurolinguistics; langanguage control; cognitive control

Introduction

The term 'cognitive control' refers to a general mechanism using different processes (attention, working memory, response selection and inhibition) in sensory, memory and motor systems to achieve a goal (Ye & Zhou 2009).

Language control is the 'control mechanism behind languages' which assures that in a particular context the correct language is used. Several authors (Abutalebi & Green 2007; Ye & Zhou 2009; Garbin et al. 2010) agree that many of the networks in the brain used for cognitive control are also used for language control, these are often overly generally described as a network of frontal, parietal and subcortical structures (Ye & Zhou 2009).

It has been observed that bilinguals have an advantage on tests of cognitive control, such as the Simon task (Bialystok et al. 2004). This advantage has been attributed to the bilingual's need to constantly manage two competing languages. However, the neural correlates of this effect have not been fully understood. Moreover, it has been argued (Frühholz et al. 2010) that different types of conflicts rely on distinct neural mechanisms of conflict processing: whereas performance on the Simon task relies on response inhibition (a stimulus-response conflict), language control relies on interference inhibition (a stimulus-stimulus conflict; see van Heuven et al. 2008).

The present study sought to explore potential overlaps in the brain circuits involved in cognitive control and language control in order to provide a tentative basis for the advantage of bilinguals on cognitive control tasks.

Experimental procedures

Participants
12 simultaneous (5 females; mean age 20,51; SD 1,89) and 12 sequential (6 females; mean age 20,56 years, SD 2,12; mean AoA French 9,25 years, SD 0,87) healthy right-handed Dutch-French bilinguals.

Tasks
In the Simon task (Simon 1969) each trial began with a fixation cross presented for 300ms followed by a red or blue square presented for a mean duration of 2200ms (ISI = 0) on the left or right side of the screen. The mapping of stimulus colour to response key was counterbalanced across participants. Each scan run comprised 156 trials.

The semantic categorization task consisted of 78 target animal nouns (39 Dutch, 39 French) and 78 random nouns (39 Dutch, 39 French) with mean length = 5.8 letters (range 5-8) and a mean frequency = 9.3 occurrences / million (Dutch and French SUBTLEX databases). We excluded all translation equivalents, homonyms, interlingual homographs and homophones, and controlled for phonological and lexical neighbours. Stimuli were presented for a duration of 2500ms, preceded by a fixation cross presented in the centre of the screen for 300ms. Each scan run comprised 156 trials.

Image acquisition and processing
In a 3-T MRI Philips Achiva scanner, using a single-shot T2*-weighted EPI gradient-echo sequence (TR/TE/Flip = 3000ms/35ms/90°, FOV = 212 x 230, matrix = 104 x 105) 130 dynamics were obtained over 22 axial slices (slice thickness = 4mm). Structural images were acquired using a T1-weighted, 3D gradient-echo pulse-sequence with TR/TE/Flip = 12ms/3.75ms/10°, FOV = 240 x 240, matrix = 240 x 240, and slice thickness = 2mm. Data were analyzed using SPM5 (The Wellcome Institute of Neurology, London, UK). Functional images were spatially realigned, co-registered, spatially normalized to standard stereotactic MNI space, and smoothed with an isotropic 8-mm full-width at half-maximum Gaussian kernel.

Results

Behavioural data
Reaction times on the Simon task did not yield significant differences for simultaneous compared to sequential bilinguals (t = -0.97, p=0.341), although accuracy scores did (t= 2.38, p=0.027). Accuracy scores on the semantic categorization task showed a significant advantage of simultaneous over sequential bilinguals (t= 6.65, p=0.000). Reaction times on switches to

French showed a significant difference for simultaneous compared to sequential bilinguals (t= -2.436, p=0.023).

Imaging data
Within-group activations
On language conflict trials, simultaneous bilinguals showed activation in the caudate, precentral gyrus (BA6), and right inferior frontal gyrus (BA13); sequential bilinguals showed activation in the right superior frontal gyrus (BA8), bilateral inferior frontal gyrus (BA9), bilateral middle occipital gyrus (BA19), and right caudate.

