

---

# Head Position Parameter in Persian: An Optimality-Theoretic Approach<sup>1</sup>

Amir Ghorbanpour

[amir.ghorbanpour@modares.ac.ir](mailto:amir.ghorbanpour@modares.ac.ir)

Ph.D. Student, Department of Linguistics  
Tarbiat Modarres University, Tehran, Iran

## Abstract

The present study aims to explore the issue of head position in Persian syntactic phrases within an Optimality-theoretic framework. Making use of syntactic alignment constraints of the type HeadLeft/HeadRight proposed by Grimshaw (2002) – which is alternatively notated in this paper as Align-Left/Right(X, XP) (McCarthy, 2008) –, the study seeks to arrive at a consistent ranking of the relevant constraints active in Persian with respect to the relative position of heads and complements within phrases. Bearing in mind the non-uniformity of head position across Persian syntactic phrases, it is concluded that the general constraint Align-Left(X, XP) is highly active and determinant in most of the syntactic structures in the language; and, the exceptions of head-finality, i.e. that of verb phrases and the direct object case marker ‘*rā*’, are accounted for by the more specific, higher ranked constraints of the opposite value – namely Align-Right(V, VP) and Align-Right(K, KP), respectively.

**Key words:** head position parameter, syntactic phrases, Optimality theory, Persian

## 1. Introduction

The theory of Universal Grammar proposed by Chomsky consists of a set of universal principles that are common to all human languages, and a number of parameters that define the certain ways in which languages may vary. One important aspect of this language variation concerns the position of the heads in relation to their complements within phrases; and the parameter accounting for this variation is termed the Head Position Parameter. According to this parameter, languages are either head-initial or head-final. Languages like English in which the head precedes its complements are referred to as head-initial languages; whereas, languages like Turkish or Japanese where the head follows its complements are referred to as head-final languages (Poole, 2011: 83). The terms ‘head-first’ and ‘head-last’ are also used alternatively in the literature to define these groups of languages (Cook and Newson, 2007: 44; Radford, 2009: 25).

The general idea is that, ‘there is a strong tendency, cross-linguistically, for the head to occur in a fixed position in relation to its complements, and for this order to be the same across all phrases within a language’ (Tallerman, 2011: 120). In English, for example, the head precedes its complements, and this ordering is consistently the same in all phrases (NPs, VPs, PPs, etc.) in this language. However, Persian is a special case in this regard. In Persian, while the relative positioning of heads and

---

<sup>1</sup> This is the English version of a paper originally published in Persian, in *Language Science* journal (*Elm-e Zaban*), Allameh Tabatabaiee University, Tehran, Iran. The Persian version can be found at: *Elm-e Zaban*, 2(3): 129-144. (<http://ls.atu.ac.ir>)

---

complements are fixed within phrases of a given grammatical category (e.g. VPs or PPs), this ordering is not consistent across all phrase structures in the language. For example, VPs in Persian are head-final, whereas PPs are head-initial (Dabir Moghaddam, 2013: 40).

The present study, adopting an Optimality-theoretic framework, aims at analysing the case of Head Position Parameter in Persian, and using syntactic alignment constraints of the type HeadLeft/HeadRight proposed by Grimshaw (2002) – alternatively notated in this paper as Align-Left/Right(X, XP) –, seeks to arrive at a consistent ranking of the relevant constraints active in this language with respect to the relative position of heads and complements within phrases.

## 2. Literature Review

Modern standard Persian is a predominantly verb-final language; that is, its basic unmarked word order is SOV. However, variations to this basic word order do occur in informal spoken form of the language, in particular, the occurrence of VO sequences. This variation means that Persian generally has a more flexible word order relative to languages like English. Nevertheless, the formal standard form of the language follows an SOV pattern.

In this section, we will take a quick look at a few of the more recent studies and standpoints on the issue of word order in Persian and, in particular, the head position within phrases.

