ISSN: 2278-4012, Volume:1, Issue:2, October 2012

The Difficulty Hierarchy in the Acquisition of English Relative Clauses by Persian Learners

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Abstract
Relative clauses, enabling writers to be more specific and making writing more sophisticated, are extremely useful in language teaching instruction. At the same time, they are also very confusing to many learners, scholars and teachers. The present study intended to investigate the Persian learners' underlying knowledge of 12 types of English relative clauses. It also attempted to see what factors constrain the learners' language acquisition process. Three predictor hypotheses, namely NAPH, PDH, and SOHH were used in this investigation. The data from 92 non-English major university students were elicited through two tasks of sentence combination test and grammaticality judgment test. The results indicate that the learners' acquisition of relative clauses is largely constrained by the universal markedness by NPAH, except GEN. The learners largely experience more difficulty in center-embedded relative clauses, which matches PDH. Largely, SOHH is a valid prediction of the learners' acquisition of relative clauses.

Key words: *NPAH, PDH, SOHH, relative clause*

Introduction

Relative clause (RC) is a noun-modifying construction resulting in the generation of a higher level noun phrase. Celce-Murcia & Larsen-Freeman (1999) define a RC as "a type of complex postnominal adjectival modifier that is used in both written and spoken English" (p. 571). They further explain "RCs give a means to encode complex adjectival modifiers that are easier to produce than complex attributive structures and that are less wordy than two independent clauses" (p. 571). Therefore, a RC is formed based on the relationship of more than one sentence, where the relationship is the result of "embedding" (p. 572) or the creation of one clause within another higher order clause.

Talking about the nature of RCs, there are two types of restrictive and non-restrictive ones. Although they seem to apparently look the same, they totally have different pragmatical properties. To take an example, it is said that '*whom I met on Saturday*' is the RC within the sentence *'the boy whom I met on Saturday had an accident'*. This RC delimits the referring noun '*the boy*'. If a speaker says '*the boy had an accident*', it doesn't provide sufficient information to

ISSN: 2278-4012, Volume:1, Issue:2, October 2012

a hearer to identify the boy. Therefore additional information using a relative pronoun '*whom I met on Saturday*' is added to '*the boy*' to indicate specifically which boy the speaker means. Moreover, in terms of the referential structure of NPs, the distinction of restrictive versus non-restrictive RCs is 'solely a reflection of referential quantification – ALL or SOME' (Lytle, 1974:41). However, non-restrictive RCs are not so prevalent as restrictive clauses are across languages. Some languages apparently have no non-restrictive RCs. In other languages they are syntactically quite distinct (e.g. English) and in some others restrictive and non-restrictive RCs are syntactically indistinguishable (e.g. Tamil) (Downing, 1978). Therefore, we just deal with restrictive relative clauses in this study.

RC has attracted the attention of a lot of second language acquisition researchers due to its complex structures (Gass & Selinker, 2001) as well as the learning problem to the language learners. RCs are a kind of complex syntactic structures in human languages. They are also difficult for learners to produce, comprehend and imitate.

In the present study, I tried to investigate the acquisition of English relative clauses by Persian learners who encounter many problems. It is worth mentioning that research studies investigating RCs in Iranian context are few (e.g., Abdolamanfi, 2010; Tavakolian, 1981), and the scope or coverage of the relative clause type is limited to SS, SO, OS, OO. Therefore, the current study further investigated all the 12 types of relative clauses, namely SS, OO, SO, OS, SIO, OIO, SGEN, OGEN, OOPREP, SOPREP, SOCOMP, and OCOMP. Thus, this study intended to see whether the three hypotheses mentioned above could predict Iranian EFL learners' acquisition of relative clauses.

The Three Predictor Hypotheses

In the acquisition of RCs, three hypotheses, namely, Accessibility Hierarchy Hypothesis (Keenan & Comrie, 1977), Perceptual Differential Hypotheses (Kuno, 1974), and SO Hierarchy Hypothesis (Hamilton, 1994) are usually tested which will be dealt with now.

