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A Minimalist Analysis of Persian Restrictive Relative Clause Derivation

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Abstract

Within the Minimalist Program (MP), Relative clauses (RCs) are considered complementizer clauses (CPs) containing a C with an edge feature [EF] in the form of [wh] and [EPP] but no tense feature. This study investigates Persian RC derivation based on MP. By proposing two approaches, namely: (1) '*ke*-movement' and (2) 'null wh-operator (OP) movement', we will consistently argue and show that the null wh-OP approach provides an appropriate generalization for Persian restrictive RCs. Adopting the latter, the results display Persian RCs can be analyzed as CPs with a null wh-OP assuming to undertake wh-movement as copying and deletion from different syntactic positions, i.e., subject, direct object, object of preposition, etc. This operator allows a small *pro* in the subject position, leaving an optional null copy, either allowing an optional resumptive pronoun (RP) behind in direct object position or attaching to the verb; and obligatorily in indirect object and object of preposition positions as well as Ezafe-construction. Also, the edge feature of the probe, the complementizer *ke*, attracts the null wh-OP to Spec-C, for checking and valuing the unvalued [wh] and [EPP] features. The long relative clause derivations can, correspondingly, work as expected by the successive cyclic movement of OP through intermediate Spec-C positions as well.

Keywords: Minimalist program, restrictive relative clauses, null wh-operator, resumptive pronouns, Persian

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1. Introduction

A relative clause (RC) is a type of embedded clause that modifies a head noun in the matrix clause. The relative clause as a CP, in fact, functions as an adjunct (Chomsky, 1977; Radford, 2009; Carnie, 2013) in a noun phrase (NP) or a determiner phrase (DP) modified. The study of the syntactic structure of relative clauses is recognized as being an old but significant issue in linguistics literature. Accordingly, this paper seeks to address the derivation of Persian restrictive RC construction on the basis of the MP approach as developed by Chomsky (1995, 2000, and 2005). Within the Minimalist Syntax, Chomsky (2005) suggests that an edge feature is the mechanism which drives the movement of wh-expressions to Spec-C. Correspondingly, Radford (2009) also states that relative wh-clauses "show wh-movement without auxiliary inversion, therefore, analyzing them as CPs containing a C with an edge feature, [EF], but no tense feature" (p. 224).

In the current MP framework outlined by Chomsky (1998, 1999, 2001, 2005), the computation of expressions must be restricted to a single cyclic/compositional process with phases which are CP and v*P.[1] Thus "for minimal computation, the probe should search the smallest domain to find the goal: its c-command domain" (Chomsky, 2005, p. 13). In this regard, Radford (2009) maintains that "a probe or goal is active if it has an uninterpretable feature associated with it". Features may drive movement (Internal merge) from one position to another (Chomsky, 1995) through the need for uninterpretable features to be checked by their interpretable counterparts. Specifically, according to Chomsky (2001), uninterpretable features on a head enter the derivation "unvalued". A head which assigns structural cases, for example, will contain unvalued phi-features and nominals will contain an unvalued Case-feature. Overt movement, which requires abstract agreement, besides, is triggered only by heads that carry an EPP feature. Agreement -and hence, movement- applied to eliminate uninterpretable features of both the Probe and the Goal.

Radford (2009, p. 380) highlights that "once a complete phase has been formed, the domain of the phase undergoes a transfer operation by which the relevant (domain) structure is simultaneously sent to the phonological component to be assigned an appropriate phonetic representation, and to the semantic component to be assigned an appropriate semantic representation – and from that point on, the relevant domain is no longer accessible to the syntax". Chomsky (2005) refers to this condition as the Phase Impenetrability Condition (PIC). Thus uninterpretable features are removed from the narrow syntax in an agreement chain with interpretable features.

In addition, Chomsky (2005) also explains the movement of the goal through different positions in the case of A/A'-movement (A-bar movement):

"The goal cannot stop at some intermediate point of the derivation, in particular, at intermediate Spec-T positions through which it must pass in successive-cyclic A-movement

[1] . DPs are also regarded as phases in some works, e.g., Chomsky (1999, p. 36).

(including exceptional case-marking constructions). In the case of A'-movement, reconstruction effects indicate that the raised goal also passes through internal positions leaving copies that are visible at the semantic interface. These observations tell us something important about the operation of Internal Merge (IM): the raised goal must reach the probe by means of local steps, passing through intermediate positions where it leaves copies, but not stopping there to be spelled out" (p. 22).

Consequently, "Within a phase-based theory of syntax, A'- movement operations like wh-movement must apply in a successive-cyclic fashion (one phase at a time): this means that each time a new phase head like C is introduced into a wh-structure, it will serve as a probe which attracts the closest wh-goal to move into its specifier position" (Radford, 2009, p. 309). Furthermore, "At the end of each phase, the domain (i.e., complement of the phase head) undergoes transfer and at the end of the overall derivation, all remaining constituents undergo transfer" (Radford, 2009, p. 383).

As the relative clause structure is a kind of wh-clause, it undertakes movement (Chomsky, 1995; Radford, 2009). On the other hand, applying the copy theory of movement in an MP analysis, "wh-movement involves a copying operation whereby a moved wh-expression leaves behind a null copy of itself at its extraction site" (Radford, 2009, p. 186, 227) and then, in line with Chomsky (1995), the copy left behind of the moved element " is deleted by a principle of the PF component in the case of overt movement but is available for interpretation at LF" (p. 202).

As to the relativization phenomenon in Persian, the present study is going to investigate whether such a derivation would be realized as either *ke*-movement (overt wh-movement) or null wh-OP movement. In this respect, as to *ke*-movement approach, the constituent *ke* would be supposed to play the role of an overt relative pronoun which has a [wh] feature and occupies the Spec-C. But then, as we will discuss, *ke*-movement assumption not only is inapplicable to derive all different types of relative clauses in Persian but the application of this approach gives rise to the violation of some syntactic conditions such as the Complementizer Condition. To remove such problems, the authors will suggest and verify the null wh-OP movement approach as an efficient way to derive all types of Persian relative clauses. In this analysis, the relativized head noun is considered as base-generated outside a relative clause and is linked to the null wh-OP via the c-command and binding relations. Also, adopting the second approach, we will account for the fact that a relative clause in Persian can be analyzed as a CP with *ke* as its complementizer (here, functioning as a relativizer), having an uninterpretable edge feature [EF].

2. Review of Literature

To the authors' knowledge, no comprehensive and separate topic or research has been devoted to the study of Persian relative clause construction in the framework of the Minimalist program. Nonetheless, here, we merely mention some preliminary works done in Persian on the subject of relative clauses.

