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Frequency Distributions as Faithfulness Targets: Or, Why Bulgarians Feminized Turkish Nouns

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While it is commonplace for loanwords to undergo phonetic/phonological changes in the course of adoption from the source language to another language, such changes typically involve changes that accommodate to the grammar of the borrowing language. That is, forms which initially violate the grammar of the borrowing language, are adapted so that they no longer do. In this study, I document a different type of loan adaptation, in which changes occur which cannot be attributed to such factors. Rather, final vowel quality changes apparently in order to maintain the pre-existing ratio between type frequency of grammatical gender categories in the lexicon. This pattern demonstrates that speakers are both aware of such lexicostatistical patterns, and use them in assigning categorical features such as grammatical gender.

1 Introduction

People are statistical learners *par excellence*, but the extent to which such information influences and is incorporated into grammars remains an open question. Proposals range from exemplar/usage-based models in which such influences are crucial, to substance-free models of phonology in which such factors are entirely excluded.

In this study, I demonstrate that information about the statistical likelihood of grammatical gender status influences its assignment in loanwords from Turkish to Bulgarian. This occurs even in preference to otherwise deterministic phonetic/phonological cues. This phenomenon provides evidence for the relevance of statistical data in grammar, and models it via OT gender assignment a la Rice (2006) and the Gradual Learning Algorithm (GLA: Boersma & Hayes 2001).

2 Gender in Bulgarian

Bulgarian has a three-gender system of feminine, neuter and masculine nouns. Manova and Dressler (2001) argue strongly an approach to Bulgarian gender assignment based on phonological form rather than semantic factors. The final phoneme of a noun stem determines its gender. In this system, feminine nouns typically end in /-a/, neuter nouns typically end in /-e/ or /-o/ vowels, and other nouns are masculine, typically consonant-final.

(1) Bulgarian	IPA	Gloss	Gender
a. книга	kniga	book	feminine
b. куче	kutʃe	dog	neuter
c. писмо	pismo	letter	neuter
d. кон	kon	horse	masculine

These generalizations are extremely robust. Nouns of common gender which may even refer to human males (such as *rodnina* 'relative') are nonetheless treated as grammatically feminine. The primary classes of exceptions are the small number of exceptional underived feminine forms do end in consonants, and a larger number of derived ones with the suffixes /-ost/ and /-est/ (Manova & Dressler 2001).

Counts from one dictionary show that 39% of included nouns are feminine, 19% are neuter, and the remaining 42% are masculine (Xeba 2012). Thus, gender categories are asymmetrically distributed in the lexicon, with masculine and feminine roots on essentially equal basis with respect to type frequency, and both with approximately double the number of neuter roots. Masculine gender can be considered the 'default' gender if any, as it includes both the largest number of roots, and also displays the widest array of phonological variation.

3 Turkish-to-Bulgarian Loanwords and Gender

Turkish is a major source of borrowed vocabulary for Bulgarian. The syllable structure of such borrowings is typically unchanged, due to Bulgarian's more permissive consonant clusters. The phoneme inventories of Turkish and Bulgarian are also relatively well-matched, with the exception of the Turkish front rounded mid and high vowels, which are decomposed into glide+/u/ sequences in Bulgarian, as shown in (2).

(2)	Bulgarian	IPA	Turkish	Gloss
a.	кюфте	kjufte	köfte	meatballs
b.	гюбре	gjubre	gübre	fertilizer

As these examples also show, a large number of Turkish words are /e/-final. These forms could be unproblematically borrowed as neuter nouns in Bulgarian, as shown in Section 2. Typically they are – but the remainder of this study will focus on an interesting class of exceptions. For a subclass of nouns which are /e/-final in Turkish, they are unexpectedly borrowed with final /a/ in Bulgarian, with no apparent phonological motivation for this change.[1]

The relevant items come from two mini-corpora, compiled by the author, of all Bulgarian Turkish-origin nouns ending in either /e/ or /a/ either in the Turkish original form or resulting loanword, excluding words for humans, from two different sources. Mini-corpus 1 consists of 59 forms, assembled from work by Kramer (1992), Sakareva (2005) and Georgieff (2012). Mini-corpus 2 consists of 131 forms, drawn from an independent compilation of loanwords attested in the late Ottoman Bulgarian press, compiled by Gadjeva (2009).