In a paper discussing the head position in Persian, Moeinzadeh (2005) argues that although most of the syntactic phrases in Persian (e.g. NPs, APs, and PPs) are considered head-initial in syntactic analyses, many grammarians, based on the constituent order of Persian sentences which have an SOV structure, regard this language as a head-final language. In his paper, Moeinzadeh, taking into account this fact that most of the maximal projections in Persian are head-initial, tries to re-analyse this language as a head-initial language, and based on the evidence as diverse as CPs coming after verbs, the positioning of the clitics, and the position of the adverbs relative to the head of a verb phrase and its complement, he hypothesises that assuming an SVO order for this language in deep structure yields a better analysis in this regard.

Dehdari (2007) in a study on the word order typology of Persian suggests that an alternative to categorically classifying Persian as either head-initial or head-final is split-headedness. Dehdari investigates 18 head-dependent relations, and concludes that all of the head-final relations involve main verbs or passive auxiliary verbs as heads. He then proposes a split-headed analysis of Persian based on structural categories, showing evidence suggesting that *v*P and lower predicate structures are head-final, while higher structures are head-initial.

In yet another study on the head position in Persian, Rezaei (2011) discusses the issue in detail, reviewing the three common views (head-initiality, head-finality, and split-headedness) in terms of the strengths and weaknesses of each analysis in turn. Rezaei argues that examining the diachronic evidence within a typological framework suggests that treating Persian as a head-initial language is more justifiable relative to the other two views. He attributes the current non-uniformity of the head position in different syntactic phrases in Persian to a cycle of very long-term diachronic changes towards the path of becoming a totally head-initial language.

Dabir Moghaddam (2013) in a lengthy discussion and analysis of word order in Persian which incorporates detailed typological statistics, concludes that, considering typological factors, Persian is a hybrid and non-uniform language in this regard; that is, it has some features of verb-final (SOV) languages and some (more) features of verb-middle (SVO) languages. This fact means that the Head Position Parameter of Generative Linguistics cannot account for the behaviour of Persian in this respect (2013: 128). Dabir Moghaddam further argues that, in terms of syntactic typological factors, Persian is

---

a language with a dominant tendency towards SVO order languages, and he puts forward the hypothesis that ‘Persian is on a stage of typological transition’ (ibid: 142).

Bearing in mind this non-uniformity of the head position across syntactic phrases in Persian, this study, incorporating the relevant syntactic alignment constraints, aims to arrive at a consistent ranking of constraints in Optimality-theoretic terms that can account for the variations in head position in different classes of syntactic categories in this language.

### 3. Theoretical Framework

As already mentioned, in this study an Optimality-theoretic approach is adopted. Optimality Theory, first introduced by Prince and Smolensky (1993/2004) and further developed by McCarthy (2002; 2008), is a model of language based on the fundamental assumption that the observed well-formed structures of a language arise from the interaction between conflicting constraints. According to this theory, Universal Grammar (UG) consists of a set of constraints on representational well-formedness, out of which individual grammars are constructed (Prince and Smolensky, 1993/2004: 2).

There are two fundamental classes of constraints in OT: the first group, called markedness constraints, are constraints on the well-formedness of the output per se, and the second group, called faithfulness constraints, prohibit any differences between input and output. The job of a constraint is to assign violation marks (shown by asterisks) to candidates that violate it; and each constraint’s definition will tell us how to determine the number of violation marks assigned to a given candidate (McCarthy, 2008: 13).

It is assumed in OT that ‘constraints are universal’, and that ‘all constraints are present in the grammars of all languages’. As alluded to above, UG includes a constraint component (CON) that contains the entire repertoire of constraints. McCarthy argues that ‘these hypotheses follow from the more general assumption that constraint ranking is the only systematic difference between languages’ (ibid: 15). An individual grammar consists of a ranking of the constraints in UG, which resolves any conflict in favour of the higher-ranked constraint (Prince and Smolensky, 1993/2004: 7)

In addition to the universal constraint set CON, there are two main components to OT: the Generator (GEN) and the Evaluator (EVAL). GEN produces a candidate set from an input, and the candidate set is submitted to the other main component, EVAL. The candidates compete to be the optimal realisation of the given input, and EVAL’s job is to find this optimal output. This evaluation is done by applying a language-specific constraint hierarchy to the set of candidates. The general process is shown in the following flowchart (McCarthy, 2008: 19):

(1) /input/ → GEN → {*cand*<sub>1</sub>, *cand*<sub>2</sub>, ...} → EVAL → [output]

The above diagram best illustrates a phonological representation; however, the same process applies to syntactic structures as well. McCarthy asserts that ‘there are separate CONs for phonology and syntax, with some overlap in their formal properties’ (ibid: 15).