Miremadi (1997) simply defines the relative clause as the one describing the noun in subject and object positions. He, then, briefly refers to the differences between the relative clause and the complement clause of some verbs in Persian. Correspondingly, the first difference mentioned concerns the movement possibility of the relative clause; that is to say, a verb complement clause cannot be moved or extraposed from its original position, but a relative clause can. The next difference deals with the point that whereas the presence of *ke* 'that' is optional in the verb complement clause but its presence in a relative clause is obligatory. Miremadi (1997) attributes such differences between these linguistic facts to the lexicon component of language. He holds that the lexicon must cover such pieces of information. As a final point, he simply gives the phrase structure representation of the Persian sentence (1) as (2), without analyzing its syntactic derivation mechanism.

(1) *polis dʒævaher-at-i* *ra* *ke* *dozd* *bord-e* *bud*
Police jewelry-PL-INDEF OM that thief take.PST-PP be.PST.3SG
dær *xane-æʃ* *pejda* *kærd*
in home-CLT.his find do.PST.3SG
"The police found the jewelry that the thief had taken to his home."

(2) *polis* [$_{NP}$ *dʒævaher-at-i* ra_1 [$_{CP}$ ke_1 [$_{IP}$ dozd t_1 bord-e bud]]] *pejda kærd* (Miremadi,1997, p.176)

As it is evident, Miremadi (1997) has only represented the syntactic derivation of (2) based on the wh-movement manifestation of relative clause derivation in English. He views the element *ke* as an overt wh-phrase equivalent, which leaves a trace behind. He never refers to Persian relative clause constructions with the small *pro* or RPs.

Ahangar (2000) has investigated the derivation of Persian restrictive RCs based on move-α, as developed in Government and Binding (GB) theory as developed by Chomsky (1981, 1986). His study puts forward two hypotheses: (1) *ke*-movement hypothesis, and (2) the empty operator movement hypothesis. *Ke*-movement hypothesis is assumed to be like the application of (overt) wh-movement involved in English relative clauses, in which the element *ke* appears as a wh-phrase. In his second hypothesis, the Persian relative clause is analyzed as a CP with an empty operator which is supposed to move from different syntactic positions and to occupy the Spec-C. After examining these two hypotheses, he arrives at the conclusion that *ke* movement hypothesis fails to account for those relative constructions with RPs. On the other hand, the analysis based on the empty operator movement hypothesis provides an appropriate generalization for the formation of different relative clauses containing either gaps or RPs.

Karimi (2001) has analyzed CPs in Persian based on Kayne's (1994) basic configuration for relative constructions. In Kayne's configuration, the CP is viewed as the complement of D rather than N. However, Karimi (2001) proposed that "a base generation analysis of the head noun and its optional determiner in the specifier of the complex DP accounts more adequately for Persian data than Kayne's raising analysis" (p. 8). One important distinction between her analysis and Kayne's,

in this respect, is that under Karimi's analysis, the Persian demonstrative (equivalent to the determiner 'the' in English) is not the head of the complex DP, but rather is base-generated in the [Spec, CP], inside the small DP containing the head noun. According to Karimi (2001, p. 14), "the relative marker *-i* heads the relative construction by occupying the D position of the complex DP since this element takes the relative CP as its complement". In her scrutiny, in addition, there is a small pro inside the relative CP, co-indexed with an operator inside [Spec, CP]. A clitic pronoun, attached to the verb and c-commanded by this small pro, is optionally possible in this configuration. The clitic pronoun can also be attached to the nonverbal element of a compound verb (pp. 13-15). Therefore, she (p. 14) suggests the following configuration for Persian relative clause constructions:

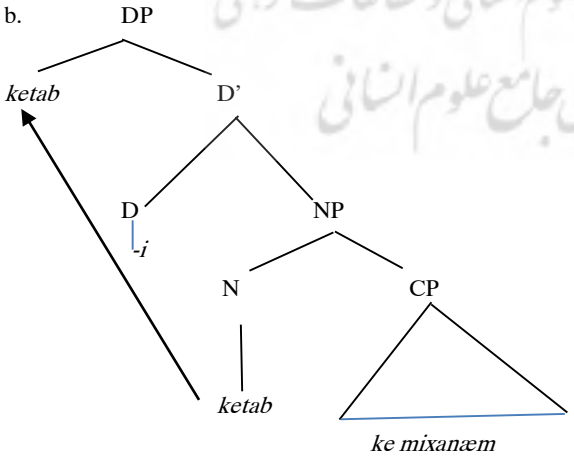
(3) $[_{DP}\,[_{DP}\,(D)\ N]i\,[_{D}$'-i $[_{CP}\ OP_i\,[_{C}$.....pro_i .]]]]

Taghvaipour (2005) has also presented an analysis of Persian restrictive relative clauses in the Head-driven Phrase Structure Grammar (HPSG) framework. He points out that relative clauses in Persian are head-modifying constituents, all typically introduced by the invariant complementizer *ke*; and that Persian RCs are Unbounded Dependency Constructions (UDCs), containing either a gap or an RP.

Modarresi and Zoghi (2016) seek to find, which of NP and DP's models may accurately describe the relationship between the head and its dependent(s), based on minimalism in the Persian language. They conclude that the DP model represents a better description of the head-dependent relations, and the NP model can be replaced by the DP to draw structural relationships of sentences. Examples (4a-b) show the structure they use in their analysis for Persian relative clauses:

(4) a. *ketab-i* *ke* *mi-xan-æm*
book-RM that IMP-read.PRES-1SG
"The book that I am reading"

b.



Nevertheless, they don't give a syntactic reason or motivation for moving N to [Spec, DP] in these clauses.

3. Data Description and Analysis

3.1. Persian Restrictive Relative Clauses:

Persian is a null-subject/pro-drop language with the SOV word order within sentences and clauses (Karimi, 1994; Karimi & Hojatollah Taleghani, 2007; Hojatollah Taleghani, 2008) as well as head initial in the non-verbal phrasal categories. Persian verb phrases are head-initial with clausal arguments and head-final with phrasal arguments as well (Samiian, 1983; Karimi, 1989; Karimi & Hojatollah Taleghani, 2007). Besides, Persian relative clauses are head-initial and may obligatorily or optionally contain either a gap or an RP depending on the position of the relativized element (Keenan, 1985; Comrie, 1991; Ahangar, 2000).

In Persian, in effect, "All various types of relative clauses begin with the invariant constituent *ke* 'that' remaining neutral for features such as animacy, possession, and different syntactic functions of the head noun" (Ahangar, 2000, p. 3). Correspondingly, as Ahangar (2000) pointed out, one property that *ke* 'that' shares with invariable relative markers in other languages like English 'that' is the fact that it is not marked for case and hence does not bear the case assigned to the relative clause internal copy. *Ke* 'that' is not marked for number and gender, too.

