

Ratings of Familiarity, Imageability, and Age of Acquisition in Correlation with Compound Headedness in Persian

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Introduction

- Several variables can affect recognition, recall, and naming of compound words.
 - These include rated age of acquisition (AOA), familiarity, and imageability.
- Available norms exist for English (e.g., Stadthagen-gonzalez & Davis, 2006; Juhasz, Lai, & Woodcock, 2015).
- There is a need for similar subjective ratings for languages other than English.

Introduction

- **Familiarity** ratings are a better predictor of word processing performance than word frequency, especially for words that are not highly frequent (Gernsbacher, 1984).
 - These ratings can be considered a way to evaluate the frequency of individual exposure to the words.
- **Imageability** is a semantic variable assessing how easy it is to produce a mental image of a word.
 - Can be used to demonstrate the effects of meaning on word processing and memory.
- **AOA** is related to orthographic, phonological, and semantic representations of words since it can affect all levels of the mental lexicon (Juhász et al., 2015).
 - Words acquired earlier in life = stronger semantic representations = more connections to related concepts in the mental lexicon = faster processing.

Introduction

- Databases of familiarity, imageability, and AOA in languages with syntactic structures different from English:
 - Would allow the study of how syntactic structures can play a role in complex word processing.
 - One lexical structure that varies across different languages is noun-noun compound headedness (order of modifier and head).
 - Persian, an Indo-European language with SOV word order, allows variable head positions (Kalbasi, 1997; Shariat, 2005; Foroodi-Nejad & Paradis, 2009).

Introduction

- Persian allows us to investigate whether there are differences in recognition, recall, or naming speed and accuracy for head-initial (left-headed, LH) versus head-final (right-headed, RH) compounds.
- Such processing effects allow us to further develop linguistic theory, including its fundamental combinatorial features.
- The availability of databases on familiarity, imageability and AOA on Persian compound words will allow controlling for these variables in investigations of the processing of compound words in Persian.

The Database

- Original pool with 200 NN compound words:
- 130 RH and 70 LH compounds
- Compounds' translations into English
- Constituents' literal meanings in English
- Length in terms of number of letters and phonemes in Persian
- Headedness (LH vs. RH) information
- Google frequency counts for whole words
- Google frequency counts for constituents
 - 118 words were selected from this corpus to be rated by (online) participants.

Methods

- **Participants:** 102 native Persian speakers completed an online Survey (McMaster Lime Survey) over the course of a year.
- **Compound words:** 149 NN items (including 31 non-words) were rated by 34 participants for each variable.
- **Procedure:** Surveys : 30 minutes each, presented on 6 pages with max. 25 words on each page.
 - *Familiarity:* 7-point Likert scale, 1: words that the participants had never seen & 7: words that had been seen very often (nearly every day).
 - *Imageability:* 7-point Likert scale, based on how easily words evoke mental images, 1: low imageable & 7: high imageable.
 - *AOA:* participants typed the age in years at which they thought they had acquired the word for the first time.

Results

Ratings separated by headedness calculated over all rated words

	Headedness	N	Mean	SD	SEM
Familiarity	left	59	5.54	0.97	0.13
	right	59	5.57	1.08	0.14
Imageability	left	59	6.47	0.92	0.12
	right	59	6.32	0.80	0.10
AOA	left	59	9.94	3.50	0.46
	right	59	11.3	3.61	0.47