The constraint interaction in OT is based on a relation of domination, or priority-ranking, that holds between constraints. The constraints are violable in OT, and even the optimal outputs violate some constraints. But these violations only occur to avoid violations of higher-ranked constraints and they should be kept minimal (Prince and Smolensky, 1993/2004: 32). Accordingly, it can be said that an optimal output is the one with fewest violations of the higher-ranked constraints; or as Prince and Smolensky put it, the one that ‘best satisfies the constraint system’ (ibid: 6).

A constraint ranking is often shown in a tableau like the one below in (2), where on the left column candidates are given and compared with each other with respect to their performance on two or more

constraints. In the top row of the tableau, constraints are sorted in a domination order from left to right, and the next rows contain the different candidates, one of which is the optimal output, usually shown by a pointing hand (☞). The violation marks incurred by each candidate on each constraint are shown by asterisks (\*) in the related column. Also, an exclamation mark (!) accompanying an asterisk marks a fatal violation; i.e., the exact point where a candidate loses out to other candidates and falls out of the competition.

(2) A tableau for a constraint ranking argument

	<b>Constraint 1</b>	<b>Constraint 2</b>
☞ Candidate 1		*
Candidate 2	*!	

#### 4. The Analysis

In this study, we will be using syntactic alignment constraints of the type HeadLeft/HeadRight as proposed by Grimshaw (2002), which align heads to the left or right of the edge of a syntactic phrase, as formally stated in the HeadLeft constraint below (Grimshaw, 2002):

(3) **HeadLeft**      *Every X-zero is at the left edge of an X-max.*  
 More precisely:    *Align (X-zero, Lft, XP, Lft)*

In her study, Grimshaw also proposes additional constraints one by one to position specifiers and complements within syntactic phrases. In alignment terms, Grimshaw's HeadLeft constraint can be alternatively notated and defined as follows (McCarthy, 2008):

(4) **Align-Left(head(XP), XP)**  
 Assign one violation mark for every constituent that intervenes between an XP's head and its left edge.

Similarly, the constraint of the opposite value, i.e. HeadRight, can be defined as follows:

(5) **Align-Right(head(XP), XP)**  
 Assign one violation mark for every constituent that intervenes between an XP's head and its right edge.

For the ease of notations, in the present analysis and in the tableaux throughout this paper, the above mentioned syntactic alignment constraints in (4) and (5) will be written as 'Align-Left(X, XP)' and 'Align-Right(X, XP)'.

In what follows in this section, the main lexical phrases in Persian and their status regarding the direction of the head word are discussed in turn. However, it needs to be mentioned here that the terms left and right as used in the present discussion refer to the transliterated (left-to-right) version of Persian as used in the examples and tableaux in this paper. It goes without saying that the original writing system of Persian is right-to-left. Accordingly, the words left and right here simply imply the more accurate terms 'initial' and 'final', respectively.

Beginning with the case of Noun Phrases (NPs) in Persian, although nouns often take optional and not obligatory complements (Tallerman, 2011: 117; Carnie, 2011: 170), whenever they do take complements, the head noun is initial in the phrase; as shown in the following examples:

- (6) a. sāken-e            Tehrān            [NP sāken-e [NP Tehrān]]  
       denizen-of        Tehran  
       ‘denizen of Tehran’
- b. ketāb-e            dāstān            [NP ketāb-e [NP dāstān]]  
       book-of            story  
       ‘storybook’

Thus, NPs are considered head-initial in Persian, satisfying the general Align-Left(X, XP) constraint introduced above, as seen in the following tableau:

- (7) Evaluation tableau for the input Noun Phrase ‘sāken (head), Tehrān (comp)’

	Align-Left(X, XP)	Align-Right(X, XP)
☞ [NP sāken-e [NP Tehrān]]		*
[NP [NP Tehrān] sāken-e]	*!	