As far as the targets of relativization in Persian are concerned, there seems to be no rigid grammatical relational restriction on relativizable elements (see Keenan & Comrie, 1977). For that reason, it is possible to relativize subjects, direct objects, objects of preposition and possessor noun phrases in this language (also see: Ahangar, 2000).

With regard to two types of relative clauses, namely restrictive and non-restrictive RCs, a restrictive RC is the one that defines and limits the referent and meaning of the head noun, as opposed to a non-restrictive (or descriptive) relative clause, which simply provides some supplementary explanation or information about the NP (Gren-Eklund, 1978; Carnie, 2013). In other words, "since the restrictive RC narrows the concept associated with the modified noun, it serves the purpose of identifying the entity" (Nikolaeva, 2006, p.502).

Persian restrictive RCs are head-modifying constituents in the sense that they modify, as a whole, the DP/NP they follow. The constituent configuration of a complex DP/NP in Persian reveals that the relative clause is generated as a post-nominal modifier and actually plays the role of an adjunct. Even so, in our analysis, because of the semantic proximity between *–i* as a restrictive marker and the relative clause as a restrictive clause, we take on Karimi's (2001, 14) configuration repeated in (5) below, where the RC has been considered as the complement of the restrictive relative clause marker *-i* (henceforth shown as -RES in glosses). Here, the head noun is supposed to be base-generated in the specifier of the larger DP, along with optional demonstratives e.g., *ʔan* 'that', or *ʔin* 'this', nor the indefinite quantifier *hær* 'every/each', occupying the D position.

(5) $[_{DP}\ [_{DP}\ (D)\ N]_i\ [_{D'}\text{-i}\ [_{CP}\ OP_i\ [_{C'}\text{.....pro}_i\ldots]]]]$

Despite adopting Karimi's (2001) account of the syntactic derivation and configuration of Persian relative construction, we will make some modifications in this respect. Correspondingly, undertaking the relativization process, a null wh-OP, moving from different syntactic positions and landing in Spec-C, will leave either a small *pro*, a copy, or an RP in its extraction site. We will use the small *pro* only when the subject position in the relative clause is the target of relativization. Moreover, in case the direct object is subject to relativization, optionally either a copy of the wh-OP or an RP will occur in this position. In this regard, generally speaking, the RP optionally appears in non-subject positions in relative clauses (the direct object) or obligatorily (as the indirect object/object of preposition and in Ezafe-construction) in the form of either a clitic or an independent pronoun. Correspondingly, the RPs are bound to the wh-OP. Similarly, as a clitic pronoun, an RP can be attached to the verb (*xæridæm-eʃ* 'I bought it', a noun (*ketab-eʃ* 'his/her book'), a preposition (*be-h-eʃ* 'to him/her'), or to the nonverbal element of a compound verb (*kar-eʃ daræm* 'I need it'). The RP can also be an independent or a clitic pronoun playing the syntactic role of direct object, indirect object, object of preposition or complement of a noun in Ezafe-construction. As a result, the modified version of Persian relative clause configuration is suggested as what given in (6):

(6) $[_{DP}\,[_{DP}\,(D)\ N]_i\,[_{D'}\text{-i}\,[_{CP}\ OP_i\,[_{C'}\ldots\ldots pro_i/\,(\sout{OP_i})\,/\,RP_i\ldots]]]]$

In the next section, we try to validate Persian RCs with two approaches, namely *ke*-movement and null wh-OP movement, to illustrate which one can give us a more appropriate MP description of the derivation of these clauses in Persian.

3.2. Analysis of Persian Restrictive Relative Clauses: Two Approaches

3.2.1. Ke-movement Approach

In *ke*-movement approach, the element *ke* is assumed to be an overt wh-relative pronoun which undergoes an obligatory movement since CP contains a C with an edge feature, i.e., [wh] and [EPP] features but no tense feature. In this view, the edge feature [EF] of the null relative clause C in the form of unvalued [wh] and [EPP] features attracts the smallest possible maximal projection containing the relative pronoun *ke* for the purpose of checking and valuing the unvalued edge features. This relative pronoun then moves to Spec-C, thereby, following copy-deletion operation, the corresponding edge features of C are deleted. As for *ke*-movement assumption, we depict the relativization in subject, direct object, indirect object and possessive or Ezafe- construction positions in the following examples:

-Subject relativization:

(7) $[_{DP}[_{DP}\,mærd]_i\,[_{D'}\,\text{-}i\,[_{CP}\ ke\ \ [_{C'}[_{C}\,\emptyset\,[_{TP}\,\sout{ke_i}\ \ be\ \ baq\text{-}e\ \ ma\ \ ?amæd]]]]]]$

man -RES who $\sout{\text{who}}$ to garden-EZ we come.PST.3SG

"The man who came to our garden… ."

-Direct object relativization:

(8) [$_{DP}$ [$_{DP}$ *ketab*]$_i$ [$_{D'}$ *-i* [$_{CP}$ *ke*$_i$ [$_{C'}$[$_C$ ø [$_{TP}$ ~~*ke*$_i$~~ (*?an*$_i$ *ra*) *xærid-i*]]]]]]

book -RES which ~~which~~ (that OM) buy.PST-2SG

"The book which you bought … ."

-Indirect object relativization:

(9) [$_{DP}$ [$_{DP}$ *pesær*]$_i$ [$_{D'}$ *-i* [$_{CP}$ *ke*$_i$ [$_{C'}$[$_C$ ø [$_{TP}$ *?anha be *ke*$_i$*/?u*$_i$*/be-h-eʃ*$_i$ *dʒajeze dad-ænd*]]]]]]

boy -RES whom they to whom/him/to-HI-CLT.3SG prize give.PST-3PL

"The boy to whom they gave the prize … ."

-Possessive relativization:

(10) [$_{DP}$ [$_{DP}$ *nevisænde*]$_i$ [$_{D'}$ *-i* [$_{CP}$ *ke*$_i$ [$_{C'}$[$_C$ ø [$_{TP}$ *ketab-eʃ/ketab-e *ke*$_i$*/?u*$_i$ *tʃap ʃod*]]]]]]

author -RES whose book-CLT.3SG/book-EZ whose/him publish become.PST.3SG

"The author whose book was published… ."

Conversely, as the ill-formedness of (9) and (10) with *ke* in base-generated positions demonstrate, the constituent *ke,* regarded as a relative pronoun, cannot occur as the object of preposition or the complement of a noun in possessive or Ezafe-construction. As a result, the assumption of *ke*-movement approach is limited to simply subject and direct object relative clauses, among other types of Relativization in Persian (also Ahangar, 2000, p. 12).

