TURCOLOGICA 103

Ankara Papers in Turkish and Turkic Linguistics

Edited by Deniz Zeyrek, Çiğdem Sağın Şimşek, Ufuk Ataş, and Jochen Rehbein

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Editorial note and acknowledgement

This volume is based on the sixteenth International Conference on Turkish Linguistics (ICTL) held in Ankara at Middle East Technical University, September 18-21, 2012. The ICTL is a unique convention bringing together linguists and turkologists working on Turkish and Turkic languages, which provides a platform of discussion for the participants with various interests ranging from descriptive accounts to explanatory models. The volume compiles revised versions of the conference papers, covering phonetics, phonology, syntax, morphology and semantics, as well as language acquisition, discourse analysis and pragmatics, and language contact studies. All 57 papers included in the volume have been double blind peer-reviewed and thoroughly checked.

The contributions are grouped under seven headings in an attempt to order them in a more concise structure than simply listing them. We hope that the attractiveness of the volume is enhanced by the fact that it does not only offer a variety of theoretical linguistic positions, but also findings of empirical research based on small or large corpora, (transcribed) production data (obtained from children, adults or language learners), and acoustic analysis of speech data. The authors are scholars from various Turkish, European, United States and Japanese universities. We are delighted that the research of linguists and turkologists from such an extensive geographical spread is represented in this volume. We believe that it captures the current state of Turkish and Turkic linguistics in terms of its range and breadth, and we hope that it stimulates interest in the topics investigated and pave the way to new research arenas in many years to come.

We are deeply grateful to Lars Johanson for his kind acceptance of this volume into the *Turcologica* series as well as for his suggesting an ideal title and for his overall support in the publication process. Special thanks go to Éva Á. Csató and Sumru Özsoy who were particularly encouraging during the preparatory stages of this volume. Last but not least, we appreciate the meticulous efforts of our reviewers without whom this volume would not have been possible.

Editors Deniz Zeyrek, Çiğdem Sağın Şimşek, Ufuk Ataş and Jochen Rehbein Ankara, March 2015

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Preface

The "Ankara Papers in Turkish and Turkic Linguistics" assemble a variety of research papers with exemplary and/or creative views. All articles have been written specifically for this volume, which means that readers will get an overview of the current topics in the field. To a certain extent, the volume can be taken to present the state of the art with regard to Turkish and Turkic linguistics, though without aspiring to the rank of an encyclopedia.

If one considers the interrelation of linguistics and philology, the first International Conference on Turkish Linguistics (ICTL) initiated by Karl Zimmer and Dan Slobin 1982 in Berkeley under the heading "Conference on the Turkish Language and Linguistics in Atatürk's Turkey" constitutes a turning point. It was only then that the linguistic dimensions of syntax, semantics, discourse, language acquisition and typological features of Turkish came into focus. As a result, in the course of the ensuing fifteen conferences the grammar of Turkish has been elaborated, with special interest in linguistic domains like word order, tense, aspect, modality, relative clause, converbial structures, specific forms of phonology and morphology, among others. At the same time, the linguistics of the Turkish language has been influenced by the philological way of dealing with language data, with regard to the language history as well as the language family of Turkic languages. Thus, it seems that, in spite of the former tense relation between General Linguistics and philological Turcology, their common interest in the linguistics of the Turkish language has fostered a fruitful cooperation, especially in the domains of phonology, morphology, syntax, discourse analysis, and, later on, of Turkic languages other than Turkish.

The past 25 years have brought about not only an expansion of the objects of research and a multiplicity of scientific approaches but also an increasing international interest, involving scholars, even, those from different continents – as documented by this volume.

Apart from the theoretical views, the volume also comprises empirical linguistic research dealing with current topics like corpus linguistics of Turkish in connection with discourse analysis, acquisition of Turkish as a foreign language, sociolinguistics of Turkish and Turkic languages as well topics from language contact research.

It is just because of the variety of the topics it covers that this volume is able to enhance the synthesis of the philology and linguistics of the Turkic languages and to connect them with the field of typology of language. If seen from the point of view of universals of language, the typological features of Turkic languages present differences as well as commonalities, and, therefore, lead to questions about genetic dependencies, areal distribution, and, above all, language change and language stability through language contact.

Due to their long history of migration and mixing among each other and with other languages the areal distribution of the Turkic languages is no longer restricted to specific territories. Even in today's national states, there is the phenomenon of social and individual multilingualism and cross-border communication. The Kazakh language is not spoken in Kazakhstan only, nor Uzbek only in Uzbekistan, and especially Turkish has spread to many parts of North and Western Europe and thus may have become a "pluricentric language" in Michael Clyne's term.

In short, Turkic languages have reached such a great diversity in space and time that the question arises what it is that constitutes their cross-linguistic stability. English, Russian, Spanish, or even Arabic as lingua francas seem to have kept, in spite of all their contact-induced linguistic changes, a relative homogeneity throughout their expansion, whereas the case is different with Turkic languages. Instead of homogeneity what we find is a mutual commonality in the domains of *aspect, mood,* and *evidentiality,* which seem to serve as a linguistic core intrinsic to all Turkic languages (Johanson, this volume).

Considering the spread of Turkic languages from a non-territorial perspective, we are dealing with questions as

- how best to analyze standard Turkish, its grammar, its forms and their functions with a view to its use as a lingua franca;

- how to assess the intra-diversity of Turkic languages with regard to the contactinduced changes (external diversity) as well as the internal diversity marked by dialects;

- how to determine the inter-Turkic communication by means of receptive multilingualism.

Receptive multilingualism is a new field of research which reflects closeness and distance across the various Turkic languages and offers tools to explore the resources of mutual understanding in spite of linguistic differences and without the mediation of an established lingua franca. In this context, the articles may provide paths towards a comparative linguistics of Turkic languages, taking into account language-typological and cross-linguistic commonalities and diversities

Seen from the point of view of multilingualism, migration, which leads to linguistic changes while conserving language structures at the same time, asks for flexible linguistic descriptions instead of normative structural ones. In this sense, the complex relations between the concepts of standard and diversity, language typology and multilingualism are reflected in this volume to a certain extent.

With regard to further perspectives on Turkish and Turkic Linguistics research, various topics of the volume point to promising areas of analysis; there are among others: mood and modality in Turkic Languages, standards and methods in building corpora of Turkic varieties for comparative and cross-linguistic research, discourse structure in Turkish and Turkic languages (including corpus linguistics), psycholinguistic approaches to the mechanisms of diverse clause processing in Turkish, language contacts across Turkic languages and other languages, Turkish

as a community language abroad. As it is not possible to discuss all these topics here in extenso, one can take them as framework of research areas to be elaborated in the future.

Last but not least, I am very pleased that, in spite of their heavy academic workload, the METU team of editors was able to publish this bulky volume which comprises such a wide range of contributions. The painstaking editorial work and the lack of supplementary support may explain why the publication took quite some time.

Jochen Rehbein

© 2015, Otto Harrassowitz GmbH & Co. KG, Wiesbaden ISBN Print: 9783447105231 — ISBN E-Book: 9783447194501 PHONETICS & PHONOLOGY

A devoicing analysis of vowel [ï] in voiceless consonant surroundings

Sıla Ay, İpek Pınar Bekâr Ankara University

1. Introduction

In this experimental study, we aim to present the devoicing value of vowel [i] > /1/ when placed between voiceless consonants in Turkish. As well known, the devoicing in Turkish is particularly seen on the word-final position of voiceless consonants. However in our study, we observed that some phonetic parameters such as formant variations (F₀, F1, F2, F3), bark combinations, intensity values and duration values which determine the degree and value of devoicing are changed towards devoicing of vowel [i] > /1/. According to our consideration, these phonetic differences such as [fif], [hïk], [çït] or [sïs] most probably are associated with such phonological reasons as manner and placement variations of Turkish consonants. Within this scope, our study's research questions are as following:

- a) How does voiceless consonant surrounding effect the vowel $[\ddot{i}] > /1/$ towards devoicing?
- b) What is the degree of devoicing in different voiceless consonantal surroundings?

2. Vowel devoicing

'Vowel Devoicing' is a phenomenon in which high vowels drop in certain phonological environments. Kondo (1994) stated that vowel devoicing is not a clear cut distinction between voiced and voiceless sounds. Vowels in devoicing environments are phonetically realized as fully voiced vowels, partially voiced vowels and completely voiceless vowels. As well known, there are eight short vowels in Turkish phonology. All of these four Turkish high vowels can undergo the process of gradual vowel devoicing; however [u] > /u/ is slightly more resistant to devoicing than [i] > /i/, [i] > /i/ and [y] > /u/. On the other hand, in an ongoing study of ours, it is detected that vowel [i] > /i/ is located in the centre of the oral cavity (Selen 1979; Ergenç 1989; IPA 1993). The calculated formant values of the Turkish central high vowel /i/ are shown in Table 1. The results/findings of this study is about the formant values of isolated /i/ are consistent with the previous studies.

	Fo	F1	F2	F3
Selen (1979)		320(m)	2000(m)	
Kılıç (2000)	145(m)	355(m)	1482(m)	2405(m)
Türk et al.		537(m) 836(f)	1578(m), 1798(f)	2722(m), 2846(f)
(2005)				
Davutoğlu		392	1557	
(2010)				
Malkoç (2011)	141(m), 227(f)	392(m), 482(f)	1444(m), 1601(f)	2547(m), 2945(f)

Table 1. Calculated F₀, F1, F2, F3 values of isolated $[\ddot{i}] > /1/$

Studies concerning the devoicing in Turkish high vowels were mostly done by Stefanie Jannedy. The study of Jannedy (1995) in which she analyzed the vowel devoicing in Turkish is the first study on this topic. She has analyzed word-initial and word-medial positions with nine native Turkish speakers and her data displayed that various prosodic and segmental system influence the process of high vowel devoicing in Turkish. In the same study, Jannedy presented that the most devoicing is found after the least aspirated stop /p/ which suggests that there is some other overlooked contributing factor. The exception among the Turkish stops in the following environment seems to be the bilabial voiceless stop /p/ that shows somewhat less devoicing than [k] > /k/ and [t] > /t/. Both labial sound [f] > /f/ and [p] > /p/ exhibit the least amount of impact on the devoicing process.

Unlike Jannedy (1995), in our study, it is aimed to find the effect of the surrounding voiceless consonants both in preceding and following environments and specifically about the high vowel [i] > /i/. Moreover, this study is done with 40 native Turkish speakers which provided more data to work on.

3. Methodology

The participants of the study were 20 male and 20 female speakers of Standard Turkish. All of the participants were university students (Ankara University and Middle East Technical University) whose ages were between 18 and 25. The participants were asked to read a list of 64 CVC (*consonant-vowel-consonant*) combinations of vowel $[\ddot{r}] > /1/$ surrounded by voiceless consonants (Table 2).

Consonant Surroundings											
çç	çf	çh	çk	çp	çs	çş	çt				
fç	ff	fh	fk	fp	fs	fş	ft				
hç	hf	hh	hk	hp	hs	hş	ht				
kç	kf	kh	kk	kp	ks	kş	kt				
pç	pf	ph	pk	pp	ps	pş	pt				
sç	sf	sh	sk	sp	SS	SŞ	st				
şç	şf	şh	şk	şp	şs	ŞŞ	şt				
tç	tf	th	tk	tp	ts	tş	tt				

Table 2. 64 CVC combinations of voiceless consonant surroundings

The data were recorded and analysed in the Linguistic Laboratory of the Brain Research Centre of Ankara University with Sony IC Recorder and analyzed by Cool Edit Pro 2.1 and Praat 5.2 Software. The findings of the analysis are presented in the following order:

- 1. Formant values (converted to Bark and averaged over the 20 male and female speakers)
- 2. The intensity values
- 3. The duration values

4. Findings

While analyzing the findings, the values of isolated $[\ddot{i}] > /i/$ were taken as basis for the amount of devoicing. The significant differences were calculated according to values' distance to the mean values. For F₀, the values under 100 Hz and above 180; for F1 the values under 435 Hz and above 635; for F2 the values under 1750 Hz and above 2200 Hz; for F3 the values under 3040 Hz and above 2240 Hz were assumed as significant.

The first set of surrounding is [t/] > /c/ as the preceding and the other voiceless consonants as the following. As seen in Table 3, the significant differences observed in this set are in [cit] and [cis] combinations.

		F_0			F1		F2		F3	
	Hz (m)	Hz (f)	Bark (m)	Bark (f)	Hz	Bark	Hz	Bark	Hz	Bark
/ï/	139	255	1,36	2,49	533,50	5,02	1960,50	12,97	2743,00	15,07
[çïs]	141	254	1,38	2,48	457,57	4,36	1727,15	12,14	2868,37	15,33
[çït]	69	256	0,68	2,50	649,32	5,98	1923,50	12,85	3073,57	15,74

Table 3. Significant differences for [t/] > /c/ as the preceding consonant

The next set of surrounding is [f] > /f/ as the preceding and the other voiceless consonants as the following as displayed in Table 4. The significant differences observed in this set are especially in F2 values and in F₀ value of [fit] combination.

	F ₀			F1		F2		F3		
	Hz (m)	Hz (f)	Bark (m)	Bark (f)	Hz	Bark	Hz	Bark	Hz	Bark
/ï/	139	255	1,36	2,49	533,50	5,02	1960,50	12,97	2743,00	15,07
[fif]	138	251	1,36	2,45	487,19	4,62	1397,19	10,72	2716,90	15,01
[fih]	143	254	1,40	2,48	472,07	4,49	1448,44	10,96	2664,52	14,89
[fik]	120	248	1,18	2,42	475,01	4,51	1488,13	11,14	2678,15	14,92
[fïp]	137	262	1,35	2,55	486,92	4,62	1336,93	10,42	2657,94	14,88
[fïs]	125	251	1,23	2,45	442,92	4,23	1555,10	11,44	2876,00	15,35
[fït]	83	247	0,82	2,41	484,62	4,60	1598,66	11,62	2814,46	15,22

Table 4. Significant differences for [f] > /f/ as the preceding consonant

Another set of surrounding is [x/ç] > /h/ as the preceding and the other voiceless consonants as the following. As seen in Table 5, the significant differences observed in this set are especially in F2 values and in F1 value of $[h\ddot{r}c]$ combination.