If we, along with the more recent developments in Minimalist Program, take the NPs beginning with demonstratives, pronouns, or wh-phrases to be actually Determiner Phrases (DPs), yet again, this group of functional phrases (headed by determiners) are head-initial in Persian. The following examples show the relative positioning of the head determiners relative to their complements:

- (8) a. in            ketāb            [DP in [NP ketāb]]  
       this        book  
       ‘this book’
- b. kodām        ketāb            [DP kodām [NP ketāb]]  
       which        book  
       ‘which book’

Turning now to adjectives which, similar to nouns, very occasionally take obligatory complements (Tallerman, 2011: 116), the Adjective Phrases (APs) in Persian are head-initial and very close in structure to the equivalent phrases in English, as the following examples show:

- (9) a. xāli        az        ma’nā            [AdjP xāli [PP az ma’nā]]  
       devoid of    meaning  
       ‘devoid of meaning’
- b. alāqemand    be    musiqi            [AdjP alāqemand [PP be musiqi]]  
       interested to    music  
       ‘interested in music’

The only difference here between Persian and English APs like the above examples is that, while in English this order is rigidly fixed and changing the order usually results in ungrammaticality (as in the phrase \*[<sub>AP</sub> [<sub>PP</sub> in music] interested]), in Persian this ordering is more flexible and if we reverse the order, the resulting phrase often will still be acceptable, but only marked now, relative to the basic unmarked order given above which places head at the beginning of the phrase. The two competing candidates of the AP in (9a) are evaluated in the following tableau.

(10) Evaluation tableau for the input Adjective Phrase ‘xāli (head), az ma’nā (comp)’

	<b>Align-Left(X, XP)</b>	<b>Align-Right(X, XP)</b>
☞ [ <sub>AdjP</sub> xāli [ <sub>PP</sub> az ma’nā]]		*
[ <sub>AdjP</sub> [ <sub>PP</sub> az ma’nā] xāli]	*!	

Concerning the adpositions, Persian is a predominantly prepositional language; with its only postposition being the direct object marker ‘*rā*’ (Dabir Moghaddam, 2013: 97). The postposition ‘*rā*’ (with its different allomorphs of /ro/ and /o/ in spoken language) is actually a case marker of definite direct objects in contemporary Persian, and following Ghomeshi (1997) we take the syntactic phrase headed by ‘*rā*’ to be a Case Phrase (KP), reserving the term ‘PP’ to define phrases headed solely by prepositions of the language.

As for the Prepositional Phrases (PPs), by definition (and as already noticed in the tableau above), the head prepositions are placed at the beginning of their phrases. In other words, Persian is head-initial regarding PPs, as shown in the following examples:

- (11) a. ruy-e    divār                    [<sub>PP</sub> ruy-e [<sub>NP</sub> divār]]  
           on        wall  
           ‘on the wall’
- b. barāy-e    to                    [<sub>PP</sub> barāy-e [<sub>NP</sub> to]]  
           for        you  
           ‘for you’

Thus, the Align-Left(X, XP) constraint is perfectly satisfied by PPs in Persian, as seen in the evaluation tableau in (12):

(12) Evaluation tableau for the input Prepositional Phrase ‘barāye (head), to (comp)’

	<b>Align-Left(X, XP)</b>	<b>Align-Right(X, XP)</b>
☞ [ <sub>PP</sub> barāy-e [ <sub>NP</sub> to]]		*
[ <sub>PP</sub> [ <sub>NP</sub> to] barāy-e]	*!	

The instance of the only postposition, the direct object case marker ‘*rā*’, which is an exception in this respect, will be discussed below after looking at the verb phrases first.