On the other hand, in wh-questions in Persian, wh-phrases like *tʃe kæsi* 'who/whom', can occur in its base-generated (in situ) position as, for instance, an object of preposition as in (11) and also wh-movement can optionally pied-pipe a preposition as in (12). In the latter case, the edge feature ([wh, EPP]) on the null interrogative C attracts an interrogative constituent. In this respect, the Chain Uniformity Condition bars the movement of an intermediate projection, *tʃe kæsi*, to Spec-C on its own. Then the next smallest possible constituent containing the wh-word must move into Spec-C leading to the structure given in (12) which is convergent/well-formed. Now, if *ke* could be regarded as a relative pronoun, it must have been able to pied-pipe a preposition just like *tʃe kæsi*, but this is not the case, as (13) and (14) illustrate:

(11) *?æli be tʃe kæsi komæk kærd*?

Ali to whom help do.PST.3SG

"Whom did Ali help to?"

(12) [$_{CP}$ *be tʃe kæsi* [$_C$ ø [$_{TP}$ *?æli* ~~*be tʃe kæsi*~~ *komæk kærd*]]]?

"To whom did Ali help?"

(13) *[$_{DP}$ [$_{DP}$ *zæn*]$_i$ [$_{D'}$ *-i* [$_{CP}$ *ke*$_i$ [$_{C'}$ [$_C$ ø [$_{TP}$ ~~*ke*$_i$~~ *be* ~~*ke*~~ *komæk kærd-æm*]]]]]] *?amæd.*

woman -RES whom ~~whom~~ to ~~whom~~ help do.PST-1SG come.PST.3SG

"*The woman whom to I helped came."

(14) *[$_{DP}$ [$_{DP}$ *zæn*]$_i$ [$_{D'}$ *-i* [$_{CP}$ *be ke*$_i$[$_{TP}$ *be ke*$_i$ [*komæk kærdæm*]]]]] *?amæd.*

The examples (13-14) support the fact that the element *ke* is not a wh-word functioning as a relative pronoun and the *ke*-movement hypothesis is not a valid syntactic approach to derive all types of restrictive relative clauses in Persian.

Furthermore, the postulation of *ke*-movement approach requires all relative clauses containing a relative pronoun to be co-indexed and co-referential with the head noun. In line with the Complementizer Condition (Radford, 2009, p. 229), "an overt complementizer cannot have an overt specifier in the superficial structure of a sentence"; thus the element *ke* must appear as a complementizer in the C position of the CP rather than a relative pronoun. Thus the ungrammaticality of (15) illustrates the concurrent occurrence of *ke* 'who' as a relative pronoun in Spec-C and *ke* 'that' as a complementizer in C position. This derivation violates the Complementizer Condition.

(15) *$[_{DP}[_{DP}$ *pesær*$]_i$ $[_{D'}$*-i* $[_{CP}$ *ke*$_i$ $[_{C'}[_C$ *ke* $[_{TP}$ ~~*ke*~~$_i$ *ræft*]]]]]] … .

boy -RES who that ~~who~~ go.PST.3SG

"*The boy who that went …."

3.2.2. Null wh-OP Movement Approach

The observations discussed in the previous subsection put forward the idea that the element *ke* functions as a complementizer rather than a relative pronoun in Persian relative clauses. Congruently, we can hypothesize that the typical Persian RC is always introduced by the invariant relative clause complementizer or relativizer *ke*, with [wh] and [EPP] features as edge features [EF].

If the MP considerations are applied to the case at hand, the probe for wh-movement in RC constructions is the left-peripheral head and the goal is the wh-phrase. With respect to their feature specifications, we assume, following Chomsky (2005), that the complementizer has an edge feature [EF] which triggers movement of the closest wh-expression to its specifier position. Thus *ke* in Persian serves as an active probe by virtue of having an uninterpretable edge feature which triggers movement of a wh-OP goal to its specifier position.

Since there are no overt wh-relative pronouns in Persian, it is plausible to offer the assumption that Persian relative clauses headed by *ke* contain a null wh-OP/OP which moves to Spec-C so as to satisfy the edge feature of C. As Carnie (2013, p. 372) illustrates, the wh-OP starts in the case position and moves to the specifier of the CP, just like a wh-phrase. The operator/OP gets the theme theta role from the embedded predicate and the co-indexed noun in the higher position gets the theta role from the main predicate.

As to the null wh-OP syntactic behavior above-mentioned, in Persian, this operator occupies Spec-C after movement from different targets of relativization all of which are case positions and hence is co-referential with an obligatory small *pro* in subject position, an optional null copy or an optional direct object RP as well as an obligatory RP as the indirect object, object of a preposition or a possessor in Ezafe-construction. According to Ahangar (2000) and Taghavipour (2004), the

grammar of Persian allows personal pronouns to behave resumptively. That is, a personal pronoun in the form of an RP being an independent or a clitic pronoun is allowed to be used where a copy of the moved element might be expected. Correspondingly, an RP comes inside an RC and is co-indexed with the head noun modified by such a clause.

Besides, it is supposed that the dependency between the RP and the moved operator is established through a syntactic process, taking place in narrow syntax. Asudeh (2005) confirms that the relationship between the RP and its antecedent is captured through the standard mechanism of anaphoric binding. In this respect, we suggest that the null wh-OP moves to the highest Spec-C position of the A'-dependency to satisfy the [wh] and [EPP] feature of C and binds the RP.

In what follows, we give examples of different relativization targets in Persian and try to demonstrate the applicability of our second proposal, i.e., null wh-OP movement approach, as far as the derivation of restrictive RCs in Persian is concerned:

I. Relativization in subject position:

In the process of Persian relativization, it is obligatory for the subject pronoun in a relative clause that is co-referential with the NP in the main clause to be deleted (12), otherwise, the occurrence of subject RP in such a position will produce an ungrammatical sentence; therefore, an obligatory small *pro* strategy in subject position is available, whereas resumption is disallowed.

