The comprehension of Relative Clauses within Movement-based hypothesis in L1 and L2: the Case of Tati and English

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Introduction

Research studying sentence processing aims to explore how human parsers analyze the structure of sentences and get their meaning as a whole (Wingfield & Titone, 1998). Over the past thirty years, researchers in psycholinguistics have endeavored to elucidate the types of information used during sentence processing and to account for processing difficulties (Reali & Christiansen, 2006). One grammatical structure that provides considerable insight into language processing difficulty is the relative clause (RC). Interest in RCs is motivated by their universality in languages of the world, unique syntactic properties, and frequency in everyday use of language (Izumi, 2003).

Statement of the Problem and Significance of the Study

RCs present a major obstacle for both first and second language learners. The chief source of difficulty is the fact that there are many RC types these learners must deal with. Another source of difficulty lies in the relative pronoun itself. English relative pronoun, for instance, has a variety of forms (who, whom, which, etc.) and is omissible in many cases. Thus, the acquisition of sentences with embedded clauses is a major achievement in the course of language development.

The present study seeks to explore the processing difficulty of RCs for EFL and Tati as a first language learners. An attempt is made to test the predictions of different hypotheses regarding the processing difficulty of different types of relative clauses.

Tati enjoys certain properties which make it lend well to a study on the processing of its RCs. In the first place, although Tati is a verb-last language, it is post-nominal, with SOV word order in declarative sentences and subordinate clauses. Although Tati and English RCs share post-nominality, they are different in many ways. Of particular interest is the fact that while English doesn't allow pronominal copies (i.e., a personal or clitic pronoun), in Tati they are grammatical. In other words, personal pronouns are used resumptively in certain RCs in Tati. More interestingly, subject RCs require a gap, object RCs optionally permit a gap, and genitive RCs never permit a gap.

The present study has the potential to advance the current knowledge and understanding of the L1 acquisition of the RCs and to contribute to the RC processing debate. Although a large body of work on the acquisition of head-initial RCs have found that children perform better on subject RCs than on object ones, the source of this asymmetry is unclear in head final languages. In this sense, this study is a significant contribution as it provides data from a non-European language that exhibits a unique typology (verb-last but post-nominal) and has rarely been studied.

The findings of the present study will have important pedagogical implications. If the results of the study show that both Tati native speakers and EFL learners process RCs in the same sequence supporting the belief that there is a hierarchy of difficulty of the linguistic structures of the various RC types in English as well as Tati, this would mean, among other things, that textbook writers and teachers must take this hierarchy of difficulty into account in preparing teaching materials for both Tati as a first language and Tati speaking EFL learners.

Research Questions
The present study will be an attempt to answer the following research questions:

1. Do Tati speaking children comprehend Tati subject and object RCs differently?

2. What is the effect of resumption on comprehending Tati RCs?
3. Do Tati speakers learning English comprehend English subject and object RCs differently?

Processing Relative Clauses

As an important part of sentence processing research, the acquisition of RCs has been studied extensively over the past thirty years. Many of these studies are related to children's comprehension of RCs in English (e.g., Brown 1971; Sheldon, 1974; Smith, 1974; Tavakolian, 1981; de Villiers et al., 1979; Goodluck & Tavakolian, 1982; Hamburger & Crain, 1982; Keenan & Hawkins, 1987; Kidd & Bavin, 2002). Numerous studies both in L1 and L2 show that subject RCs are easier to process than object RCs (e.g., King & Just, 1991; Miller & Isard, 1964; Traxler et al., 2002; Traxler, et al., 2005) and this finding has been obtained by researchers using various methodologies (e.g., reading time: King and Just 1991; eye-tracking: Traxler et al., 2002). In addition, subject RC preference has been replicated for various languages (Dutch: Frazier 1987; German: Schriefers et al., 1995; Hebrew: Arnon 2005).

One aspect of sentences with RCs is that the RC can interrupt the main clause. Chomsky (1965) and Miller and Isard (1964) discussing how adult speakers process RCs have argued that sentences with embedded RCs are more demanding to process than sentences with right branching RCs because they contain an interruption of the main clause. Bar-Hillel et al. (1967) note that an internal clause contains a dependence to the left and to the right of the nested element and this dependence creates a load on memory. As Miller and Isard (1964) note, embedding places heavier demands on the temporary storage capacity of any device that attempts to cope with it. According to Sheldon (1974), if self-embedding is demanding for adults, it is natural to expect the same or greater difficulty for children as children's linguistic abilities rely on their short term memory which is more limited compared to adults' memory.

Classification of Relative Clauses

The two factors which have been employed for the categorization of relative clauses into various types are focus and embeddedness. Embeddedness refers to the position of the RC in the sentence which changes according to the constituent in the main clause it modifies. In a subject embedded sentence, the RC occurs after the subject of the main clause and is often referred to as center-embedded because it breaks up the main clause subject and the verb phrase. In an object embedded sentence, the RC occurs after the object of the main clause and is often referred to as right-branching.

Focus refers to the role the head noun plays in the RC. For example, in "the student that sees the teacher", the head noun (the student) has the role of subject and in "the student that the teacher sees", the head noun (the student) has the role of object. On the basis of focus and embeddedness, Celce-Murcia and Larsen-Freeman (1983) describe four basic types of RCs as follows:

(1) OS   The head noun is the object of the main clause and the relative pronoun is the

subject of the relative clause.

e.g., I know the man [who speaks English]

(2) OO   The head noun is the object of the main clause and the relative pronoun is the

object of the relative clause.

e.g., I know the man [whom you saw]

(3) SS   The head noun is the subject of the main clause and the relative pronoun is the

subject of the relative clause.

e.g., The man [who speaks English] is my teacher

(4)   SO   The head noun is the subject of the main clause and the relative pronoun is the

object of the relative clause.

e.g., The man [who(m) you met] is my teacher

Hypotheses Concerning the Acquisition and Processing of Relative Clauses

Concerning the prediction of accuracy, acquisition, and processing difficulty orders of different types of RCs, different hypotheses have been proposed which will be briefly elaborated below:

1. Accessibility Hierarchy (AH). Keenan and Comrie (1977) suggest the following universal order of easiest to most difficult relative clauses:

SU > DO > IO > PREP > GEN > COMP

SU (Subject)	the boy that came
DO (Direct Object)	the boy that John hit
IO (Indirect Object)	the boy that he spoke to
PREP (Object of Preposition)	the boy that he sat near
GEN (Genitive)	the boy whose father died
COMP (Object of Comparative)	the boy that he is taller than

The AH predicts that RCs formed on the subject are easiest to acquire, while those on the object of a comparative are the most difficult. According to Ozeki and Shirai (2007), regarding postnominal RC languages (English, Swedish, Italian, French), the Noun Phrase Accessibility Hierarchy (NPAH) has been consistently supported, whereas results from studies on prenominal RC languages (Japanese, Korean, Chinese) have been inconsistent. This means that we still do not know whether the NPAH can universally predict the acquisition difficulty of RCs.

1. Perceptual Difficulty. Kuno (1975) argued that sentences with center embedding are perceptually more difficult to process than sentences with right branching relative clauses. He therefore argued that OS and OO should be easier than SS and SO.

Word Order Difference Hypothesis (WDH)

According to Word Order Difference Hypothesis which is based on the differences in canonical versus non-canonical word order (MacDonald & Christiansen, 2002; Bever, 1970), the ease in processing subject RCs, in English for example, can be accounted for by the compliance of the word order in subject RCs with the canonical word order in English (SVO) which is highly frequent, thus aiding the processing of subject RCs due to the processor's experience with simple sentences. As Love and Swinney (1998) note, an important issue in linguistics is the distinction between the canonical word order (e.g., Subject-Verb-Object in English; Subject-Object-Verb in Persian) and non-canonical structures that may exist in a certain language. Some researchers have claimed that second language learners (e.g., Cook, 1994), like first language learners (Slobin & Bever 1982), are attracted to the canonical order of the language they are learning.