Persian Verb Phrases (VPs) are the category where the exceptions of head position come to play. Being an SOV language in the unmarked ordering of constituents, Persian is considered head-final in its VPs; that is, it places the head verbs at the end of VPs. The following example well illustrates this tendency:

- (13) yek ketāb xar-id-am [VP [DP yek ketāb] xaridam]  
 a book buy-PAST-I  
 ‘I bought a book’

To explain this head-finality of VPs in Optimality-theoretic terms, we need to define a new constraint which more specifically covers this unique behaviour of head verbs. In other words, we need to narrow down the general constraint of Align-Left(X, XP) and modify its value to account for the head-finality of VPs. This new constraint is given below:

(14) **Align-Right(V, VP)**

Assign one violation mark for every constituent that intervenes between a VP’s head and its right edge.

In the following tableau, this new constraint is added to the more general constraint we had in previous tableaux above, and it is ranked higher to give us the optimal output.

- (15) Evaluation tableau for the input ‘xaridam (head), yek ketāb (comp)’

	<b>Align-Right(V, VP)</b>	<b>Align-Left(X, XP)</b>
☞ [VP [DP yek ketāb] xaridam]		*
[VP xaridam [DP yek ketāb]]	*!	
[VP [DP ketāb yek] xaridam]		**!
[VP xaridam [DP ketāb yek]]	*!	*

Of course, it needs to be added here that, as already mentioned above, this is the unmarked word order used in formal standard form of the language. In informal spoken Persian, verbs quite frequently come before their object complements. This tendency is well illustrated in the above tableau, where the second candidate [VP xaridam [DP yek ketāb]] has the same number of violation marks as the optimal output; however, it incurs violation of a higher-ranked constraint and consequently loses out to the optimal candidate.

The last category to be discussed here, which is another exception along with VPs, is the case of postposition ‘rā’. As alluded to above, we assume the syntactic phrase headed by ‘rā’ to be a Case Phrase (KP) (Ghomeshi, 1997), since this postposition is the case marker of definite direct objects in Persian. The following example illustrates this:

- (16) ketāb rā xān-d-am. [VP [KP ketāb rā] xāndam]  
 book-DO read-PAST-I  
 ‘I read the book’

As can be seen, the head ‘rā’ needs to be positioned at the end of KP. For this to happen, we need to define another new constraint; again a subcategory of the Align-Left(X, XP) constraint family, with an opposite value. This new constraint is defined below:

(17) **Align-Right(K, KP)**

Assign one violation mark for every constituent that intervenes between a KP’s head and its right edge.

Integrating this new constraint in our constraint set thus far, and placing it highest in the ranking, will give us the following evaluation tableau:

(18) Evaluation tableau for the input ‘xāndam (head), ketāb rā (comp)’

	<b>Align-Right(K, KP)</b>	<b>Align-Right(V, VP)</b>	<b>Align-Left(X, XP)</b>
☞ [VP [KP ketāb rā] xāndam]			**
[VP xāndam [KP ketāb rā]]		*!	*
[VP [KP rā ketāb] xāndam]	*!		*
[VP xāndam [KP rā ketāb]]	*!	*	

In the tableau in (18), although there is no direct ranking argument to position Align-Right(K, KP) higher than Align-Right(V, VP) (and hence the dotted line), the reason to place it highest here is the fact that this constraint is never violated in Persian; that is, ‘rā’ always follows the object it case-marks, and never precedes it. However, while Align-Right(V, VP) remains inviolable in formal standard Persian (this holds true at least in simple sentences), it is sometimes violated in informal spoken form of the language, as previously mentioned. In other words, the candidate in the second row [VP xāndam [KP ketāb rā]] in the above tableau can be considered the second optimal output, acceptable only in informal language.

