Heaviness and Constituent ordering : a Corpus-based study in Persian

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Effect of heaviness in the relative order between the verbal complements

- **Short-before-long** (end-weight) principle :
  - Processing & planning heavy constituents require more memory or resources
  - Costly constituents tends to be postponed.

(Wasow, 2002; Arnold *et al*, 2000; Stallingd *et a*l, 1998; a.o.)

- Is this principle **universal**?
  - Hawkins *EIC* principle predicts an asymmetry in VO and OV languages
  - Long-before-short principle in OV languages (confirmed for Japanese by corpus and experimental studies)

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- Is this principle **universal**?
  - Hawkins *Early Immediate Constituent* (EIC) principle

    Minimize domain → Maximize efficiency

    Predicting an **asymmetry in VO and OV** languages

    (Hawkins, 1994, 2008 a.o.)
  - **Long-before-short** principle in OV languages

    Confirmed for Japanese by corpus and experimental data

    (Yamashita & Chang, 2001)

Object of study:

The preferential word order between the DO and the IO in preverbal domain in Persian

Methodology:

Corpus-based study using logistic regression modeling

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Essential properties of Persian

- A mixed head-direction language
- Head-final in verbal domain **but head-initial elsewhere**:
  - Nominal domain is head-initial : Det N Mod
  - Prepositions and no postpositions : Prep NP
  - Clausal phrase follow the complementizer : Comp P
- SOV is the canonical order but all variations are possible depending on register, information structure, prosody, etc.
  - E.g. goal arguments (locatives and datives) are post-verbal in informal language
  - Clausal arguments are strictly post-verbal

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Complex predicates (CPs)

- Only around 200 simplex verbs
- Verbal concepts are expression by combination of a non-verbal element and a verb :
  - *bāzi kardan* : play do -> to play
  - *harf zadan* : speech hit -> to speak
  - *be kār bordan* : to work take -> to use
  - *az dast dādan* : of hand give -> to loose

→ From syntactic point of view the combination behaves like the combination of a verb with its complement

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Does Hawkins's *EIC* principle work for Persian?

Data for Japanese strict head-final language

[Mary-ga]	[kinoo	John-ga	kekkonsi-ta	to]	it-ta
Mary-NOM	yesterday	John-NOM	married	that	said

'Mary said that John got married yesterday.'

Mary-ga	**kinoo**	**John-ga**	**kekkonsi-ta**	**to**	it-ta
1	2	3	4	5	6
kinoo	**John-ga**	**kekkonsi-ta**	**to**	**Mary-ga**	it-ta
			1	2	3

✓

DO < IO (by 3 words)

	[NP]	**[NP**	**Prep]**	V
	1	2	3-5	6
✓	**[NP**	**Prep]**	**[NP]**	V
		1	2	3

The IO OD order should be preferred

Does Hawkins's *EIC* principle work for Persian?

DO IO or IO DO ?

DO < IO (by 3 words)

[NP]	**[Prep**	**NP]**	V
1	2	3-5	6
[Prep	**NP]**	**[NP]**	V
1	2-4	5	6

No preferential order based on relative length

DO > IO (by 3 words)

[NP]	**[Prep**	**NP]**	V
1-5	6	7	8
[Prep	**NP]**	**[NP]**	V
1	2	3-7	8

No preferential order based on relative length

Most prominent hypothesis regarding complement ordering in Persian is

the Differential Object Marking criterion

The DOM criterion

- DOM in Persian
  - Definite and/or specific DOs are marked with the enclitic *=rā*

Maryam	**in**	**ketāb=rā**	be Nima	dād
Maryam	this	book=DOM	to Nima	gave

'Maryam gave this book to Nima.'

  - Indefinite non-specific DOs are unmarked

Maryam	be Nima	**ketāb**	dād
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'Maryam gave a book/books to Nima.'

The DOM criterion

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  - Definite and/or specific DOs are marked with the enclitic *=rā*
  - Indefinite non-specific DOs are unmarked
- The hypothesis:
  - Marked DOs can be separated from the verb : **DO IO** V
  - Unmarked DOs should be adjacent to the verb : **IO DO** V

(Karimi, 2005 a.o.)

- Our Corpus study (at the preliminary stage) showed that part of this hypothesis fails usage data validation:
  - Marked DOs have a very strong (95%) preference for the NP PP order
  - But, unmarked DOs do not behave homogenously

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(Faghiri & Samvelian, 2013)

Based on preliminary observations on corpus data 4 DO types have been defined :

(1) Maryam be Nima **ketāb** dād — **Bare**
Maryam to Nima book gave
'Maryam gave a book/books to Nima.'