6 Sıla Ay, İpek Pınar Bekar

		Fo			F1	F1		F2		F3	
	Hz (m)	Hz (f)	Bark (m)	Bark (f)	Hz	Bark	Hz	Bark	Hz	Bark	
[ï]	139	255	1,36	2,49	533,50	5,02	1960,50	12,97	2743,00	15,07	
[hïç]	130	255	1,27	2,49	435,92	4,17	1885,81	12,72	2821,03	15,23	
[hïf]	137	246	1,34	2,41	473,74	4,50	1440,71	10,92	2630,67	11,76	
[hïh]	141	265	1,39	2,58	479,16	4,55	1578,51	11,54	2688,35	11,99	
[hïk]	149	263	1,46	2,56	457,98	4,36	1617,22	11,70	2652,71	11,84	
[hïp]	147	270	1,44	2,63	485,57	4,61	1457,49	11,00	2656,62	14,87	
[hïs]	143	255	1,40	2,49	479,89	4,56	1606,78	11,66	2748,67	12,22	
[hït]	146	260	1,44	2,53	480,03	4,56	1639,13	11,78	2732,01	15,04	

Table 5. Significant differences for [x/c] > /h/ as the preceding consonant

The set of surrounding [k] > /k/ is as the preceding and the other voiceless consonants as the following. Like the previous two sets the significant differences observed in this set are especially in F2 and in F₀ value of [kït] and also F1 values of [kïç] combination (Table 6).

Table 6. Significant differences for [k] > /k/ as the preceding consonant

		F ₀			F1		F2		F3	
	Hz (m)	Hz (f)	Bark (m)	Bark (f)	Hz	Bark	Hz	Bark	Hz	Bark
/ï/	139	255	1,36	2,49	533,50	5,02	1960,50	12,97	2743,00	15,07
[kïç]	140	256	1,38	2,50	433,23	4,14	1816,58	12,47	2710,85	15,00
[kïf]	137	254	1,34	2,48	474,33	4,51	1468,24	11,05	2649,47	14,86
[kïh]	139	260	1,37	2,54	483,56	4,59	1680,36	11,96	2623,23	14,80
[kïk]	140	268	1,37	2,61	474,32	4,51	1649,53	11,83	2652,52	14,87
[kïp]	130	233	1,27	2,28	461,41	4,39	1445,23	10,94	2640,42	14,84
[kït]	84	252	0,83	2,46	495,96	4,70	1709,50	12,07	2792,83	15,17

The other set of surrounding is [p] > /p/ as the preceding and the other voiceless consonants as the following as seen in Table 7. In this set, you may see that the significant difference is observed only in F2 values.

Fo			Fl	l	F2	2	F3			
	Hz (m)	Hz (f)	Bark (m)	Bark (f)	Hz	Bark	Hz	Bark	Hz	Bark
/ï/	139	255	1,36	2,49	533,50	5,02	1960,50	12,97	2743,00	15,07
[pïç]	139	265	1,37	2,59	460,35	4,38	1687,55	11,98	2753,60	15,09
[pïf]	135	254	1,33	2,48	470,62	4,47	1441,63	10,93	2676,02	14,92
[pïh]	144	257	1,41	2,51	498,10	4,72	1536,65	11,36	2690,65	14,95
[pïk]	138	252	1,35	2,46	482,21	4,58	1439,19	10,92	2724,62	15,03
[pïp]	144	267	1,41	2,61	498,19	4,72	1334,54	10,41	2730,44	15,04
[pïs]	136	253	1,34	2,47	462,54	4,40	1552,73	11,43	2757,49	15,10
[pït]	141	260	1,38	2,53	482,72	4,58	1494,65	11,75	2797,52	15,18

Table 7. Significant differences for [p] > /p/ as the preceding consonant

In the set of surrounding is [s] > /s/ the significant differences are observed in F2 values; F₀ and F3 values of [sïç] and F₀ value of [sït] combination as presented in Table 8.

Table.8 Significant differences for [s] > /s/ as the preceding

		F0			F1	l	F2		F	3
	Hz	Hz	Bark	Bark	Hz	Bark	Hz	Bark	Hz	Bark
	(m)	(1)	(m)	(1)						
/ï/	139	255	1,36	2,49	533,50	5,02	1960,50	12,97	2743,00	15,07
[sıç]	98	246	0,96	2,40	567,23	5,31	1986,14	13,05	3172,84	15,93
[sïf]	138	261	1,36	2,55	488,61	4,63	1574,62	11,52	2871,72	15,34
[sïh]	133	257	1,31	2,51	486,44	4,61	1715,57	12,09	2857,53	15,31
[sïk]	120	253	1,17	2,47	457,84	4,36	1708,70	12,07	2715,37	15,01
[sïp]	142	258	1,39	2,51	499,03	4,72	1537,74	11,36	2822,24	15,24
[sïs]	105	246	1,04	2,40	559,78	5,24	1705,63	12,05	3009,73	15,62
[sït]	98	244	0,96	2,38	506,95	4,79	1596,46	11,61	2949,66	15,50

The next set of surrounding is [/] > /\$/ as the preceding and the other voiceless consonants as the following. There are no significant differences observed in this set displayed in Table 8. Final set of surrounding is [t] > /t/. In this set, again the significant difference is observed in F2 values and in the values of [tis] combination except F1 value (Table 9).

8 Sıla Ay, İpek Pınar Bekar

Fo			F1	l	F2		F3			
	Hz (m)	Hz (f)	Bark (m)	Bark (f)	Hz	Bark	Hz	Bark	Hz	Bark
/ï/	139	255	1,36	2,49	533,50	5,02	1960,50	12,97	2743,00	15,07
[tïf]	119	257	1,17	2,50	487,06	4,62	1649,38	11,83	2892,80	15,38
[tïh]	144	261	1,41	2,54	495,20	4,69	1652,92	11,85	2748,74	15,08
[tïp]	144	273	1,41	2,66	488,03	4,63	1524,78	11,30	2844,24	15,28
[tïs]	96	257	0,94	2,51	513,30	4,85	1651,62	11,84	3040,38	15,68
[tït]	106	242	1,04	2,37	480,86	4,56	1572,87	11,51	2824,22	15,24

Table.9 Significant differences for [t] > /t/ as the preceding consonant

The intensity mean values of the overall combinations are shown in Table.10. As seen in the following, we have analyzed the gender specific intensity and we found no significant difference. And in Table.11, the minimum and the maximum mean values of the gender specific duration are shown.

Table 10. Mean values of overall combinations of intensity

	Overall Combinations
Female	76,817 dB
Male	75,541 dB
General	76,179 dB

Table 11. The minimum and maximum values of the gender specific duration

	Overall (min ~ max)
Female	0,043 ms ~ 0,127 ms
Male	0,038 ms ~ 0,088 ms

In Table.12, the duration values of female participants could be grouped into three parts according to their mean values. 19 of the 64 combinations were between 0.043 ms and 0.068 ms, 16 of the 64 were between 0.070 ms and 0.092 ms and 29 of the 64 were between 0.097 ms and 0.127 ms.

Mean Values	Surroundings	Ratio
0.043 ms ~ 0.068 ms	[çt], [fç], [fk], [fs], [fş], [ft], [hç], [hş], [kp], [ks], [kt], [sç], [sf], [sk], [sp], [ss], [st], [tf], [ts]	19/64
0.070 ms ~ 0.092 ms	[çk], [çp], [çş], [hp], [kk], [pk], [pp], [pt], [şk], [şp], [şş], [şt], [tk], [tp], [tt], [tş]	16/64
0.097 ms ~ 0.127 ms	[çç], [çf], [çh], [çş], [ff], [fp], [fh], [hf], [hh], [hk], [hs], [ht], [kç], [kf], [kh], [kş], [pç], [ph], [pf], [ps], [pş], [sh], [sş], [şç], [şf], [şh], [şs], [tç], [th]	29/64

Table 12. Duration values of female participants

On the other hand, the duration values of male participants could be grouped into two parts according to their mean values. As shown in Table 13, 38 of the 64 combinations were between 0.038 ms and 0.067 ms and 26 of the 64 were between 0.071 ms and 0.088 ms.

Table 13. Duration values of male participants

Mean Values	Surroundings	Ratio
0.038 ms ~ 0.067 ms	[çk], [çp], [çt], [çş], [fç], [fk], [fp], [fs], [fs], [ft], [hç], [hk], [hp], [ht], [hş], [kf], [kp], [ks], [kt], [pk], [pp], [pt], [sç], [sf], [sh], [sk], [ss], [sp], [st], [şk], [şp], [şt], [tf], [tk], [tp], [tt], [ts], [tş]	38/64
0.071 ms ~ 0.088 ms	[çç], [çf], [çh], [çs], [ff], [fh], [hf], [hh], [hs], [kç], [kh], [kk], [kş], [pç], [pf], [ph], [ps], [pş], [sş], [şç], [şf], [şh], [şs], [şş], [tç], [th]	26/64

In all of the sets, the significant differences are observed in F2 values regardless of the consonants' position, namely, it is preceding or following. In Table 14, it can be seen that the values highlighted are close to the isolated $[\ddot{i}] > /i/.$

5. Results

The vowel [i] > /i/ is devoiced when placed almost between all voiceless consonant surroundings and F2 values may display the amount and degree of devoicing (partially or fully). Devoicing is mostly seen when preceding and following the consonant [p] > /p/. Combination [pip] has the most distinctive F2 values compared to the isolated /i/. F₀ values of male participants are significantly lower than the isolated [i] > /i/, especially in the combinations following the consonant [t/] > /s/, either in preceding or following environments. There is no difference between the gender specific intensity of the combinations. The range of duration values of the combinations is different for male and female participants. While the duration values of the male were grouped in two; the values of female had a third group with higher mean of duration.

F2						
	Hz	Bark		Hz	Bark	
isolated [ï]	1960, 500	12, 975	isolated [ï]	1960, 500	12, 975	
preceding [t/]	1872, 831	12, 663	following [tʃ]	1886, 323	12, 710	
preceding [f]	1572, 273	11, 463	following [f]	1550, 280	11, 398	
preceding [x/ç]	1650, 448	11, 798	following [x/ç]	1649, 980	11, 820	
preceding [k]	1673, 220	11, 904	following [k]	1698, 945	11, 990	
preceding [p]	1531, 599	11, 313	following [p]	1531, 281	11, 293	
preceding [s]	1712, 898	12, 061	following [s]	1666, 414	11, 895	
preceding [t/]	1846, 749	12, 569	following [ʃ]	1897, 586	12, 755	
preceding [t]	1683, 371	11, 957	following [t]	1662, 579	11, 868	

Table 14. Voiceless consonants as preceding and following

6. Conclusion

F2 may be the indicator formant which demonstrates the value of vowel devoicing. The finding of this study about the effect of consonant [p] > /p/ on vowel devoicing effect is consistent with the findings of Jannedy (1994). This may be explained by the phonological features of this consonant in the set of voiceless consonants as it is the only one which is plosive and bilabial. The result concerning consonant [f] > /ş/ may be interpreted with the duration values of combinations having this consonant in a preceding or following environment. That is the duration values of [f] > /ş/ combinations are usually in the longer value groups. Another explanation may be the consonant manner and place of the consonant.

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Buffering, linking or latent consonant deletion?

Marcel Erdal Freie Universität Berlin

The distinction between grammatical, phonetic and prosodically motivated epenthesis¹ is very important for understanding Turkish unstable consonants.

Grammatical epenthesis is found in French 'liaison', where latent coda consonants appear before vowels: In sequences such as les enfants /lɛ. \overline{z} ã.fã/ 'the children' with |z| vs. les garçons /lɛ.gaʁ.sɔ̃/ 'the boys' where the noun starts with a consonant, without $\frac{z}{z}$; similarly nous avons /nu. \hat{z} a.võ/ 'we have' vs. nous prenons /nu.pkc.nɔ̃/ 'we are taking'. In inversions such as *elle dort* /ɛl.dɔʁ/ 'she sleeps' vs. dort-elle /dou.t-el/ 'does she sleep?' or on parle /5 paul/ 'one speaks' vs. parle-t-on /pa \mathfrak{sl} . $\mathbf{\hat{t}}$ $\mathbf{\hat{s}}$ / 'does one speak?' the latent consonant is /t/. Turkish has latent coda /n/ in the demonstrative pronouns and the 3rd person possessive suffix; it appears e.g. in on-suz, sun-u, bun-lar and ev-in-e and is absent only when these elements are followed by no suffix (as o and ev-i).² The reflexive pronoun kendi(n) and the converter $\{-ki(n), -\}$ have latent coda *n* before case suffixes (e.g. *kendin-ce* and *ordakin-de*) but not before the plural suffix {-lAr} (*kendi-ler-i*, *orda-ki-ler*). This coda epenthesis is a purely grammatical, not a phonetic or prosodic matter. The Turkish onset epenthesis of consonants is similar to the French coda process in being triggered by adjacency to vowels: In the genitive suffix $\{-(n)In\}$ the latent consonant is *n* (as in English *an apple* vs. *a pear*), in the 3rd person possessive suffix $\{-(s)I(n-)\}$ it is s and in $\{-(s)Ar\}$, the suffix for distributive numerals, it is $s^3/n s s/are$ coronal consonants, which have been said to be typical of grammatical insertions. The alternations of these three suffixes, a different latent consonant for each suffix, have, I think, to be dealt with as allomorphs and not within phonology. The dropping of s in the possessive suffix is not a phonological but a morphological matter especially because the s in the conditional suffix $\{-sA\}$ and the 3^{rd} person optative suffix $\{-sIn\}$ are not dropped.