Though the canonical order for a specific language is subject to disagreement, there is general agreement that some languages have different canonical orders. Some languages are strongly ordered

and others are not, which means that the strength of canonicity varies in different languages depending on the degree to which word scrambling is allowed in language use (Travis, 1991). An important question which is raised here is related to the existence of a universal canonical order to grammatical relationships or the strength of such relationships and their specificity to a certain language. Love and Swinney (1998) have taken up this question and conducted a rigorous study which is briefly discussed in the following paragraphs.

As an important structural property, discontinuous dependencies are common in languages of the world. It is a common property of any language that two related elements are often separated in the surface strcture of a sentence. In English filler-gap dependencies, gaps are created in the surface structure of a sentence by moving a word to a different position. In object RCs in English which is a canonical SVO language, the object precedes the verb, which is a non-canonical order. In (6), the object of the verb likes is the boy which has been moved to a position before the verb. Such movement from the underlying canonical position leaves an empty trace marking the underlying unmarked canonical position (i.e., the gap) from which it has been moved (Chomsky, 1995).

5.   The boyi the girl likes ti visits the teacher.

2.   Models of language processing have long aimed both at discovering how the comprehension device links the moved elements of these discontinuous dependencies to enable the human processor to interpret the input and at examining the role of the underlying canonical order of a certain language in the processes activated during such linkage. Thus, a fundamental question is whether the processing system needs to recover the moved element as soon as it finds a gap or whether such linkages are arranged only after the initial processing of the entire sentence (Love & Swinney, 1998). Regarding the fact that different languages have different underlying or canonical orders (e.g., German (SOV), Hebrew (VSO), Japanese (SOV)), according to Love and Swinney (1998), one can use on-line techniques to determine whether the movement of elements from their underlying unmarked canonical language-specific positions has a role in processing.

Love and Swinney (1996) studied whether the process of automatic reactivation of filler-antecedents found in gaps involved a search for an antecedent through a deep or superficial representation of the sentence and found that gaps are automatically linked to their structurally defined antecedents, a finding observed in many other studies (Osterhout & Swinney, 1993; Zurif, Swinney, Prather, & Love, 1994). Thus, one can argue that the comprehension device tends to have the direct object activated immediately following the verb during ongoing processing, which is in line with a view of comprehension as driven by the need for recovering the canonical SVO order online during comprehension (Love & Swinney, 1998).

Minimal Chain Principle (MCP)

De Vincenzi's (1991) Minimal Chain Principle (MCP) is based on the principle of economy in parsing. De Vincenzi (1991) argues that human parsers postulate necessary chain members at the earliest point which is grammatically possible but they don't postulate any potentially unnecessary chain members. According to Carlos and Farina (2003), MCP is reminiscent of Rosenbaum's (1967) Minimal Distance Principle, and especially of Chomsky´s (1995) Minimal Link Condition. According to MCP, the parser assumes a filler-gap dependency only as a last resort. Since shorter dependencies are computationally less demanding and the filler-gap distance in subject RCs is shorter, subject RCs are predicted to be easier than object RCs. As can be seen in (a), the trace of the head noun in a subject RC is adjacent to the pronoun, while in an object RC it is separated by the embedded subject and an embedded verb, as shown in (b).

(a) Subject RC [DP The babyi] [CP that [IP [DPti] sees the cat]]]

(b) Object RC [DPThe babyi] [CP that [IP [DP the cat] [VP sees [DPti]]]]

Since longer dependencies are computationally more demanding and parsing strategies are based on economy (Arosio et al., 2005), the observation is that subject RCs are easier than object RCs because the filler gap distance in the subjet RC is shorter than that in the object RC. According to the Minimal Chain Principle, the parser prefers shorter chains. In an object RC like the baby that the cat sees, when the parser sees the complementizer that, it postulates an RC and assumes the shortest chain by putting a trace immediately after the complementizer, that is, in subject position. After that, the parser sees the cat that disconfirms this analysis. It deletes the trace and after it has seen the verb it inserts a trace in object position and assumes a new chain.

Arosio et al. (2005) studied the processing of subject and object RCs by preschool- and school-aged Italian-speaking children through different grammatical devices and indicated that subject RCs are easier than object RCs, a result which is in keeping with the predictions of MCP, DLT (Gibson 1998), and Competition Model (Bates & MacWhinney, 1987). A study by Utzeri (2007) also shows that Italian children process subject RCs with more ease in comparison with object RCs, a finding which can be accounted for by De Vincenzi's (1991) MCP.

Movement-based Approach (MBA)

The movement-based approach, which has been proposed to explain the performance of normal children (Friedmann & Novogrodsky, 2004), children with SLI (van Der Lely, 1994) and aphasic patients (Grodzinsky, 2000), claims that children do not possess the ability to process movement that is necessary to create the link between the clausal head and its role in the clause. As a result, children can not determine the thematic role of the clausal head and assign it an agent role. In the case of subject RCs like *the boy that kisses the girl*, this strategy results in the correct interpretation because the head is given the correct thematic role, but for object RCs like *the boy that the girl kisses*, the strategy results in chance performance because both the head *the boy* and *the girl* now have an agent role. The existence of two competing agents leads the child to guess.

Researchers (e.g., Arnon, 2005), however, have questioned the movement-based account because, for one thing, children have been found to comprehend wh-questions at an age when they do not comprehend object RCs (Seidl, Hollich & Jusczyk, 2003) indicating that not all structures that involve movement are difficult for children. The second finding used as an argument against the movement-based account is adults' difficulty with object RCs (Traxler, et al., 2002) which undermines the claim that the difficulty is just developmental. Also some methodological flaws have been observed in studies which have gathered support for the movement-based account (see Friedmann & Novogrodsky, 2004). Thus, the evidence of adult difficulty with object RCs, the lack of child difficulty with WH-questions, and methodological shortcomings in previous studies question the validity of the movement-based account.

Arnon (2005) who tested young Hebrew-speakers' comprehension of Hebrew resumptive RCs lacking movement argues for a processing-oriented account to explain children's difficulty with object RCs. The results of her study showed that although resumptive RCs do not involve movement, they are still difficult. Challenging developmental hypotheses that attribute children's difficulty in comprehending object RCs to the use of non-adult processing strategies (e.g., Tavakolian, 1981) or to an inability to process structures involving movement, Arnon (2005) argues that although children's difficulty is in part developmental, it partly results from the extra processing load imposed by object RCs on both children and adults. Arnon's (2005) analysis of children's errors suggests that there are two types of difficulty with object RCs: mastering the modifying nature of the clause and assigning the thematic roles correctly.

Tati

According to Yar Shater (1969), Tati (Tātī) refers to a group of Iranian dialects spoken in northwestern Persia, in areas where the common vernacular is Azarbaijani Turkish. Listed under definitely endangered languages by UNESCO Atlas of the World's Languages in Danger (see:

http://www.unesco.org/culture/languages-atlas/index.phpn), Tati dialects constitute one of the most important branches of Northwestern Iranian (Yar Shater, 1969) and their remarkable grammatical features and archaisms in morphology, syntax, and vocabulary invite special attention.