Noun phrase accessibility hierarchy hypothesis

Within Greenberg's (1966) typological framework, Keenan and Comrie (1977), by examining some fifty languages in the world, generalized several linguistics universal constraints on relative clause formation. They have made several claims. First, it is generalized that various grammatical functions that noun phrases have in the RCs form a hierarchy, in which the subject, being the easiest to relativize, takes the highest position, and the object of comparative, being the most difficult to relativize, takes the lowest position. This hypothesis focuses on the grammatical function the relative pronoun has in the RCs only, not involving the head NP in the matrix sentence. Second, on the basis of this hierarchy, an implication is in order; that is, within the RCs, if a language can relativize a noun phrase in a given grammatical function in the hierarchy, then it can relativize a noun phrase in any grammatical function higher in the hierarchy, but not the opposite. Third, the claim that the presence of one property implies the presence of another, but not conversely, imposes a markedness relationship within the NPAH. In the case of this hypothesis, for example, a language which allows relativization of direct object is more marked than a language that allows relativization of subject only (Chou, 2006).

ISSN: 2278-4012, Volume:1, Issue:2, October 2012

Table 1: Noun Phrase Accessibility Hierarchy

RC type	Examples
SU=subject	The man who met the girl
DO=direct object	The man that the girl met
IO=indirect object	The man that the girl gave a book to
OPREP=object of preposition	The desk that the girl put a book on
Gen=genitive	The man whose book the girl took
OCOMP=object of comparative	The man that the girl is taller than

Perceptual difficulty hypothesis (PDH)

Perceptual difficulty hypothesis is based on the notion that the limitation of the human temporary memory affects processing of sentence (Kuno, 1974). Specifically, it is argued that the center-embedded syntactic construction is perceptually more difficult than the right- or left-embedded construction because the center-embedded clause interrupts the flow of the sentence and strains more on the short-term memory. Let's look at the examples in (1):

(1) a. Center embedding: The cheese that the rat [[that the cat chased] ate] was rotten.

b. Right embedding: The cat chases the rat [that ate the cheese [that was rotten]].

Although the order of difficulty was not intended by Kuno, according to this hypothesis, the difficulty order of the various RCs would be as in Table 2. It is to be noted that the first letter stands for the grammatical function of the noun phrase in the matrix sentence, and the rest stands for the grammatical function of the noun phrase in the relative clause (Chou, 2006).

Table 2: Order of difficulty predicted by PDH

OS, OO, OIO, OOPREP, OGEN, OOCOMP>SS, SO, SIO, SOPREP, SGEN, SOCMOP

SO hierarchy hypothesis (SOHH)

Hamilton (1994), motivated by NPAH, PDH and the notion of embeddedness (O'Grady, 1987), proposed the SO hierarchy on the basis of two main assumptions: (1) Center embedding of the RC sets up a processing discontinuity in the main clause; and (2) relativized subject sets up a single discontinuous S, whereas relativized object sets up two phrasal discontinuities within the relative clause (S and VP), as in the following example (2).

(2) a. Relativized subject: The man who$_i$ [$_s$ t_i saw us].

b. Relativized object: The man who$_i$ [$_s$ we [$_{vp}$ saw t_i].

(Hamilton, 1994)

Originally, this hierarchy is of three level, OS<OO/SS<SO (< means is implicated by) (Hamilton, 1994). By counting the depth of embedding of the gap (the counting method that was employed by O'Grady, 2003), the six-level hierarchy, which embraces the various RCs would be as follows:

ISSN: 2278-4012, Volume:1, Issue:2, October 2012

Table 3: Order of difficulty by SO Hierarchy Hypothesis

OS/OGE	OO/SS/SGEN	SO/OIO/OOPREP	SIO/SOPREP	OOCOMP	SOCOMP
1	2	3	4	5	6

RC Type	Example sentences	No. of discontinuity
SS	The man [who$_i$ [$_{IP}$ t$_i$ needed a job]] helped the woman	2
SO	The dog [that$_i$ [$_{IP}$ the woman [$_{vp}$ owns t$_i$]]] bit the cat	3
SIO	The woman [who$_i$ [$_{IP}$ Bill [$_{vp}$ passed a note [$_{pp}$ to t$_i$]]]] is a nurse	4
SOPREP	The candidate [who$_i$ [$_{IP}$ I [$_{vp}$ vote [$_{pp}$ for t$_i$]]]] didn't win the election	4
SGEN	The man [[whose$_i$ wallet]$_j$ [$_{IP}$ t$_j$ was stolen]] called the police	2
SOCOMP	The person [who$_i$ [$_{IP}$ John [$_{vp}$ is taller [$_{cp}$ than [$_{IP}$ t$_i$ [$_{vp}$ e]]]]]] is Charles	6
OS	Jerry like the teacher who$_i$ [$_{IP}$ t$_i$ explained the answers the class]	1
OO	A man bought the clock that$_i$ [$_{IP}$ the woman [$_{vp}$ wanted t$_i$]]	2
OIO	The teacher looked at the girl who$_i$ [$_{IP}$ I [$_{vp}$ explained the sentence [$_{pp}$ to t$_i$]]]	3
OOPREP	I saw the woman who$_i$ [$_{IP}$ I [$_{vp}$ went to elementary school [$_{pp}$ with t$_i$]]]	3
OGEN	I know the man [whose$_i$ bicycle]$_j$ [$_{IP}$ t$_j$ is new]	1
OOCOMP	I know the hotel which$_i$ [$_{IP}$ Hilton [$_{vp}$ is cheaper[$_{cp}$ than [$_{IP}$ t$_i$ [$_{vp}$ e]]]]]	5

In comparison, the three hypotheses which are based on different theoretical grounds and have disparate focus give rise to dissimilar, yet complementary order of difficulty of relative clause (Izumi, 2003). They can be summarized as in table 4.

Table 4: Summary of the three hypotheses (adapted from Chen, X.L., 2004)

Hypotheses	Theoretical basis	Focus	Order of difficulty
NPAH	Typological markedness	Relative clause	SU>DO>IO>OPREP>GEN>OCOMP
PDH	Short-term memory capacity	Matrix clause	OS/OO/OIO/OOPREP/OGEN/OOCOMP> SS/SO/SIO/SOPREP>SGEN>SOCOMP
SOHH	NPAH, PDH, & processing discontinuity	Matrix clause & relative clause	OS/OGEN>OO/SS/SGEN> SO/OIO/OOPREP>SIO/SOPREP> OOCOMP>SOCOMP

ISSN: 2278-4012, Volume:1, Issue:2, October 2012

Role of L1

The role of L1 in second language acquisition has long been debated. In reaction to the Contrastive Analysis (Lado, 1957; Ellis, 1996), some researchers downplayed the role of L1 in the process of L2 acquisition. Recent view holds that language transfer is not necessarily seen as associated with behaviorism, but it is rather a cognitive activity (Ellis, 1996).

Comparison and Contrast between Relative Clauses in English and Persian

Although Persian is a verb final language, it has certain head-initial constructions such as Noun-Possessor, Noun-Adjective and Noun-Relative Clause constructions. Relative clauses in Persian, as in English, are head-modifying constituents in the sense that they modify the NP they follow (Taghvaipour, 2005).

Persian RCs are unbounded dependency constructions containing gaps or resumptive pronouns, licensed by a higher structure in which the RC modifies a NP. In some positions only gaps are allowed and in some position only resumptive pronouns. There are also some positions where both gaps and resumptive pronouns are allowed. Additionally, all Persian RCs contain the invariant complementizer *ke.*

Persian is one of the languages in which there is a formal distinction between restrictive and non-restrictive RCs (Comrie, 1983). These two types of RCs are distinguished semantically. Restrictive RCs use presupposed information to identify the referent of a noun phrase, while the non-restrictive relative is a way of presenting new information on the basis of the assumption that the referent can already be identified.

(3) a. Restrictive RC:

Daneŝju-i [ke be ŝiraz ræfteh bud], bærayæm nameh-i neveŝt.
Student-RES COMP to Shiraz go-PP-3sg, for me letter-IND wrote-3sg
'The student who had gone to Shiraz wrote me a letter.'

b. Non-restrictive RC:

Ali, [ke be ŝiraz ræfteh bud], bærayæm nameh-i neveŝt.
Ali COMP to Shiraz go-PP-3sg for me letter-IND write-PAST-3sg
'Ali, who had gone to Shiraz, wrote me a letter.'

(Safavi, 1994)

There are two main features by which restrictive RCs are formally distinguished from the non-restrictive ones in Persian: (1) 'comma intonation', i.e., the obligatory pause the noun modified by a non-restrictive RC, and (2) the suffix *-i* on the noun modified by a restrictive RC.