Simon conflict trials for simultaneous bilinguals showed activation in the superior frontal gyrus (BA8), posterior (BA31) and central anterior (BA25) cingulate gyrus; in the sequential bilinguals showed activation in the superior parietal lobe (BA7), postcentral gyrus (BA2), superior frontal gyrus (BA8), and posterior cingulate gyrus (BA31).

Between-group activation
Relative to the simultaneous group on language conflict trials, sequential bilinguals showed activation in the superior parietal cortex (BA 7), precentral cortex (BA 6), anterior cingulate cortex (BA 32), and medial frontal cortex (BA 8). We found no specific activation for simultaneous bilinguals.

On Simon conflict trials, simultaneous compared to sequential bilinguals showed activation in the superior frontal cortex (BA 8), posterior (BA 8) and anterior (BA 25) cingulate cortex. Sequential compared to simultaneous bilinguals showed no significant activation.

Discussion
We identified distinct brain activations for each conflict type. For language conflict trials we found heightened activation in the inferior frontal cortex which is thought to be involved in response inhibition (Aron et al. 2004), in the superior parietal cortex (Liu et al. 2004), and in the caudate, which has been directly linked to language selection (Abutalebi & Green 2007) and language control (Crinion et al. 2006). Simon conflict trials elicited activations in the superior frontal cortex which has been identified during S-R conflicts in earlier studies (Früholz et al. 2010) and in the posterior cingulate cortex which is involved in spatial orienting (Vogt et al. 1992) or spatial target detection (Mesulam et al. 2001).

Interesting to note is that during both types of conflict trials we found activity in the anterior cingulate cortex which has been hypothesized to be responsible for conflict control and response inhibition in general (Liu et al. 2004) but also for stimulus-identity based stimulus-stimulus conflicts (van Veen & Carter 2005). We cautiously interpret these data as suggesting that

the anterior cingulate cortex may constitute a bridge between stimulus-stimulus and stimulus-response conflict resolution and thus between language and cognitive control as a result of the more 'trained' use of this area during language conflict resolution in bilinguals.

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'Seeing and thinking for speaking' across languages: spatial encoding and attention allocation in agrammatic aphasia

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Abstract

Current typological research has shown that languages encode space in strikingly different ways, onto divergent lexical and syntactic structures. Such typological properties seem to strongly guide speakers' 'speaking' and 'thinking' in typical and atypical (pathological) contexts. Such asymmetries in the distribution of the lexical and grammatical elements are also particularly interesting for the study of agrammatic speakers who show dissociations between those two elements when speaking. The present research investigates whether language-specific factors influence how speakers of typologically different languages with and without agrammatism encode motion events verbally (speaking), as well as how they allocate their visual attention (seeing) when constructing their spatial representations (thinking).

Key words: Spatial language, eye movements, Thinking for speaking framework, agrammatism

Introduction

Recent typological and crosslinguistic research has begun to examine the implications of linguistic diversity for human cognition (Evans & Levinson 2009) in normal as well as in pathological states (Soroli 2011). More specifically, in the domain of space, languages are found to encode lexical and syntactic structures in strikingly different ways (*satellite-framed* vs. *verb-framed* languages) (Talmy 2000). With respect to the expression of motion, languages are classified into: those expressing *Manner* (the subjective component of motion) in verb roots and *Path* (the objective component of motion) in satellites (e.g., English), see example (1); and those lexicalizing *Path* in the verb leaving *Manner* implicit or peripheral (e.g., French), in example (2).