Stilo (1981) has used Tati to refer to a group of languages of Northwest Iranian origin, generally classified as a subgroup of the Central Plateau Languages, spoken in an area that extends from the Irano-Soviet border in Azerbaijan, south to the Saveh area and possibly beyond. Stilo has divided Tati-type languages into ten groups on the basis of geographic proximity and linguistic and ethnic criteria (see the map):
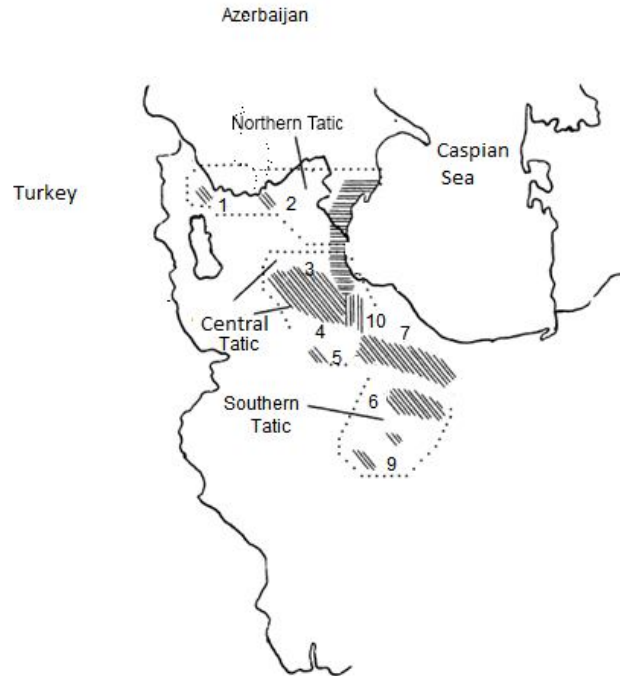
Group One: dialect of Harzan, dialects of Dizmar District
Group Two: Northern Talyshi, Central Talyshi, Southern Talyshi
Group Three: dialects of Khalkhal District in Eastern Azerbaijan Province
Group Four: dialects of the Taromil type including dialects of Upper Tarom of Zanjan Province and dialects of Kalas and Kabate of Rudbar District of Gilan Province
Group Five: dialects of the Khoin area of Zanjan Province
Group Six: Southern Tati of Professor Yar-Shater's (1969) classification including dialects spoken in Takestan, Esfarvarin, Shal, Xiāraj, Xoznin, Ebrāhim-ābādi, Sagz-ābād, Dānesfān, and Eshtehard
Group Seven: Dialects north and northeast of Qazvin including Qazvin Kuhpaye area, Maraghei dialects of the upper Rudbar area, and Alamut area
Group Eight: Dialects of Alvir and Vidar, near Saveh
Group Nine: Dialects of Vafs and environs, in the Arak District of the Central Province
Group Ten: Rudbar dialects of the Sefid Rud Valley which are considered transitional to Caspian languages

Yar Shater (1969) categorized Southern Tati group into nine different dialects:

1. Tākestāni
2. Esfarvarini
3. Shali

4. Xiāraji
5. Xoznini
6. Ebrāhim-ābādi
7. Sagz-ābādi
8. Dānesfāni
9. Eshtehardi

The name of each dialect corresponds to the main village or town in which the dialect is spoken. All these towns and villages are situated to the southwest and south of Qazvin. The towns and villages from north to south are:

1.   Tākestān, locally and formerly Siādohon, 36 kms. southwest of Qazvin at the conjunction of the Tehran-Zanjān and Tehran-Hamadān roads, in the Dodānga rural district, Ziā-ābād county. Population around 100,000. A thriving town growing vines and cereals with a raisin factory.
2.   Esfarvarin, locally *Esvavarin, Esbarin, Esparin*, 26 kms. northwest of Buyin, in the Ramand rural district, Buyin county. Population 3,870.
3.   Shāl, locally *Čāl*, 30 kms. to the northwest of Buyin, in the Ramand rural district. Population 5,546.
4.   Xiāraj, locally *Xiāra*, 27 kms. west and slightly north of Buyin, in the Rāmand rural district. Population 1,395. A village of declining fortunes, important at one time.
5.   Xoznin, 24 kms. northwest of Buyin, in the Rāmand rural district. Population 1,015.
6.   Ebrāhim-ābād, locally *Bermowā*, 18 kms. northwest of Buyin, in the Zahrā rural district, Buyin county. Population 1,235. The village has an exceptionally high level of literacy.
7.   Sagz-ābāad, locally *Seyzowa, Sazjowa*, 12 kms. northwest of Buyin, in the Zahrā rural district. Population 1,942.
8.   Dānesfān, locally *Dānesbon*, 30 kms. west and slightly north of Buyin, in the Rāmand rural district. Population 2,409. This village, together with Xoznin, was the worst hit in the area by the earthquake of the summer of 1962. Both have now been reconstructed.
9.   Eshtehārd, locally *Eštrārda* (fem.), 78 kms. west of Karaj, in the Mahābād rural district, Karaj county. Population 4,542.

Tati Relative Clauses

Tati is a null-subject verb-final language with SOV word order in declarative sentences and subordinate clauses. Tati RCs are typically introduced by the complementizer ke. Ungrammatical example (1) illustrates that Persian does not allow ke-less RCs. This is unlike English, for example, which allows that-less relatives.

(1) *A magave gorbeye myshureye mariza.

     'The cow that is washing the cat is sick.'

The complementizer ke in Tati is invariant. That is, it does not agree with the function of the noun phrase it follows. Ke is used regardless of the animacy, gender, function, or number of the noun modified by the RC. Examples in (2) illustrate invariant Ke when the modified noun is in subject and object positions or in genitive case.

(2)

a. (relativized element in subject position)

… A mardak ke ishtish vind….

'…the man who saw you…'

b. (relativized element in object position)

… A mardak ke ta vindy…..

'…the man whom you saw…'

c. (relativized element in genitive case)

… A mardak ke sheyesh zarde …

…the man whose shirt is yellow …

Personal pronouns can be used resumptively in Tati. That is, a personal pronoun is used where a gap might be expected. Example (3b) represents a Tati RC in which the pronoun *jay/jave*, 'she/he', is used resumptively.

(3a)   A mardak [ke ____ azire vindy] aqay-e Bayat ve.

'The man whom you met yesterday was Mr. Bayat.'

(3b)   A mardak [ke jay azire vind] aqay-e Bayat ve.

'The man whom you met (*him) yesterday was Mr. Bayat.'

English Relative Clause

Relative clause says something about the intended referent of the head noun, attributing to it the property of fitting into the event in a way that can be inferred by matching it to the under-represented element. In the following example, a particular man has the property of being the person who the addressee met in the event denoted by the relative clause (O'Grady, 2011, p. 15).

(1)English:

The man [that you met __]

(2) Persian

Mærdi	[Ke	ura	molagat	kærdid]
Man-RelMrkr	that	him	meet	AUX.PST.2SG

'The man that you met'

O'Grady (2011, p. 15) mentions three crucial properties for relative clauses.

1. They are instances of an event-denoting (sentential) category.

2. Some component of the event is under represented within the relative clause itself- it is entirely absent (there is a 'gap', as in English) or it is encoded as a resumptive pronoun, as in Persian.

3. That under-represented element picks up its interpretation from the nominal with which the relative clause is associated (e.g., man, the so-called 'head noun' in the examples above).

Comrie (2002) considered two characteristics for RCs. First, they are distinct construction types. Second, there is a clear syntactic link between the main clause and the RC. That is, the RC is analyzed syntactically as a clause modifying a NP in the main clause and also there is a notional head that plays the same syntactic role in both clauses. Diessel and Tomasello (2000) defined relative clause as a

subordinate clause that modifies a noun or noun phrase in an associated main clause. Relative clauses are classified based on two important features: One is the syntactic role of the main-clause element functioning as the head of the relative clause (i.e., the element that is modified by a relative clause, also called embeddedness). If the subject of the matrix clause is modified it is called *center-embedded*, while if the object of the matrix clause is modified it is called *right-branching*. The other feature is the syntactic role of the element that is gapped or relativized inside of the relative clause (also called the focus of the relative clause). Based on these two features, four types of relative clauses are usually classified: SS, SO, OS, and OO. They are identified by a two-letter acronym. The first letter describes the grammatical function of the head noun in the matrix clause and the second letter describes the grammatical function of the gap in the relative clause. An example of each type is given in 3 to 6.