In Mini-corpus 1, there are 36 forms which have final /a/ in the original Turkish. Of those 36 forms, the final /a/ is deleted in one item, resulting in a consonant-final word (*çarka* 'paddlewheel' → *çark*). In one

[1] Although Turkish has a rich inflectional case system, the borrowed form is always based on the un-suffixed nominative (also non-specific accusative) form.

additional form, Turkish final /a/ is changed to /e/ (*parça* 'piece' → *parçe*). No other changes to Turkish /a/-final source forms are observed.

The picture is quite different for forms with final /e/ in the original Turkish. In Mini-corpus 1 there are 23 such forms. Turkish final /e/ is changed to /i/ in one item (*çerge* → *çergi* 'tent'). However, Turkish final /e/ is changed to /a/ in six items, listed in (3).

(3)	Bulgarian	IPA	Turkish	Gloss
a.	чешма	tʃeʃm**a**	çeşm**e**	fountain
b.	тенджера	tendʒer**a**	tencer**e**	cooking pan
c.	махала	maxal**a**	mahall**e**	neighborhood
d.	механа	mexan**a**	meyhan**e**	tavern
e.	вересия	veresij**a**	veresiy**e**	(financial) credit
g.	кесия	kesij**a**	kes**e**	bag[2]

While the absolute numbers of items involved are small, the changes are going primarily in one direction – from final /e/, to final /a/, rather than vice versa.

final /a/	**36**	**final /e/**	**23**
remain /a/	34	remain /e/	16
/a/ → /e/	1	/e/ → /a/	6
/a/ deleted	1	/e/ → /i/	1

Fig. 1: Treatment of Turkish final /a/ and /e/ forms

The overall effect of these changes is an increase in the number of /a/-final (presumably feminine) forms at the expense of the number of /e/-final (presumably neuter) forms. Figure 2 contains the relative percentages both before and after the vowel changes.

[2] The final item also involves the introduction of the suffix /-ija/, which is used elsewhere for vowel-final loanwords from Turkish, especially those referring to human males, e.g. *neighbor*, and items with the occupational Turkish suffix /-ʤi/.

	Turkish	%	Bulgarian	%
final /a/	36	.61	40	.68
final /e/	23	.39	17	.29
Other	--	--	2	.03
total #	59		59	

Fig. 2: Final vowel percentages in Turkish source and Bulgarian output

Recall that the ratio of neuter forms to feminine forms in the Bulgarian lexicon overall is 19%/39%, equivalent to **.48**. With gender assigned to the loanword forms based on final vowel *after* the observed vowel changes, the ratio of neuter to feminine forms closely approximates this number: 17/40=**.43** neuter-to-feminine. However, if the vowels had persisted unchanged and gender was assigned in accordance with their original final vowels, as expected, the ratio would instead be 23/36=**.64** neuter-to-feminine.

Thus, the changes to the loanword final vowels brings the mini-corpus closely into line with the gender proportions in the lexicon as a whole, reported in Section 2. A binomial distribution test bears out the finding that the gender ratio in the set of resulting loanwords *after* vowel changes is from the same distribution as the gender ratio in the lexicon as a whole (p=.10, so, no significant difference between distributions). However, the same test on the gender ratio in the loanwords as they would have appeared *without* the observed modifications approximates a statistically significant difference from the ratio in the lexicon as a whole (p=.06).

The forms in Mini-corpus 2 replicate these findings. Mini-corpus 2 contains 70 forms with final /a/ in Turkish. Of these, Turkish final /a/ is changed to /e/ in only a single item (*nişasta* 'starch' → *nişaste*).

There are 61 forms with final /e/ on Turkish. Of these, Turkish final /e/ is deleted in one item, resulting in a consonant-final word (*kestane* 'chestnut' → *kestan*). A final consonant is added in one item (*sefte* 'day's first breeze' → *siftax*). But final /a/ appears in place of original final /e/ in a total of 17 items (one has both variant forms), listed in (4).