Phonetic epenthesis is dealt with before coming to onset y, the Turkish default latent consonant. We know since Collinder 1939 that Turkish speakers freely pronounce hiatus and glides, but the modern formulation for this topic is Kabak 2007. In fact, vowel sequences involving hiatus are quite common in Turkish, and this hiatus freely alternates with three approximant glides. The choice between these glides – the labial approximant [w], the palatal approximant [y] and the velar approximant [u] – is fully determined by the surrounding vowels. [w] and [y] are very common in the world's languages as epenthetic glides; pharyngeal and glottal

insertions are discussed in Lombardi 2002 and Morley 2011. I will first discuss hiatus and glides within Turkish stems and then come to epenthesis at affix junctures.

Vowel sequences can be heard both within original Turkish stems and in words adopted from Arabic, Persian or French. In original Turkish stems they can be spelled with y when the second vowel is i, as in *beyin* or *geyik* (usually pronounced more like a palatal constriction than a palatal fricative) – or with v beside u, as in *tavuk, duvak* 'bridal veil' or *kavun* (usually pronounced as a bilabial or labiodental approximant rather than a labiodental fricative); but the usual spelling is with \check{g} , e.g. in *ağır, yoğurt, öğürmek, doğa, eğitmek, eğer* or *düğün*. In borrowings, vowel sequences can come from foreign vowel sequences, as in *neon, noel* or *seans*, or from the resolution of diphthongs as French *suite* [suit] becoming bisyllabic *süit*,⁴ two-syllable [kwafœr] becoming three-syllable *kuaför* or Arabic *bayt* becoming bisyllabic *beyit*. More commonly, vowel sequences come from consonant deletion, dropped foreign consonants being *?*, e.g. in *mesai* 'work', *S* e.g. in *dua, facia* or *şair*, v e.g. in *küvet* 'bath tub' or *döviz* 'foreign exchange', or voiceless velar or pharyngeal fricatives or approximants e.g. in *tohum, şehir, mühim, vahim* or *ihanet*.

Hiatus freely alternates with the glides appropriate to their phonetic context; here are some non-conservative examples: Beside labial vowels we find [w], e.g. in ku[w]aför, no[w]el, so[w]an or yo[w]urt. Beside unrounded front vowels we have [y], e.g. ate[y]ist, di[y]et, müsa[y]it, fa[y]iz, e[y]itmek or di[y]er which, by the way, comes from Persian diger with a voiced stop. With front labial vowels there is a conflict between resolution as labial or as palatal glide, dü[y]ün and mü[y]im on the one hand, biskü[w]it on the other; sö[w]üt and sö[y]üt are both attested. The glide serving beside dorsal vowels, e.g. in si[u]at, health', sa[u]at, hour' or to[u]um, is the dorsal approximant.

Among many speakers of Standard Turkish, this same dorsal approximant appears also at the end of stems,⁵ e.g. in the noun *dağ*, the adjective *sığ* and the verbs *sığmak, boğmak, değmek* or *öğmek*. In casual speech this approximant is normally dropped between vowels, e.g. in the aorist [do'ar], and it can be replaced by other approximants in accordance with under-specification, e.g. [deyip] from *değmek* and [dowup] from *doğmak*. It can also be retained even between two [e]s, e.g. in the aorist form [deuer]. There hardly is any difference between *çiğ* 'raw' and the noun *çiy* 'dew'; both appear to engender hiatus or [y] when followed by vowels. The dorsal approximant is, interestingly, retained beside *i*, e.g. in *sığının* 'take refuge (pl.), which does not become **sıyının*.

The phonetic output of stem-final and suffix-final voiceless velar deletion is very similar; e.g. in ['bu mesle,e] 'to this profession' from *meslek* and the dative suffix $\{-(y)A\}^6$ or in [baca^ama] 'to my leg' with a sequence with a reduced and assimilated second vowel, from *bacak* with the possessive suffix $\{-(I)m\}$ and the same dative suffix. Hiatus alternates with glides, in *ayağı* 'his foot' with the dorsal approximant [u₁], in [çowu] 'most of it' or [göwü] and [oluwu], the accusatives of the nouns 'sky' and 'gutter', with the labial approximant and in [eteyin] 'your skirt' or [seveceyim]

'I will love' with the palatal approximant. Beside ι we do not get the palatal approximant; 'my fish' is [baluum], not *[baluum].

All this is as natural phonology would let us expect. Note that all variation between hiatus and glides depends on the speaker's idiolect and on how careful he is about his speech; it is always explicable on a universal articulatory basis and is not conditioned by morphology. The glide [w] is not even a Turkish phoneme.

Now let us turn to unstable y at the boundary of function elements. y can freely alternate with /i/ in 6 clitics in which it is followed by a consonant: the postposition $\{(y)|A\} \sim ile$ 'with' the conjunction $\{(y)ken\} \sim iken$ 'while' the topicalizer $\{(y)sA\} \sim ise$, homophonous with the 3^{rd} person conditional clitic $\{(y)dI\} \sim idi$ 'was' inflecting for reference to the subject $\{(y)sA\} \sim ise$ 'if it is' inflecting for reference to the subject $\{(y)sA\} \sim ise$ 'if it is' inflecting for reference to the subject $\{(y)sA\} \sim ise$ 'if it is' inflecting for reference to the subject $\{(y)sA\} \sim ise$ 'if it is' inflecting for reference to the subject $\{(y)sA\} \sim ise$ 'if it is' inflecting for reference to the subject $\{(y)sA\} \sim ise$ 'if it is' inflecting for reference to the subject $\{(y)sA\} \sim ise$ 'if it is' inflecting for reference to the subject $\{(y)sA\} \sim ise$ 'if it is' inflecting for reference to the subject $\{(y)sA\} \sim ise$ 'if it is' inflecting for reference to the subject $\{(y)sA\} \sim ise$ 'if it is' inflecting for reference to the subject $\{(y)sA\} \sim ise$ 'if it is' inflecting for reference to the subject $\{(y)sA\} \sim ise$ 'if it is' inflecting for reference to the subject $\{(y)sA\} \sim ise$ 'if it is' inflecting for reference to the subject $\{(y)sA\} \geq ise$ 'if it is' inflecting for reference to the subject $\{(y)sA\} \geq ise$ 'if it is' inflecting for reference to the subject $\{(y)sA\} \geq ise$ 'if it is' inflecting for reference to the subject $\{(y)sA\} \geq ise$ 'if it is 'inflecting for reference to the subject $\{(y)sA\} \geq ise$ 'if it is 'inflecting for reference to the subject $\{(y)sA\} \geq ise$ 'if it is 'inflecting for reference to the subject $\{(y)sA\} \geq ise$ 'if it is 'inflecting for reference to the subject $\{(y)sA\} \geq ise$ 'if it is 'inflecting for reference to the subject $\{(y)sA\} \geq ise$ 'if it ise 'inflecting for reference to the subject $\{(y)sA\} \geq ise$ 'if it ise 'inflecting for reference to the subject $\{(y)sA\} \geq ise$ 'if it ise 'inflecting for reference to the subject $\{(y)sA\} \geq ise$ 'if it ise 'inflecting for refer

The replacement of *i* by *y* saves a syllable, as the non-clitic forms all consist of two syllables whereas the clitic forms have the *y* only after vowels but drop it when their host ends in a consonant, giving a single syllable in either case; this is typical of glides. The *y* is dropped if the clitic comes after a consonant but stays on if it comes after a vowel, whereas the *i* in the onset of the non-clitic variant is never dropped. In all cases except {(y)ken}, juncture with the host shows further strengthening through vowel harmony.⁷ These elements belong to various functional parts of speech and none is a content lexeme. They show neither morphological, nor syntactic fusion with the host: This phenomenon appears to be a purely prosodically motivated, taking place between syntactically distinct elements. The latent *y* of these six elements and the latent *n* of the six pronominal elements discussed early on in the paper do not stand between vowels and do not serve hiatus avoidance.

The conspiracy against hiatus at affix junctures comes in three structural types:

Firstly, the three suffixes with latent onset /n s s/ which we mentioned above. These are continuants but not glides and don't share any phonetic features with their surroundings.

Secondly /y/, the default latent consonant appearing at the onset of 25 elements; note that there is no suffix with a stable *y* onset. This *y* is followed by a vowel and therefore cannot alternate with *i*. It is part of the phonological material in the input but not always in the output. There are two clitics in this list, the clitic 1st person pronouns {(y)Im} sg. and {(y)Iz} pl. (like *evdeyim* 'I am at home', *evdeyiz* 'We are at home'), but all other members of this 25 element group are suffixes: There are the accusative and dative suffixes {-(y)I} and {-(y)A} (the only nominal suffixes); further: optative/imperative {-(y)AyIm} (1sg), {-(y)AsIn} (2sg), {-(y)A} (3sg),⁸ {-(y)AIIm} (1pl), {-(y)In} (2pl)

the participle suffixes {-(y)An} and {-(y)AcAG} and the future-oriented modal {-(y)AsI} suffix

the action noun suffix $\{-(y)Is\}$ and agentive $\{-(y)IcI\}$;

the converb suffixes {-(y)A} (usually doubled), {-(y)Ip}, {-(y)IncA}, {-(y)ArAk} and {-(y)All}

 $\{-(y)Abil-\}\$ and $\{-(y)AmA-\}\$ expressing ability and inability to carry out an action $\{-(y)Iver-\}, \{-(y)Adur-\}, \{-(y)Agel-\}\$ etc. expressing actionality, formed from the $\{-(y)A\}\$ converb followed by auxiliaries.

Thirdly, in some suffixes, the 1st and 2nd person possessives $\{-(I)m\}$ (pl. $\{-(I)mIz\}$) and $\{-(I)n\}$ (pl. $\{-(I)nIz\}$), the ordinal suffix $\{-(I)ncI\}$, the approximative color suffixes $\{-(I)mSI\}$ and $\{-(I)mtIrAk\}$, the reciprocal suffix $\{-(I)s-\}$, the reflexive suffix $\{-(I)n-\}$, derivational suffixes such as $\{-(I)II\}$ and $\{-(I)k\}$ and the aorist $\{-(I)r\}$,⁹ the unstable element is not a consonant but a high vowel.

The anti-hiatus conspiracy links consonant and vowel latency at suffix onsets with the constraint that both stems and suffixes retain their form.¹⁰ A similar case is the Mongolian g insertion: If, in Khalkha Mongolian, a stem ends in a long vowel or a diphthong and a suffix with a long vowel onset is to follow, a g is inserted between them.¹¹

The assignment of suffixes to the unstable onset vowel group or to the unstable onset consonant group is not explicable by any synchronic general rules of the language, whereas the glide and hiatus alternation mentioned earlier is. The phenomena discussed first show a lot of inter- or intra-speaker variation whereas the latter ones don't. Scholars have argued about whether phonotactics cause the addition of the unstable consonants after vowels or their deletion after consonants and whether they cause the deletion of high vowels after vowels or their addition after consonants. Lees 1961, Hankamer & Itô 1989 and Özsoy 2004: 103 are for consonant deletion, Lewis 1967, Underhill 1976 and Inkelas 1995 for insertion. It could make sense to state that the absence of n, s and s at the onset of the suffixes which show them after vowels is a grammatically driven deletion; since y is known to be a glide, the appearance of y at the onset of the greatest group of variable suffixes might, on the other hand, be a phonetically driven insertion before suffixes with vowel onset, meant to avoid hiatus. This insertion of the glide y would save the suffixes concerned from losing their onset vowels while still preserving the ban on hiatus - making the word longer as a byproduct. Another result of such an insertion would be the syllabic independence of affixes – serving, together with the retention of onset vowels, the natural preservation of transparency in morphology.

The dominance of y in hiatus avoidance is unlikely to be a coincidence as this segment is well documented as a glide both in Turkish and universally. However, in Old Turkic, it was the postvocalic vowel dropping strategy which was near-universal (see Erdal 1979: 107-109): The only exceptions were the $\{-yU\}$ variant of the vowel converb and the $\{-yUr\}$ variant of the aorist suffix appearing after vowels (as against $\{-Ur\}, \{-Ar\}$ or $\{-Ir\}$). However, the bare *-r* form of the aorist suffix appears to be older than the $\{-yUr\}$ variant;¹² this latter might have been created in analogy to the

vowel converb, with which it shared other inflectional details. Since the postconsonantal converb suffix form consisted only of the vowel $\{-A\}$, $\{-U\}$ or $\{-I\}$ (depending on the stem class), nothing would be left for dropping if the stem ended in a vowel and some complementary distribution was needed. In most modern Turkic languages the situation has not changed much.¹³ The Turkmen forms show long vowels at suffix junctures, e.g. in *yaşa:p* from *yaşa-* 'to live'. This form may not come from **yaşa:-* with a long vowel in the second syllable (as some scholars have proposed in view of Yakut data) but be a contraction from **yaşayıp*. In case this is so, we would have to delegate the dominance of *y* to Proto-Oguz (since the separation of Turkmen from the other Oguz languages occurred at a rather early stage), but certainly not to Proto-Turkic.