(3) SS RC: The pig [that kicks the cow] pushes the horse.
(4) SO RC: The rabbit [that the cat watches] kicks the bird.
(5) OS RC: The girl kicks the cat [that pushes the rabbit].
(6) OO RC: The pig kicks the cat [that the dog pushes].

In SS relatives, the main-clause subject is modified by a relative clause in which the subject is relativized. In SO relatives, the main-clause subject is modified by a relative clause in which the object is relativized. In OS relatives, the main-clause object is modified by a relative clause in which the subject is relativized. In OO relatives, the main-clause object is modified by a relative clause in which the object is relativized. SS and OS type are referred to as *subject-extracted relatives* and OO and SO types as *object-extracted relatives*. SS and SO are referred to as *subject-modifying relatives* and OO and OS as *object-modifying relatives*.

Resumption

Resumption relates to the involvement of a pronominal pronoun that appears in a position from which movement is proposed to occur (McKee & McDaniel, 2001, p. 114). Sells (1984) referred to two types of resumptives (a) true resumptive and (b) intrusive resumptives. True resumptive also known as grammatical resumptive is used as a grammatical option and are licensed by the grammar. Intrusive resumptives are used to facilitate sentence processing burden of complex sentences. Rahmany, Marefat, and Kidd (2013) found the facilitative role of resumptives in their study of Persian-speaking children's comprehension of object relatives. They reported that children's comprehension of object relatives containing a resumptive pronoun were improved than comprehension of gapped objects and subject relatives. They asserted that resumptive pronouns provide local cues to thematic role assignments and facilitate processing of syntactically complex sentences.

Languages are different in terms of licensing of resumptive pronouns (RP, henceforth) and within one language, RPs is allowed in some contexts but not in others. In English, the distribution of resumptive pronoun is very limited and is influenced by extractability (i.e., whether a trace is acceptable). Resumptive pronouns and traces are in complementary distribution. That is, where the trace is allowed, the resumptive pronoun is not as in (41) and where the trace cannot appear, the resumptive pronoun is allowed as in (42). Examples are taken from (McKee & McDaniel, 2001).

(41)   a. That's the girl that I like t.
          * b. That's the girl that I like her.
(42) * a. That's the girl that I don't know what t did.
          b. That's the girl that I don't know what she did.

McKee and McDaniel (2001) used three experiments to investigate the child grammar difference from the adult grammar with respect to resumptive pronouns. Using two elicitation production tests and one grammatical judgment tasks, they found that adults' responses of grammatically judgment were influenced by extractability and the children and adults' production data had a similar pattern and resumptive pronouns occurred in unextractable positions.

In Persian, resumptive pronouns have various distributions. A gap is obligatory in subject RC as in (43a) and resumptive pronoun can never appear.

(43a) Persian subject RC

Mærd-i	ke	___	pirahæn-o	pušid
Man-RM	that	___	shirt-OM	wore-3sg

'The man who wore a shirt'

(43b) unacceptable Persian subject RC

*mærd-i	ke	u	pirahæn-o	pušid
Man-RM	that	he	shirt-OM	wore-3sg

* 'The man who he wore a shirt'

In object RC either a gap or resumptive pronoun may appear as illustrated in (44a) and (44b).

(44a) Persian object RC

Zæn-i	[ke	[mærd	negā (h)-š	mikon-e]]
Woman-RM	[that	[man	look-Clitic	do.pres-3SG]]

'The woman that the man is looking at'

(44b) Persian object RC

Zæn-i	[ke	[mærd	negāh	mikon-e]]
Woman-rm	[that	[man	look __	do-pres-3SG]]

'The woman that the man is looking at'

A genitive RC never permits a gap (i.e., it always requires a resumptive pronoun). Example (45a) illustrates a Persian genitive RC.

(45a) Persian genitive RC

Mærd-i	ke	pirahæn-æš	zærd	æst
Man-RM	that	shirt-Clitic	yellow	is

'The man whose shirt is yellow'

(45b) unacceptable Persian genitive RC

*mærd-i	ke	pirahæn __	zærd	æst
Man-RM	that	shirt __	yellow	is

'The man whose shirt is yellow.'

Method

Participants

Two groups of language learners participated in this study. Group 1 was made up of 53 Tati-speaking children aged 5 to 8. These 53 female and male children were selected randomly from the elementary schools in Takestan, Iran. Group 2 were ESL (English as a Second Language) learners, composed of 30 participants. They took a selection picture test in order to test that they comprehend sentences.

Materials

The participants in the study performed a picture verification task which consisted of 20 items, with 5 items representing each of the three RC types (subject, object, and genitive) and 5 fillers. On each page of the test booklet, there were two pictures from among which the participants had to choose the one which matched the item the research assistant read to them. All the verbs used in the RCs were in the present tense. All the noun phrases were animate to control for possible animacy effects, as animacy of the subject or object of a clause has been shown to affect comprehension to a great extent (e.g. **Gibson**, Desmet, **Grodner**, **Watson** & Ko, 2005). Animacy of both subjects and objects and, therefore, their reversibility, enabled logical assignment of agent and theme roles to both NPs in each construction and so prevented the participants from using the semantic cue without using their grammatical knowledge.

Since Tati verbs agree in person and number with the subject in each clause, the two NPs had the same person and number to factor out possible cues from verb agreement. The picture verification task was used because it tests the comprehension of language structures before they emerge in production and it is not affected by surface mistakes like slips of tongue (Özçelik, 2006). Despite the criticisms leveled at the use of picture-cued comprehension tasks by researchers like de Villiers et al. (1979) on the grounds of their under-representation of children's possible processing errors, this procedure has been preferred to act-out procedure especially since the standard act-out task is said to violate certain pragmatic and semantic aspects of language use (see Hamburger & Crain, 1982).

Below, a sample item with the two accompanied pictures is presented, representing *'the dog that is pulling the elephant'*

Figure 1. A sample item representing *'the dog that is pulling the elephant'*.

The fillers used in the study were noun phrases consisting of a noun and an adjective. The sample below represents a filler from the test booklet illustrating *the sitting man.*

Procedure
Participants were shown a booklet each page of which contained two pictures. They were asked to listen to the item the research assistant (she had enough experience of working with children, and trained by the researcher to implement the experiment as designed) read to them and refer to the picture described. Each participant was tested individually on the 20 items in a single session. Each item was read to the participant while two pictures were presented only one of which matched the item. The child heard the item and was asked to point to the picture that matched it. At the child's request only, the research assistant repeated the item. The research assistant then wrote down on the answer sheet the number (first or second) of the picture the child selected. Prior to the experiment, three sample training items were presented to make sure the participants know the procedure. At the training stage, if a child made a mistake, the research assistant helped him/her by pointing to the target picture and explaining the difference among the three pictures. She would not start the task unless she made sure the participants knew how to proceed. However, during the actual test phase no feedback was given. No time limit was set. The entire procedure lasted about 18 minutes for each child.

Data Analysis
Data obtained from the picture selection task was analyzed using Repeated-measures ANOVA. Repeated-measures ANOVA is used when all members of a random sample are measured under a number of different conditions.