As Karimi (2001) stated the Persian relative construction is different from its English counterpart in three ways. First, there is a relative particle *-i* attached to the head noun in Persian, as in (4). English lacks this particle.

ISSN: 2278-4012, Volume:1, Issue:2, October 2012

(4) Ketab-i ke mæn xær-id-æm
book-REL that I buy-PAST-1SG
'The book that I bought'.

Second, there is no relative pronoun in Persian. In fact, Persian relative clauses are more similar to English [*that* CP] constructions like (5), the English translation of (a): in Persian, the relative clause is always introduced by the invariant relative complementizer *ke*.

(5) The book that I bought.

Finally, Persian allows either a gap or a clitic pronoun, representing the missing head noun, within the CP.

Research Questions

The questions raised and looked for in the present study are as follows:

1. Does Iranian EFL learners' acquisition of English RCs follow the order of acquisition predicted by NPAH?
2. Are RCs that are center-embedded more difficult that right-embedded as is predicted by PDH in Iranian EFL learners' acquisition of English RCs?
3. What is the role of sentence discontinuity in the main and relative clauses, predicted by SO hierarchy, in Iranian EFL learner's acquisition of English RCs?

Method

Participants

The subjects were 92 Iranian EFL first-year university students whose majors were not English. Both male and female participated in this study. They roughly had the same level of proficiency based on the achievement test given to them as they were passing a prerequisite course. Adult learners were chosen since RC is a complex construction that generally appears late in learners' language development.

In accordance with the previous studies (e.g., Gass, 1980; Eckman, Bell, and Nelson, 1988; Izumi, 2003), and due to the time pressure, a quantitative design was used for the study. In this study, a questionnaire consisting of two tests was designed. In order not to have the limitation of the previous studies (Izumi, 2003), 12 types of are tested in this study. The type of genitive that is restricted to the genitive that functions a subject is also tested in this study.

Instruments

In this study, two kinds of elicitation tasks, sentence combination and grammaticality judgment, are used in order to adequately describe second language learner's interlanguage, both the actual performance of the learners and their intuitions about the target language (Schachter, Tyson, & Diffley, 1976). The test items that were used in these tasks are adapted from Azar (1999) and Celce-Murcia and Larsen-Freeman (1999).

ISSN: 2278-4012, Volume:1, Issue:2, October 2012

Sentence Combination Test

This test contained 12 items in which each item tapped into each types of relative clause tested in this study. The subjects were told to combine sentence (B) into sentence (A) and supply appropriate relative pronoun, such as who, which, whose, and that, or Ø. The distribution of the items was random.

Grammaticality Judgment Test

This test consisted of 24 items, each of which contained one of the 12 subtypes of relative clauses in which some were grammatically correct and some were grammatically incorrect. The items of the test were randomly distributed.

Procedure

The questionnaire was piloted by 20 English-major students. The piloted questionnaire was then administered to 92 non-English major students at Azad University of Sari, Iran in 2012. Since this study was intended to investigate the learners' underlying knowledge of RCs (implicit knowledge), time-pressured tests were given to draw the learners' implicit knowledge not their explicit one. So, 40 minute time was allotted to the learners.

Results

The accuracy order of the RCs

Analysis of Sentence Combination Test

Table 5 and figure 1 present the total correct responses and the percentage for the 12 types of RCs. As the table 5 and the figure 1 show, the highest scores were obtained for SU, followed by GEN, DO, IO, OPREP, and OCOMP. Except GEN, the order generally matches the universal markedness as predicted by NPAH. This is in conformity with the research prediction made earlier in this study. In term of the matrix positions, the score obtained for the matrix object position is higher than the subject position: 35.9% vs. 19.3%. This does match the prediction by PDH, and also the research hypothesis. As for the difficulty order obtained for each different type of RCs, it is OS > OGEN > OO > SS > OIO > SGEN > OOPREP > SO > SIO > SOPREP > OOCOMP > SOCOMP. This order is generally as predicted by SOHH, except OIO, which gets a lightly higher score than SGEN. To restate, the order for SOHH is OS/OGEN > OO/SS/SGEN > OOPREP/SO/OIO > SOPREP/SIO > OOCOMP > SOCMOP. Total mean accuracy rate for this test is 27.6%.