(4)	Bulgarian	IPA	Turkish	Gloss
a.	хазна	xazna	hazine	treasury
b.	везне/а	vezne/a	vezne	balance
c.	терсана	tersana	tersane	naval arsenal
d.	пейка	pejka	peyke	bench
e.	лула	lula	lüle	pipe
f.	махмудия	mahmudija	mahmudiye	type of coin
g.	бахча	baxʧa	bahçe	garden
h.	анджаклама	anʤaklama	enikleme	gadget
i.	фераджа	feraʤa	ferace	voile
j.	пенджера	penʤera	pencere	window
k.	тенджера	tenʤera	tencere	cooking pan
l.	механа	mexana	meyhane	tavern
m.	махала	maxala	mahalle	neighborhood
n.	чешма	tʃeʃma	çeşme	fountain
o.	тенекия	tenekija	teneke	tin
p.	вересия	veresija	veresiye	(financial) credit
q.	кесия	kesija	kese	bag

Precisely the same asymmetry of changes to the final vowel is observed as in Mini-corpus 1.

final /a/	**70**	**final /e/**	**61**
remain /a/	69	remain /e/	42
/a/ → /e/	1	/e/ → /a/	17
--	--	/e/ → C	1
--	--	/e/ deleted	1

Fig. 3: Treatment of Turkish final /a/ and /e/ vowels

Only a single isolated example of loss of final /a/~feminine gender is observed, whereas the single most numerous change by far is of final /e/ (neuter) to final /a/ (feminine). Again, the overall percentage of feminine /a/-final forms increases.

	Turkish	%	Bulgarian	%
final /a/	70	.53	86	.66
final /e/	61	.47	43	.33
Other	--	--	2	.02
total #	131		131	

Fig. 4: Final vowel percentages in Turkish source and Bulgarian output

The resulting Bulgarian loans *with* vowel changes yield a neuter-to-feminine ratio of 43/86=.**50**, extremely close to the overall lexical ratio of **.48**. The original forms, on the other hand, would yield a ratio of 61/70=.**87.**

Once again, changes result in a close approximation to the pre-existing lexical gender ratio. In addition, the relationship among gender ratios is again statistically robust according to binomial distributional tests. The gender ratio of the modified loanwords as appearing in Bulgarian is statistically indistinguishable from that of the lexicon as a whole (p=.07, so, no significant difference between distributions). However, the gender ratio of the Turkish forms if unmodified with respect to final phoneme is significantly different (p=.0003).

This disappearance of a significant difference, replaced by a not-significantly-different distribution, is exactly what we expect given our hypothesized motivation for the final vowel changes.

4 Alternative Explanations for Gender/Vowel Changes

I have argued that the match with pre-existing lexical gender ratios provides the motivation for final vowel changes. In this section, I consider, but ultimately dismiss, other potential explanations for these changes.[3]

Default gender cannot account for the final vowel changes, as the default gender of Bulgarian would presumably be masculine, which is both the most common gender, and the one with greatest variability in phonological form.

Semantic commonality cannot account for the changes, as there is none apparent from the list of items, repeated in (5). In any case, Manova and Dressler (2001) argue strongly against the relevance of semantic classes in Bulgarian gender assignment.

In addition, analogy with a translational equivalent from the pre-existing native lexicon also fails to account for the assignment of feminine gender/final /a/ in the exceptional cases. The examples in (5) include such translational equivalents, where identifiable.

[3] Most of the phonetically-based alternatives were suggested by anonymous reviewers for FASL 2015, whom I thank for their suggestions. The semantics-based alternatives were suggested by audience members, whom I also thank for their insights.