Results and discussion

Experiment 1

Investigation of the First Research Question

The first research question of this study sought to find out the order of comprehending subjective and objective and genitive RCs in Tati. In order to answer this research question a repeated measures one-way ANOVA was used. Table 4.1 contains the results of the descriptive statistics. Table 4.1 shows that the highest mean score on comprehending RCs in Tati is for the genitive RCs ($\bar{x}$ = .87, *SD* = .17), followed by the subject RCs' ($\bar{x}$= .78, *SD* = .19), and then the object RCs ($\bar{x}$ = .69, *SD* = .26). In fact, there is a gradual increase in the mean scores form object to genitive sentences. Besides, the normality of the three sets of scores is approved since the ratios of skewdness and kurtosis (see Table 4.2) over their respective standard errors are not beyond the ranges of +/- 1.96 (Table 4.1).

Table 4.1

Descriptive Statistics for Comprehending Subjective, Objective, and Genitive RCs in Tati

Sentence Type	*N*	Mean	*SD*	Skewness	Kurtosis
Subject	53	.784	.194	-.871	.492
Object	53	.693	.260	-.566	-.517
Possessive	53	.873	.177	-1.526	1.372

Figure 4.1, Figure 4.2, and Figure 4.3 below illustrates RC comprehension scores in Tati and their frequencies on normal curves.

Figure 4.1 below displays that for comprehending subject RCs in Tati, the minimum score is 0.20 obtained by one student, and the maximum score is 1.00 recorded by fourteen students. Also, as it is obvious from Figure 4.1, the scores have formed a curve normal shape implying normal distribution.
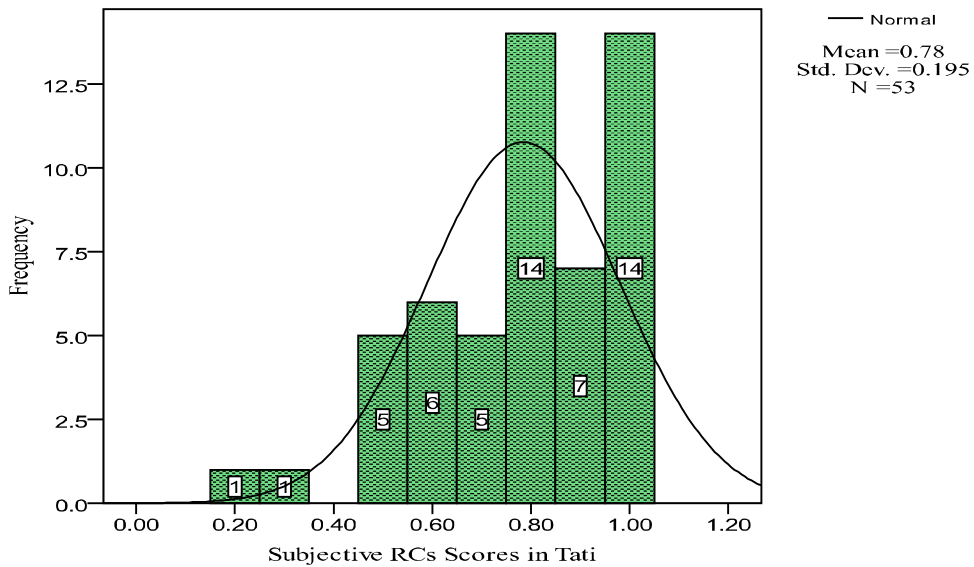

Figure 4.1 Scores on comprehending subject RCs in Tati

As can be seen from Figure 4.2 clearly, for comprehending objective RCs in Tati, the minimum score is .13 acquired by two students, and the maximum score is 1.00 obtained by twelve students. In addition, the scores have made a curve normal shape signifying that the scores are normally distributed.
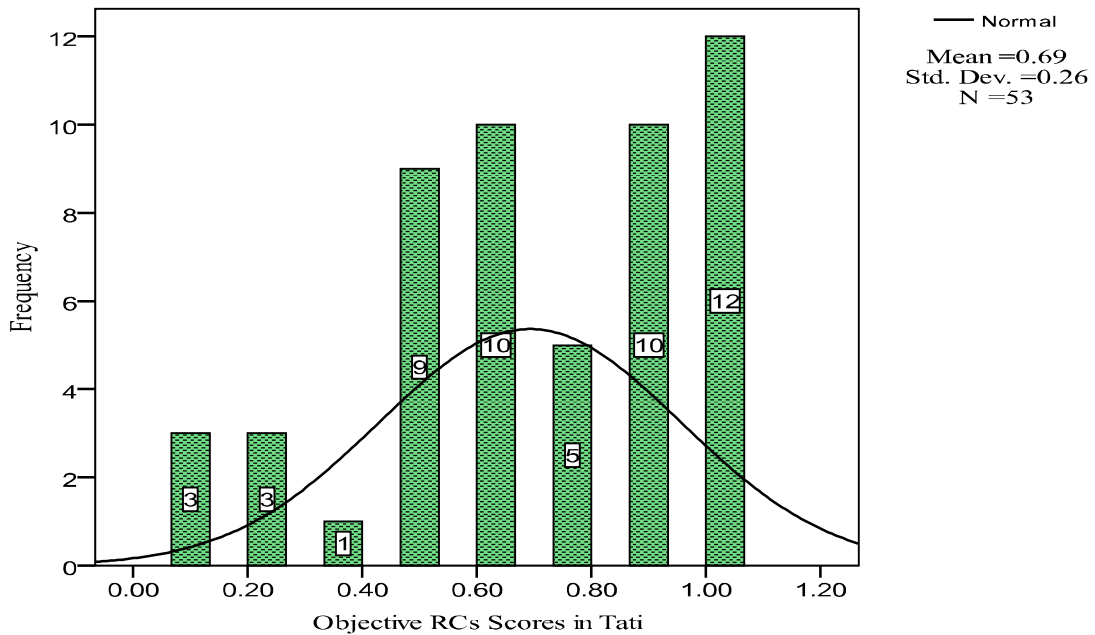

Figure 4.2 Scores on comprehending object RCs in Tati

Figure 4.3 below shows that for comprehending genitive RCs in Tati, the minimum score is 0.40 obtained by three students, and the maximum score is 1.00 recorded by 26 students. Besides, as Figure 4.3 demonstrates, the scores have formed a curve normal shape denoting normal distribution of the scores.
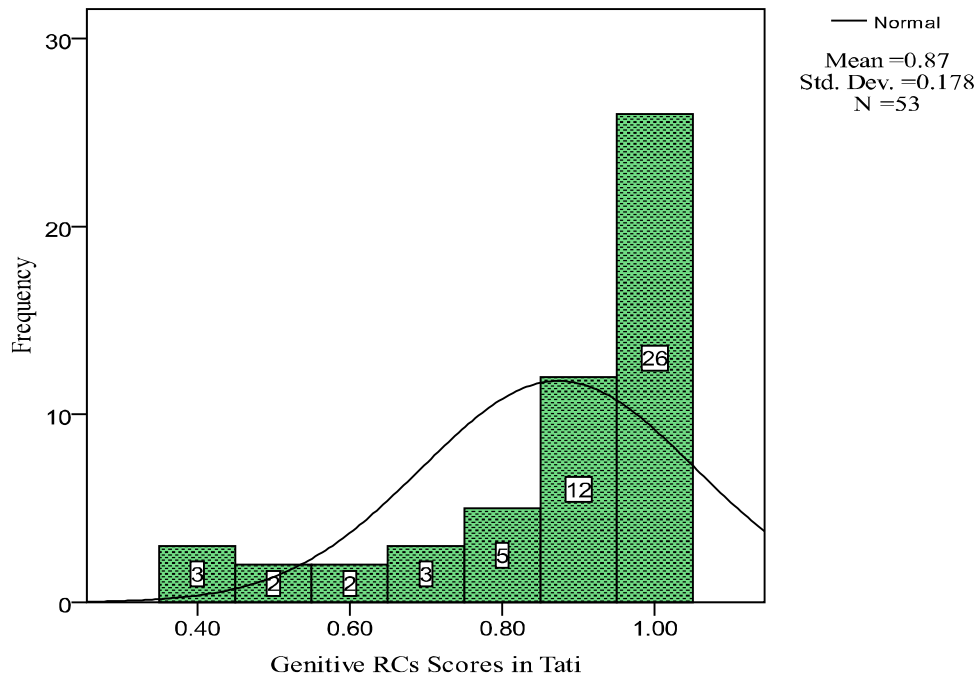

Figure 4.3 Scores on comprehending genitive RCs in Tati

RM one-way ANOVA was used to see whether these mean differences are statistically significant; the results of which are presented in Table 4.2.