(2) Maryam be Nima **ketāb=e** **tārix** dād — **Bare modified**
Maryam to Nima book=EZ* history gave
'Maryam gave a history book/history books to Nima.'

(3) Maryam **čand** **ketāb=e** **qadimi** be Nima dād — **Indefinite**
Maryam some book=EZ old to Nima gave
'Maryam gave some old books to Nima.'

(4) Maryam **in** **ketāb=rā** be Nima dād — **Marked**
Maryam this book=DOM to Nima gave
'Maryam gave this book to Nima.'

Our corpus study

Corpus

- Bijankhan corpus (Bijankhan, 2004), freely available
- 2,6m tokens, extracted from newspaper
- Manually annotated for POS

Dataset

- Lemmatized verbs, extracted ditransitives (42k token, 122 lemmas)
- First dataset (541 tokens, 82 lemmas)
  - Random sample of 2000 tokens
  - Identified sentences corresponding to the NP PP V or PP NP V pattern
- Final dataset (908 tokens, 82 lemmas)
  - All instances of two low frequency typically ditransitive verbs 'to send' and 'to pour'
  - Random samples of two high frequency typically ditransitive verbs 'to give' and 'to take

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   Random sample of 2000 tokens
   - Identified sentences corresponding to the NP PP V or PP NP V pattern
3. Final dataset
   - All instances of two low frequency typically ditransitive verbs 'to send' and 'to pour' (219, 254 tokens respectively)
   - Random samples of two very high frequency typically ditransitives 'to give' and 'to take (10494, 6849 tokens respectively)

Methodology

- Mixed-effect regression model*
  - Dependent variable : Order (NP PP V = 1)
  - Random effect: verbal lemma
  - Predicting variables :
    - DO type
    - Relative length (nb of words) : log(NP) – log(PP)
    - Collocational relation with the verb : Frequency of the sequences N-V or Prep-N-V in the whole corpus

*Executed with R

Data description:

- Average preference of 59% for NP PP V order
- All variables came out to have a significant effect
- DO type and order are strongly correlated

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	Bare		Bare-Modified		Indefinite		Marked	
NP PP V	43	(16%)	23	(34%)	112	**(77%)**	404	**(95%)**
PP NP V	228	**(84%)**	44	**(66%)**	33	(23%)	21	(5%)
Total	271		67		145		425	

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DO type predict order with 87% of accuracy in our data

N.b. the DOM provide 78% of accuracy

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- The previous hypothesis with regards to the DOM criterion is only partially valid:

Unmarked

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The relative length effect:

- Average preference of 59% for NP PP V order
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- The previous hypothesis with regards to the DOM criterion is only partially valid:

The relative length has an effect only in these cases

	Bare		Bare-Modified		Indefinite		Marked	
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The relative length effect:

Beyond the strong effect of DO type

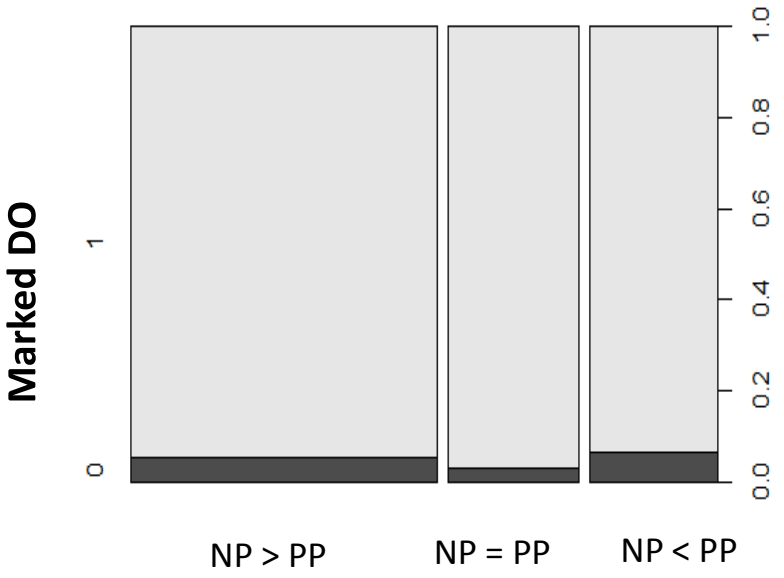
Relative length shows a significant effect (p-value < 0.001)

corresponding to the **long-before-short** tendency

Improving accuracy by 2%

Long-before-short tendency

Relative length have an effect in the case of
Indefinite and **Bare-Modified DO**