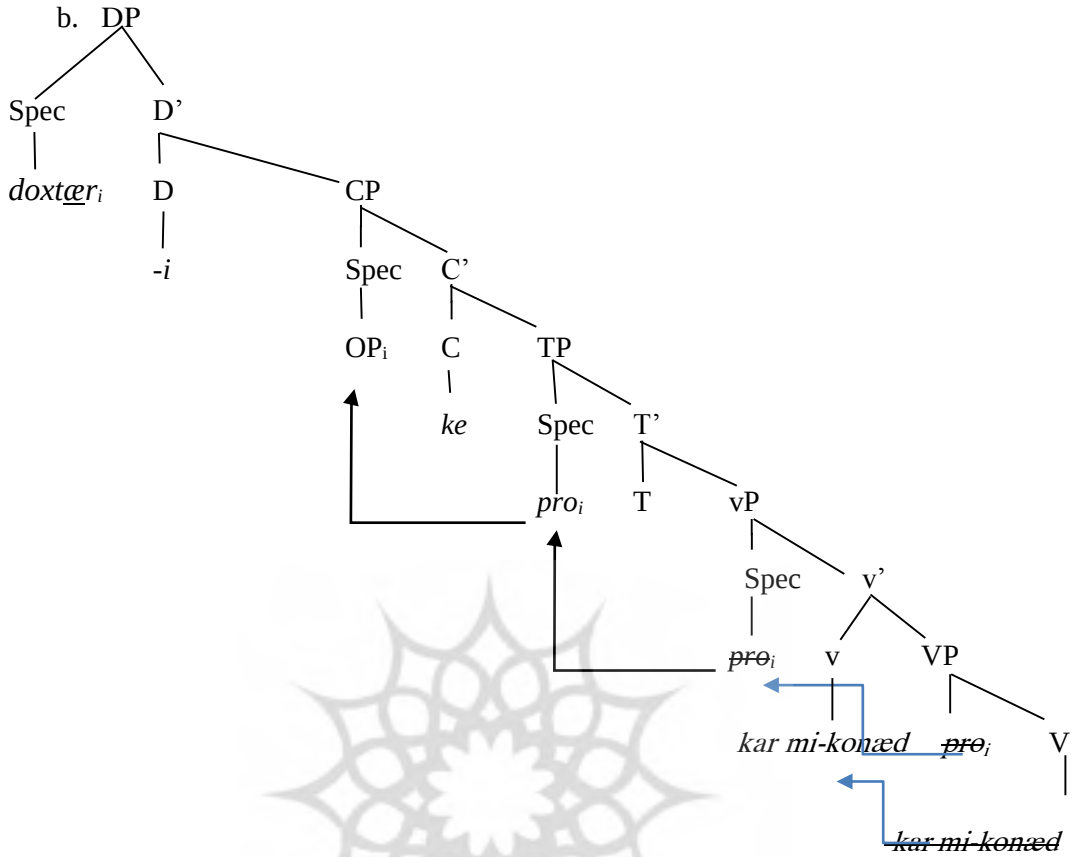
In keeping with Koopman and Sportiche's (1991) claim, subjects are introduced as the specifier of the main VP. As a result, consistent with the VP-internal subject hypothesis, the null wh-OP is first located in the specifier of the VP and then moves to the Spec-T to satisfy the EPP feature of T inherited by C. Afterwards, the relativization process applies, according to which, the null wh-OP moves to the Spec-C to satisfy the [EF] of C, following copy-deletion operation, and then allows a small *pro* in its extraction site. The appearance of a subject pronoun, instead, makes the derived structure ill-formed. The small *pro* is, in turn, controlled by the null wh-OP in Spec-C of the relative clause and also the NP inside DP in the matrix clause. Subsequently, as given in the example (16), *doxtær* is the controller or antecedent of the small *pro*. In addition, the tree diagram[2] 16(b) displays the derivation of this example:

(16) a. $[_{DP}[_{DP}$ *doxtæ*r$]_i[_{D'}$ *-i*$[_{CP}$ OP$_i$ $[_{C'}$ *ke* $[_{TP}$ *pro*$_i$/* *?u*$_i$ *kar mi-kon- æd*]]]]]

girl -RES that *pro*/*(s)he work IMP-do.PRS-3SG

"The girl that works …"

[2] In order to save space, we discarded to provide tree diagrams for no-subject positions relativization.



There are enough pieces of evidence that support such a movement. The linguistic intuition motivates us to posit this small *pro* as the subject because the verb *kar kærdæn* has an understood subject. Hence, postulating a small *pro* subject for the *kar kærdæn* clause captures this judgment. The subject OP is generated in the specifier of the embedded voice VP, where it is assigned the agent theta role.

Further evidence in support of speculating the small *pro* in the embedded clause subject position comes from the syntax of reflexive anaphors (i.e. reflexives including *xod* forms such as *xodæm* (myself), *xodæt* (yourself), *xodæsh* (himself/herself), *xodeman* (ourselves), *xodetan* (yourselves), *xodeʃan* (themselves)). Reflexives require a local antecedent in accordance with Principle A of the Binding Theory (Chomsky, 1981). In the words of Adger (2002, p. 94), "A reflexive must be co-referential with a c-commanding expression".

(17) [$_{DP}$ [$_{DP}$ *ʔan* *doxtær*]$_i$ [$_{D'}$ *-i* [$_{CP}$ OP$_i$ [$_{C'}$ *ke* [$_{TP}$ *pro*$_i$ [$_{T'}$ *ʔæz* *xodæʃ* *tærif mi-kærd*]]]]]]

that girl -RES that from herself admiration IMP-do.PST.3SG

"That girl that was admiring herself … ."

A reflexive anaphor such as *xodæʃ* can only be bound by (i.e., refer to) a c-commanding expression within the closest TP containing the reflexive (Raford, 2009). If we assume that there is a null wh-OP in the subject position which undergoes A-bar movement to Spec-C of the relative clause, and a small *pro* occurs in that position, then the antecedent of the reflexive is the c-

commanding clausemate, the small *pro*, which, in turn, is controlled by OP, *and ?an doxtær* in the matrix clause. This means that *xodæʃ* is co-referential with OP, *?an doxtær* and the small *pro*.

Another theoretical argument in support of assuming a small *pro* as the subject of the embedded clause is that all T-constituents have an EPP feature inherited from the phase-head C (Chomsky, 2005) which requires them to project a subject on the edge of TP. Our analysis, that is to say, a small subject *pro* assumption is consistent with this generalization as well. Therefore, it postulates that the embedded (relative) clause has a small *pro* subject which satisfies the EPP feature of T-constituent. As a result, positing a small *pro* has enough syntactic evidence to be considered an acceptable analysis. For the reason that the complementizer *ke* serves as an active probe by virtue of having an [EF], and the null wh-OP serves as an appropriate goal by being the smallest possible constituent containing the [wh] feature, the edge feature on C (*ke*) enables it to attract the null wh-OP to Spec-C position letting a small *pro* in its extraction site as the subject of the relative clause. Then and there the edge feature is deleted once its requirements are satisfied. This null wh-OP c-commands and is co-indexed with the small *pro* in the subject position. As a consequence, in example (17), the DP *?an doxtær* is the controller of OP, the small *pro* and *xodæʃ* in the relative clause.