(5)	Bulgarian (IPA)	Gloss	Translational Equivalent
a.	xazna	treasury	sɨkroviʃtnitsa, kovʧeʒniʧestvo
b.	vezne/a	balance	maʃtab
c.	tersana	naval arsenal	arsenal, oriʒie
d.	pejka	bench	skamejka, tezgjax
e.	lula	pipe	---
f.	mahmudija	type of coin	---
g.	baxʧa	garden	gradina
h.	anʤaklama	gadget	prisposoblenie
i.	feraʤa	voile	muselin
j.	penʤera	window	prozorets
k.	tenʤera	cooking pan	tigan, ʧinija, tava
l.	mexana	tavern	kriʧma, xan
m.	maxala	neighborhood	kvartal
n.	tʃeʃma	fountain	fontan, izvor
o.	tenekija	tin	kalaj, lamarina
p.	veresija	credit	kredit
q.	kesija	bag	ʧanta, torba, ʧuval

The examples in (5) demonstrate that there is no clear relationship between feminine gender in a native Bulgarian translational equivalent, and the loan nouns which unexpectedly received feminine gender. Only one case (5g 'garden') has a single feminine noun counterpart from the native vocabulary. Others have masculine gender counterparts, or multiple possible translational equivalents of different genders. In many cases, these equivalents are themselves loans, probably later loans from French, and therefore of dubious status as possible sources for the grammatical gender of the Turkish forms.

A semantic supercategory is another potential source for analogical extension of grammatical gender (e.g., if 'utensil' is feminine, perhaps all types of utensils will also be assigned feminine gender). An appropriate semantic supercategory could be identified for only a handful of these items. For the coin name /mahmudija/, either Bulgarian *moneta* or *para* (the latter itself a Turkish borrowing) are possible, both of which would yield feminine gender for the subcategory term, as expected. However,

for the ‘voile’ term, the large number of possible terms for the supercategory ‘cloth,’ which include forms from all three genders, make this factor indeterminate (these include *kɨrpa, plat, tɨkan, sukno*, and *paʧavra*). While the ‘tin’ term has the superordinate *metal*, this is masculine and should not lead to feminization of the subcategory term, nor should the possible supercategory ‘city’ (*grad*) for neighborhood. We must conclude that gender of the semantic supercategory is not playing a role in loanword gender assignment here.

Phonological factors similarly fail to explain the final vowel changes. Turkish is typically described as having final stress for nominal roots (barring certain exceptions such as for placenames and Greek/Italian loanwords), or alternatively, as stressless (Inkelas & Orgun 2003). Therefore, stress properties of the source language cannot be motivating differences in final vowel quality. In Bulgarian, on the other hand, stress is free and unpredictable, and there are even minimal pairs involving only stress placement, for example /‘ko.la/ ‘cola drink’ versus /ko.’la/ ‘automobile.’ There is no restriction on final stress on the vowel /e/ or on neuter gender, as shown by such a frequent form as /mom.’tʃe/ ‘young boy.’ Therefore, none of these stress-related factors can be the motivation for changing the final vowel/gender in the minority of these loans.

The number of syllables in the root also cannot account for the changes, as there is a wide and relatively even spread of syllable counts in the original Turkish forms seen above. The list of examples includes 6 bisyllabic, 8 trisyllabic, and 3 quadrisyllabic forms.

The quality of the preceding consonant cannot account for the changes either, as wide variability is seen there as well, in both place and manner of articulation, as shown in Figure 2 below.

labial	alveolar				palatal			velar
m	n	r	l	s	j	ʧ	ʤ	k
2	4	2	2	1	2	1	1	2

Fig. 5: Quality of preceding consonant in vowel-changing items

Finally, additional support for the gender-based account of loanword final vowel changes in Bulgarian comes from closely-related and geographically-contiguous Macedonian. The gender system of Macedonian largely parallels that of Bulgarian. For non-humans, consonant-final nouns are masculine, /a/-final nouns are feminine, and nouns ending in other vowels are neuter.

Ten of the 17 final-vowel-changing loan items are attested in closely-related and geographically-contiguous Macedonian as well as in Bulgarian (Koneski & Toshev 1950, Kramer 1992, Friedman 2003, Netkovska 2015). These are listed in (6).