(1)　　*The mouse <u>climbs</u> **up** the table*
　　　　　　　　<u>Manner</u> **Path**　　　　　　　　(S-framed pattern)
(2)　　*La souris **monte** sur le pied de la table [<u>en courant</u>]*
　　　　　　　　　　Path　　　　　　　　　　<u>Manner</u>
　　　　Lit. 'The mouse ascends on the table leg [by running]'.
　　　　　　　　　　　　　　　　　　　　　(V-framed pattern)
　Such striking cross-linguistic differences, apart from their typological interest (Slobin 1996), are significant for the study of the relationship

between language and cognition (Hickmann et al. 2009), contribute to the debate opposing universalist approaches — according to which spatial cognition is based on universal, perceptual and cognitive processes that are independent from language-specific properties; and relativity approaches — according to which language-specific factors may affect how speakers construct spatial representations beyond language use (Soroli & Hickmann 2010). Such linguistic variation is also of great interest for the investigation of the lexical vs. syntactic strategies of aphasic speakers during verbal encoding (Nespoulous 1999). In this context, and despite a few cross-linguistic studies of aphasia (Menn & Obler 1990), little is still known about universal vs. language-specific aspects of aphasia in language use and beyond (Soroli et al. in press).

The present study aims to determine the role of typological (language-related/typological) vs. language-independent (universal/ syndrome-related) factors for language encoding processes, in accounting for similarities and differences in the verbalization, and visual attention patterns of speakers with and without agrammatism.

Method

In order to measure the relative role of language-independent and language-specific factors we coupled the analysis of verbal data with an eye-tracking paradigm. More specifically, we compared how several groups of speakers: English and French controls (N=40); English and French speakers with agrammatism (N=2), describe motion events presented visually (video-clips) in a Production and how they allocate their visual attention.

The Production task consisted in watching a series of short target video-clips showing motion events performed in different *Manners* (i.e. walking, jumping, crawling) and along a variety of *Paths* (up/down, across/along, into/out of). Participants were asked to describe at the end of each clip what had happened.

The analysis examined the type of information expressed (*Manner*/*Path*), the linguistic means used (verbs/other devices), and the eye fixations to specific Areas of interest in the clips corresponding to the main motion components (cf. *Path* (P) and *Manner* areas (P+/-M)), as illustrated in Figure 1.

Figure 1. Example of an 'into' motion event divided in different Areas of interest (Source (S), Goal (G), Path (P), and Manner (P+/-M))

Results

The results from the production task confirmed the main *V-* vs. *S-framed* typological differences in the patterns of French and English control speakers: main focus on *Path*-component typically lexicalized in French; systematic lexicalization of Manner together with *Path* in the verbal network in English. With respect to speakers with aphasia, the French speaker either expressed no semantic information in his utterances or when selected one, he preferred to express *Path* in the verb and no other information in the periphery. In parallel, in English the participant mainly produced utterances expressing only one component (in contrast to the typical compact *Manner+Path* pattern) and encode either *Manner* or *Path* in the verb, and either only *Path* or no semantic information in peripheral devices.

The data from the production eye-tracking paradigm showed that, depending on the language group and irrespective pathology, spatial components were not only encoded differently, but also filtered visually in different ways. French *Path*-fixations were more frequent than those performed by the English viewers on the same Areas, whereas, with respect to the time spent fixating these areas, participants' fixations to the specific *Path* and *Manner* areas did not depend on the language factor.

Discussion and conclusion

We examined speakers' verbal and non-verbal responses in a task that required speakers to construct representations of motion events and then encode them verbally. Overall, the results showed important differences in the linguistic verbalizations (speaking), but also in the representations

beyond language use (thinking), as revealed by the non-verbal measures (seeing). More specifically, findings showed language-specific variation in the encoding patterns across all participants, but only a partial language effect on the attention allocation data. More specifically, a significant language effect was found in the encoding patterns used in discourse, and in the numbers of eye-fixations during the exploration of the visual scenes, but only a partial language effect for the duration of the eye fixations in the same Areas of interest. Speakers with agrammatism developed parallel language- and syndrome-related strategies showing a rather double pattern of compensation.

These findings support a moderate relativistic/typological view and indicate the need for additional research directions before definitive conclusions can be reached. It is clear that the use of multiple methodologies, and the account for multiple factors are essential in order to deeply investigate how language relate to thought and what is the relative impact of language- and syndrome-related factors for the cognitive processes involved in aphasia.