Moreover, one reason why the relative pronoun can be given a null spell-out is the point that its person/number properties can be identified by its antecedent and the verb in the relative clause since Persian is a pro-drop or a null subject language indicating the number and person properties of the subject on the verb morphological endings. For this reason, the presence of a small *pro* in the subject position in our inquiry contributes to this language-specific property of Persian. In other words, because this language has a rich system of verb-subject agreement, it allows a pronoun to drop from the subject position. The agreement marking on the verb is rich enough to determine, or recover the content (i.e. reference) of the missing subject. In general, the assumption of a small *pro* in subject position of the relative clause is also in line with Karimi (2001) in which a small 'pro' appears in the subject position of the relative clause as well as Ahangar (2000), Taghvaipour (2005), Dabir-Moghaddam (2006), among others, in the sense that the subject of the relative clause being co-referential with the head noun has no phonetic spell out. However, unlike Ahangar (2000) and Taghavipour (2005), who used a copy or a gap strategy in their analysis of the Persian subject Relativization respectively, the authors of the present study propose a small *pro* in the subject position of such constructions.

II. Relativization in direct object position

In addition to subjects in Persian, if the relativized element is co-referential and co-indexed with the internal direct object of the relative clause CP, it patterns either with a null copy of the null OP or an optional RP in the form of a pronominal (18 and 19) or a clitic pronoun (20) in its base-generated position. This means, in general, that the null wh-OP having moved from direct object position in the relative clause, either an optional copy is left behind and then deleted, as a result of

copy-deletion operation, or an RP appears in the form of object pronouns as well as clitics in this very syntactic position. The clitic pronoun functioning as the direct object never occurs alone in the base position of the noun phrase, but it attaches to the verb. Following Ahangar (2000), in the case of compound verbs, it may be added to either the nominal or verbal part of the compound, as depicted in (20). Furthermore, the direct object RP is obligatorily followed by the object marker (OM) or particle *ra* as in (18 and 19).

(18) [$_{DP}$[$_{DP}$ *ketab*]$_i$[$_{D'}$ *-i*[$_{CP}$ OP$_i$ [$_{C'}$ *ke* [$_{TP}$ *nahid* [$_{vP}$ ~~OP~~$_i$ *(?an$_i$ ra) xærid/ xærid-eʃ$_i$*]]]]]]

book -RES that Nahid (that OM) buy.PST.3SG(-CLT.3SG)

"The book that Nahid bought (LIT. it)… ."

(19) [$_{DP}$[$_{DP}$ *pesær*]$_i$ [$_{D'}$ *-i*[$_{CP}$ OP$_i$ [$_{C'}$ *ke* [$_{TP}$ *bæradær-æm* [$_{vP}$ ~~OP~~$_i$ (***u$_i$*** *ra*) *dævæt kærd*]]]]]]

boy -RES that brother-my (him OM) invite do.PST.3SG

"The boy that my brother invited (LIT. him)… ."

(20) *pesær$_i$-i* OP$_i$ *ke bæradær-æm* ~~OP~~$_i$ *dævæt(-eʃ$_i$) kærd/dævæt kærd(-eʃ$_i$)*

boy-RES that brother-my invite(-CLT.3SG) do.PST.3SG/invite do.PST.3SG(-CLT.3SG)

"The boy that my brother invited (LIT. him)… ."

Given the phase impenetrability condition, in (18b) as an instance, at the lower v phase, *Nahid* raises to the edge, so it is accessible to the phase head C, *ke*. The Agree feature of C-T seeks the subject *Nahid* and raises it to Spec-T, and, finally, the edge feature of C raises the object null wh-OP to Spec-C. Our analysis in keeping with Ahangar (2000), Taghavipour (2005) and Dabir-Moghaddam (2006), inter alia, indicates that there remains an optional RP in the direct object position in such Persian RCs; the only difference among these studies is that they did not suggest the optional OP movement as we do here, instead, they use a trace or a gap in case there is not a resumtive pronoun in direct object position.

III. Relativization in the indirect object (the complement/object of preposition) position

In Persian, the appearance of an RP in the form of an independent personal pronoun or a clitic pronoun functioning as an indirect object (or complement/object of a preposition) is obligatory in relative clauses (21 and 24) while the occurrence of an OP is disallowed (22-23, 25-26):

(21) [$_{DP}$[$_{DP}$ *mærd*]$_i$ [$_{D'}$ *-i*$_i$ [$_{CP}$ OP$_i$[$_{C'}$ *ke* [$_{TP}$ *pedær-æm* [$_{vP}$ *be **?u**$_i$/be-h-eʃ$_i$* *komæk kærd*]]]]]]

man -RE that father-my to him/to-CLT.3SG help do.PST.3SG

"The man that my father helped (LIT. him)… ."

(22) **mærd-i$_i$* OP$_i$ *ke pedær-æm be* ~~OP~~$_i$ *komæk kærd*

(23) * *mærd-i$_i$* OP$_i$ *ke pedær-æm* ~~OP~~$_i$ *komæk kærd*

(24) [$_{DP}$[$_{DP}$ *mærd*]$_i$ [$_{D'}$ *-i* [$_{CP}$ OP$_i$[$_{C'}$ *ke* [$_{TP}$ *ʃoma* [$_{vP}$ *?æz-æʃ$_i$/**?u**$_i$* *pul qærz gereft-id*]]]]]]

man -RES that you.PL from-CLT.3SG/him money borrow take.PST-2PL

'The man that you borrowed money from (LIT. him)…. .'

(25) *$mærd_i$-*i* OP_i *ke ʃoma ?æz* ~~**OP**~~$_i$ *pul qærz-gereft-id*

(26) *$mærd_i$-*i* OP_i *ke ʃoma* ~~**OP**~~$_i$ pul *qærz-gereft-id.*

In examples (21) and (24) the presence of the prepositions *be* "to" and *?æz* "from" actually makes the manifestation of an RP obligatory. In this respect, we suggest that in such prepositional constituents, the null wh-OP is the complement of the preposition that moves to the Spec-C to satisfy the [wh] and [EPP] feature on C, i.e., *ke*. However, since the object of a preposition internal to VP cannot be moved to the edge of VP across the prepositional head, the lack of prepositional complements produces ungrammatical sentences. In other words, the preposition stranding phenomenon in Persian never occurs, as seen in the ungrammatical sentences (22) and (25). Thus the obligatory appearance of an RP in the extraction site of the null wh-OP produces well-formed sentences (as given in 21 and 24).

On the other hand, the distribution of RPs in relative clauses given in examples (18-21) reveals the point that all non-subject resumptions include explicit instances of structural case-marked positions in their domains. In the cases where the direct object position is relativized and is filled by a clitic or pronominal, as shown in (18-20), the RP appears in the domain of the head verb. For that reason, the head verb assigns the accusative/direct object case to it. In addition, in (21 and 24), the prepositions are case assigners, consequently, the RPs as complements of prepositions get the oblique/indirect object case.