(6)	Bulgarian	IPA	Turkish	Gloss	Macedonian
a.	лула	lula	lüle	pipe	lule
b.	фераджа	feradʒa	ferace	voile	feredʒe
c.	пенджера	pendʒera	pencere	window	pendʒere
d.	тенджера	tendʒera	tencere	cook pan	tendʒere/a
e.	механа	mexana	meyhane	tavern	meana
f.	махала	maxala	mahalle	neighborhood	maalo
g.	чешма	tʃeʃma	çeşme	fountain	tʃeʃma
h.	тенекия	tenekija	teneke	tin	teneke/tenekija
i.	вересия	veresija	veresiye	credit	veresija
j.	кесия	kesija	kese	bag	kese

Four of the items maintain the Turkish source final vowel /e/, unlike the Bulgarian loans. One changes to a different vowel (/o/, also associated with neuter gender, just like the original /e/ vowel). Two more exist in variants with both /e/ (original, neuter-associated) and /a/ (changed, feminine-associated. Finally, 3 change final /e/ to /a/, just as happened to their counterparts in Bulgarian.

final /e/→/a/	**17**
unattested	7
remains /e/	4
/e/ → /a/	3
/e/ ~ /a/	2
/e/ → /o/	1

Fig. 6: Macedonian treatment of Bulgarian /e/→/a/ changers

From this variety in outcomes, a number of conclusions may be drawn. First, Macedonian and Bulgarian both borrowed, but with different lexical items ultimately surviving. Second, of the words which were borrowed in both Macedonian and Bulgarian, the same changes were not usually observed for counterpart loans. Thus, it is unlikely that some inherent property of the source forms is driving the final vowel changes. If this were the case, then this property would in all likelihood be operative in *both* Bulgarian and Macedonian, given their high degree of similarity.

5 Cross-linguistic Evidence outside Slavic

Additional support for the gender-based explanation for final vowel changes comes from very similar patterns observed in previous research on Arabic loanwords to Spanish and Portuguese, as well as on L2 Arabic data.

Epenthetic final vowels in both Spanish and Portuguese loanwords from Arabic surface as /a/ rather than default /e/ in precisely the proportions that generate a match with pre-existing lexical gender ratios. In Spanish, the percentage of feminine nouns in the lexicon (versus masculine nouns) in diachronic corpora ranging from the 13th century to the present is relatively stable in the range of 40-49%. This is also the case for the loanwords from Arabic, for which the use of final /a/ vowels in place of typical epenthetic /e/ results in 40% feminine forms. Unexceptional use of epenthetic /e/, however, would result in the percentage of feminine nouns dipping to 36% in the loan corpus, outside

the range attested for Spanish in corpora from the last eight centuries (Walter 2006).

The Portuguese data replicates this pattern. As in the Bulgarian/Macedonian datasets, the same set of borrowings is not attested in both languages, and those which are doubly attested do not necessarily show the same gender/vowel changes. However, the separate corpus of Arabic loans in Portuguese also shows a percentage of 40-44% feminine (depending on inclusion of variant forms), versus only 34% feminine without the exceptional vowel changes (Walter 2011).

Loans going in the other direction – from Romance (primarily French, also Spanish) to (Moroccan) Arabic – exemplify a parallel pattern once again. A conspiracy of phonological processes, including final consonant deletion, epenthesis of final /a/, and simplification of nasalized vowels, as well as changing final vowel quality to /a/, results in an exact match of loanword grammatical gender proportions with pre-existing Arabic lexica (both 31%) versus the 19% feminine that the loanword corpus would otherwise contain without such changes (Walter 2011).

Finally, adult acquisition of Arabic language plurals presents a comparable pattern, in which noun roots are assigned to plural classes by advanced learners in the correct proportions, though often incorrectly for individual items (Walter 2004, 2011).

Taken together, these patterns in an unrelated set of languages and contexts from Bulgarian and Macedonian provide strong evidence that exceptional and apparently unmotivated changes to final vowel phonology may be motivated by probability-matching according to gender. This phenomenon is consistent with other work on lexicostatistical effects on categorical grammatical processes. For example, the assignment of the non-transparent voiced feature to consonants heard only in devoiced final context by both Dutch and Turkish speakers is done according to the lexicostatistical likelihood of such consonants in final position according to place of articulation (Ernestus & Baayen 2003, Becker *et al*. 2011), rather than simply assigning the most transparent underlying representation (voicelessness). While such distributional information may be ignored when truly

arbitrary, its relevance here suggests that gender distribution is one of the statistical patterns which speakers consider to be linguistically important.