Table 4.2

Test of Within Subjects Effects RM ANOVA for Comprehending Sentence Types

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Task goal orientation	Sphericity Assumed	.862	2	.431	21.764	.000	.295
	Greenhouse-Geisser	.862	1.722	.501	21.764	.000	.295
	Huynh-Feldt	.862	1.776	.486	21.764	.000	.295
	Lower-bound	.862	1.000	.862	21.764	.000	.295

Based on Table 4.2., Greenhouse-Geisser correction indicates that the mean score differences for comprehending sentence types are statistically significant ($F = 21.76$, $P < .01$). Therefore we can claim

that word order affects comprehending subject and object and genitive RCs in Tati. Multivariate tests for the RM ANOVA (Table 4.3) further confirm this result.

Table 4.3

Multivariate Tests[b] RM ANOVA for Comprehending Sentence Type

Effect		Value	F	Hypothesis *df*	Error *df*	Sig.	Partial Eta Squared
Factor	Pillai's Trace	.483	23.840[a]	2.000	51.000	.000	.483
	Wilks' Lambda	.517	23.840[a]	2.000	51.000	.000	.483
	Hotelling's Trace	.935	23.840[a]	2.000	51.000	.000	.483
	Roy's Largest Root	.935	23.840[a]	2.000	51.000	.000	.483

a. Exact statistic

b. Design: Intercept

 Within Subjects Design: factor1

As it can be seen in Table 4.3 above (multivariate tests), the partial eta square index is .48, which shows that 48 percent of the variance in the comprehending scores is due to word order effect; this is quite a large effect size (.483 > .138). The attained results for Wilks' Lambda ($F_{(2, 51)} = 23.48$, $P < .01$) indicates that word order (i.e., subjective, objective, and genitive RCs in Tati influences comprehending significantly. In order to locate the meaningful differences, pairwise comparisons were made (Table 4.4).

Table 4.4
Pairwise comparison for the RM ANOVA on task goal orientation

(I) Factor	(J) Factor	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
					Lower Bound	Lower Bound
Subjective	Objective	.092[*]	.031	.015	.014	.169
	Possessive	-.089[*]	.022	.000	-.142	-.035
Objective	Possessive	-.180[*]	.028	.000	-.250	-.111

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

a. Adjustment for multiple comparisons: Bonferroni.

Table 4.4 above shows that all the mean differences on the three sentence types differ significantly from one another ($P = .000$, $P < .05$). Figure 4.4 shows the differences between mean scores across the three measurement times.
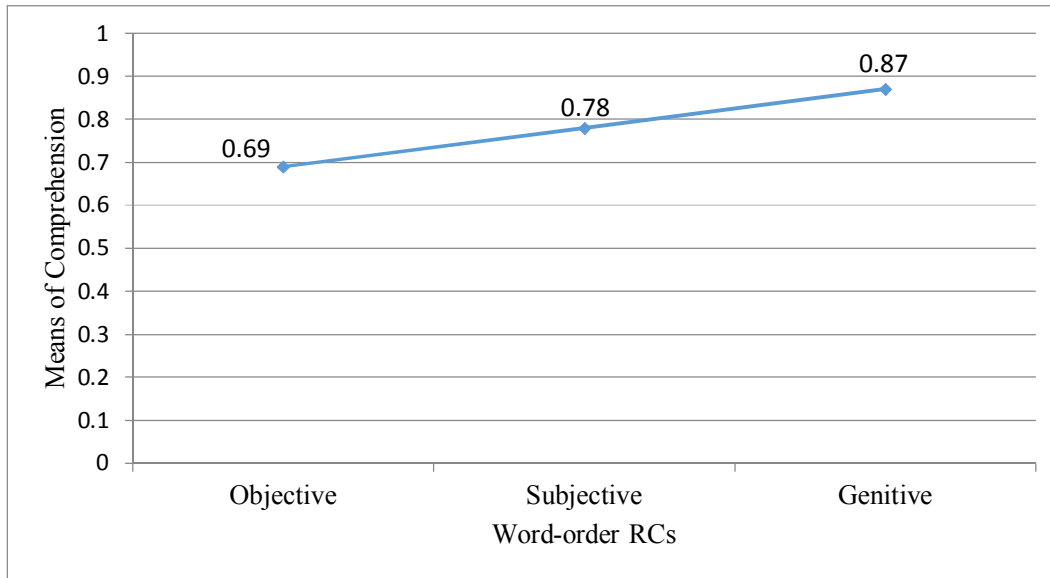

Figure 4.4 L1 Comprehending means on the three sentence types

Experiment 2
Investigation of the First Research Question

The first question was aimed to see if RC type has an effect on the comprehension of RCs in L2. In order to test this null hypothesis, the L2 comprehension of the RCs on two RC types was assessed. Table 4.5 presents the related descriptive statistics.
Table 4.5
Descriptive Statistics for L2 Comprehension of RCs in Two RC Types

	Age (in month)	Mean	Std. Deviation	N
	179-186	.7500	.12910	4
	187-194	.3250	.45735	4
Subject RC	195-202	.6750	.15000	4
	203-210	.4750	.27538	4
	Total	.5563	.30761	16
	179-186	.7750	.22174	4
	187-194	.6750	.28723	4
Object RC	195-202	.7000	.18257	4
	203-210	.5750	.17078	4
	Total	.6812	.21046	16

Results are reported in terms of mean scores of subject and object comprehension among different age groups. As is obvious in the table, the average mean score of object RCs is significantly higher than subject RCs (.68 versus .55). Figure 4.5 below displays a graphical illustration of the result.
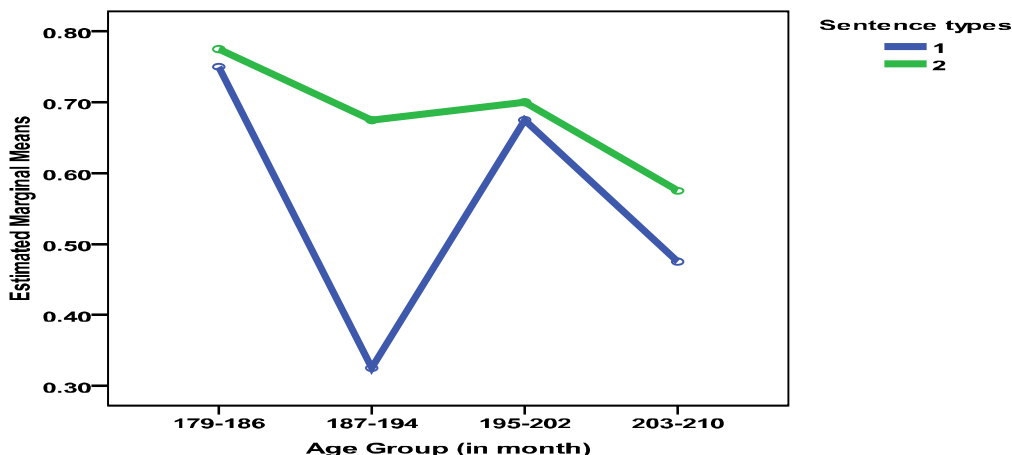

Figure 4.5 Mean average scores of the comprehension of subject and object RCs in L2

To see whether the differences were significant or not, a repeated measure ANOVA was run with sentence type as a within-subject factor and age as a between-subject factor.