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Discourse effects on the choice of modal adverbs in English

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Abstract

This study examines modal adverbs from a functional perspective, focusing on the four synonymic expressions: *doubtless*, *no doubt*, *undoubtedly* and *without doubt*. By adopting a questionnaire study, the paper aims to determine two factors regarding their patterns of occurrence: (i) whether they occur in the initial position or elsewhere in a clause; and (ii) whether the subject of the clause in which they appear is a pronoun or a full NP. The results of our analysis reveal that, compared to the other adverbials expressions above, *no doubt* behaves at the discourse-pragmatic level and the factors influencing their usage are strongly associated with the parameters of two different kinds of discourse.

Key words: modal adverb, synonym, function, discourse, questionnaire study

Introduction

This paper investigates whether the choice of modal adverbs in English is sensitive to the discourse context in which they occur. As illustrated by Examples (1a–c), the four modal adverbials *doubtless*, *no doubt*, *undoubtedly* and *without doubt* are similar in form and nearly equivalent in meaning, and can thus be classified in the same semantic category:

(1) a. You have *doubtless* or *no doubt* heard the news. (Fowler 1998: 230)
    b. It was *no doubt* clever of him to offer his resignation at that point in the proceedings. (Quirk et al. 1985: 622)
    c. During the action the person will *undoubtedly* have certain feelings towards it and gain satisfaction from achievement. (ACAD) (Biber et al. 1999: 854)

Although the existing literature offers various interpretations of the usage of these modal adverbs (Simon-Vandenbergen and Aijmer 2007; Swan 2005; Huddleston and Pullum 2002; Biber et al. 1999; Hoye 1997; Quirk et al. 1985), it is still unclear whether discourse factors influence their use. In this paper, we will show the prominence of such discourse effects by means of a questionnaire study.[1]

Methodology
In this study, we generated four experimental conditions by manipulating two factors regarding discourse (2 × 2 design). The first factor was *position*, referring to whether the modal adverbs occur in the initial position of the clause or elsewhere in the clause. A modal adverb positioned initially expresses the topic or theme of modality (Halliday and Matthiessen 2004, Hoye 1997, Halliday 1970). The second factor was *definiteness*, referring to whether the subject of the clause in which the adverbs appear is a pronoun or a full NP. This is pertinent because pronouns serve as markers of links between clauses in discourse (Halliday and Hasan 1976).

  We conducted a cloze test with 16 discourse fragments, containing a choice of embedding modal adverbs (1: *doubtless*, 2: *no doubt*, 3: *undoubtedly* and 4: *without doubt*), as shown in Examples (2a–d):

(2) a. Non-Initial/Full NP
      Well, tell on to the end. The archers cut them down -- a few broke back for home unscathed. Some (   ) made their way back later with their hurts.
   b. Non-Initial/Pronoun
      R. Jenkins has been a tower of strength in Rugby and under normal circumstances would probably have gained an International cap. He is (   ) worthy of the honour.
   c. Initial/Full NP
      I sampled three of them -- first in Finland, then in France and finally in Switzerland. Scandinavia is where skiing began. (   ) even the Vikings got about their own snowy land on useful planks of wood.
   d. Initial/Pronoun
      Nora was not in the car. I keep telling you. I keep telling you. Nora went back to Germany. (   ) she is in Germany now

  In this paper-based experiment, the questionnaire with 64 items (16 target fragments and 48 fillers) was administered to 40 participants, 20 of whom were native speakers of American English and 20 of whom were native speakers of British English (20 females, 20 males), all aged between 20–50 years. A total of 640 discourse completion responses (16 fragments × 40 participants) were obtained and we conducted further quantitative analysis on these responses in terms of frequency.

Results and Discussion
The frequency of analysable occurrences produced in this experiment is shown in Table 1. The table shows that *no doubt* and *undoubtedly* displayed

a tendency towards high frequency, but the differences were not statistically reliable enough for the two high frequency adverbials.