Table 5: Total correct responses on sentence combination test by relative clause type and matrix position type

Relative clause type							
Matrix Position	SU	DO	IO	OPREP	GEN	OCOMP	Total

ISSN: 2278-4012, Volume:1, Issue:2, October 2012

Subject	(32) 34.8%	(15) 16.3%	(14) 15.2%	(14) 15.2%	(20) 21.7%	(12) 13%	(17.8) 19.3%
Object	(49) 53.3%	(42) 45.7%	(30) 32.6%	(18) 19.6%	(46) 50%	(13) 14.1%	(33) 35.9%
Total	(40.5) 44%	(28.5) 31%	(22) 24%	(16) 17.4%	(33) 35.9%	(12.5) 13.6%	

Mean: 25.4 (27.6%), N= 92

Figure 1: Percentage of correct response on sentence combination test by relative clause type and matrix position type

Analysis of Grammaticality Judgment Test

The table 6 displays an unusual pattern that does not show in sentence combining test. The accuracy order being obtained is IO>OCOMP>GEN>DO>OPREP>SU (>means is more accurate than), which entirely violates the universal markedness as predicted by NPAH. The NPAH predicted that the least marked one of SU is otherwise the most marked in the grammaticality judgment test. Considering the matrix position, the results are as predicted by the PDH: the RCs in the matrix object position have a higher accuracy rate than in the matrix subject position. But, in terms of the order of the 12 types of relative clauses, it is OOCOMP > SIO > OIO / OOPREP / SGEN > OIO > OGEN > SO > OOCOMP > SS > OS > OOSOPREP which do not match SOHH.

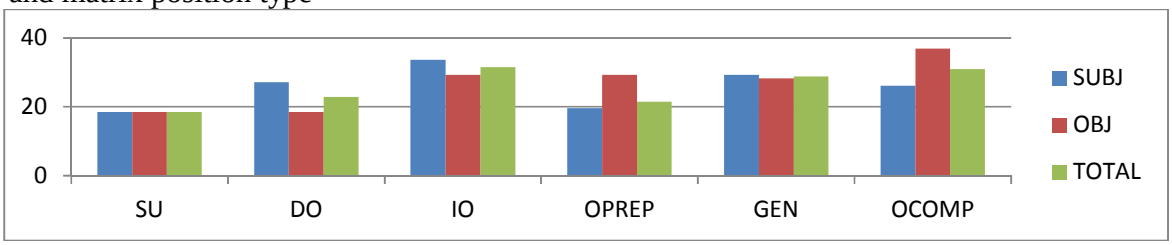
Table 6: Total correct responses on grammaticality judgment test by relative clause type and Matrix position type

	Relative clause type						
Matrix Position	SU	DO	IO	OPREP	GEN	OCOMP	Total
Subject	17 18.5%	25 27.2%	31 33.7%	16 19.6%	27 29.3%	23 26.1%	23.2 25.2%
Object	17 18.5%	17 18.5%	27 29.3%	27 29.3%	26 28.3%	34 37%	24.6 26.7%
Total	17 18.5%	21 22.8%	29 31.5%	21.5 23.4%	26.5 28.8%	28.5 31%	

Mean: 23.9 (26%), N= 92

ISSN: 2278-4012, Volume:1, Issue:2, October 2012

Figure 2: Percentage of correct responses on grammaticality judgment test by relative clause type and matrix position type



Conclusion

As the result showed, the participants' acquisition of English relative clauses was generally constrained by the universal principle, except in the grammaticality judgment test, which turned out to be unusual in the result. In this test, the learners seemed to experience great difficulty in the typological least marked position, SU, rather than the typological marked ones, which totally defied universal hierarchy by NPAH. Nor was there any support for PDH and SOHH. Iranian students' incorrect use of relative pronoun is due to the complex structure of English relative clause and the distinctions between English and Persian relative pronoun. The result also implies that NPAH is a universal phenomenon, but there is still some influence from L1 interference in the acquisition process. This finding will give some hints to language teaching and will make language teaching and learning more effective. Moreover, it can inform curriculum design, teaching methodology, and evaluation.

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