We find that the Turkish latent onset *y* comes from several historical sources.

a) The stop g alternating with fricative after vowel, as source: The dative suffix comes from $\{-gA\}$; the 2nd and 3rd person sg. optative forms, the future suffix and the $\{-(y)AsI\}$ form all come from $\{-gA\}$ (related to Old Uygur $\{-gAy\}$);¹⁴ the participle suffix comes from $\{-gAn\}$ and $\{-(y)IcI\}$ comes from $\{-gUcI\}$; $\{-(y)IncA\}$ comes from $\{-gIncA\}$ and $\{-(y)AII\}$ from $\{-gAII\}$. Among all these, the only suffix which occasionally had an *i* after the velar was $\{-gIncA\}$. In early Oguz, the voiced velar fricative might have been replaced by a palatal glide beside all front vowels, unlike Turkish, where this replacement takes place fully only when beside high front vowels; the second step would need to be an analogical extension to back vowels. In all these cases we have retention of the original syllabic structure and not a switch away from the vowel dropping type.

b) b > w as source: The clitic pronoun {(y)Iz} comes from *biz* over (*w*)*Uz*, attested in Ottoman. Ottoman also had $wAn < b\ddot{a}n$, its reduction to *In* and its expansion to *wAnIn*; forms ending in *n* survive in Anatolian dialects. {(y)Im} emerged under the influence of the Persian 1st person sg. clitic pronoun {(y)am} and the possessive suffix {-(I)m}; Ottoman also has {(y)am} and {(w)Am}. The Turkish 1st person clitic pronouns differ from their Azeri and Turkmen counterparts and were formed only in late Ottoman.

c) The source of the converb suffix $\{-(y)A\}$ from $\{-(y)U\}$ has already been discussed; $\{-(y)ArAk\}$ comes from $\{-(y)A\}$ plus an expressive suffix $\{-rAk\}$ and verb stems like the ones in $\{-(y)AmA-\}$ or $\{-(y)Abil-\}$ are formed from this suffix followed by postverbs.

d) Accusative $\{-(y)I\}$ must have come from the pronominal declension (e.g. *biz-i* 'us'); it cannot have come from Old Turkic $\{-(X)g\}$ as that would have given $\{^*-(y)U\}$ in Ottoman (which it does not).¹⁵

e) The original forms of optative $\{-(y)AyIm\}$, $\{-(y)AIIm\}$ and $\{-(y)In\}$, of (originally purely derivational) $\{-(y)Is\}$, and of the converb suffix $\{-(y)Ip\}$ were of the type dropping their onset vowel. $\{-(y)AyIm\}$ and $\{-(y)AIIm\}$ with *y* are the only forms in Old Anatolian Turkish,¹⁶ though Azeri has $\{-yIm\}$ in the 1st person sg., dropping the suffix vowel after vowel stems. Concerning $\{-(y)Is\}$, the existence of an identical-sounding verbal-noun suffix in Persian can very well have helped, as pointed out in

Erdal 1998; outside the Persian contact area, this suffix has remained wholly in the derivational domain. For the remaining suffixes, the change from vowel deletion after vowel to *y* insertion after vowel seems to have been a gradual one: Forms like *aŋla-p, de-p, sözlä-pdür, bulunma-yım, bağışla-ŋ, yürü-ŋ, başla-ŋ, düşme-ŋ, de-ŋ, esirge-ŋüz, eyle-ŋüz, etme-ŋüz, bakma-ŋuz* without *y* and with vowel loss at the suffix onset are quite common in Early Anatolian Turkish.

Erdal 2006¹⁷ makes it likely that contact with Iranian languages, which already had such consonant insertions, was an important cause for this change in Turkish and Azeri. Another, not less important reason was the dropping of all gs after vowels in Oguz, which did not happen in the other branches of Turkic (except the Chuvash branch); not, e.g. in Khaladi, where intrusive y was not developed although it is spoken right in the middle of Iran. Modern Uyghur, whose predecessor Chaghatay Turkic had very intensive contact with Persian, has intervening /y/ when stems ending in long vowels are followed by suffixes starting with vowels, to preserve the length opposition; e.g. *jaza:-y-im* 'my punishment' vs. *ja:za-m* 'my shelf'. This /y/ freely alternates with /r/, here giving *jaza:-r-im* for 'my punishment'. Uyghur regularly drops final /r/, *gar* 'snow', e.g., becoming *ga*:. Modern Uyghur latent /r/ is thus similar to linking and intrusive r/r/r in non-rhotic varieties of English, where *tuner* is pronounced like *tuna* but recovers its /r/ in the sequence *tuner amp*; in return, tuna oil is pronounced as if it were tuner oil. In both languages /r/ emerged as an original part of a stem but was generalised to where it was not historical for juncture transparency.

The generalization of y instead of subphonemic glides in all positions and between all vowels and the change from constraint-based optional glides to rulebased juncture has meant a passage from phonetic to morphological motivation of this process. The gradual replacement of vowel deletion after vowels codas, the earlier morphologically regulated process for hiatus avoidance, is no doubt related to the continuous contact which Early Anatolian Turkish had with Persian, which has a rich system of consonant epenthesis (cf. Naderi & van Oostendorp 2011 and Dehghan & Kambuziya 2012). Kabak 2007 took all Turkish epenthesis to be underspecified; Turkish y started out that way but has been specified already for 1000 years.

Segmental markedness constraints are unable to account for a striking crosslinguistic generalization: in most cases where the historical phonology can be reconstructed and where segments are not phonetically predictable, epenthetic consonants are those for which earlier consonant-loss is evidenced. However, there is evidence for /g/ loss but none for /y/ loss; y latency came from the glide replacing /g/ and its generalization by language contact.¹⁸

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⁵ This is the traditional variant; among many speakers, the only remaining reflex of this approximant is a retraction of the preceding vowel.

⁶ This notation on the morphological level indicates a rule-dependent alternation between -e, -a, -ye and -ya governed by syllable harmony (indicated by capitals) on the one hand, and the suffix onset deletion rules which are the topic of the present paper on the other hand.

⁷ *için*, another postposition with onset high vowel + consonant, showed the same behavior in Ottoman, which can also explain why it changed from $\ddot{u}c\ddot{u}n$ to *icin*; it has, however, left this group again.

⁸ Dialectal and archaic, but standard in the sequence *keşki* ... {-(y)A-ydI} 'had (s)he only ...ed'. ⁹ Beside {-Ir} and {-r}, the Turkish aorist suffix also has an allomorph {-Ar} used with most single syllable stems ending in consonants, but I take *-r* to be the variant of {-Ir} and not of {-Ar}: Otherwise, all Turkish unstable vowels are high, and {-Ir} is more common than {-Ar}. ¹⁰ Low coda vowels of verb stems are raised in the present tense form, e.g. *oynuyor* '(s)he is playing' < *oyna-(I)yor*, *diyor* '(s)he is saying' < *de-(I)yor*, but this is not connected to hiatus avoidance: In Turkish verb forms, all vowels are raised before /y/.

¹¹ With the Spanish diminutive suffix *-ito* \sim *-cito*, the distribution is exactly the opposite: When added to *perro* 'dog' it gives *perrito* and to *gato* 'cat' *gatito*, but it has the variant *-cito*, with added consonant, when the bases end in consonants, e.g. in *ratoncito* 'little rat' or *amorcito* 'dear love'.

¹² The *-r* variant is very well attested in the oldest Old Turkic texts and with the most common verbs like *yarlıka-r* '(s)he orders' or *yorı-r* '(s)he walks'; for the highly common verb 'to say', the runiform sources, including Orkhon Turkic, have only *te-r* and no *te-yür*.

¹³ The status of y in Azeri is similar to that found in Turkish; see below for epenthetic Modern Uyghur /y/.

¹⁴ This variant is also found in Early Anatolian *olga bolga* texts, also e.g. in verse by Mevlana Celaleddin Rumi; it is still in use e.g. in Horasan Turkic.

¹⁵ Other Turkic languages – which did not have /y/ at their disposal to be used after vowels – resorted to a replacement by $\{-nI\}$, the pronominal accusative suffix e.g. after *bu* 'this'; there are some such cases also in Early Anatolian *olga bolga* texts.

¹⁶ They may also have been influenced by optative forms such as $\{-(y)AvAn\} / \{-(y)AvAm\} / \{-(y)AvM\} \}$ and $\{-(y)AvUz\}$ respectively, where the *y* comes from an original *g*.

¹⁷ Updated Turkish translation Erdal 2013.

¹⁸ A part of the phenomena described here are also dealt with by Johanson 2011, whose views could not be discussed here.

¹ See Zygis 2010 for this classification.

² Since the presence of *n* in these elements is more common than its absence, the forms with *n* should be considered basic; not the forms without *n*, which are usually quoted. Round brackets around single letters, as with the *n* in *kendi(n)*, indicate that elements so marked turn up under certain specified conditions but are absent otherwise.

³ I take *st(n-) and *t(n-) to originally have been distinct pronouns which got into morphological complementary distribution. The *s* has been thought to have metanalysed from *bes* 'five'.

⁴ Note that *öğle* [öyle] 'noon' does have a diphthong.

Acoustic correlates of focus in Turkish

Senka İvoşeviç, İpek Pınar Bekâr Ankara University

1. Introduction

This experimental study investigates acoustic correlates of verb-adjacent focus in Turkish. The purpose of the study is to find if there are differences in expressing broad, informational, and contrastive focus in simple declarative sentences in this language. In accordance with this purpose, following research questions were created:

Do different types of focus affect;

- a) maximum, minimum, range, and average values of F_0 in a focused word,
- b) duration of focused word, accented syllable and segments in accented syllable of focused word,
- c) peak alignment relative to accented syllable in a focused word, maximum and average intensity of focused word?

2. Background

From a prosodic point of view, focus is usually analysed in two levels: in the first level referring to focus scope, focus is divided into broad and narrow focus (Ladd 1996). While domain of broad focus usually extends over the whole utterance, the domain of narrow focus is restricted to a single constituent. In the second level, narrow focus is partitioned into narrow-new and contrastive focus. Regarding discourse functions, narrow-new focus presents an extension of the topic in a discourse, while contrastive focus corrects rather than augment a certain part of the topic (Toepel and Alter 2004). As pointed in Toepel and Alter (2004), this tripartition of focus into broad, narrow-new, and contrastive is useful to capture the interactions of semantic-pragmatic, phonological and phonetic aspects of focus in discourse.

When we look at different languages we can see that particular acoustic correlates play an important role in dividing focus types. Pierrehumbert & Hirschberg (1990) and Oliver & Andreeva (2004) state that the peak alignment occurs earlier in accented syllable in broad and informational foci (H* tone) and occurs lately in accented syllable in contrastive focus (L+H* tones) in English, Bulgarian and Polish. On the other side, according to Grice (1995) and Frota (2000) the peak alignment occurs earlier in broad focus with (H+L*) tones and occurs lately in narrow focus with (H*+L) tones in Palermo Italian. Face (2002) and Smiljanić (2004) indicate that peak alignment in broad focus occurs in post-tonic

syllable (L*+H); in contrastive focus peak alignment occurs in tonic (accented) syllable (H*+L) in Spanish and Zagreb Croatian. These explanations show that the peak alignment has been an important acoustic parameter in defining broad and contrastive focus structure. Beside the peak alignment, in languages like German the peak height, duration and intensity also play a significant role in marking focus types (Baumann et. al 2007; Kügler 2008; Breen et. al 2010).

On marking focus types in Turkish, Ivošević (2011) found that duration and intensity are systematically increased if the constituent is narrowly focused, but 'fundamental frequency of informational focus' when compared to the relative element in broad focus sentences does not increase. Similarly, İpek (2011) claims that narrow focus does not create significant differences in F_0 values of the focused word in languages like Turkish.

3. Methodology

11 male and 10 female speakers of Standard Turkish participated in the study. All were students at Ankara University, aged between 18 and 27. The recordings were carried out in the Linguistic Laboratory at Ankara University's Brain Research Center. The examiner read out the questions and the participant read the answers written on a computer screen. During recording, Shure PG81 Microphone and Praat 5.2 were used. For acoustic analysis, Praat 5.2 and Adobe Audition 2.0 Softwares were used. Focused elements were not specially marked, and the participants were asked to read the answers as natural as possible. Carrier sentences used in the experiment were declarative sentences with a) default SOV word order with focused object on preverbal element (Table 1), and b) non-default OSV word order with focused subject on preverbal element¹ (Table 2).

Broad Focus	Informational Focus	Contrastive Focus	
Gezi nasıl geçti? How was the trip?	Gizem'in gözünden hiçbir şey kaçmaz. Bu sefer neyi görmüş? Nothing escapes Gizem. What did she see this time?	Bu ormanda çok sevimli bir sincap var. Gizem onu gördü mü? There is a very cute squirrel in this forest. Did Gizem see it?	
Gizem [yılanı] _F gördü. Gizem saw [the snake] _F .	Gizem [YILANI] _{INF} gördü. Gizem saw [the SNAKE] _{INF}	Gizem [YILANI] _{CONT} gördü. Gizem saw [the SNAKE] _{CONT}	

Table 1. Focus types with default word order

Informational Focus	Contrastive Focus
O patika yolunda hep bir yılan güneşleniyor. Onu çocuklar da gördüler mi? <i>There is always a snake sunbathing on that pathway.</i> <i>Did children see it?</i>	Yılanı Burak mı gördü? Did Burak see the snake?
Yılanı [GİZEM] _{INF} gördü. [GİZEM] _{INF} saw the snake.	Yılanı [GİZEM] _{CONT} gördü. [GİZEM] _{CONT} saw the snake.