Table 1. Frequency and percentage of the four modal adverbials in this experiment

Modal adverbials	Freq.	%
doubtless	75	11.7
no doubt	196	30.6
undoubtedly	236	36.9
without doubt	133	20.8
Total	640	100.0

$$(\chi^2 = 93.91, p < 0.001)$$

Table 2 shows the frequency of analysable completions when presented with the pronoun or full NP subject and the adverbial construction in the initial position or elsewhere in the clause.

Table 2. Frequencies of the four modal adverbials according to experimental conditions

	doubtless	*no doubt*	*undoubtedly*	*without doubt*
Non-Initial/Full NP	20	29	84	27
Non-Initial/Pronoun	22	47	72	19
Initial/Full NP	11	59	45	45
Initial/Pronoun	22	61	35	42

$$(\chi^2 = 103.55, p < 0.001)$$

One conclusion that is immediately evident is that the frequencies of the four modal adverbials varied according to the experimental conditions and uneven frequencies of scored responses illustrated that the adverbs fulfilled different functions at the discourse-pragmatic level. The participants provided the most *undoubtedly* completions under the Full NP conditions, whereas *no doubt* completions occurred the most frequently under the Pronoun conditions. The second result that is evident in Table 2 is that for *no doubt* and *undoubtedly*, significant frequency was observed between all conditions, except for between the Initial position/Full NP condition and the Initial position/Pronoun condition ($p < 0.05$). What is important is that the participants' preference for *no doubt* was especially strong when the Initial position involved a Pronoun. Thus, *no doubt* is not only merely fixed within a clause but also assumes discourse functions; *no doubt* can thus be used flexibly within a clause. Furthermore, two important implications follow from the results observed in this experiment. First, each of *position* and

definiteness has an evident effect on the choice of modal adverbs. Second, under the Initial position conditions, the effect of definiteness was not significant, whereas under the Non-Initial position conditions, it was significant.

Conclusion

In this paper, we demonstrated that the effects of *position* appear to be larger than those of *definiteness* and that these two discourse factors variously influence the usage of modal adverbs.

Notes

1. In the field of English Linguistics, Quirk (1968) discusses the negative preterite forms of *dare* through adopting a questionnaire study.

Acknowledgements

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Speech rhythm in native and non-native Polish

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Abstract

This paper presents a study on the realization of speech rhythm in native and non-native Polish. The paper examines the usefulness of %V-ΔC and nPVI-rPVI metrics for rhythm analysis in native and non-native speech and their efficiency in capturing speaker idiosyncrasies in the realization of rhythm. The metric scores are also used to investigate the effect of speakers' L1 (German or Korean) on the realization of speech rhythm in Polish.

Key words: rhythm, metrics, native & non-native speech

Introduction

Traditionally, rhythm was defined as a production-based effect (Abercrombie 1965), but observations of overall durational variability of vocalic and consonantal intervals resulting from differences in the phonotactic structure supported by findings of empirical research led to a redefinition of this concept. Nowadays rhythm is considered as the result of interaction of a number of components: phonetic and phonological on the one hand and segmental and prosodic on the other (Dauer 1987). In the measurement of rhythm three sets of metrics are generally used: %V-ΔC (Ramus et al. 1999), PVIs (Grabe & Low 2002) and Varcos (Dellwo 2006).

It can be expected that as in case of segmental errors (e.g. substitutions, insertions or deletions) the realization of rhythm in non-native speech will also be influenced by the native language (L1) and transfers of timing patterns to the foreign language will occur. This kind of information can be used in pronunciation and prosody training in the foreign language e.g. with respect to curriculum preparation and foreign accent assessment. Another area where such knowledge might be valuable is speaker classification (e.g. for forensic purposes): here the specific realization of rhythm, along with other features, can be used to distinguish non-native from native speakers, to classify foreign accents or to identify particular speakers.

In the current study we try to answer the following questions: Do the %V-ΔC and PVI metrics provide a reliable basis for distinction between Korean-accented, German-accented and native Polish? To which extent do the metrics capture speaker idiosyncrasies in the realization of rhythm? And finally, do the metric scores show the effect of speaker's L1 on the realization of rhythm in Polish?