Table 4.6
ANOVA Results for L2 Comprehension of RCs on Two Sentence Types

Effect	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Sentence type	.660	6.186	1.000	12.00	.027	.340
Sentence type * Age	.630	2.351	3.000	12.00	.124	.370

ANOVA detected a statistically significant difference ($F_{(1, 12)}$ = 6.18, p = .02, Effect size = .34); it can be concluded that there is a statistically significant difference between the mean scores of subject and object RCs; accordingly, it is fair to argue that RC type has an effect on the comprehension of RCs in L2.

The interaction effect of the within and between-subject factors, i.e. sentence type-age effect was not significant ($F_{(3, 12)}$ = 2.35. p = .12, Effect size = .37).

Discussion

This chapter presented the results of this study which was an attempt to investigate the potential effect of RC type and resumption on the comprehension of RCs in both first and second language. Sentence type was a within-subject factor and age was a between-subject factor. To obtain the goal, the researcher attempted to answer the research questions.

The first step to answer the research questions was to calculate the descriptive statistics for the related conditions, and the second step was to submit the data to repeated measures ANOVAs to determine whether there were significant differences between the conditions specified for each null hypothesis. In this section, the results are discussed.

The effect of RC type

Numerous studies on different languages of the world have shown that every language has a canonical word order and some derived word orders (WOs). Canonical word order in English is SVO and OVS is a derived WO. The order of words in RCs in English is different, if the focus of sentence is on subject it is a subject–focused RCs like this example *what grabbed the bear was the elephant* and if

the focus is on object it is an object-focused RC like *what the cow washed was the dog* (Kaiser, 2010). The results of both Experiment 1 and Experiment 2 show that there is a significant effect (p>.05) of RC type on the comprehension of RCs in both L1 and L2. The results of Experiment 2 reject the finding of Hsiao and Gibson (2003) that in English object-extracted RCs are more complex than subject-extracted ones as well as the finding of Erdozia et al (2002) which argues that displaced elements increase syntactic complexity and non-canonical word order is syntactically more complex.

The result is related to the fact that canonical word order is easier to process and comprehend than non-canonical word order, since L2 learners learn canonical word order (SVO) before derived word orders (like OVS). So the findings of Greenberg (1966), Slobin and Bever (1982), Urosevic et al (1986), Erdozia et al's (2002), Hsiao and Gibson's (2003) and Rahmany et al (2011) based on the fact that subject-object word order is easier and faster to process than object-subject in fact is not supported. Friedmann (2007) also found that object RCs are more complex than subject ones for individuals with agrammatical aphasia in Hebrew and Rahmany et al (2011) concluded that the comprehension of subject relatives is not by chance while it is opposite about object relatives.

In Basque in which canonical WO is SOV Erdozi et al (2002) concluded that non-canonical word orders are syntactically more complex than canonical ones. In Chinese subject-extracted RCs are more complex than object-extracted ones but in English it is vice versa (Hsiao & Gibson, 2003). Rahmany et al.'s (2011) results also showed that the process of object and genitive RCs were more difficult for children in comparison to subject RCs, and hence suggested that the children have particular difficulty processing sentences with non-canonical word order. The results of tests Experiment 2 show that word order does not have any effect on the comprehension of RCs in L2. As it is obvious these results are not in agreement with Rahmany et al (2011) which may be due to the specific structure of RCs or the tests applied.

The current study investigated the acquisition of RCs in Tati-speaking children aged 5 – 8-years. Tati has typological features that make it an interesting data point in the context of debates about RC complexity. Like Indo-European languages such as English and German, it has post nominal RCs; however, like East Asian languages such as Japanese and Korean, it is a pro-drop language and has SOV word order. These two broad language categories have been argued to differ in experiments investigating RC complexity, making Tati a potentially interesting middle ground.

Generally speaking, performance on subject RC types was low. The performance on object and genitive RCs was better that that on subject RCs showing the facilitative effect of resumptive pronouns. Thus these structures are not demanding for children at this young age showing that their processing capacity is not limited. This finding is inconsistent with Friedmann and Novogrodsky's (2004) findings who report that very young children fail to comprehend RCs. But the results of the study confirm the previously documented asymmetry in comprehension of RCs. The prediction that Tati-speaking children would experience more difficulty processing object RCs than subject RCs was not supported by the results, which is not in keeping with the predictions of the NPAH and the findings of a number of studies on a variety of languages (Frauenfelder et al., 1980; Gibson, 1998; Gibson & Schutze, 1999; Schriefers et al., 1995). But contrary to the predictions of the NPAH, genitive RCs were less difficult than object RCs. It seems that resumption as a pronominal copy aids processing of this type of sentence making them less difficult than object RCs, which are, in principle, higher in the NPAH. A number of studies have shown that children tend to rely on resumption in their early RCs. Resumptive strategies are often the first strategy acquired by children (Labelle, 1990 on Canadian French, Goodluck & Stojanovic, 1996, on Serbocroatian). Thus, it can be claimed that resumption is a coping strategy that compensates for processing complexity.

Thus, the first major finding was that the children found genitive RCs easiest to interpret. This prediction is inconsistent with all of the theoretical approaches to structural complexity, which for Tati differ only in their predictions about the complexity of subject RCs relative to object and genitive RCs. Secondly, the children differed in their performance on object and genitive RCs. This is consistent with the predictions of both the SDH and the LDH, which both predict that the genitive RCs should have been easier to process than the children's performance indicated. In fact, the children performed consistently high on the genitive RCs. This result is inconsistent with the WDH hypothesis, which

argues that difficulty is associated with the fact that both object and genitive RCs contain non-canonical word order.

There are some broad theoretical issues that are raised by these results. The first concerns the question as to why non-canonical word order causes less difficulty for the children with the presence of resumptive pronouns for Tati-speaking children's interpretation of object and genitive RCs. Numerous studies of language acquisition have shown that children experience difficulty with non-canonical structures (e.g., Bates & MacWhinney, 1982, 1989; Bever, 1970; Slobin & Bever, 1982). Such results show that children's processing systems, like those of adults, are attuned to the frequency distributions of their input language (Townsend & Bever, 2001). That is, upon segmenting a series of nouns and verbs in the speech stream, children prefer to assign grammatical roles according to how they are most frequently assigned given their history speaking and listening to the language.

What the results also suggest, however, is that children prefer attending to local cues to interpretation (i.e., resumptive pronouns). This is consistent with arguments in the literature that suggest that local cues are privileged in acquisition (e.g., Bowerman, 1985; Slobin, 1982), but inconsistent with results reported by Dittmar, Abbot-Smith, Lieven, and Tomasello (2008), who showed German-speaking children prefer to use word order to interpret sentences over and above case marking until the age of 7-years. Since nouns in German are marked for case on determiners, the cue is local and, in general, fairly reliable. Despite this fact, children do not use it as a cue until they are school-age. Why might this be the case? It so happens that although case marking is a reliable cue to interpretation, the case system is rather difficult for children to acquire because it is fairly complex, owing to the fact that there are three noun genders and different case paradigms for each. Therefore, although reliable the cue of case marking is not as readily available to children as is word order. As such, since word order is both reliable and available to children, they appear to rely on the cue that will provide them with the best chance at pursuing correct interpretation, or, in other words, they pursue the strategy that has been most successful for them in the past. Coming back to the Tati data, it is likely that the weakness of canonical word order as a cue to interpretation, and potentially the high perceivability or availability of resumptive pronouns result in young children choosing resumption as their preferred comprehension strategy.