N =number. SD =standard deviation. SEM =standard error of mean

Results

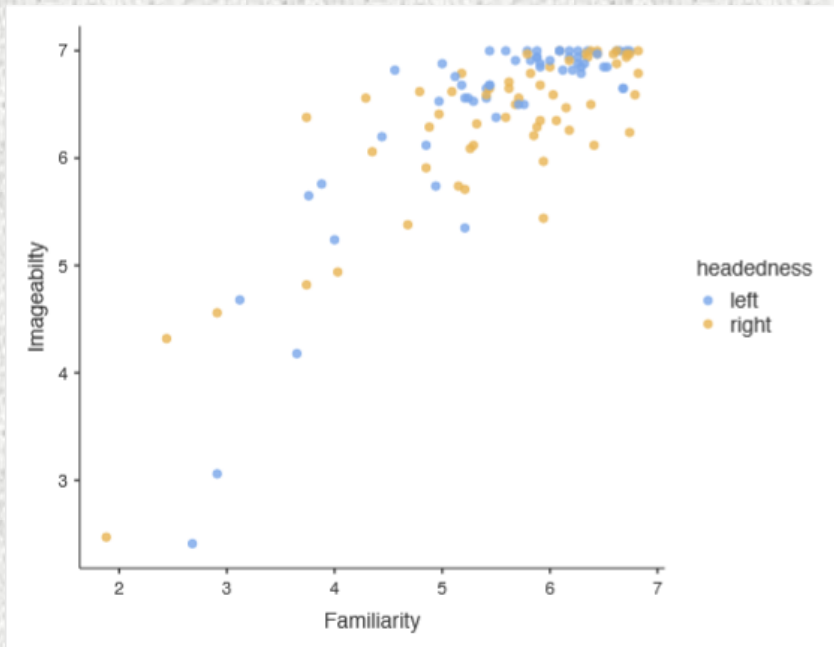
- Correlations of frequencies: whole word, right constituent, or left constituent, were not significant for any of the three rated variables.
- Imageability and familiarity were not significantly different for LH and RH compounds.
- Left-headed (LH) compounds were rated to have been learnt earlier in life.
 - LH compounds in Persian are historically shaped out of two nouns combined with the Ezafe construction (Kahnemuyipour, 2014).
 - LH compounds are semantically more transparent for native Persian speakers (have a closer relationship with noun phrases in Persian where each word contributes to the meaning).

Differences between LH and RH compound words for the three rated variables

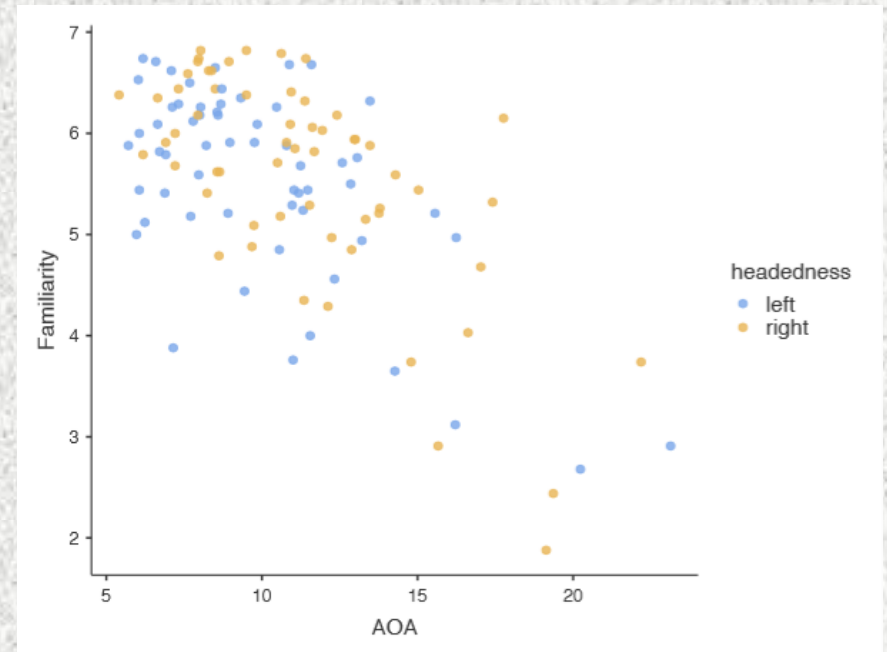
		Statistic	df	p	Direction
Familiarity	Student's t	-0.16	116	0.871	n.s.
AOA	Student's t	-2.122	116	0.036	LH < RH
Imageability	Student's t	0.937	116	0.351	n.s.