Methodology

The speech material comes from speakers whose native language was Polish, German or Korean. German is a typical stress-timed language, whereas the status of Polish and Korean is unclear. Polish is sometimes classified as stress-timed (Ramus et. al 1999), but most often it is considered as rhythmically mixed: like syllable-timed Spanish or French it has no vowel reduction, but on the other hand, like stress-timed English or German, it can have very complex syllable structure. Rhythm in Korean is more syllable-timed than stress-timed (Arvaniti 2009, Mok & Lee 2008), but there is also evidence that Korean is one of the mora-timed languages (Cho Moon-Hwan 2004).

Speech material

The speech material includes recordings of a short literary story read by 7 German and 5 Korean learners of Polish and 5 Polish native speakers. The corpus (19 sentences x 17 speakers) was segmented into vocalic and consonantal intervals on the basis of automatically obtained and manually verified phonetic transcription and segmentation. Vocalic intervals were defined as stretches of signal between vowel onset and offset and consonantal intervals as stretches of signal between vowel offset and vowel onset. Segmentation, annotation and measurements were carried out in Wavesurfer and Praat.

Acoustic measurements

For each sentence 4 acoustic parameters were extracted from the duration measurements of the vocalic and consonantal intervals: %V – proportion of vocalic intervals, ΔC – standard deviation of consonantal intervals (Ramus et. al 1999), nPVI and rPVI – vocalic and consonantal pairwise variability indices (Grabe & Low 2002).

Results

The distribution of %V-ΔC and nPVI-rPVI metric scores calculated on the basis of native Polish (pl), German-accented (de) and Korean-accented Polish (kor) speech data is illustrated in Figure 1.

  The vocalic nPVI is the same in German-accented and native Polish (46), which indicates that German speakers avoided vowel reduction (present in German, but absent in Polish). The rPVI value is higher in German-accented than in native Polish (75 vs. 70.6), but at the same time it is significantly lower than in German (55.3 in Grabe & Low 2002). This effect, also observed in Korean-accented Polish, can be attributed to complex structure of Polish syllables: difficulty in the realization of long consonant clusters causes greater variability in the timing of the consonantal intervals.
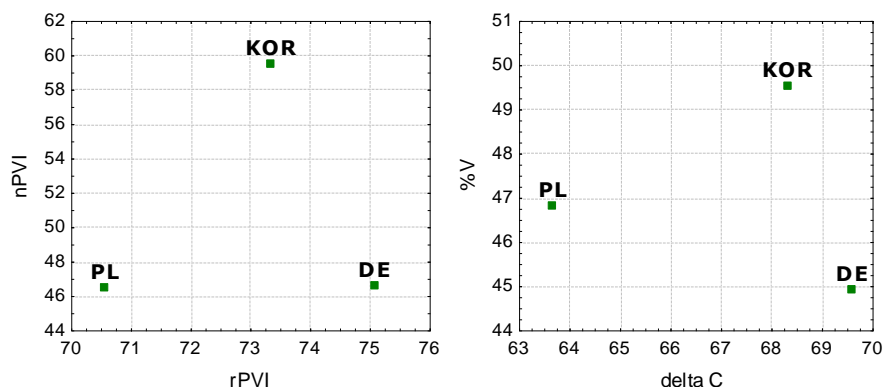
Figure 1. Distribution of metric scores in native and non-native Polish.

High nPVI value in Korean-accented Polish (about 60, i.e. the same as in native Korean, Mok & Lee 2008) suggests that the speakers transferred the timing of vocalic intervals from their L1 to Polish. Since vowels are more significant to the perception of rhythm than consonants, it can be concluded that concerning rhythm, Korean-accented Polish differs more from native Polish than German-accented Polish and that German speakers were more successful in the realization of rhythm in Polish then the Korean ones. This is in line with informal perceptual evaluation of rhythm in non-native Polish.