IV. Relativization in the possessor position (complement of noun)

(27) [$_{DP}$[$_{DP}$ *mærd*]$_i$ [$_{D'}$ *-i* [$_{CP}$ OP_i [$_{C'}$ *ke* [$_{TP}$ *pirahæn-****eʃ***$_i$ / *pirahæn-e* ***?u***$_i$ *?abi ?æst*]]]]]

man -RES that shirt-CLT.3SG/ shirt-EZ he blue be.PRS.3SG

"The man whose shirt is blue ((LIT. The man that his shirt is blue)…."

(28) *$mærd_i$-*i* OP_i *ke pirahæn-* ~~**OP**~~$_i$ (-e ~~**OP**~~$_i$) *?abi ?æst*

Example (27) illustrates a relativized element in the possessor's position in Ezafe-construction. Along the lines of Ghomeshi's (1997) analysis of Persian noun phrases, the possessor is base-generated in Spec-D and the null determiner or D-head bearing the feature [+def] is the case assigner. As a result, the RP is structurally case-marked. Also, following Ghomeshi (1997), an RP occurs in a possessor position in a DP configuration within a relative clause.

As for the derivation of the sentence (27), we assume that in the first place, the null wh-OP is located in the possessor position. As *ke* is an active probe by virtue of having [EF], it attracts the smallest possible maximal projection containing [wh] feature to move to Spec-C. Now, the smallest maximal projection containing a [wh] feature is the null wh-OP itself, and we might expect the null wh-OP to move to Spec-C on its own, deriving the structure associated with (28); however, the resulting sentence is ungrammatical as, according to Left Branch Condition identified by Ross (1967), the extraction of any constituent from the edge of the relevant kinds of expression is barred.

This condition prevents the null OP from being extracted out of the DP containing it accounting for the ungrammaticality of (28). Hence after the movement of the null wh-OP, an RP in the form of a clitic or a pronominal appears in the original position of the null wh-OP to prevent the ungrammaticality of the sentence, as revealed in example (27). Similarly, we can say that the complex DP is an island (Carnie, 2006; 2013); subsequently, it is not possible to move the OP out of it since it blocks OP movement and instead permits the presence of an RP.

In addition to what has been said so far, using the phase impenetrability condition can also clarify the impossibility of the extraction of the RP. In phase A with the head H, the domain of H is not accessible to operations outside A, only H and its edge are accessible to such operations (Chomsky, 2001). As DPs are phases considering Chomsky (1999), the extraction of the RP as the complement of D is barred.

Furthermore, Pesetsky (1997) argues that there is a principle which requires copies of moved constituents to be as close to unpronounceable as possible. Therefore, the minimal overt spellout of the null-OP is simply to spell out the person/number/gender/case feature of the expression (but not its wh-feature)- hence the use of the third person singular genitive pronoun *-eʃ/-æʃ/u*. Resumption is also the last resort strategy when the identification of phi-features fails (Shlonsky, 1992, Alexopoulou, 2006).

In the present study, the obligatory presence of the RP in the site of the complement of the preposition (indirect object) and possessor position is a shared observation in Ahangar (2000), Karimi (2001), Taghavipour (2005) and Dabir-Moghaddam (2006), among others, as well. Nevertheless, the author's assumption of the movement of null wh-OP and permitting the presence of an RP in its extraction site seems to be a unique approach in the literature.

Having studied various relative clause derivation instances in Persian thus far, we arrive at the following patterns of distribution of the null wh-OP, the small *pro* and the RPs in Persian restrictive RCs, as represented in Table 1:

Table 1

The Distribution Patterns of the Null Wh-OP, Small Pro and Resumptives in Rcs

Subject	Direct Object	Object of Preposition	Possessor/Ezafe-Construction
pro	NC of wh-OP/RP	RP	RP

3.2.3. Successive Cyclic A-bar Movement in Persian RCs

Where greater distance intervenes between C and the wh-word, the movement must be staged through all intermediate v and C positions in a successive cyclic manner. Long-distance extraction is then simply an extension of this procedure with movement via several Spec-v and Spec-C positions. According to Radford (2009, p.394) "a sentence containing n transitive verbs and m CPs intervening between the original position of a wh-expression and its ultimate landing-site will involve movement through n Spec-v positions and m Spec-C positions". In Persian cases where the

null wh-OP leaves a copy, it follows both the Attract Closest Principle/ACP and Minimal Link Condition/MLC given in Chomsky (1995, p.311). In accordance with ACP and MLC, a C carrying [EF] feature will trigger the movement of the closest constituent carrying a wh-feature to Spec-C. In the following sentence, the null wh-OP moves in a successive cyclic pattern:

(29)[$_{DP}$[$_{DP}$ *doxtær*]$_i$ [$_{D'}$*-i* [$_{CP1}$ OP$_i$ [*ke*$_1$ [*?æli* *fekr* *kærd* [$_{CP2}$ ~~OP$_i$~~ [*ke*$_2$ [$_{TP}$ *pro*$_i$ $_{vP}$[*ræft*]]]]]]]]

girl -RES that Ali think do.PST.3SG that go.PST.3SG

"The girl that Ali thought she went …."

The syntactic derivation of this sentence illustrates that the verb *ræftæn* 'to go' is an intransitive verb and merges with the null wh-OP as its internal subject argument; accordingly, [vP] is not a phase, and transfer cannot apply at this point. The syntactic computation; therefore, continues with T merging with vP. Following Radford (2009, p. 402-403), after a series of merger operations have been applied to build up a particular phase structure (before case/agreement/movement operations apply), the phase head 'hands over' its uninterpretable features to the head beneath it, so that, e.g., T inherits its agreement features from C in a finite clause, and V inherits its agreement features from v in a transitive clause. As a result, as to Persian relative clauses, T agrees with and assigns the nominative case to the wh-OP subject and the [EPP] feature of T inherited from C triggers raising of the null wh-OP from Spec-V to Spec-T allowing a small *pro* in the extraction site. Since *ke*$_2$has an [EF], it requires movement of the closest wh-OP to its specifier position. Merging the complementizer *ke* with the resulting TP forms the CP [OP$_i$ *ke*$_2$ [$_{TP}$ *pro*$_i$ *ræft*]. As CP is a phase, its domain undergoes transfer at this point. This means that neither TP nor any of the constituents of TP will be available for further syntactic operations. Thus the small *pro* will receive a null spell out in the PF component. After transferring TP, the syntactic computation goes on to the point where the higher complementizer *ke*$_1$ merges with the TP *[?æli fekr mi-kærd* [OP$_i$ [*ke*$_2$ [$_{TP}$ *pro*$_i$ *ræft*]. Here the edge feature of C, *ke*$_1$, attracts the wh-OP to move into the Spec-C position on CP1 to satisfy its [wh] and [EPP] features. Since CP functions as a phase, its TP domain undergoes transfer, so that the copies of the wh-OP will be given a null spell out in the PF component.