Table 2. Focus types with non-default word order

Acoustic analysis was conducted in a number of steps. First of all, sentences and focused words were segmented manually using a combination of listening, inspection of F_0 -tracks, and spectogram. After the segmentation, minimum, maximum, range and average values of F_0 in accented syllable were determined (*Table 3*):

Fo	UNITS	DESCRIPTION
Min	Hz	Min F ₀ accented syllable
Max	Hz	Max F ₀ accented syllable
Range	Hz	Range F ₀ accented syllable
Average	Hz	Average F ₀ accented syllable

Table 3. Investigated fundamental frequency (F₀) features

The second analysis was concerned with intensity, namely minimum, mean intensity of focused word, mean intensity of sentence. Also, in order to neutralize the external effects, mean intensity ratio was calculated (*Table 4*):

INTENSITY	UNITS	DESCRIPTION
Max intensity	dB	Max dB in focused word
Mean intensity	dB	Mean intensity of focused word
Mean sentence	dB	Mean intensity of sentence
Mean intensity ratio		Mean intensity of focused word/mean intensity of sentence

The third analysis was concerned with duration. After locating the previously mentioned onset, nucleus and coda points, duration of a) word, b) accented syllable, c) onset of accented syllable, d) nucleus of accented syllable, d) coda of accented syllable, e) F_0 peak time, and F_0 peak alignment were calculated (*Table 5*):

DURATION	UNITS	DESCRIPTION
Word	S	Word duration
Accented syllable	S	Duration of accented syllable
Onset of accented syllable	s	Beginning of nucleus (NB) – Beginning of accented syllable (SB)
Nucleus of accented syllable	S	 Open Syllable: End of the syllable (SE) - Beginning of nucleus (NB) Closed Syllable: Beginning of coda (CB) - Beginning of nucleus (NB)
Coda of accented syllable	s	End of the syllable (SE) - Beginning of coda (CB)
F ₀ peak time	s	F ₀ peak time in accented syllable of focused word
F ₀ peak alignment		F ₀ peak time in accented syllable of focused word divided by duration of accented syllable

To find out if there are significant differences between the values of acoustic correlates in different focus types, ANOVA (repeated measures) with Bonferroni correction and Paired Samples Tests were used with the help of PASW Statistics 18.00 Software. The significance level was p < 0.05.

4. Results

4.1 Default Word Order

According to the obtained results, acoustic correlates like minimum, maximum, range, average F_0 do not differ between focus types in default word order. RM ANOVA and Bonferroni correction displayed no significant difference in any parameter of F_0 . Average F_0 values of focus in default word order are shown in *Table 6* below:

Fo	yılanı _F	YILANI _{INF}	YILANI _{CONT}
Min	168.05	164.22	166.35
Max	193.75	194.78	196.88
Range	25.1	33.83	30.05
Average	179.85	179.89	186.71

Table 6. F₀ values of focus types in default word order

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However, the results concerning duration showed a different trend. Here it was found that duration plays a significant role in dividing broad from informational focus. The post-hoc test using the Bonferroni correction revealed that in informational focus word duration significantly increases (p=.005). Contrastive focus also showed higher but not statistically significant values when compared to broad focus. No significant difference between informational and contrastive focus was found. Average durational values of focus in default word order are shown in the *Table 7* below:

DURATION	yılanı _F	YILANI	YILANI _{CONT}
Word	0.335	0.385	0.361
Accented syllable	0.115	0.151	0.132
Onset	0.057	0.062	0.063
Nucleus	0.058	0.089	0.069
Peak time	0.054	0.084	0.062
Peak alignment	0.470	0.553	0.551

Table 7	Dunation		. f f	+	d a famile	a a d	
Table /.	Duration	values	of focus	types in	default	word	order

Similar to results related to fundamental frequency, the results concerning intensity did not show any significant difference in any intensity parameter:

INTENSITY	yılanı _F	YILANI	YILANI _{CONT}
Max	70.99	73.4	71.46
Mean	68.45	70.58	68.43
Mean Sentence	67.67	68.22	66.8
Mean Ratio	1.01	1.034	1.023

Table 8. Intensity values of focus types in default word order

4.2 Non-default word order

In non-default word order cases where Paired Sampled Tests were used, no significant difference in any parameter of F_0 between the informational and the contrastive focused subject was found

Table 9. F₀ values of focus types in non-default word order

F ₀	GİZEM _{INF}	GİZEM _{CONT}
Min	163.5	154.42
Max	202.2	196
Range	38.2	34.64
Average	176.85	173.16

The results concerning duration also did not show any significant difference in any examined parameter. In *Table 10*, we can see that values are rather similarly distributed:

DURATION	GİZEM _{INF}	GİZEM
Word	0.387	0.379
Accented syllable	0.289	0.281
Onset	0.079	0.078
Nucleus	0.117	0.110
Coda	0.094	0.093
Peak time	0.146	0.120
Peak alignment	0.498	0.431

Table 10. Duration values of focus types in non-default word order

The results concerning intensity also showed the same trend, i.e. no significant difference was found in any parameter. The mean ratio is slightly higher in contrastive focus but does not approach significance level.

Table 11. Intensity values of focus types in non-default word order

INTENSITY	GİZEM	GİZEM
Max	72.44	71.57
Mean	68.33	67.17
Mean Sentence	67.43	65.4
Mean Ratio	1.013	1.026

6. Conclusion

This preliminary study investigated acoustic marking of different focus types in Turkish. The results obtained in this study showed that, in comparison with broad focus, word duration was the only acoustic parameter in the expression of informational focus for the subjects in this study. Similar to other studies dealing with acoustic properties of focus in Turkish, F_0 did not play a significant role in defining focus types. The lack of any acoustic difference between informational and contrastive foci in this study indicates that these distinct categories do not exist at phonetic-acoustic levels in Turkish. To represent the main parameters for phonetic-acoustic level of focusing strategy in Turkish, 'non-adjacent focus' should be investigated and compared with 'verb-adjacent focus' in a further research.

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¹ Preverbal position in both word orders is considered to be a default focus position in Turkish.

Information structure in Turkish yes/no questions*

Beste Kamali Zentrum für Allgemeine Sprachwissenschaft (ZAS)

1. Introduction

Departing from most European languages, Turkish reflects a wide array of information structural notions in its yes/no questions. Among these, some attention has been given to Yes/No Questions (YNQs) with narrow constituent focus. Here I will describe other information structural configurations of YNQs in Turkish. For this I will put broad focus YNQs in closer scrutiny, describe in detail the differences between broad focus, narrow focus and verum focus YNQs, and introduce contrastive topics in YNQs.

2. Yes/no question formation and narrow focus YNQs in Turkish

From the simple declarative in (1a), various YNQs can be derived with the vowelharmonic particle -mI. What differentiates (1b-d) is their information structures. In narrow focus, -mI attaches to the focused constituent and the question receives an interpretation like that of a cleft in English (1b, c). If the polarity or the predicate is in focus, as in the phrase "whether or not" -mI attaches to the verb (1d). I will call this verum focus here.

(1)	a.	Ali dün yemek yap-tı.	
		Ali yesterday dinner make-PAST	
		'Ali made dinner yesterday.'	Declarative
	b.	Ali mi dün yemek mi yaptı?	
		'Is/was it Ali who made dinner yesterday?'	Subject Focus YNQ
	c.	Ali dün mü yemek yaptı?	
		'Is/was it yesterday that Ali made dinner?'	Adverb Focus YNQ
	d.	Ali dün yemek yaptı mı?	Verum Focus YNQ
		'Did Ali make dinner yesterday, as discussed	assumed/ promised?

No word order change is needed to form YNQs with different narrow foci. However, an optional operation may put the focused element 'closer to the verb' as in declaratives (Göksel and Özsoy 2000). Below such word order variants of (1b) and (1c) are given. The difference between moved (2) and in-situ (1b, c) focus is hard to pinpoint and probably more relevant in textual organization than focus structure, as is also the case in declaratives.

(2)	a.	Dün	Ali mi yemek yap-tı?		(~1b)
		Yesterday	Ali Q dinner make-	PAST	
		'Is/was it A	li who made dinner ye	esterday?'	
	b.	Ali (?)yeme	k/yemeğ-i dün	mü yap-tı?	(~1c)
		Ali dinner/dinner-ACC yesterday Q make-PAST		Т	
		'Is/was it ye	dinner?'		

Instead of obligatory word order change, Turkish uses obligatory focus intonation to mark the focused constituent (Göksel and Özsoy 2000 among others), to which we will return.

Again in line with declaratives, the focused element marked with -mI cannot appear in the postverbal domain which is reserved for backgrounded material.

(3) a. *Yemek yaptı Ali mi?

b. *Ali yemek yaptı dün mü?

In Ladd (1996), Kornfilt (1997), Göksel and Kerslake (2005) the -mI particle is cited to form narrow focus YNQs by attaching to the constituent in focus. This is what we have been observing. However with broad focus questions, the attachment size is different.

3. Broad focus YNQs

-*mI* can also attach to the object of the sentence, as in (4). Not surprisingly, this question may indicate narrow focus of the object (4i). Strikingly, however, it also indicates VP focus (4ii) and true broad focus (4iii), which I will illustrate extensively in this section.

(4) Ali dün yemek mi yap-tı?

Ali yesterday dinner Q make-PAST

- i. 'Is/was it [dinner]_F that Ali cooked yesterday?' Object Focus
- ii. 'Is/was it [cooking dinner]_F that Ali did yesterday?' VP Focus
- iii. 'Is/was it [Ali's cooking dinner yesterday]_F that happened?' Broad Focus

Broad focus is the information structure configuration allowed in all-new contexts. In broad focus the intonational prominence realized on a single constituent "projects" to the sentence level, indicating that not only this constituent but the whole sentence is new information.

Intonational prominence on objects indicates VP and broad focus, but prominence on subjects does not. Thus we see focus projection in (4), but not in (1b=5). The absence of readings (ii) and (iii) indicates this. This is because focus projection happens when the prominence is on the default sentence stress position, which is the object (Selkirk 1995).

- (5) Ali mi dün yemek yaptı? (=1b)
 - i. 'Is/was it [Ali]_F that made dinner yesterday?' Subject Focus

ii. *'Is/was it [cooking dinner]_F that Ali did yesterday?' VP Focus

iii. *'Is/was it [Ali's cooking dinner vesterday]_F that happened?'Broad Focus

We can observe this with alternative questions. Only a subject alternative can be expressed when the subject has -mI(6a). Focus is not an alternative (6b).

- (6) a. Ali mi dün yemek yap-tı, Emre mi (dün yemek yap-tı)? Ali Q yesterday dinner make-PAST Emre Q
 'Did Ali make dinner yesterday or Emre?'
 - *Ali mi dün yemek yaptı, ders mi çalıştı?
 *Was it Ali who made dinner or do his homework?"

3.1 VP-internal attachment and broad focus

YNQs where -mI attaches to the object can correspond to true broad focus, as indicated in the possibility of focus projection as in (4). Below I further illustrate this with pragmatic and morphosyntactic tests. From now on I will refer to this placement of -mI as the VP-internal placement, and its attachment on the verbal complex as in (1d) the verbal placement.

Our first argument comes from out-of-the-blue guesses which constitute an allnew dicourse situation. In such cases the VP-internal placement (7) is very clearly the felicitous option in comparison to the verbal placement (8).

(7) (Hearing a sudden crash in the next room, I run, open the door and ask:)

a.	Biri	cam-1	mı kır-dı?
	someone	window-ACC	Q break-PAST
	'Did someon	e break the wi	ndow?'
b.	Raflar mı	devril-di?	
	shelves Q	collapse-PAS	Г
	'Did the shel	ves collapse?'	
c.	Bebek yata	ak-tan miyu	varlan-dı?
	baby bed-A	BL Q rol	l-past
	'Did the baby	roll down the	e bed?'

The corresponding verbal placement examples are all infelicitous in this context as they evoke an interpretation where breaking the window, shelves collapsing and the baby rolling down from the bed must have already been talked about or otherwise salient in the discourse: (8) (Same context as above)

- a. #... Biri camı kırdı mı?
 - 'Did somebody break the window as discussed/expected/planned?'
- b. #... Raflar devrildi mi?
 - 'Did the shelves collapse as as discussed/expected/planned?'
- c. #... Bebek yataktan yuvarlandı mı?'Did the baby roll down the bed as discussed/expected/planned?'

News items are telling as they typically introduce all-new information. In journalistic style, it is very common to use YNQs as titles, where a VP-internal placement is favored.

 (9) Alman bakan faka mi bas-ti? German minister 'fak'.DAT Q step.on-PAST 'Did the German minister screw up?' Source: http://www.sonsayfa.com/Haberler/Dunya/Alman-Bakan-faka-mibasti.html

Such cases of discontinued idioms present a formal argument as well: -mI even breaks off an idiom to establish VP-internal placement in its broad focus use. Below this is illustrated with the VP idiom *sinek avla*- 'lit:catch mosquitoes', meaning 'one's business not going well'. This idiomatic reading is available (and indeed contextually forced) even when -mI is on 'mosquito' (or on meaningless root *fak* as in 9).

(10)	A:	Ali'nin bankaya bir sürü borcu varmış.
		'I heard Ali owes a lot of money to the bank.'
	B:	Hala sinek mi avl-1yor?
		still mosquito Q catch-PRES
		i. <i>#Literal narrow:</i> 'Is it mosquitoes that he catches?'
		ii. #Literal broad: 'Is it catching mosquitoes that he does?'
		iii. Idiomatic broad: 'Is Ali's business not going well?'
		iv. *No such thing as <i>idiomatic narrow</i>

Another formal argument is the possibility of disjunction with VP-level or higher elements. In an alternative question where playing cards is the alternative to doing homework, *-mI* surfaces VP-internally in both alternatives. Note the type of possible answer.

(11)	Ali [iskambi	mi çalış-tı]?		
	Ali cards	Q play-PAST or	schoolwork	Q work-PAST
	'Did Ali pla			
	Possible ans	VP altQ		

A similar structure with verbal placement as in (12) cannot be interpreted as an alternative question like (11). Instead it has two distinct (verum) YNQs, as the difference in the possible answer indicates. Also, the two questions in (12) cannot be conjoined with *yoksa* 'or' as in alternative questions, and seem to be in separate intonational phrases unlike (11). This is because VP focus and VP alternatives are only expressed by the VP-internal placement.¹

(12)	Ali iskambil	oyna-dı mı, (*yoks	çalış-tı mı?	
	Ali cards	play-PAST Q or	schoolwork	work-past Q
	'Did Ali play			
	Possible ans	Consecutive YNQs		

One final argument for the broad focus association of VP-internal placement comes from (other) focus particles such as *bile* 'even' and -dA 'also'. In their broad focus association (ii), these particles also occur in a VP-internal position. Note that *bile* 'even' is not affixal (i.e. vowel-harmonic etc.) like -mI. The fact that even nonaffixal elements behave this way indicates that the VP-internal placement cannot be a mere glitch of morphology.