The distribution of %V-ΔC metrics reveals more variability in vocalic intervals' duration in Korean-accented than in native and German-accented Polish, but comparing to nPVI values the effect of speakers' L1 is smaller (see also ANOVA results, Table 1). The timing of consonantal intervals of German and Korean speakers is distinct (higher ΔC values) from that of Polish speakers, but the differences do not pattern in the expected direction (i.e. that of speaker's L1) – the explanation is the same as in case of rPVI values. ANOVA results (Table 1) show significant effect of *speaker's L1* on all the metric scores except for rPVI. %V and nPVI are affected by speaker's L1 to a greater extent than ΔC and rPVI. Pairwise comparisons based on Tukey HSD post-hoc test revealed that only %V is statistically different among the three speaker groups, therefore it can be considered the best predictor of speaker's L1.

Table 1. The effect of speaker's L1 on the metric scores.

metric score (ANOVA)	%V (F=49.9, p<0.01)	ΔC (F=3.44, p<0.01)	nPVI (F=56.25, p<0.01)	rPVI (F=0.92, p=0.4)
pairwise comparison	all	pl x de	kor x pl kor x de	-----

In order to test the robustness of the metrics in capturing speech rhythm differences between individual speakers ANOVA and Tukey HSD test were carried out using *speaker* as the predictor variable. The results showed statistically significant differences among speakers in %V and nPVI. Pairwise comparisons indicated that these differences are mainly due to speaker's L1 and reflect rhythmic variability among individual speakers to a limited extent. The scores form distinct groups according to speaker's L1, but in each group some statistically significant deviations in %V can also be found.

Discussion

The metrics capture differences in the realization of speech rhythm in German-accented, Korean-accented and native Polish and it is mainly vocalic interval duration variability that conveys these differences. %V-ΔC are generally more robust in this task than PVIs and %V can also be used to analyze inter-speaker variability in rhythm. The metrics show transfer of some timing patterns from L1, but more importantly, they reflect differences in speech rhythm resulting from distinct phonotactic structure of the languages.

Acknowledgements

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Adjectives in translation: an experimental study of cognitive links

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Abstract

The study presents results of an association test focused on adjectives and related to translation of literary prose. The goal is to investigate whether modernization of language in translation leads to better comprehension. The stimuli used in the experiment are adjectives from two Polish translation of the same English novel: one contemporary translation, and one published in 1912.

Adjective semantics, translation, equivalence, psycholexicology

Introduction and Goal

For several decades, word association tests have been used as a tool for investigating the organization of the mental lexicon – a study field that Miller and Johnson-Laird (1976) have proposed to call psycholexicology.

"The lexical organization of adjectives is unique to them, and differs from that of the other major syntactic categories", as stated in (Miller et al. 1993:26). While the most important lexical relation between nouns and verbs seems to be hypo-/hypernymy (called "troponymy" in the case of verbs), descriptive adjectives are supposed to be organized into clusters of semantically similar (close to synonyms) entries, which in turn are related to clusters of antonyms. For relational adjectives (adjectives that do not have antonyms) connections to nouns having features denoted by the adjective are claimed to be crucial (Fellbaum 1995, Gross and Miller 1990, Gawronska and Erlendsson 2001).

In translation of literary prose, the right choice of adjectives is of high importance, since a translation equivalent that triggers wrong associations may destroy the artistic effect; as a consequence, functional equivalence between the source and the target text will not be achieved.

The goal of the current study was to investigate Polish translation equivalents of English adjectives in two versions of an English novel: from 1912 and 2003. The main questions was: are the adjectives chosen by the contemporary translator better cognitively anchored in the mental lexicons of the young Polish readers than the adjectives in the old translation? The method used in search for answer to these questions was association test.

Experiment Design

As stimuli for the association test, 30 Polish adjectives were chosen from two translations of the novel "Anne of Green Gables" by L. M.

Montgomery, first published 1908. The first translation into Polish, later referred to as TT1 (target text1), by R. Bernsteinowa, occurred 1912; the second one (TT2), by A. Kuc, was published 2003. The adjectives were chosen from first two chapters of the books, with focus on phrases, where the two translators have used different adjectives in the same context. The stimuli are shown in Table 1, along with the original adjectives and their collocates from the source text (ST).