6 Formalization

Rice (2006) develops a theory of optimal gender assignment employing language-specific gender assignment constraints, ranked together as a bloc. These constraints, adapted for Bulgarian, are listed in (7) below.

(7)

a. *-E→M, F: A noun ending in /e/ (or /o/) is assigned neither masculine nor feminine gender
b. *-A→M, N: A noun ending in /a/ is assigned neither masculine nor neuter gender
c. *-C→F, N: A noun ending in a consonant (or vowel other than /a/, /e/ or /o/) is assigned neither feminine nor neuter gender

Markedness constraints against each gender (*Neut, *Fem, *Masc) are ranked language-specifically. Following this model, a comparable tableau for Bulgarian unproblematically generates neuter final /e/ forms and feminine final /a/ forms as expected, and as demonstrated by the tableaux in Figures 7 and 8 below, respectively.

/atabe/	*-E→M, F	*-A→M, N	*-C→F, N	FAITH	*N	*F	*M
a. → atabe N					*		
b. atabe F	*!					*	
c. ataba F				*!		*	
d. ataba N		*!		*	*		

Fig. 7: Bulgarian typical neuter gender assignment

/ataba/	*-E→M, F	*-A→M, N	*-C→F, N	FAITH	*N	*F	*M
a. atabe N				*!	*		
b. atabe F	*!			*		*	
c. → ataba F						*	
d. ataba N		*!			*		

Fig. 8: Bulgarian typical feminine gender assignment

The inclusion of gradient constraint ranking for the gender markedness constraints, following Boersma and Hayes (2001), entails the assumption that those constraints (*N, *F, *M) are initially more highly ranked, and are adjusted downwards over the course of the L1 acquisition process in response to frequency in lexical items. Stochastic ranking means that such rankings would fluctuate probabilistically based on lexical type frequency of grammatical gender classes. Therefore, high-ranked *N, militating against neuter gender assignment, could persist in some cases. This ranking would yield the Bulgarian final vowel changes in the exceptional cases, as shown by the tableau in Figure 9 below.

/atabe/	*N	*-E→M, F	*-A→M, N	*-C→F, N	FAITH	*F	*M
a. atabe N	*!						
b. atabe F		*!				*	
c. → ataba F					*	*	
d. ataba N	*!		*		*		

Fig. 9: Bulgarian exceptional feminine gender assignment

The long-term persistence of such rankings could lead to the disappearance of a grammatical gender category, as with neuter in neighboring Albanian and, perhaps eventually, Bosnian/Croatian/Serbian.

I assume the winning outputs from variable rankings as in Figure 8 are consistently selected thereafter via something like the USELISTED

constraint(s) proposed by Zuraw (2000), in order for them to continue in usage for the loan-borrowing individual and thereafter propagate through the speech community.

A final note concerns the change of gender from neuter to feminine rather than masculine. The change in vowel quality, rather than the vowel deletion which would be required for assignment of masculine gender, can be straightforwardly accounted for by the ranking of a faithfulness constraint enforcing phoneme preservation of input segments (MAX) over a constraint enforcing faithfulness to vowel quality (IDENT). This is in keeping with the tendency for loan adaptation to favor perceptibly minimal changes to source forms (for discussions and examples, see several papers in Calabrese & Wetzels 2009).

7 **Conclusions**

Loanwords from Turkish to Bulgarian display a pattern of apparently phonologically unnecessary final vowel changes. These changes result in a larger number of nouns with feminine gender than would otherwise be expected. The 'new' lexicon, including such borrowings, displays the same grammatical gender ratios as the 'old,' pre-borrowing lexicon. I argue that this parallelism is the driving force of such changes, rather than an accidental outcome.