As evident in the final tableau in (18), the overall constraint ranking with this small set of alignment constraints is as follows:

(19)  $\text{Align-Right(K, KP)} \geq \text{Align-Right(V, VP)} \gg \text{Align-Left(X, XP)}$

This ranking forms the set of relevant constraints active and determinant in Persian with respect to the position of heads in relation to their complements within phrases. As already mentioned above, it is assumed in OT that all constraints are present in the grammars of all languages, and that only their rankings differ across languages. Accordingly, it can be argued about this constraint ranking that all the other syntactic alignment constraints of the types included in (19) (for example, the general constraint Align-Right(X, XP)) are present in Persian, only so down in ranking that they have no effect on deciding the optimal output in syntactic phrases in this language.

## 5. Conclusion

All in all, the alignment constraints used in this paper in terms of the head position of different syntactic phrases in Persian suggest that the general tendency of the language is towards head-initiality rather than head-finality. This reasoning is based on the fact that the general alignment constraint used as the basis of our analysis, which is highly determinant in most of the phrase structures in Persian, is Align-Left(X, XP) rather than Align-Right(X, XP). The more specific Align-Right constraints, that is, Align-Right(V, VP) and Align-Right(K, KP), were only integrated to account for the exceptions of head-finality, i.e. that of verb phrases and the direct object case marker ‘rā’, respectively. These more specific Align-Right constraints are ranked higher relative to the general Align-Left(X, XP) constraint, so that they can correctly decide on the optimal outputs in case of the above-mentioned exceptions of head-finality in related phrases.

---

The Optimality-theoretic analysis presented in this paper is along the lines of the hypothesis put forward by Dabir Moghaddam and Rezaei that Persian is on a stage of typological transition towards SVO order (head-initial) languages; and that this non-uniformity of head position across Persian syntactic phrases is attributable to series of very long-term diachronic changes that the language has been going through.

## References

- Carnie, A. (2011). *Modern Syntax: A Coursebook*. Cambridge: Cambridge University Press.
- Cook, V. J. and Newson M. (2007). *Chomsky's Universal Grammar: An Introduction (3<sup>rd</sup> ed.)*. Oxford: Blackwell.
- Dabir Moghaddam, M. (2013). *Radeshenasiye Zabanhaye Irani [Typology of Iranian Languages]*. Tehran: Samt.
- Dehdari, J. (2007). Split headedness in Persian. Paper presented at the Second International Conference on Iranian Linguistics, Hamburg, Germany.
- Grimshaw, J. (2002). Economy of structure in OT. In: Angela Carpenter, Andries Coetzee, and Paul de Lacy (eds.) *University of Massachusetts Occasional Papers in Linguistics 26: Papers in Optimality Theory II*. Amherst, MA: GLSA Publications, pp. 81–120. [Available on Rutgers Optimality Archive, ROA-434.]
- Ghomeshi, J. (1997). Topics is Persian VPs, *Lingua*, 102: 133-167.
- McCarthy, J. J. (2002). *A Thematic Guide to Optimality Theory*. Cambridge: Cambridge University Press.
- McCarthy, J. J. (2008). *Doing Optimality Theory: Applying Theory to Data*. Oxford: Blackwell.
- Moeinzadeh, A. (2005). Zabane farsi be mosabe zabani haste aghazin [Persian as a head-initial language]. *Majale Zaban va Zabanshenasi. [Journal of Language and Linguistics]*, 2: 129-135.
- Poole, G. (2011). *Syntactic Theory (2<sup>nd</sup> ed.)*. Hampshire: Palgrave Macmillan.
- Prince, A. and Smolensky, P. (1993/2004). *Optimality Theory: Constraint Interaction in Generative Grammar*. Oxford: Blackwell.
- Radford, A. (2009). *Analysing English Sentences: A Minimalist Approach*. Cambridge: Cambridge University Press.
- Rezaei, H. (2011). Jaygahe haste dar zabane farsi: ta'amoli az didgahe radeshenasiye darzamani [Head position in Persian: reflections from a diachronic typological perspective]. *Majale Pazhooheshhaye Zabanshenasi. [Journal of Linguistic Research]*, 3(2): 35-46. Isfahan: Isfahan University.
- Tallerman, M. (2011). *Understanding Syntax (3<sup>rd</sup> ed.)*. London: Hodder Education.