Apart from the subject position that can be subject to the successive A-bar movement, the non-subject relativized positions undergo such a movement in Persian, too. In this regard, sentences (30-32) are grammatical because the null wh-OP movement here applies in a successive cyclic fashion, i.e., moving the wh-OP from its base-generated position to the Spec-C position of the complement clause of the verb, *fekr kærd*, 'thought' satisfying the [EF] feature of *ke*, while letting an optional or obligatory RP to occur in the target position of relativization. Once this null wh-OP is moved, it is no longer in the domain of the lower *ke* and hereafter is free to be attracted by the relative clause *ke* to move into Spec-C in the higher clause satisfying the [EF] feature of the higher C. This account of OP-movement is along with the claim that "If EF is always deleted when satisfied" (Chomsky, 2006, p.8), the edge feature carried by C will be deleted (and thereby

inactivated) once its requirements are satisfied. Such an analysis is also in accordance with the Minimal Link Condition (Chomsky, 1995, p. 311) according to which K attracts only if there is no b, b closer to K than a, such that K attracts b.

(30) $[_{DP}[_{DP}$ *doxtær*$]_i$ $[_{D'}$ *-i* $[_{CP}$ OP_i [*ke* [*?æli fekr kærd* [~~OP~~$_i$ [*ke*[*mæn* ~~OP~~$_i$*/?u$_i$ ra did-æm*]]]]]]]]
girl-RES that Ali think do.PST.3SG that I he OMsee.PST-1SG
"The girl that Ali thought that I saw her … ."

(31) $[_{DP}[_{DP}$ *doxtær*$]_i$ $[_{D'}$ *-i* $[_{CP}$ OP_i [*ke* [*?æli mi-dan-est* [~~OP~~$_i$ [*ke æz ?u$_i$/-æʃ$_i$*
girl-RES that Ali IMP-know-PST.3SG that from her/CLT.3SG
pul qærz gereft-æm]]]]]]]
money borrow take.PST-1SG
"The girl that Ali knew I borrowed money from ((LIT. her)… … ."

(32) $[_{DP}[_{DP}$ *doxtær*$]_i$ $[_{D'}$ *-i* $[_{CP}$ OP_i [*ke* [*?æli mi-danest* [~~OP~~$_i$ [*ke pirahæn-e ?u/-æʃ$_i$*
girl-RES that Ali IMP-know.PST.3SG that dress-EZ her/CLT.3SG
abi ?æst]]]]]]]
blue be.PRS.3SG
"The girl that Ali knew her dress is blue … ."

Furthermore, In Persian RCs, the clitic pronouns are bound variables c-commanded by, and co-indexed with the OP in [Spec, CP]; that is to say, the Persian clitic pronouns can appear either as an RP, a variable bound by an operator in the sense of Sells (1984) and Shlonsky (1992), or as a pronoun c-commanded by an element in an argument position (Karimi, 2001, p. 21). Correspondingly, in sentences (30-32), the RPs are c-commanded by the null wh-OPs and the head of the highest clause in a successive cyclic fashion.

4. Conclusion

In the present research, we have offered an analysis of the derivation of restrictive relative clauses in Persian based on MP. By taking the RC as the complement of the head D, -i, first, we have proposed that such a derivation would be realized as either *ke*-movement (overt wh-movement) or null wh-OP movement. As explained, in rendering *ke*-movement approach, the constituent *ke* would play the role of an overt relative pronoun which has a [wh] feature and occupies the Spec-C. In this process of the relative clause CP derivation, the element *ke* is supposed to move from its base-generated position in relative clauses to Spec-C following copy and deletion operations. However, as we discussed, the *ke*-movement assumption is not applicable to derive all different types of relative clauses in Persian. Since there are relative clauses containing RPs in the form of independent and/or clitic pronouns functioning as counter-evidence in the formation of which no overt relative pronouns are involved. Similarly, the application of this approach gives rise

to the violation of some conditions such as the Complementizer Condition. So, as an alternative, the authors supposed that the null wh-OP movement approach would be an efficient way to derive all types of Persian relative clauses. Adopting the latter, the relativized head noun is considered base-generated outside a relative clause and is linked to the null wh-OP via the c-command and binding relations. Correspondingly, we accounted for the fact that the relative clause in Persian can be analyzed as a CP with *ke* as its complementizer (here, functioning as a relativizer), having an uninterpretable edge feature [EF], i.e., [wh] and [EPP] features, making it an active probe searching for a [wh] feature for feature valuation. Henceforth we have demonstrated that in the process of relativization in Persian, the element internal to the relative clause is considered as the null wh-OP, bearing the interpretable [wh] feature which makes it an active goal for the complementizer probe *ke*, carrying the unvalued [EF]. The [EF] of the complementizer/ relativizer *ke*, attracts the closest wh-OP to move into Spec-C to satisfy its [EPP] and [wh] features. Our work has led us to conclude that this movement allows the occurrence of a co-indexed small *pro* in the subject position, a null copy or an optional RP (in the form of a pronominal or a clitic) in the direct object position, and an obligatory RP in the indirect object position and the possessor in Ezafe construction in Persian RCs. The evidence from this study suggests that subject and non-subject relativized positions in Persian can also be subject to successive A-bar movement by successive cyclic movement of the null wh-OP through all intermediate Spec-v and Spec-C positions satisfying the [EF] and [wh] feature of *ke*, allowing a small *pro* in the subject extraction site, while letting a null copy, an optional or an obligatory RP to occur in the non-subject positions of relativization. In this regard, the RPs are c-commanded by the null wh-OPs and the head of the highest clause in a successive cyclic fashion. Once the null wh-OP moves, it is no longer in the domain of the lower *ke* making it free to be attracted by the relative clause *ke* to move into Spec-C in the higher clause satisfying the [EF] of the higher C.

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Appendix

List of Abbreviations

ACP	Attract Closest Principle
CLT	Clitic pronoun
EZ	Ezafe vowel/marker (-e)
HPSG	Head-driven Phrase Structure
HI	Hiatus
IM	Internal Merge
IMP	Imperfect (mi-)
INDEF	Indefinite marker
LIT	Literally
MP	Minimalist Program
NC	Null Copy
OM	Object marker (ra)
OP	Operator
PIC	Phase Impenetrability Condition
PL	Plural
PRES	Present
PST	Past
RC	Relative Clause
Res	Restrictive RC marker
RP	Resumptive pronoun
SG	Singular
UDC	Unbounded Dependency Construction