The results from the present study suggest that Tati does pattern like Indo-European languages in that subject RCs were not found to be easier to process than object RCs. Recent findings in English and German have shown that object RCs are not always more difficult than subject RCs. In particular, Brandt et al. (2009) and Kidd et al. (2007) have shown the subject-object asymmetry disappears when children are tested on object RCs that conform to the discourse conditions that generally lead to object RC use: when they contain (i) an inanimate head noun, and (ii) a pronominal RC subject, as in *This is the pen that I used yesterday* (cf. *This is the boy the girl chased yesterday*). Since we only tested animate NPs in this study, a similar effect is yet to be established in Persian. Furthermore, it is unclear at what age Persian-speaking children become sensitive to the role of the resumptive pronoun in both object and genitive RCs. This would be valuable information to know, because resumptive pronouns can potentially alleviate the complexity associated with non-canonical word order in these two structures. These issues await further research.

Clitics are always used in genitive constructions and this invariant clitic gives the children a processing advantage, because it has high reliability as a cue to interpretation. In contrast, in the object RCs, which optionally allow a clitic, there is lower reliability, because the clitic is not always there. A second explanation for why the clitic in the genitive RCs is more helpful than in object RCs may be because the clitic is placed on different syntactic categories in the sentence. A noun modifying clitic, as is the case with Tati genitive RCs, makes thematic role assignment easier because it reduces ambiguity. However, a verbal clitic, as is used in Persian object RCs, does not reduce ambiguity of thematic role assignment completely since comprehension is about correctly assigning thematic roles (Caplan & Waters, 1999). Thus, as the results show, it does make sense to attempt to explain the results in purely structural terms, because such explanations can never adequately capture the processing complexity of object and genitive RCs for Tati-speaking children. Instead, the result must be explained by appeals to other aspects of language that are crucial to parsing - frequency of structure, the reliability of the cue to interpretation, and the semantic complexity associated with genitive constructions.

Thus, as the NP in object and genitive RCs carries a resumptive clitic pronoun attached to it referring to the NP in the matrix subject position and with regard to the finding that pronominal copies aid processing of genitive RCs by making them more salient and easier (see Gass, 1979; Goodluck & Stojanovic, 1996; Labelle, 1990), it seems that canonicity together with the shorter distance between the head and the gap do not override the effect of resumption.

Thus, based on the findings of the present study, the findings as to the processing of Tati RC structures by children can be summarized as follows: 1) Subject focus RCs are not easier than object focus RCs. 2) Word order canonicity makes no difference in processing RCs.

The job of resumptive elements is as a prop which creates an opportunity to reactivate the mind referent in children's working memory which may not be possible in the absence of them (Mckee & Mc Daniel, 2001). And as it was noted in the previous discussion it is reported that in a number of languages of the world resumption is used in syntactic contexts by children where they are not permitted or needed (Arnon, 2010; Labelle, 1990). The results indicate that resumption has a significant effect on the comprehension of RCs in Tati as L1. These results are not in agreement with Friedmann's (2007) finding that the presence of RPs does not improve the comprehension of object RCs in Hebrew whereas they strenthen the conclusion of Rahmany et al. (2014) based on facilitating effect of resumption on both comprehension and production of RCs in Persian.

RPs are not allowed in English (Sells, 1987) while they are significantly employed in Tati and Persian RCs (Rahmany et al, 2011). The results of Experiment 1 show that resumption facilitates the comprehension of object and genitive RCs.

The facilitating effect of RPs has also been reported by other researchers like Arnon (2010) and Labell (1990). Rahmany et al (2014) also claims RPs are facilitating in comprehension of RCs in Persian. The results of this experiment supports the claims of previous studies based on the facilitating effect of RPs on comprehension like McKee and McDaniel (2001) which exemplifies the role of resumptive elements as a prop which causes the reactivation of the head referent in the process of comprehension. The claim of Rahmany et al (2014) based on facilitating effect of RPs in Persian is supported in comprehension task. But Friedmann's (2007) argument that the presence of RPs improves the comprehension of object RCs in Hebrew by individuals with agrammatic aphasia is not attested since RPs facilitate the comprehension of RCs.

Conclusion

Word Order

The current study revealed that word order is an effective factor in the comprehension in L2 learning. The results of this study in comprehension do not support the foregoing studies in English or other languages like Urosevice et al (1986), Erdozia et al (2002), Rahmany et al (2011) which claimed the process of SO order is simpler than OS it may be for the specific structure of RCs. For example this is a simple RC: *the bear that the cow pulled it* (O RC) or *the cow that pulled the bear* (S RC). As it is obvious RC structure is a strange structure that L2 learners never learn at school and when it is read out they think it is a WH question and as they have learned in grammatical rules that canonical structure of English sentences is SVO they think *the bear* is the O that has come after the V and this correct so they understand it easily and complexity of sentence does not hinder its processing although it decreases the speed of processing while in the simple RC the process of S RCs is certainly easier than O RCs because the first one is closer to canonical WO. On the other hand, the results indicated that word order has a significant effect (p>.05) on the comprehension of RCs in Tati as L1. The processing of S RCs is not easier than that of O ones and this rejects Rahmany et al (2011). The reason for this conclusion is that although Tati regular WO is SOV but changing the place of sentence components significantly affects comprehension it is the children's native language and obviously mother language is significantly different from foreign language (see Birdsong, 2006).

Resumption

Resumption is known as a facilitating factor in production and comprehension in different languages even where they are not allowed or needed like in English (Labelle, 1990; Mc Kee & Mc Daniel, 2001; Arnon, 2010). What is concluded from the results of chapter 4 is that resumptive pronouns are facilitating in comprehension. The result shows that RP significantly facilitates the comprehension of O RCs. This result is the sign of working memory capacity (Chomsky, 1965, see also Birdsong, 2006) of L2 learners because O RCs with RP are longer than O ones so that learners eliminate *it* or the last phrase. In comprehension (picture selection task) the results indicated that RPs are facilitating and can be said that they acted as a prop (McKee & McDaniel, 2001) so that the comprehension of Object RCs was better that that of Subject RCs. In comprehension RP helps the learner to have enough time to reactivate the mind referent which may not be otherwise recoverable from working memory (Mc Kee & Mc Daniel, 2001). Thus in Tati tests resumption has a significant effect on comprehension. Some previous studies like Labelle (1990), Rahmany et al (2011) and Hofmeister (2013) concluded that gap strategy appears before resumption strategy. So this study is not in agreement with the studies conducted on comprehension.

An important point needs to be made about the structure of RCs in Tati and specifically whether they are truly RCs or not. It should be noted that a similar argument has been made for Turkish (Özçelik, 2006) as well as for Japanese and Korean (see Murasugi, 2000). As Özçelik (2006) asserts, contrary to what linguists such as Comrie (1989) and Kornfilt (2000) have claimed, Turkish RCs are not really RCs, and that they do not have any gaps or movement, but they are just nominalized constructions. It has also been suggested that gaps in Japanese RCs are not represented by a trace left by movement but rather by the null pronoun *pro* (Murasugi, 2000).

As for Persian, Karimi (2001) believes that the RC is base-generated in its surface position. According her, RCs are basically considered as DPs with embedded CPs. The head noun is in the Spec of DP and the embedded CP combines with D as its adjunct. Karimi (2001) posits a *pro* inside DP in the empty position of object which is coindexed with the head noun and clitic. The following is the schematic representation of a Persian object RC (zæni ke mærd negaš mikone; the woman that the man is looking at). Perhaps a similar argument can be made about Tati.

There is another more recent analysis which is largely due to Kayne's (1994) monograph on anti-symmetry of syntax and involves base generation of the noun inside the RC and its subsequent movement to the head noun position of DP, leaving trace in that position. In other words, the head of RCs has undergone movement from its base position inside the CP to the Spec-DP. In this study, Kayne's (1994) analysis of RCs will be adopted.

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