AOA=age of acquisition in years. n.s.=not significant

Results



Scatterplot of imageability ratings as a function of familiarity ratings



Scatter plot of familiarity ratings as a function of AOA ratings

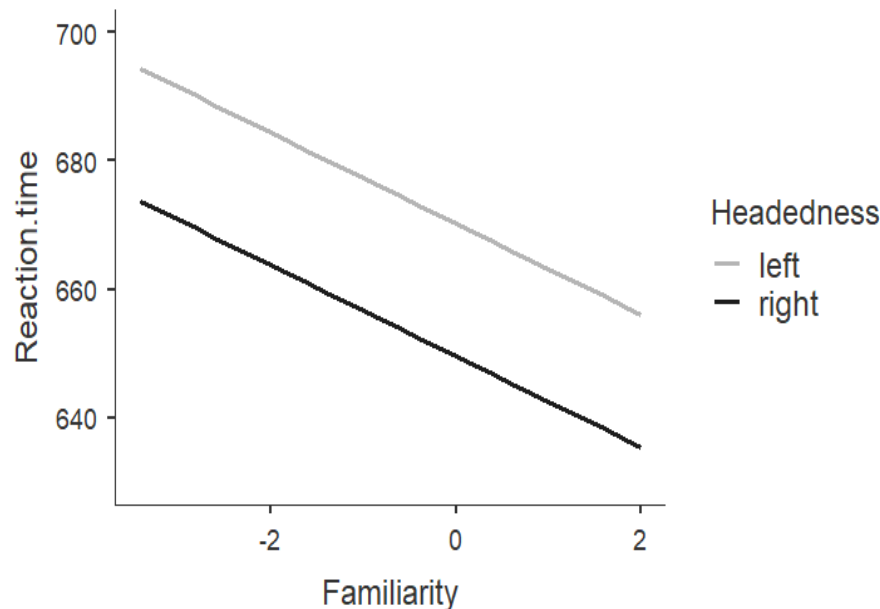
- Results indicate high correlations between
 - Familiarity and imageability ratings, $r = .816$
 - Familiarity and AOA ratings, $r = .637$
 - Imageability and AOA ratings, $r = .727$

Results

Linear regression predicting naming reaction times from rated familiarity, with headedness as a categorical effect

Predictor	Estimate	SEM	t	p
Intercept	694.60	4.405	157.68	< .001
Familiarity	-7.09	0.855	-8.29	< .001
Headedness:				
right – left	-20.63	2.763	-7.47	< .001

AOA = age of acquisition SEM = Standard error of mean, p = p-value



- Familiarity significantly predicted reaction times in compound word naming.
- Compounds that were rated more familiar had shorter reaction times.

Correlation of naming reaction times and familiarity by Headedness

Conclusions

- This work reports familiarity, imageability, and age of acquisition ratings for 118 Persian noun-noun compound words.
- The database also provides the Google frequency counts for the selected compounds and for their constituents.
- The lexical variable ratings provided here allow experimental researchers to choose compound word stimuli for their experiments, controlling for the rated variables.
- The ratings can also be used to explore the effects of these lexical features in different compound word processing tasks such as naming and lexical decision.

Conclusions

- Familiarity, imageability and AOA are highly intercorrelated for the 149 compound words.
- Familiarity can significantly predict reaction times in compound word naming experiments.
- Interestingly, the AOA results showed that the LH compounds were thought to have been learnt earlier in life.
 - The underlying NP Ezafe structure in the LH compound words (Kahnemuyipour, 2014), make them syntactically different from RH compounds.

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Acknowledgements

- We are grateful to **Dr. Arsalan Kahnemuyipour** for his great support and help with creating the database and during this project.
- Thanks to the members of the LMBLAB and ARiEAL for all their support.

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