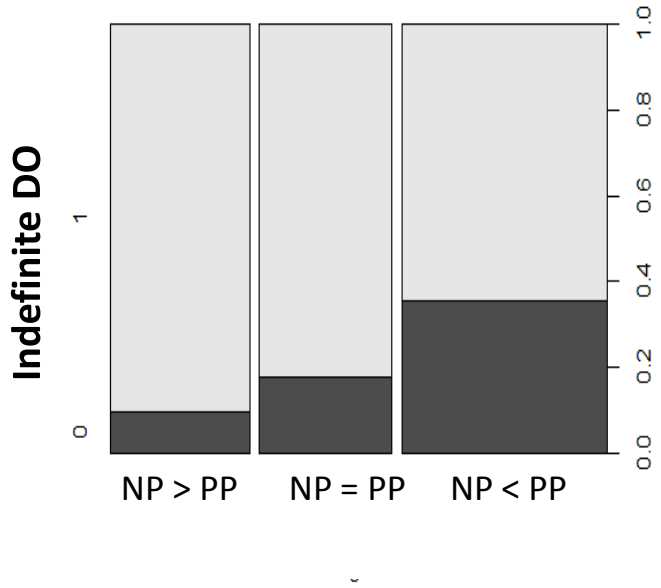


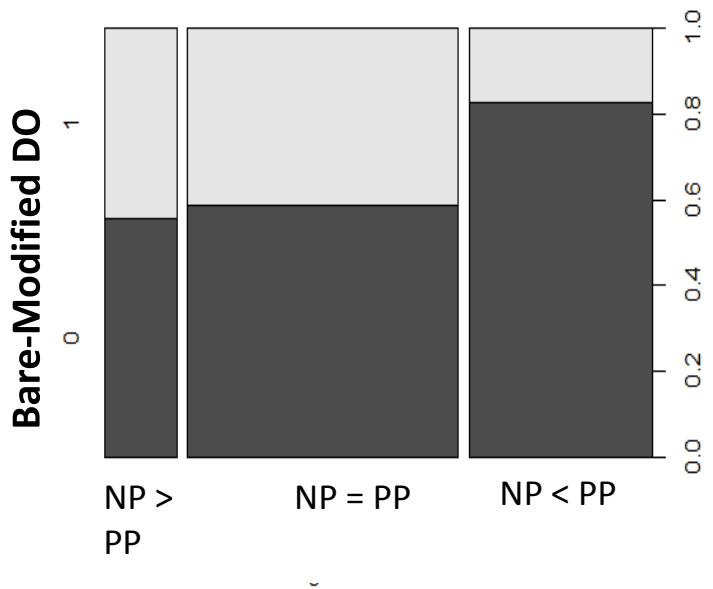
As for Bare DOs,
Relative length is meaningless

NP is always shorter (or equal) to PP

Long-before-short tendency

Shorter DOs prefer the **PP NP V** order significantly more often





NP PP = 1
PP NP = 0

Discussions

Short-before-long is not universal

Not only Japanese (strictly head-final) but also Persian (mixed head-direction) presents the long-before-short tendency

→ The verbal position has to be taken into account in the effect of relative length on preferential order between verbal complements

→ Theories solely based on general principles ignoring linguistic parameters would eventually fail cross-linguistic validity

→ Theories proposing accounts in terms of dependency seems to be more appropriate

❖ However Hawkins's *EIC* principles fails to account for Persian data

Discussions

Short-before-long is not universal

Not only Japanese (strictly head-final) but also Persian (mixed head-direction) presents the long-before-short tendency

→ The **position of the verb** has to be taken into account in the effect of relative length on preferential order between verbal complements

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- However Hawkins's *EIC* principles fails to account for Persian data

Furthermore:

In Persian the relative length plays only a secondary role while the DO type, which depends on the information status of the NP, plays the essential role.

To go further : Experimental methods

We are currently running a couple of experiments to explore the effect of information structure and relative length independently

- For Indefinite and Bare-Modified DOs (2 experiments):

  Semi-guided production task (online questionnaire on Ibex)

  2 conditions (2x2):
  - Givenness : IO given vs IO new (DO always new)
  - Length : DO > IO vs DO < IO (at least 6 syllables)
  - With control for Animacy (DO –animate, IO +animate)

  20 items (7 verbs)

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➢For Indefinite and Bare-Modified DOs (2 experiments):

Semi-guided production task (online questionnaire on Ibex-farm)

2 conditions (2x2):

- Givenness : **IO given** vs **IO new** (DO is always new)
- Length : **DO > IO** vs **DO < IO** (at least 6 syllables)

➢ With control for Animacy : **DO –animate**, **IO +animate**

Schema : 'someone (something) (to someone) give'

20 items (7 verbes) / 40 fillers

References

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