The informants were 111 children, 49% girls and 51% boys, all of them native speakers of Polish, aged 12-13 (which corresponded to the age of the intended receivers of the novel). The data were collected in school classrooms. The pupils received instructions to write down the first word that will occur in their mind when seeing the word on the slide. The adjectives were presented on Power Point slides, one at time, in 15-20 seconds intervals.

Table 1. Adjectives and their collocates from the source text, and their equivalents in TT1 and TT2.

ST Noun	ST Adj	TT1 Adj	TT 2 Adj
brook	headlong, intricate	swawolny, kapryśny	wartki
stream	quiet	spokojny	cichy
stream	well-conducted	dobrze ułożony	spokojny
willow	great	wysoki	rozłożysty
birch	slender	smukły	wysmukły
bloom	filmy	puszysty	delikatny
tree	weeny-teeny	nędzny	marny
chorus	mournfully sweet	melancholijny	żałobny
gulf	dark blue	szafirowy	granatowy
tree	huge	wielki	potężny
Lombardies	prim	0	strzelisty
sky	purple	purpurowy	fioletowy
water	crocus	szafranowy	0
veil	misty	koronkowy	lekki
mists	pearl	opalowy	fioletowy
plumes	nodding	zwiewny	powiewny
orchard	beautiful	cudny	0

Analysis and Results

The responses were classified according to semantic and phonetic criteria.
Six main groups were identified:

1. Synonyms or adjectives close to synonyms
2. Antonyms
3. Nominal collocates
4. Nominalizations or synonyms to nominalizations of the stimulus adjective
5. Phonetically (not semantically) motivated associations
6. Associations that were not possible to interpret and cases of zero response.

Table 2. Associations to adjectives from the two translations (in %).

Stimulus adjective	Synonym	Antonym	Nominal collocate	Nominalization	Phonetic link	Uninterpretable
TT1	26.2	1.3	35.5	1.7	4.0	31.3
TT2	23.9	0.7	33.4	2.0	5.5	34.5

Table 3. Adjectives displaying a high percentage of phonetic associations (examples).

Stimulus adjective	Synonym	Antonym	Nominal collocate	Nominalization	Phonetic link	Uninterpretable
opalowy	1	0	12	0	28	59
granatowy	9	1	35	0	22	33
strzelisty	8	0	10	0	32	50
powiewny	6	0	31	0	18	45

   The results of the association test (Table 2 and 3) confirm the claim that the strongest cognitive links that constitute the meaning of an adjective are connections to synonymous adjectives and to nominal collocates. The importance of antonyms in the mental semantic network is not confirmed by the current results.

   There was no significant difference in the average percentage of uninterpretable answers/no answers between the two groups of adjectives: 31.3% for TT1 and 34.5% and TT2. The average percentage of associations based on phonetic features is slightly higher (5.5%) for adjectives from TT2 than for those from TT1 (4%). High (above the average) percentage of uninterpretable answers or no answers correlate with presence of phonetic associations among the responses given to the adjective. The correlation is statistically significant, on the verge of being strong, despite the limited number of lexemes in the study ($r=.667$, $p=.01$).

Semantically odd answers or lack of answers, as well as problems with finding synonyms indicate that the informant does not feel sure about the meaning of the word in question, i.e. that the word's semantic links to other entries in the mental lexicon are few and/or week. Instead of "deep", semantic associations, form-related associations occur in such cases. The lack of evident statistical differences between TT1 and TT2 with respect to the proportions between semantically based response and semantically unmotivated associations indicates that the adjectives used in the older translation are in general quite well cognitively anchored in the mental lexicon of the young speakers of Polish. Thus, the modernization of language performed by the contemporary translator does not seem to have any important effect on the comprehensibility of the adjective phrases. Nevertheless, the modern translator was no doubt right when she decided to omit or replace certain adjectives, used in the older translation (*szafranowy*, *opalowy*, *swawolny*), since these lexemes seem not to be fully intelligible to the young readers.

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