(13) Biz dün iskambil de/bile oyna-dı-k.
we yesterday cards also/even play-PAST-1pl
i. 'We also/even played [cards] yesterday (in addition to backgommon).'
ii. 'We also/even [played cards yesterday] (in addition to visiting our old school the previous day).'

In conclusion, all these examples indicate a VP/broad focus reading of YNQs with VP-internal attachment even though the particle is attached to the object on the surface. This means that the previous attach-to-focus understanding needs to be revised.

3.2 VP-second placement

In the last section we saw that in broad focus the question particle could be attached to various syntactic elements. Among these were zero-marked (4) and accusative-marked (7a) direct objects, oblique objects (7c), objects in idioms (9, 10) and subjects of unaccusative predicates (7b). One suspects that the VP-internal placement of -mI is after an internal argument. Let us observe with a subject of unaccusative and a subject of unergative.

Subjects of unaccusative predicates in many languages show signs of being in the VP rather than in the higher canonical subject position. In Turkish they have similar characteristics, observed in word order preferences and sentence stress. In (14a) the subject of unaccusative follows the locative adverbial and receives default sentence stress (indicated with small caps) (Üntak-Tarhan 2006, initially due to Erguvanlı-Taylan 1984). The resulting broad focus YNQ follows the unaccusative subject, as was the case in (7b).

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(14)	a.	Ocak-ta su kayn-1yor.	
		stove-loc water boil-PRES	
		'There's water boiling on the stove.'	Unaccusative Declarative
	b.	Ocak-ta su mu kaynı-yor?	
		'(What's this bubbling?)	
		Is there water boiling on the stove?'	Broad Focus Q

With unergative predicates, however, the subject shows characteristics of being in the higher TP subject position, attested by its rejection of default sentence stress and its obligatorily referential status (15a). In the resulting YNQ, if the question particle is placed after the subject as in (14), only a narrow subject focus reading is available (15c), unlike the broad focus in (14b). The broad focus placement here is verbal (15b).

(15)	a.	Pazarları çocuklar YÜZ-ÜYOR.			
		Sundays children swim-PRES			
		'The children swim on Sundays.'	Unergative Declarative		
	b.	Pazarları çocuklar yüzüyor mu?	-		
		'Do the children swim on Sundays?	Broad Focus Q		
	c.	Pazarları çocuklar mı yüz-üyor?			
		'Is it the children who swim on sundays?'	Only Narrow Focus Q		

To understand the placement of the question particle fully, we need to look into VPs that are composed of more than two elements. This is found in two configurations in Turkish: one with non-derived adverbs (Erguvanlı Taylan 1984), another with transitive light verb constructions (Öztürk 2005).

Non-derived adverbs are very low in the structure. They occur before pseudoincorporated arguments and attract default sentence stress in declaratives (16a). In a broad focus question, -mI follows this adverb. This question is licensed, say, in a discourse where Ali's busy roommates have started eating at home. The verum question in (16c) is licensed when cooking fast is given in the discourse, say, when candidates for a new cook are considered.

(16)	a.	Ali HIZLI yemek yap-iyor.	
		Ali fast dinner make-PRES	
		'Ali cooks (dinner) fast.'	Non-derived Adv
	b.	Ali hızlı mı yemek yapıyor?	
		'Does Ali cook fast?'	Broad F. Q
	c.	Ali hızlı yemek yapıyor mu?	Verum:'cooking fast' is Given.

In comparison, a derived adverb, or any other adverb for that matter, has to be narrowly focused when it hosts -mI. In the declarative, these do not take default sentence stress.

(17)	a.	Ali hızlı-ca YEMEK yap-ıyor.	
		Ali fast-DER dinner make-PRES	
		'Ali is quickly making dinner.'	Derived Adv
	b.	Ali hızlıca mi yemek yapıyor?	
		'Is it quickly that Ali is cooking?'	Only Narrow Focus

In the case of light verb constructions, we see that the broad focus placement of -mI is after the internal argument of the LVC (18a). If this argument is discourse-given or under predicate focus, it is placed inside the LVC (18b). And finally in verum focus it is verbal (18c). I illustrate the information structures with appropriate alternative questions.

(18)	a.	Ali araba-yı mı tamir ed-iyor, (yoksa) aletler-i mi düzenl-iyor?
		Ali car-ACC Q repair do-PRES or tools-ACC Q sort-PRES
		'Is Ali fixing the car or sorting the tools?'

- b. Ali arabayı tamir mi ediyor, (yoksa) (arabayı) servise mi götürecek? 'Is Ali fixing the car or is he taking it to the repair shop?
- c. Ali arabayı tamir ediyor mu, (yoksa) etmiyor mu? 'Is Ali fixing the car or not?

These latter two cases allow for a more refined understanding of the placement of the question particle in broad focus. The placement is not related to argumenthood (non-derived adverbs can host -mI), nor is it tied to the immediate direct object (the object 'dinner' and the light verb object 'repair' are skipped in 16b and 18a). It in fact is not tied to anything other than a position. This is the second position in the VP. In other words, -mI seems to be a Wackernagel clitic of the VP domain (see details in Kamali 2011).

4. Verum focus

We have gone over numerous cases of verum focus YNQs so far. Morhosyntactically these questions show verbal placement while an internal argument that could host -mI is also available.² Below, the broad focus example with VP-internal attachment allows a VP-level alternative (19a), but the verum focus example cannot (19b).³ Note that the first alternative in (19b) itself is infelicitous in this all-new discourse environment.

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- (19) (Upon noticing that Ali doesn't touch his dinner...)
 - a. Ali diyet mi yap-ıyor, (yoksa) iştahsız mı? Ali diet Q do-PRES or appetite.less Q 'Is Ali on a diet or has he lost his appetite?'
 b. *Ali diyet yapıyor mu, (yoksa) istahsız mı?

On the other hand, the verum question is perfect with polarity alternatives:

 (20) (I thought/was told that Ali was on a diet but I'm not sure anymore...) Ali diyet yap-1yor mu, (yoksa) yap-m-1yor mu? Ali diet do-PRES Q or do-neg-PRES Q
 'Is Ali on a diet or not?'

In terms of their pragmatics, verum questions (as well as verum declaratives) require that everything other than the truth of the proposal or at least the object is discourse-given: mentioned, assumed, implied, or otherwise recoverable in the discourse.⁴ For instance in the case of the crash next door (8), such questions are infelicitous because no prior common knowledge regarding the possible causes and results of the crash can be assumed.

The givenness requirement in verum focus can be observed in the typical postverbal occurrence of constituents with this type of questions. Topics aside, all such elements in our verum focus examples so far can be postverbal.

 (21) Yap-tı mı Ali dün yemek? (~1d) make-PAST Q Ali yesterday dinner?
 'Did Ali make dinner yesterday as discussed/assumed/promised?'

The verbal complex is the locus of truth conditional information (tense etc.), so verum focus is realized on the verb. Negative sentences are typically under a similar focus configuration in Turkish, preferring main stress on the verb (Göksel and Kerslake 2005). Negative questions, accordingly, are typically formed with a verbal -mI.

(22)	a.	Merve artik bu partiye oy VER-ME-YECEK.
		Merve now this party vote give-neg-FUT
		'Merve will not vote for this party anymore.'
	b.	Merve artık bu partiye oy vermeyecek mi?

'Will Merve not vote for this party anymore?'

Predicate focus is the narrow focus of the verb itself. In the absence of free-standing auxiliaries, verum and predicate focus are both expressed with main stress on the verb and verbal placement of -mI (disambiguated with light verbs: 18b predicate, 18c verum). We get a three-way ambiguity with broad, polarity, and predicate focus if the broad focus attachment is on the verb (unergatives: 15b).

5. Contrastive topics in questions

In this section I will introduce contrastive topics (CTs) in YNQs (see Kamali and Büring 2011). This novel set of data is interesting both typologically and theoretically. The relevant contrast is in (23). This time I will use capital letters to indicate intonational focus. This wasn't necessary before, as the intonation was transparent from the placement of -mI.

(23)	a.	ALİ mi dün iskambil oynadı?	(~1b)
		'Is/was it Ali who played cards yesterday?'	'Adjacent -mI
	b.	ALİ dün iskambil oynadı mı?	-
		'Is/was Ali one of those who played cards yesterday?'	'Distant – <i>mI</i> '

(23b) is an interesting case involving a contrastively accented phrase as in our narrow focus examples, yet -mI is on the verb. Its interpretation is starkly different from that of (23a) in that it is presupposed that there are other individuals in the discourse who played cards. The subject in this case is also topical, as if the question begins with "how about Ali?". I will refer to the case where -mI is attached to the contrastively accented/narrowly focused element as Adjacent -mI questions (AMQ), and those where -mI is attached to the verb while there is an earlier contrastively accented element as Distant -mI questions (DMQ).

This configuration has received very little attention. Göksel and Kerslake (2005) mention these structures, Sato (2009) attempts to analyze the prosody. I will briefly analyze these questions as YNQs with contrastive topics in the sense of Büring (2003).

5.1 Difference in intonation

There are other differences between (23a) and (23b). One is intonational. Whereas (23b) and all examples considered so far lack a rising boundary (Fig. 1, top panel), the DMQ instantiates a rising boundary (bottom panel).⁵ In other respects such as prominence realized as focal accent on the subject and postfocal deaccentuation, they are comparable.





Figure 1: Pitch tracks of *ALİ mi dün iskambil oynadı* (top) and *ALİ dün iskambil oynadı mı* (bottom)

5.2 Difference in interpretation: Exhaustivity

YNQs that ask for an exclusive answer must be realized with the AMQ (a examples). The DMQs which are the (b) examples are infelicitous as they imply multiple top-scorers of one championship and multiple grooms getting married to one woman at one wedding.

(24)	a.	Bu Kupa'da	en ç	ok	gol-ü	MESSI mi at-tı?
		this cup-LOC	most n	nany	goal-ACC	Messi Q score-PAST
		'Did MESSI	score the	most	goals in this V	World Cup?'
	b.	# Bu Kupa'd	a en çok	golü I	MESSI attı mi	?
(25)	a.	Melis'le	bu akşaı	m	ERKAN	mı evlen-iyor?
		Melis-COMM	this ever	ning	Erkan	Q wed-PRES
		'Is ERKAN marrying Melis tonight?'				
	b.	# Melis'le b	u akşam I	ERK A	N evleniyor 1	nu?

Conversely, the DMQ configuration is needed when the predicate at hand is nonexhaustive. The (b) examples fail in this case because they imply a single goalscorer for the whole championship, and a single card-player playing on his own.

(26) (After World Cup 2010 where 145 goals were scored.)

- a. ÖZİL gol at-tı mı? Özil goal score-PAST Q 'Did ÖZİL score a goal?'
- b. #ÖZİL mi gol attı?

(27) (My friends stayed up after I went to bed and some played cards.)

ALİ iskambil oyna-dı mı?	(~Fig. 1, bottom)
Ali cards play-PAST Q	
'Did ALİ play cards?'	
#ALİ mi iskambil oyna-dı?	(~Fig. 1, top)
	ALİ iskambil oyna-dı mı? Ali cards play-PAST Q 'Did ALİ play cards?' #ALİ mi iskambil oyna-dı?

5.3 Contrastive topics and discourse strategies

We have seen that in the AMQ where -mI immediately follows the contrastively accented constituent has an exhaustive interpretation and no rising intonation (23a, 24a, 25a). The DMQ, on the other hand, has verbal -mI with earlier contrastive accent and rising intonation, and brings about a non-exhaustive interpretation (23b, 26a, 27a).

If the accented element in the DMQ is analyzed as a contrastive topic (CT), all of these properties can be derived at once. CT in YNQs signals a discourse strategy, just like in declaratives. Strategies are by definition non-exhaustive, therefore exhaustive readings are banned. Intonational rise is possibly related to the presence of a discourse strategy, because the implied presence of other sister nodes might require a continuation intonation. Such a discourse tree (in the sense of Büring 2003) for (27a) is given in (28).



AMQs, in comparison, must have a flat representation, i.e. no discourse strategies, as the reading is exhaustive. Each Q-A pair is considered in its own right, or in sequence.

In conclusion, in addition to broad, verum and narrow focus described in Sections 2 to 4, Turkish also expresses contrastive topics in yes/no questions. YNQs with focus and those with CT are distinguished by mI-placement (adjacent or distant) and boundary tone.

6 Conclusion

Information structural types of Turkish Yes/no Questions, then, can be classified as follows (/ indicates rising intonation):

(29)	• ACCENT _F mI ?	• Focus
	– For XP other than VP: $[XP]_F mI \dots ?$	-Narrow Focus Types
	– For VP: $[XP mI \dots V]_F \dots ?$	-Broad Focus
	– [XP V] mI ?	-Verum Focus
	• $\overrightarrow{ACCENT}_{CT}$ mI / ?	• Contrastive Topic

With such information structural richness, Turkish YNQs present a valuable source for theory and for further analysis. Here I have made a case for VP-second Wackernagel clitics and contrastive topics in questions based on the distribution of the question particle -mI.

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¹ Possibly (12) in fact encompasses two dictinct sentences, but it displays a useful contrast to (11).

² The pragmatic conditions that license what is standardly called verum focus questions in English and those I claim to be verum focus in Turkish are slightly different in that English is more restrictive.

³ Note that semantically verum and broad focus are very similar, as they do not differ in truth conditions, which is why the reader might think (19b) is not all that bad. The difference lies in

fine pragmatic distinctions discussed in Section 3, and as cooperative speakers we normally tend to accommodate these.

4 The related fine-grained semantic distinctions are outside of the scope of this paper.

5 Note that the accents peaks are late-realized on the following item. Such phonetic late realization seems to be rampant in Turkish. Pitch tracks represent the author's speech.