This phenomenon provides additional support for the relevance of probability-matching according to lexicostatistical data in assignment of categorical morphophonological properties. Adults deploy their knowledge of distributional generalizations over the lexicon (Frisch & Zawaydeh 2001, Hudson-Kam & Newport 2005), and are motivated by such generalizations at least as much as by faithfulness to individual phonemes or derivational transparency.

References

Becker, Michael, Nihan Ketrez, and Andrew Nevins. 2011. The Surfeit of the Stimulus: Analytic Biases Filter Lexical Statistics in Turkish Laryngeal Alternations. *Language* 87:1.84-125.

Boersma, Paul and Bruce Hayes. 2001. Empirical Tests of the Gradual Learning Algorithm. *Linguistic Inquiry* 32.45-86.

Calabrese, Andrea and W. Leo Wetzels. 2009. *Loan Phonology*. Current Issues in Linguistic Theory 307. Amsterdam: John Benjamins.

Ernestus, Mirjam, and Harald Baayen. 2003. Predicting the Unpredictable: Interpreting Neutralized Segments in Dutch. *Language* 79.5-38.

Friedman, Victor. 2003. *Turkish in Macedonia and Beyond: Studies in Contact, Typology and Other Phenomena in the Balkans and the Caucasus*. Turcologica 52. Wiesbaden: Harrassowitz Verlag.

Frisch, Stefan and Adnan Bushra Zawaydeh. 2001. The Psychological Reality of OCP-Place in Arabic. *Language* 77.91-106.

Gadjeva, Snejana. 2009. *Les Turcismes dans la Langue Bulgaire Contemporaine/Turcisms in the Contemporary Bulgarian Language*. PhD thesis, Paris INALCO.

Georgieff, Anthony (ed.). 2012. *The Turks of Bulgaria: History, Traditions, Culture*. Vagabond Media.

Hudson Kam, Carla L. and Elissa L. Newport. 2005. Regularizing Unpredictable Variation: The Roles of Adult and Child Learners in Language Formation and Change. *Language Learning and Development.* 1.151-195.

Inkelas, Sharon; & Orgun, Cemil Orhan. 2003. Turkish stress: A review. *Phonology* 20:1.139-161.

Koneski, Blazhe & Krum Toshev. 1950. *Makedonski pravopis: So pravopisen rechnik*. Skopje: Drzhavno Knigoizdatelstvo na NR Makedonija.

Kramer, Christina. 1992. The Use of Turkisms in Balkan Languages as Reflected in Konstantinov's Novel *Baj Ganjo*. *Zeitschrift für Balkanologie* 28. 44-60.

Manova, Stela and Wolfgang Dressler. 2001. Gender and Declensional Class in Bulgarian. *Wiener Linguistische Gazette.* 45-81.

Netkovska, Gordana. The Ottoman Influence in Macedonia.
http://www.macedonia.co.uk/ Accessed 20/03/2015.

Rice, Curt. 2006. Optimizing Gender. *Lingua* 116.1394-1417.

Sakareva, Ivanka. 2005. Changes in the Bulgarian Language during the CenturIes: Impact of Different Cultures on the Language in the Past. *TRANS. Internet-Zeitschrift für Kulturwissenschaften* 16.

Walter, Mary Ann. 2004. Arabic Pluralization in Second-language Acquisition. Poster, Generative Approaches to Language Acquisition (GALANA). University of Hawaii at Manoa.

-----. 2006. Grammatical Gender via Lexical Statistics: The Case of Arabic-to-Spanish Loanwords. In *Studies in Loanword Phonology, MIT Working Papers in Linguistics 52*, F.F. Hsieh & M. Kenstowicz (Eds.) Cambridge, MA: MITWPL.

-----. 2011. Probability Matching in Arabic and Romance Morphology." In *Perspectives on Arabic Linguistics*, Ellen Broselow and Hamid Ouali (Eds.). Amsterdam: John Benjamins. 205-243.

Xeba Angliiski a-b, b-a dzhoben rechnik. 2012. (Хеба Английски джобен речник).

Zuraw, Kie. 2000. *Patterned Exceptions in Phonology*. PhD dissertation, UCLA.

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