Compound stress in Turkish is phrase stress*

Beste Kamali, Didem İkizoğlu

Zentrum für Allgemeine Sprachwissenschaft (ZAS), Georgetown University

1. Introduction

Our aim is to propose a novel analysis of compound stress in Turkish. We argue that the productive forms of compounding, specifically the Noun+Noun-sI form and various 'compound verb's, are phrases, and that they have the stress pattern expected of phrases. The true lexical compounds are those with final stress. As these are maximally lexicalized words, they exhibit the expected final stress pattern of words in Turkish.

Previous analyses mostly classify compounds among the categories that induce exceptional stress in Turkish because in a sizeable number of compounds the stress is on the left member (Inkelas & Orgun 1998, among others) as opposed to regular word stres on the final syllable. This in turn has led to analyses seeking to account for the asymmetry at the level of word (Inkelas & Orgun 1998, 2003), or as an instance of the Clitic Group in the prosodic hierarchy (Kabak & Vogel 2001). The proposed asymmetry, however, is not without exceptions. Some compounds have stress on the rightmost syllable similarly to simplex words. Below we illustrate this duality. (1a) receives stress on the rightmost syllable. (1b) is a productive compound with stress on the left member.

- (1) a. Hünkarbeğendí 'pot roast lamb with eggplant puree'
 - b. Kandílli Cadde-si 'Kandilli Street-SI' (Swift 1963)

The compounds above behave differently under affixation. As seen in (2a), compounds receiving final word stress transfer the stress when suffixed further, while 'compound stress' constructions retain their stress on the designated syllable of the left member (2b).

 (2) a. hünkarbeğendi-niz-dén pot roast lamb with eggplant puree-POSS2PL-ABL
 b. Kandílli Cadde-sin-den-dir Kandilli Street-SI-ABL-EVID (Slightly changed from Inkelas & Orgun 1998)

A comparison between (2) and (3) shows that this behavior is not specific to compounds. (a) examples show regular final word stress which is transferrable, indicating that compounds of this sort are not treated any differently than words. (b)

examples also behave similarly regardless of whether the base is a compound or a simple stem. The leftmost lexical accent of an exceptionally stressed stem is honored to the exclusion of others.

- (3) a. kitap-çı-lar-ımız-dán book-DER-PL-POSS1PL-ABL
 - b. pásta-cı-lar-ımız-dan cake-DER-PL-POSS1SG-ABL
 'from our book/cake vendors'

Two major analyses have been formulated to address compound stress in Turkish: Inkelas and Orgun (1998, hence IO) analyze compound stress as a co-phonology with leftmost stress. Kabak and Vogel (2001, hence KV) argue that compound stress is an instantiation of the Clitic Group in the prosodic hierarchy. Thus the two works consider compounds to be relevant at two categories lower than the PhP in the prosodic hierarchy.

Phonological Phrase
 Clitic Group (KV: Compounds with non-final stress)
 Prosodic Word (IO: Compounds with final and non-final stress)

Below we will point to the shortcomings of these approaches and argue for what we believe is a more elegant account: Productive compound forms such as the Noun+Noun-sI form are syntactic phrases that are mapped to Phonological Phrases, and the stress pattern is the expected stress pattern of a phonological phrase. The finally-stressed compounds are presumably morpho-prosodically unanalyzed Words, as their final stress also indicates.

2. A critique of previous analyses

2.1 Inkelas & Orgun (1998)

For IO, both compound types instantiate word-level phonological processes. They propose the following rule to derive the compound stress pattern:

(5) Inkelas & Orgun's (1998) rule for Stressed Compounds: First member of relevant compounds receives an application of (default) word stress (Leftmost Wins).

In this analysis, compounds with compound stress (above referred to as "stressed" compounds) and those with final stress are sets of words with different cophonologies. One co-phonology requires final stress, while the other calls for Leftmost Wins. There is no algorithm proposed to decide between compounds with the compound stress pattern and those with the final stress pattern. Which cophonology a compound or any other word belongs to is listed in the lexicon.

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There are two major problems with this approach. First, running in the face of this lexical account, compounds with compound stress do not show lexical integrity expected of lexical items. Second, contrary to predictions, the stress pattern of a compound is not random, but largely predictable from its morphosyntactic makeup.

2.1.1 Compounds that do not display lexical integrity

As widely known at least since Hayasi (1996), in N+N-sI compounds the plural suffix precedes the -(s)I affix (6c). According to IO's anaysis, this affix must be part of the lexical make-up of the compound word and should remain inside the plural, as in *(6b).

- (6) a. bebek araba-sı 'baby carriage'
 - b. *[bebek araba-s1]-lar
 - c. bebek araba-lar-1 'baby carriages'

Similarly going against the lexical integrity of compound forms, the suffix -(s)I disappears under further affixation with certain affixes.

- (7) a. sokak kedi-si 'stray cat (lit: street cat)'
 - b. *benim sokak kedi-si-m
 - c. benim sokak kedi-m 'my stray cat' (Tat, this volume)

Thirdly, verbal compounds, which are discussed by KV but not IO, constitute a type where morphemes clearly separate a verb and its non-head. (8) illustrates this point.

(8)	a.	Ali	[kitap	da oku]d	и.
		Ali	book	ADD rea	ad-PAST
		'Ali also did	book rea	ading.'	(Incorporation: Erguvanlı-Taylan 1984)
	b.	Meclis	yasa-yi	ı [redd	mi et]-ti?
		Assembly	law-AC	cc rejecti	on Q do-PAST
		'Did the asse	mbly rej	ject the lar	w?(Light verb construction: Öztürk 2005)

2.1.2 The overlooked regularity

For Inkelas and Orgun, the internal makeup of the compound is not relevant for the stress pattern it will have. However there is strong reason to suspect otherwise (see Section 3.3).

Two compound forms in Turkish have the highest productivity by a landslide: N+N-sI and (Obj+V). These forms exclusively surface with the compound stress pattern. This is the case both with old compounds of these form and recent neologisms.

- (9) a. N+N+sI: bebék arabası, pará babası, apáçi dansı
 *bebek arabasí, *para babasí, *apaçi dansí
 'baby carriage, rich man (lit: money daddy), apache dance'
 - b. Obj V: telefón et-, ziyán ol-, dównload et*telefon ét-, *ziyan ól-, *download ét'phone do, go to waste (lit: waste become), download do'

This rule-governed subsystem receives no explanation in IO's lexical account, according to which we would expect a memorized lexical specification and not a rule.

2.2 Kabak & Vogel 2001 According to KV (2001), the domain for compound stress is the Clitic Group (CG):

(10) Clitic Group Stress: Promote stress of first word in CG; reduce the prominence of any other stress(es). (KV 2001: 340)

This prosodic rule ensures that compounds will be stressed on the leftmost member. Each word is assumed to be a Prosodic Word (PW) to begin with, and compound stress arises as a matter of prosodic constituency within the higher category, the Clitic Group.

(11) ((açí)_{PW} (ölçer)_{PW})_{CG} 'protractor' (lit: angle measurer)

KV's account is better able to account for the facts of lexical integrity of compounds presented in (6) through (8). The building blocks of the compound as well as the resulting compound itself are prosodic units, and not necessarily lexical entities. As a result, morphophonological processes can take place inside them. This account also better captures the regularity issue illustrated in (9). Compound stress is rule-governed and (largely) predictable, because it does not arise from lexical specification, but rather from the prosodic makeup of the compound. KV do not address the duality in compound stress patterns and final stress compounds are entirely ignored (see Inkelas & Orgun 2003).

The aspect of KV's proposal we take issue with is the claim that compounds with the compound stress pattern instantiate a distinct prosodic unit than phrases. According to KV, while compounds with compound stress are CGs, syntactic phrases are Phonological Phrases (PhP). They formulate the following PhP stress rule, where the PhP, in contrast to the CG, does not display the reduction of prominence:

(12) Phonological Phrase Stress: Promote stress of first word in PhP. (KV 2001: 340)

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We argue that the distinction between PhP and CG is unmotivated. First, the alleged difference is based on impressionistic judgements prone to misinterpretation. Second, two crucial minimal pairs KV present as evidence to this difference in fact fail to test for it.

2.2.1 Impressionistic judgements

KV's (2001) claims as to the difference between compounds and phrases come from impressionistic judgements on prominence and deaccentuation. While in principle this is an acceptable method, judgements can be skewed for various reasons including other aspects of prosody. KV state that, there is a weak accent on the second member of a phrase. This weak accent is entirely absent in compounds. We believe that a H- boundary tone may have been mistaken as an accent in cases where KV claim to find a weak accent on the second word. One of their own examples strongly suggests this interpretation:

(13) kırmızí çantá 'red bag' (KV's (37a), 2001, judgement as reported)

In (13), we see a PhP made of an adjective noun sequence. KV describe the accentuation pattern of this example with a weak but retained accent on the second word. However, *çanta* 'bag' bears stress on its first syllable, rendering the placement of this purported accent contrary to intuition. The absence of an accent on the initial syllable (*çánta*) suggests that it has been deaccentuated. As to the purported accent, we suspect that this might be a boundary H- at the end of the phrase (as described by Kamali 2011).

2.2.2 Problematic minimal pairs

KV provide the following contrasts as conclusive evidence testifying to the difference between Phrase and Compound stress patterns.

- (14) a. Phrase (((sút)_{PW})_{CG} + ((beyáz)_{PW} dır)_{CG}) 'Milk is white'
 - Phrase (((aci)_{PW})_{CG} + (($\ddot{ol}cer$)_{PW} mi)_{CG}) 'Does it measure an angle?'
 - b. Compound (((sút)_{PW} (beyaz)_{PW} dır)_{CG}) '(It) is milk-white.' Compound (((açi)_{PW} (ölçer)_{PW} mi)_{CG}) 'Is it a protractor?' (rearranged from KV's (38), 2001)

While we agree with the stress judgements, we take issue with the validity of the comparisons. The examples are intended to compare a compound and a phrase to argue that the difference in intonation must be due to the fact that one is a PhP and the other a CG. The comparison in these examples, however, is between one compound and *two* phrases. (a) examples have stress on both words because each word is phrased separately for independent reasons.

In (14a), *süt* 'milk' is the syntactic subject. Subjects are phrased separately from the VP in Turkish (Üntak-Tarhan 2006, Kamali 2011). These two PhP's are: $(sút)_{PhP}$ (beyázdır)_{PhP}. Again in (14a), the word *açı* 'angle' is phrased separately due

to its informational status as Given. This we understand from the placement of the question particle at the end, rather than attaching to the object (see Kamali, this volume). The two PhP's in this case are the following: $(aci)_{PhP}$ (ölcér mi)_{PhP}.

Since the (a) examples are two PhPs rather than one, the comparison to a single compound cannot be taken to reveal the true nature of PhP-hood and CG-hood, but rather the nature of being a two-unit phrase and a one-unit phrase.

An alternative pair of examples where the two words make up one PhP rather than two is given below. Here the unmarked intonational partitioning of the sentence does not impose additional PhP boundaries, as the verb and its internal argument form one phrase together in an all-new context.

- (15) a. Q: Bu alet ne işe yarar? 'What is this gadget for?'
 - A: Açí ölçer. '(It) measures angles.'
 - b. Q: Bu nedir? 'What is this?' A: Acíölcer. '(A) protractor.'

The intonational makeup of the two answer utterances are identical, where one sequence is a VP (15a), and the other is a compound (15b). So, intonationally speaking, there is no difference between a VP and a compound. We show this instrumentally in the next section.

3. The proposal

We have seen that both IO's analysis of compounds as lexical entities and KV's analysis based on the notion of the Clitic Group suffer from certain limitations. IO's account captures the variation in compound stress patterns while disregarding regularity and a problem with lexical integrity. KV introduce a prosodic complexity in the analysis which can potentially capture regularity and morphological complexity, but fail to address the compound stress/final stress duality and evoking an unmotivated notion of Clitic Group.

We would like to pursue a line of thought that combines the best of two worlds.

(16) Productive compounds with compound stress are syntactic phrases.

Following standard assumptions, syntactic phrases are mapped to PhP's in the phonology (Selkirk 1995, Truckenbrodt 1995). This derives their prosody. Since the form is syntactic, it would be maximally productive and not expected to show lexical integrity. Final stress compounds, in contrast, are unanalyzed words with expected final word stress. Below we provide further arguments from prosody, syntax and the lexicon to support our proposal.

3.1 Intonational parallelisms between compounds and phrases

3.1.1 Other syntactic phrases and deaccentuation patterns

NPs with an adjective are systematically treated with the compound-like intonation, namely with the deaccentuation of the second element. As with the compounds in (14b), the lexical accent on the right members *ánnem* 'mother-poss1sg', and *kralíçe* 'queen' are deleted in (17), (the diacritic in $[\bar{a}]$ is used to indicate deaccentuation). Note that these are novel syntactic formations, not lexical/morphological, yet they receive the same prosodic pattern as compounds.

(17)	Sihirlí ānnem 'My magical mother'	(Adj N) _{NP} stress
	Muhteşém kralīçe 'Magnificient queen'	

The same stress pattern is observed in PPs and VPs.

(18)	kapıyá doğru 'toward the door' baná göre 'according to me'	PP stress
(19)	köpék besle- 'feed dogs' kitáp yaz- 'write books'	VP stress

With inflected VPs, the effect of deaccentuation is even clearer. Lexically accented affixes -Iyor and -Iver in the second word lose their accent with an internal argument.

(20) köpék beslīyorum 'I have (lit:feed) a dog' VP stress with deaccentuation bir kitáp yazīver 'Quickly write a book'

Thus, deaccentuation is not a property specific to compounds or compound stress, but is found across phonological phrases.

3.1.2 Beyond impressionistic judgements

Below we support our impression regarding the intonational similarity between compounds with compound stress and syntactic phrases with pitch tracks of the relevant structures.

In Fig. 1, the upper left panel is a Noun+Noun-(s)I compound. Upper right exemplifies an instance of a non-case-marked argument and its verb. Finally in the lower panel we have an inflected VP in which the all-new object inside is marked with accusative and carries nuclear accent.

The tonal realizations of the three are almost identical. The finally stressed word ayva(yt) 'quince(-acc)' ends in around 125 Hz. on its last syllable, followed by a Low tone on the second word settling around 95 Hz. in all three occurrences.¹ In addition, the lower panel shows the deaccentuation of the verb with a lexically accented affix –*Íyor*, as in (20).



Figure 1: Pitch tracks in all-new context, male speaker

The stress is on the left element in all three instances. The pitch tracks show that both compounds with compound stress and phrases have leftmost stress and deaccentuation of the non-leftmost elements.

Some analyses take non-case-marked arguments (as in the upper right panel) as lexically incorporated (Kornfilt 1994 among others). However, we have seen that a case-marked internal argument also induces the same intonation (lower panel). Similarly, the numeral/determiner *bir* can occur in the VP and the intonation would be the same.

(21) Bir ayvá ar-īyor-uz. One quince search-PROG-1PL 'We are looking for a quince'

Based on deaccentuation patterns and representative pitch tracks, we conclude that there is no difference between compound and phrase intonation. Both are instantiated with the nuclear fall after the leftmost element, which is the hallmark of phrasal stress in Turkish.

3.2 Productive compounds have syntactic complexity

In the case of noun-verb incorporation as well as light verb constructions with *et*-, *ol*- etc, which KV among others include under 'verbal compounds', there is ample evidence that the constructions are syntactic, and not lexical (Öztürk 2005). Particles like -dA and -mI can intervene between the two words (8). The incorporated noun can be externally modified.

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(22)	Ali	[konuşacak	insan] ara-dı.	
	Ali	talk.to-REL	person look.for-PAST	
	'Ali I	looked for som	eone to talk to.'	(Öztürk 2005)

Secondly, incorporation and light verb constructions causativize like transitives: the causee is marked with dative like in regular transitives, not with accusative like in intransitives (Öztürk 2005). That is, the internal constituency of the construction is transparent to syntax.

(23)	a.	Ali	telefon et-ti/	balık	tut-tu.	
		Ali	phone do-PAST	fish	catch-PA	AST
		'Ali made a	phone call/went fis	shing.'		
	b.	Birisi	Ali-ye/*yi tel	efon e	t-tir-di	/ balık tut-tur-du.
		someone	Ali-DAT/*ACC pl	none de	o-CAUS-P	AST fish catch-CAUS-PAST
		'Soemone m	ade Ali make a ph	one cal	l/go fishi	ng.'
	c.	Birisi	Ali-yi/*ye	koş-tu	ır-du.	-
		someone	Ali-ACC /* DAT	run- C	AUS-PAST	ſ
		'Someone m	ade Ali run.'			(Öztürk 2005)

Let us now illustrate with N+N-sI compounds. The transitivity test (23) does not apply, as there is no transitivity alternation in NPs. Particles (as in 8) do not appear inside these compounds either (24a). However, they also do not appear in regular phrasal NPs (24b). This must be a property of NPs rather than compounds.

(24)	a.	*Ayva	mı	marmelad-1	al-dı-n?	N+N-sI Compound
		quince	Q	marmalade-SI	buy-PAST-2SC	Ĵ
	b.	*Güzel	mi	marmelat-lar	al-dı-n?	(Adj N) _{NP}
		nice	Q	cloth-PL	buy-PAST-2SC	Ĵ
		Intended: 'Di	d yo	ou buy quince	marmalade/nic	e marmelades?'

One test that applies is external modification. The first member of a N+N+sI compound can be modified by an adjective and even a full-blown relative clause.

(25) [lise-ye yeni başlayan ergen] tavr-1 high.school-DAT new start-REL adolescent attitude-SI '[adolescent who has just started high school] attitude'

Also, part of a compound can be conjoined with another word of the same category.

(26) [biber ve kabak] dolma-sı 'filled pepper and courgette' (Güneş 2009)

In comparison, compounds with final stress cannot be externally modified or have an internal conjunction. *Hünkar* in *hünkarbeğendi* cannot interact with the outside syntax.

(27)	a.	*haşmetli hünkarbeğendi	Intended: 'magnificient sultan likes-		
	b.	*vezir ve hünkarbeğendi	Intended: 'vizier and sultan likes-it'		

In conclusion, the so-called compound verbs and N+N-sI compounds show syntactic transparency expected of synactic phrases, whereas compounds with final stress are invisible to external morphosyntactic processes.

3.3 An argument from productivity

There is a large amount of predictability regarding the stress pattern of a compound based on its construction type. In Table 1, major compound forms are illustrated under word stress and compound stress. Observe that there are gaps in this list.

Table 1. Stress nottorn by someound trees

radie 1. Suess patient by compound type					
	Final Stress	Compound Stress			
Noun+Noun+sI	[NONEXISTENT?]	yemék odası 'dining room'			
Noun+Noun	babayiğít 'fearless'	anádil 'mother tongue'			
Adj+Noun	düztabán 'flatfooted'	saríkanat 'young bluefish'			
(Verb+Verb) _N	uyurgezér 'sleepwalker'	[NONEXISTENT?]			
(Obj+Verb) _N	ağaçkakán 'woodpecker'	açíölçer 'protractor'			
(Subj+Verb) _N	hünkarbeğendí 'a lamb dish'	[NONEXISTENT?]			
(Obj+Verb)v	[NONEXISTENT]	telefón et- 'to phone'			

Some compound compositions seen in Table 1 favor final stress over compound stress, and some have it the other way around. Specifically, compound verbs and Noun+Noun-(s)I compounds virtually exclusively have compound stress. Nominal compounds with verbs inside, on the other hand, predominantly have final stress.

Note that some of this grouping is captured in the syntactic account. Compound verbs and N+N-(s)I compounds have one stress on the left, because they are syntactically one phrase. Subj+Verb of Verb+Verb compounds are not expected to be syntactically one phrase, therefore not have the intonation of one phonological phrase as the former.

This paradigm also has a corelation with the productivity of the compound types. Verbal compounds and Noun+Noun-(s)I compounds are the most productive compound forms, responsible for creating novel forms out as we speak (*download et-* 'download', *cep telefonu* 'cell phone (lit: pocket phone)'). The proposal that these are syntactic phrases fares well with the expectation of maximal productivity. Compound types that tend to have predominant final stress are at the other end of the spectrum. These are the least productive types, and show the morphosyntactic and prosodic properties of words rather than phrases.

4. Summary and conclusion

We have argued that previous accounts of compound stress in Turkish are untenable for various reasons. The productive Noun+Noun-sI form as well as 'verbal compounds' display syntactic, morphological, and prosodic properties of regular syntactic phrases (also see Güneş 2009, Tat, this volume). The observed intonation is that of a PhP, which is the expected phrasing of syntactic phrases under standard assumptions. Thus, we propose that 'compound stress' is in fact phrase stress.

The least productive compound constructions, on the other hand, display wordlike properties in the relevant respects. We propose to derive the duality found in (1) as instances of Prosodic Word and the Phonological Phrase in the prosodic hierarchy.

(28) Phonological Phrase: Most productive compounds ~ (non-final) phrase stress Prosodic Word: Least productive compounds ~ final stress

Thus, our analysis captures the correlation between syntactic compexity, productivity, and stress pattern in compounds. It accounts for compound stress as a rule-governed process without having to refer to an additional level in the Prosodic Hierarchy, namely the Clitic Group. We have argued with external evidence from morphology and syntax that the existing PhP stress and lexical stress categories suffice to capture the two types of compound stress.

The jury is out as to how the cases between the most productive and the least productive forms receive their stress pattern. Intuitively, there are diachronic processes at play and variation is inevitable. Yet we would expect that the degree of lexicalization is correlated with word-like behavior. Additionally, the fact that Turkish has a mixed lexicon of final and non-final stress words could make it possible to encode both stress patterns lexically. It remains to be seen whether such lexical non-final stress is measurably distinct from phrase stress, for which intuition is not enough.

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¹ The initial height in the third example is due to this sequence being clipped from a larger sentence to ensure broad focus. All utterances are elicited in an all-new context.

Türkçe'deki ötümsüz sürtünmeli ünsüzlerin akustik özellikleri

Mehmet Akif Kılıç Kahramanmaraş Sütçü İmam University

1. Giriş

Sürtünmeli ünsüzler, ses yolunun ileri derecede daralmasıyla ortaya çıkan konuşma sesleridir. Akustik olarak, darlıktan geçen havanın oluşturduğu girdap gürültüsünden ve hızla hareket eden havanın önündeki engele çarpmasıyla ortaya çıkan gürültüden oluşur. Ötümlü sürtünmeliler ek olarak ötüm enerjisi de içerir. (Harrington 2010; Ladefoged ve Maddieson 1996)

1.1 Türkçedeki sürtünmeli ünsüzler

Türkçede yedi adet sürtünmeli ünsüz vardır: [f, v, s, z, \int , 3, h]. Bu ünsüzlerden üçü ([v, z, 3]) ötümlü, dördü ([f, s, \int , h]) ötümsüzdür. Çıkış noktaları; ikisi diş-dudak ([f, v]); ikisi dişeti ([s, z]); ikisi dişeti ardı ([\int , 3]) ve biri ([h]) gırtlak şeklindedir. Diş-dudak sürtünmelileri yuvarlak ünlü ortamında çift dudak sürtünmeli ünsüzlerine ([ϕ , β]) dönüşmektedir. (Demirezen 2004; Özsoy 2004)

Bu çalışmada incelenen dört sürtünmeli içinde en tartışmalısı [h] sürtünmelisidir. Bu ünsüz, ses yolunun başında oluştuğu için ses yolunun tamamı tını boşluğu görevi görür ve komşu ünlüye göre akustik özellikleri değişir. Ayrıca, iki ünlü arasında genellikle ötümlü ([fi]) olarak telaffuz edilir. Özsoy (2004), bu ünsüzün komşu ünlüye göre akustik yapısının değişmesinden yola çıkarak, Türkçedeki /h/ sesbiriminin [h], [ç] ve [x] şeklinde üç farklı alt sesbirimi olduğundan bahseder. Kopkallı Yavuz (2000), Türkçedeki /v/ ünsüzünün diş-dudak daralmalı ünsüzü olduğunu ve /v/ simgesi ile gösterilmesi gerektiğini savunur. Türkçedeki sürtünmeli sesbirimler ve alt sesbirimleri Tablo 1'de görülmektedir.

Grup	Sesbirim	Alt sesbirim	Boğumlanma noktası	Ötüm
	/ s /	[s]	Dișeti	Ötümsüz
Islıksı	/ z /	[z]	Dișeti	Ötümlü
olanlar	/∫/	[∫]	Dişeti ardı	Ötümsüz
	/ 3 /	[3]	Dişeti ardı	Ötümlü
	/ f /	[f]	Diş-dudak	Ötümsüz
	/ 1 /	[•]	Çift dudak	Ötümsüz
Ialika	/ v /	[v]	Diş-dudak	Ötümlü
almayonlar		[ß]	Çift dudak	Ötümlü
onnayannai		[w]	Dudak-yumuşak damak	Ötümlü
	/ h /	[h]	Gırtlak	Ötümsüz
	/ n /	[fi]	Gırtlak	Ötümlü

Tablo 1. Türkçedeki sürtünmeli sesbirimler ve alt sesbirimleri

1.2 Sürtünmelilerin akustik özellikleri

Sürtünmelilerin akustik özellikleri; genlik, süre, yalancı formantlar, ünlü başlangıç noktasındaki ikinci formant (F2) değeri, lokus denklemi, spektral tepe yerleşim yeri, sıklık aralığı, spektral momentler gibi parametrelerle ifade edilir.

- 1.2.1 Genlik: Sürtünme gürültüsünün şiddetini gösterir. Ağız-mikrofon uzaklığı ve kayıt ayarları gibi değişkenler genliği etkileyeceğinden çalışmalar arası karşılaştırma yapılması yanlış olur. Sadece, değişkenlerin sabit kalması şartıyla, aynı kayıt sistemi kullanılarak yapılan kayıtlar karşılaştırılabilir. Jongman ve ark. (2000), ünlü genliğinin sürtünmeli genliği üzerindeki etkisini ortadan kaldırmak için normalleştirilmiş genlik parametresini önermiştir. Bu parametre, sürtünmeli genliğinden komşu ünlünün genliği çıkarılarak hesaplanır.
- 1.2.2 *Süre:* Sürtünmelilerin başlangıç ve bitiş noktaları arasında kalan süredir. Jongman ve ark. (2000), konuşma hızının sürtünmeli süresi üzerindeki etkisini kaldırmak için normalleştirilmiş süre parametresini önermiştir. Bu parametre, sürtünmeli süresi sözcük süresine bölünerek hesaplanır.
- 1.2.3 Yalancı formantlar: Ünlülerin akustik özelliği olan formantlar, ses yolunun etkisiyle belirli sıklık bölgelerinde görülen enerji artışıdır. (Kılıç, 2003) Ünlülere ait formantlar, sürtünmeli ünsüzlerin gürültü spektrumunu etkileyerek belirli bölgelerde şiddet artışına yol açabilir. Formant benzeri bu yapılar gerçekte formant olmadığı için *yalancı formant* olarak isimlendirilir ve pF1, pF2... şeklinde gösterilir.
- 1.2.4 Ünlü başlangıç noktasındaki F2 değeri: Sürtünmeli-ünlü dizilerinde ünlü başlama noktasındaki F2 değeri de o sürtünmelinin boğumlanma noktası ile ilgili bilgi verir. Bazı ünsüzler için, kendinden sonra hangi ünlü gelirse gelsin, ünlünün ikinci formantı belirli bir odaktan başlar; ünlüye göre değişmeyen bu ortak çıkış noktasına F2 lokusu adı verilir.